

**COLLABORATIVE PROCUREMENT AND ~~UK~~ PRIVATE-SECTOR  
HOUSEBUILDING AND REFURBISHMENT WORKS: A PILOT STUDY  
INVESTIGATION OF THE UK**

**ABSTRACT**

**Purpose**

Framed as a pilot study, ~~the purpose of this paper is to study the research sought~~ the perceived appropriateness of an existing collaborative procurement procedures (CPP) framework from the ~~UK~~ housebuilder's perspective; seeking to improve its utility and stimulate further exploration.

**Design/methodology/approach**

Informed by an existing CPP framework, and conducted by a ~~UK-~~based development professional, four in-depth semi-structured interviews were undertaken with senior housebuilding practitioners from London and surrounding counties. A qualitative analysis was then conducted for this sociological study.

**Findings**

Perceived appropriateness of the framework was high; ~~however~~, a number of procedural improvements were identified, along with limitations. Future studies are recommended including the influence upon project performance of ground-worker integration at the design stage.

**Research limitations/implications**

Limited to four interviews from one regional area, the study is an initial insight into the appropriateness of an existing CPP framework. Insights into why CP uptake is marginal within housebuilding were also gained. The research purpose was achieved but by offering a self-reflection upon practice (*vis-à-vis* wider generalisations) the findings provide a springboard for further studies.

**Practical implications**

The research identifies with current practice, industry perceptions, and paths towards improving the utility of the CPP framework.

**Social implications**

This study offers insights into the perceptions of private housebuilding practitioners of their own practices and the factors they find challenging within the social constructs of their industry.

**Originality/value**

This research constitutes one of the first studies in the UK to examine the CPP framework from the perspective of the private housebuilder and ~~is~~ undertaken with the express purpose of furthering that framework's utility.

## **TYPE**

Research paper

## **KEYWORDS**

UK construction, collaborative procurement, collaborative planning, housebuilding, lean construction and partnering.

## **INTRODUCTION**

Collaborative procurement (CP otherwise known as ‘partnering’) in the United Kingdom’s (UK) construction industry has been the topic of much research and discussion since the publication of the highly influential Latham (1994) and Egan (1998) reports. Both authors found the construction industry’s performance lagged behind other industries and considered partnering as a means of addressing the issue – particularly, regarding supply-chain coordination. Farmer (2016) derived similar conclusions, whilst arguably the advent of Brexit has further increased the need to improve low performance levels, triggered by concerns over procurement of both appropriate materials and the correct mix of skilled and unskilled labour (DBW, 2018; Samp, 2016; Barker, 2016; Mohamed *et al.*, 2017). The importance of an integrated and industrialised supply chain to achieve comprehensive energy efficient or low carbon retrofits is also highlighted by Brown (2018) and Kesidou and Sorrel (2018). Yet despite Eriksson and Westerberg (2011) developing a conceptual framework of collaborative procurement procedures for the industry as early as 2011 (hereafter referred to as the ‘CPP Framework’), uptake has been limited, and positive change slow to materialise. For the purposes of this paper, the definition of CP put forth by Construction Excellence is used, where CP is an:

*“...effective way for more than one client, contractor, consultant or supplier to join together to procure works, services, materials or goods, share expertise, promote efficiency and deliver value for money savings in the delivery of a project (or series of projects) or service objectives.”*

(Construction Excellence 2009, p.6)

In addition, it is suggested that CP reduces duplicated effort, leads to a more collaborative working culture, and so can bring about otherwise unrelated benefits such as improved timelines (Construction Excellence, 2009). However, the purpose of the pilot study presented in this paper is not to argue the merits or otherwise of CP, or this particular CPP framework specifically, but rather to tentatively identify the perceived appropriateness of an existing CPP framework from the housebuilder’s perspective. Then, guided by the identified

perception(s), seek means to improve that framework's utility and stimulate further research of a more action-oriented form: i.e. research that may effect change.

Research conducted to date on CP (and lean production more broadly), tends to focus upon the public, industrial and large commercial construction sectors (Akintoye *et al.*, 2000; Black *et al.*, 2000; Bresnen and Marshall, 2000; Forgues and Koskela, 2009). Despite general research being offered in very specific sectors of low-carbon and or renovation and retrofit industry (such as: Mlecnik *et al.*, 2018; Kesidou and Sorrell, 2018). there is limited research into the uptake or appropriateness of CP principles to the UK's private housebuilding sector. Even the otherwise broadly inclusive study by Daniel *et al.* (2017) offers no particular insights on this area. Such is lamentable given that both Egan (1998) and Farmer (2016) highlight the importance of private housebuilding/house refurbishment (herein referred to as house building) sector to the UK's economy. Against this contextual backdrop, this present study sought to conduct pilot work to generate suggestions to improve the utility of CP in the private housebuilding sector and stimulate further research investigation.

Prior to implementing this study, several practical and theoretical considerations were required, i.e. identification of the client and use of a pertinent theoretical framework. Any attempt to evaluate the appropriateness of CP to the UK private housebuilding sector must resolve the question of who or what defines and delineates a 'client'. There are two reasons for this: first, consensus within academic discourse is that for change to occur, it must be client led. Hence, any evaluation of appropriateness must acknowledge this perspective; second, the typical client, end purchaser or 'consumer' of private homes in the UK has little knowledge of, and even less influence upon, the procurement process - unlike their counterparts in the public and large commercial sectors who tend to be architects, developers, government bodies or corporations. Because of this ambiguity, this study adopts Farmer's (2016, p.12) proposition that the housebuilder represents the client. Farmer's (*ibid*) proposal, and this study's acceptance of it, is based on the fact that the housebuilder initiates and controls the procurement process and provides the focal point of all contracts prior to on selling or leasing the final product (*ibid*). In accepting Farmer's proposition, the UK private housebuilder is seen as best positioned to implement CP; being both driver and key beneficiary.

Evaluating the appropriateness of a set of principles to a context requires a framework: a 'system' or 'model' that may be tested for fit. For this research, Eriksson and Westerberg's (2011) CPP Framework is adopted because it is generally considered theoretical best-

practice and contains basic tenets that may be easily evaluated contextually. The framework follows Eriksson's earlier definition of partnering, being: "...a cooperative governance form that is based on core and optional cooperative procurement procedures to such an extent that cooperation-based competition is facilitated" (Eriksson, 2010, p.905).

Using the CPP Framework as a model of form and practice, this research sought to determine the appropriateness of CP as conceptualised by Eriksson and Westerberg (2011) from a UK private housebuilder's perspective. In pursuing this aim, the research holds two objectives: firstly, to reframe and overlay Eriksson and Westerberg's (2011) CPP Framework upon the Classic UK Private Housebuilding structure; and secondly, determine, from the Classic UK Private Housebuilder's perspective, the appropriateness of CP as so conceptualised.

### **THE RELEVANCE OF CP TO THE UK PRIVATE-SECTOR HOUSEBUILDING: ITS DEPICTION IN THE LITERATURE**

Despite CP and other lean production approaches being widely researched in a construction context (cf. Latham, 1994; Egan, 1998; and Farmer, 2016), the industry remains in a state of inertia, with low levels of productivity and innovation relative to other sectors (Russel *et al.*, 2018). Others, such as Mlecnik, Straub and Haavik (2018) have made similar remarks concerning the slow emergence of any systemic innovation towards energy efficient house renovation through collaboration due to the project-based nature of the sector. Latham, (1994), Egan (1998) and Farmer (2016) considered partnering as a path out of this stagnation - consequently adopting the lean manufacturing approach. Originally developed to advance the automotive industry, the philosophies and strategies of the automotive sector offer significant insights into improved performance in construction, particularly in areas such as off-site manufacture and procurement practices more generally (Womack *et al.*, 1990; Edwards *et al.*, 2017; Pärn and Edwards, 2017). The value in testing the perceived applicability of a well modelled framework (CPP or otherwise), reflective, at least in part, of these advances in the automotive sector is thus apparent.

Given this opportunity to transfer superior lean manufacturing into the construction sector, both Farmer (2016) and Barker (2006) suggest that there is no reason to treat UK housebuilding sector any differently because advanced from any other manufacturing processes are equally relevant and applicable. Put simply – why reinvent the wheel? Despite some caveats, Egan (1998) likewise suggested that the recommendations might be easily implementable in the housebuilding sector as it is dominated by a limited number of large volume companies: a view supported by Nathaniel Lichfield and Partners (2015) and

Commane (2016). Yet Farmer (2016, p.9), and Mlecnik (2013) counter this, suggesting that it is ‘unlikely’ that innovation of this scale would arise from within the UK volume housebuilding sector. Instead Farmer (*ibid*) calls for a change in ‘commissioning trends’, suggesting elements of prefabrication through ‘scalable pilot programs’ and greater integration. Hence, whilst Farmer (*ibid*) concurs that change is implementable in the sector, it is not on the scale that Egan (1998) anticipated. Further literature (e.g.: Beach *et al.*, 2005; Barker, 2006; Meng, 2013; Sarhan and Fox, 2013; Ball, 2014) supports this position, suggesting that, whilst opportunities for improvement afforded by CP exist for the housebuilding sector, they have not been capitalised upon.

Despite the sector’s socio-economic importance (Lichfield *et al.*, 2015; Farmer, 2016), currently only one survey has specifically focused on UK private housebuilding (Barker, 2006). The majority of UK-based empirical studies on CP focusing have focused upon large general contractors (Ng *et al.*, 2002; Wood and Ellis, 2005; Manu, 2014) and subcontractors (Dainty *et al.*, 2001; Packham *et al.*, 2003; Mason, 2007; Aagaard *et al.*, 2015). Others have more broadly covered the wider supply-chain, including commercial and government clients and consultants (Akintoye *et al.*, 2000; Black *et al.*, 2000; Bresnen and Marshall, 2000; Forgues and Koskela, 2009). Throughout extant literature however, there is a strong belief that the uptake of CP should be client led (Latham, 1994; Egan, 1998; Dainty *et al.*, 2001; Ng *et al.*, 2002; Eriksson and Westerberg, 2011; Shang and Low, 2014). Despite finding corresponding sentiment amongst their interviewees, Daniel *et al.* (2017) offer a caveat suggesting that any push from external sources, such as clients and public bodies, could hinder uptake when not met with an appropriate level of motivation internal to the contractor.

Consistent with Farmer’s (2016) comments of a ‘hybrid business model’, Ball (2010) describes four different activity stages that UK housebuilders typically undertake, namely: i) project conception and evaluation; ii) land preparation; iii) building construction; and iv) marketing and sales. Typically, there is no long-term interest retained in the development once handed over to the end user(s). To execute such activities Ball (*ibid*) provides five distinct organisational structures that have been adopted in the sector, the most prolific being the ‘Classic UK Private Housebuilder’ (the focus of this research) which is reflective of Callcutt’s (2007) ‘Current Trader’ model. For the classic UK private housebuilding firm a management and concomitant infrastructural hierarchy consists of a head office and one or more regional offices beneath which is an array of departments of equal importance. The observations of the in-situ research suggest that these departments generally include: land, technical, commercial, construction, sales and customer care.

Best described as a ‘functional organisational structure’, there is a clear chain of command with each discipline grouped separately (Project Management Institute, 2008, pp.28-9). Essentially projects pass from left (land) to right (customer care) through these departments with handover meetings occurring between some stages and limited departmental collaboration following that handover. Ball (2010) finds that this production is based on six interrelated principles, namely: i) continuous production; ii) a complex division of labour; iii) simplification of component tasks; iv) standardisation; v) repetition; and vi) effective monitoring and control. Barlow *et al.* (2003) suggests that rather than focusing on the construction process, this model places emphasis on extracting profits from the development and financial management during that process, tending thereby to inhibit innovation. These principles, coupled with the organisational structure, are reminiscent of the ‘mass production model’, which has been abandoned in many other industries and is less conducive to CP (Womack *et al.*, 1990).

In comparison, Barlow *et al.* (2003) offers the production process adopted by Sekisui Heim, a Japanese housebuilder. The Sekisui Heim process essentially flows in the opposite direction to that described above, yet is nonlinear, more integrated and infinitely more flexible as a result. Such structures are typically more conducive to CP due to the holistic nature of the process and the inherent interdependence of stakeholders in the process (Womack *et al.*, 1990). Implementation of CP within the contemporary private housebuilding sector undoubtedly has its place. However, a plethora of CP descriptions and definitions are available aside from that offered by Construction Excellence (2009) provided earlier (Meng, 2013). Of these, Ericksson’s (2010) definition is arguably the most directly relevant to construction as it provides a clear framework that is easily studied and critiqued relative to broader descriptions, and includes a number of core and optional procedures. It is the inherent flexibility of this definition that makes it so applicable to the UK private housebuilding sector. Eriksson and Westerberg (2011) thus went on to generate a formal CPP framework: a framework which forms the basis of this pilot study and is discussed more fully later in the paper

Yet Naoum and Egbu (2016) note that CP per se is not a procurement route but rather an approach to procurement. This is because design-bid-build (DBB), design and build and management contracts remain prevalent in many CP arrangements (*ibid*). Unfortunately, the DBB route (which is least conducive to CP), is the most prolific (Shang and Low, 2014; Hinton and Hamilton, 2015; Naoum and Egbu, 2016). This is unsurprising given the typical organisational structure and production methods outlined previously.

Yet despite the reviewed literature being in broad agreement that the prospects for CP are positive, the reported reality is less effusive: with the main barriers cited as cultural and organisational. Ericksson (2008), for example, found Swedish clients largely focused their procurement decisions on competition rather than cooperation; this, despite intentions to increase the uptake of CP. Hartmann and Caerteling (2010) likewise discovered price to be the determinant factor in subcontractor selection, with main-contractors placing less emphasis on softer bid parameters. More broadly, Phelps and Horman (2010) suggest that the most the critical aspects facing all facets of the modern construction industry are related to ineffective communication, inadequate trust, resistance to the uptake of technology and the inability to integrate teams. Recently Farmer (2016, p.8) diagnosed the UK construction industry with three discreet but interrelated problems, namely: i) a 'survivalist' structure and outlook; ii) non-aligned interests coupled with cultural resistance to change; and iii) a lack of strategic incentives and implementation frameworks. These studies present the difficulties inherent to the contemporary British construction industry which may be summed up as holding a common resistance to both change and internal and external team collaboration: trust, or a distinct lack of it due to poor communications, being the overriding factor.

Eriksson and Westerberg (2011) argue that these problems, as identified by Erickson (2008), Phelps and Horman (2010), and Farmer (2016), all stem from sociological issues that can be mitigated through CP procedures. Likewise, Fischer *et al.* (2017) suggest that these can be improved via Integrated Project Delivery (IPD) which features CP. Moreover, Porwala and Hewageb (2013), Shang and Low (2014), and Naoum and Egbua (2015) also suggest that CP has the potential to improve project automation and communication, including modular construction and the adoption of Building Information Modelling (BIM); all elements conducive to the sustainability goals argued for by the likes of Mlecnik, Straub and Haavik (2018)It is to be noted that all of this is consistent with historic lessons from the automotive industry suggesting that the supply-chain must be optimised for any level of automation to be effective (Womack *et al.*, 1990).

Eriksson and Westerberg's (2011) developed their CPP Framework around project performance metrics such as cost, time, quality, environmental impact, work environment and innovation. Specifically, the framework focuses on seven different aspects of procurement, which are: i) design stage; ii) tendering; iii) bid evaluation; iv) subcontractor selection; v) types of payments; vi) collaborative tools; and vii) performance evaluation. Procedures are suggested for each aspect to improve project performance. For clarity, the framework's aspects and procedures are reproduced in Table 1 below. Yet despite the

framework's inherent flexibility, this same literature clearly reports that adoption has hitherto failed to occur: determining why is an underlying purpose of this study. Eriksson and Westerberg's (2011) CPP Framework is clearly testable, holistic, and meets the definition of partnering, thus making it highly appropriate for the any such exploratory study into the appropriateness of CPP as it is perceived by the UK housebuilding sector. The means by which such a preliminary or pilot exploration was then conducted is depicted in the following section.

<Insert Table 1 about here>

## **METHODOLOGY**

Because the proposed research is effectively a sociological study of a very specific sector of the UK construction industry, an inductive (and qualitative research approach (Alvesson and Skoldberg, 2018) was adopted for this study that was framed within a social constructivist paradigm (Denzin and Lincoln 2018). This involved deriving a tentative theoretical position via an interpretivist literature review (Denzin and Lincoln 2018), then exploring and grounding this theorising in context through a pilot study involving in-depth semi-structured interviews to gather differing perceptions of CP's appropriateness from a classic UK private housebuilder's perspective.

Doody and Doody (2015) define a pilot study as a: "*small-scale version of a planned study conducted with a small group of participants*" (p. 1074). While the small sample size may limit the generalizability of the findings, the pilot sample is also more uniform and subsequently increases internal validity. As such, large sample sizes are not expected or needed; rather, pilot studies support a more sophisticated research design, or identify important research variables which may be used to guide a future full-scale study (Moore *et al.*, 2011; O'Cathain *et al.*, 2015). A pilot study approach is consequently appropriate for this research study presented because its main objective is to: i) evaluate the methods and feasibility of understanding the perceived appropriateness of the CPP Framework in the UK private housebuilding sector; and ii) through this assessment, stimulate discussion and further research in this field.

### **Selection of Participants**

Through the insights of a researcher participant to the context of inquiry, twelve carefully and purposefully selected industry professionals were approached from a range of volume home builders within the outer London area. It must be noted here that the researcher had previous short-term professional relationships with the selected participants. As such, ethical

factors were considered and addressed by focussing on selection at the managerial level or higher, and ensuring anonymity of all participants. This initial cohort included one each of those holding the following titles: Senior Land Manager; Managing Director; Planning Manager; Divisional Managing Director; Build Manager; Divisional Operations Director; Construction Director; Commercial Director; Technical Director; Adoptions Manager; and Site Manager. Of these, a Senior Land Manager (SLM), a Planning Manager (PM), a Divisional Operations Director (DOD), and a Site Manager (SM) agreed to be interviewed about their experiences in relation to the framework. The key areas of influence and responsibility of these individuals, in reference to the applicability of the CPP framework, are summarised as follows:

- Divisional Operations Director (DOD): influence over the appointment of sub-contractors
- Site Manager (SM): management of sub-contractors (but no influence in their selection)
- Senior Land Manager (SLM): responsibility for design procurement (with PM)
- Planning Manager (PM): responsibility for design procurement (with SLM)

Although this represented a small sample size, as a pilot study, the participants offered the requisite breadth of knowledge and experience across the targeted context. This determination was based upon the group being positioned to offer key insights from within the context on a broad range of procurement matters including sub-contractor selection and management, as well as construction and design procurement more generally. As Mason (2010) suggests, within qualitative research, samples are selected to reflect the purpose of the study: achieving saturation resting largely on the quality of data, rather than the sample size. Within a pilot study, however, saturation in absolute terms is seldom sought, nor is it requisite; rather, the focus is upon a quality and depth that gives contextual grounding for future studies (Doody and Doody (2015)). From the perspective of this paper's pilot study, the relevance of the insights and comprehensive picture offered by the four participants into the applicability of the CPP framework, formed an acceptable basis for gathering the essential information from which such further research might be launched.

### **Data Collection and Analysis**

The semi-structured interviews were exploratory in nature and were structured to reflect the procedures of Eriksson and Westerberg's (2011) CPP Framework. The seven procedures include: the design stage, tendering, bid evaluation, subcontractor selection, types of

payment, collaborative tools and performance evaluation. Each question then sought to derive specific housebuilding experiences to test the frameworks suitability to the sector. As Kahneman (2011) observed, people may respond differently to questions based on recent stimuli, including how a specific question is worded or structured: an influence known as priming. To reduce the probability of invoking confirmation bias, the interview questions were designed to be as neutral as practicable. This phenomenon is partly linked to that described as the Hawthorne Effect, where participants may answer questions based on what they think the researcher might want to hear (Fellows and Liu, 2015). Confirmation bias and the Hawthorne Effect can be eliminated from the results by virtue of the participants varying views on whether the framework had a positive influence or not, as well as the depth of some of the examples provided to support their claims.

All interviews took place between 16 March and 22 March 2017 and were recorded using TapeACall Pro and hand-written notes. A thematic analysis of the interview transcripts was undertaken. King and Horrocks (2010) suggest a basic system of thematic analysis as a ‘straightforward’ method consisting of descriptive coding, interpretive coding and defining of overarching themes (King and Horrocks, 2010, pp.149-150). Kvale (1996) illustrates meaning condensation as involving “*an abridgement of the meaning expressed by the interviewees into shorter formulations*” (Kvale, 1996, p.192), and meanings interpretation where the researcher goes beyond what is being directly said to work out structures and relations of meaning not immediately apparent in a text (Kvale 1996, p.201).

Because the analysis drew directly on Eriksson and Westerberg’s (2011) CPP Framework, the research investigation was able to select and interpret specific parts of the interviewees’ responses. First, a provisional reading was undertaken after each interview had been transcribed where the researcher read for clarification, then secondly, relevant points aligning with the CPP Framework and its seven different aspects of procurement were identified and collated. The purpose being, to investigate the appropriateness of CP as conceptualised through the CPP Framework.

## **INTERVIEWS: THE KEY RESPONSES**

As intimated earlier, the interviews were structured around, and ordered by, the seven procedures in Eriksson and Westerberg’s (2011) CPP Framework (see Table 1 previous). Each participant was asked, based on their experience, ‘do the procedures influence project performance in the sector and if so, what aspects do they affect and why?’? Participants’ responses are summarised by procedure in Table 2. The following narrative reports upon

the key responses to each question by participants, coupled with some minor discussion of their internal alignment with each other. A more focused discussion regarding alignment with the CPP Framework is offered towards the end of this paper.

<Insert Table 2 about here>

### **Design Stage**

All participants answered this question. Agreement was unanimous that integration between those initiating the project (i.e. the Land Dept.) and the Construction Department in the design stage positively influenced all metrics of project performance. Participants also confirmed that this was largely due to increased certainty about the build-programme. The DOD, for example, suggested that *“early engagement [with the Construction Department] helps with defining scope and identifying potential overlaps with subcontractors.”* This, he argued, helped rationalise the programme and increase ease of delivery and certainty. Likewise the SLM, experienced with integrating the Construction Department in the design stage, stressed that it *“...basically sets the whole precedence for forecasting, for the budgeting, and... ..everything going forward...It is important to set a benchmark and measure all our targets against that”*. However, the SM suggested that there was currently insufficient engagement with subcontractors who could interpret the project’s intricacies better and so provide increased certainty relative to that provided by the Construction Department. The SM stating that: *“If you don’t have the groundworkers on board from day one, and you’re both singing from the same hymn sheet, you wind up wasting so, so, so much money.”* One example related to excavated material taken offsite, only to be brought back onsite for fill – with significant negative time and cost consequences. Participants suggested that’s such could be avoided if groundwork subcontractors were engaged during the planning and design of the project. Additionally, the SM suggested that poor *“...planning most definitely contributes to the high turnover.”* The SM and the PM both suggesting that project planning lacking input from the Construction Department resulted in rushed, sometimes under-resourced, programmes, whilst increasing stress levels amongst staff. They believed that this contributed to a poor work environment and high levels of staff turnover. Similarly, the DOD stated that more holistic planning increased buy-in and collaboration by all stakeholders, and a more positive work environment.

### **Tendering**

Excluding the SM, all participants answered this question. The SLM and the PM had no direct responsibility for appointing subcontractors, referring instead to their interaction with consultants for design procurement. The DOD responded with regards to both consultants

and subcontractors. All respondents agreed that limiting tender invites positively influenced the metrics of cost, time, quality, work environment and innovation. The PM and DOD also suggested that lower tender invitations reduced environmental impact but did not expand upon this point. However, the DOD believed that all metrics could be negatively affected if too few tender invites were offered: suggesting collusion as a possible outcome. Clouding this point, the DOD stated that trust was complex, time consuming and only developed over time, so broadened numbers of suppliers did not necessarily resolve the issue: suggesting that *“If you have a good and continuing relationship with subcontractors they’re more likely to share potential innovations that only they’re aware of because of their position.”* The SLM also thought that maintaining deeper relationship with fewer consultants (i.e. around 3 to 5) was likely to enhance their understanding of the target product, thereby increasing quality, innovation and work environment. With regards to tenderers, the SLM and DOD believed they increased input to proposals if they felt their chance of winning was high. This, they suggested, improved overall project certainty and product quality, and had positive implications for innovation. Table 1 indicates that with regards tendering, there is disagreement between participants and the CPP Framework on all aspects except time.

### **Bid Evaluation**

All responded to this question directly except the SM who provided the insights offered here incidentally whilst answering subsequent questions. The SLM and the PM responded with regards to consultants for design procurement, and the DOD answered with regards to both consultants and subcontractors. All participants concurred that time, quality, work environment and innovation were positively influenced by soft parameters (e.g. history of quality, competence and environmental consideration) in bid evaluation. The PM, SM and DOD thought they also improved cost performance. The SLM, however, argued counter to this, holding time and quality as the only aspects influenced. He accepted additional consultancy costs for greater time certainty, quality and innovation. Other participants disagreed, suggesting that engaging more competent suppliers positively increased cost performance beyond the initial outlay. Environmental impact was also considered to be improved through soft parameters: the SM exemplifying a contractor who, awarded a bid on cost alone, unlawfully disposed of waste to protect their margin.

Interestingly, the DOD suggested that the introduction of soft parameters in bid evaluation has created a market for specialist consultants who shape winning bids by *“saying the right things.”* He believed that this compromised the validity of such procedures. In order to effectively implement this procedure they collectively advised that it be deeper than a *“box-ticking exercise”*, perhaps including interviews. Bid evaluation with soft parameters could

therefore take longer than traditional evaluations. Despite this additional frontend investment, the DOD believed that projects would perform better overall.

### **Subcontractor Selection**

All participants answered this question. Although the SLM, the PM and the SM had no direct responsibility for appointing contractors, their time in the industry had offered insights on this aspect. Additionally, the SM had subcontractor management experience and stated that: *“They just seem to push, push, push, money, money, money, and they forget about the product, and they forget about the customer”*; this was the concern expressed by the SM regarding the Commercial Department. He observed that often poor consultation with the Construction Department led to procurement decisions based predominantly on price. The SLM echoed this view, stating that: *“The Commercial and Construction Departments can be somewhat disjointed, because the Commercial Department can very much purely look at pounds and pence and they won’t consider some of the more soft parameters.”* The SM’s experience suggested sub-optimal procurement decisions were a result, with subcontractors unable to complete within time, budget or quality. Likewise, factors such as the environment, innovation, and work environment were also compromised. Others observed that the money saved in appointing the cheapest contractor was lost in subsequent actions to complete scope or remediation works (environmental remediation due to diesel leaks being exemplified). The SM suggested that consultation with the Construction Department could avoid such subcontractors being appointed, expressing frustration that: *“They [the Commercial Department] never ever learn from it because they [a specific subcontractor] always come in the cheapest.”* Poor performance did not lead to subcontractors losing the next job due to commercial pressure to select the cheapest tender and limited knowledge of which subcontractors underperformed or why. The DOD agreed with the SM’s position and stressed, *“the best solution is a cost-effective solution, not necessarily a cheap solution.”* He also observed that poor subcontractors need to be ‘over-managed’, detracting SMs from other duties. These issues, he felt, could be avoided by integration with the Construction Department at subcontractor selection. Both the SLM and PM also reflected these sentiments.

The participants unanimously agreed that engagement with the Construction Department during subcontractor selection improved project performance in terms of cost, time, quality and work environment. Additionally, the SLM, SM and DOD thought that it also improved environmental performance. The SM and DOD also thought that it improved innovation.

## **Types of Payments**

All participants responded, agreeing that incentive based payments can positively influence time, quality, innovation and cost metrics, except the SM who expressed no opinion on cost implications. All participants (except the SLM) also thought it could lessen environmental impact and improve work environment. These views were contingent however, upon the conditions discussed below. The SM's experience suggested that contracts transferring all risk to the contractor (including liability for damages regardless of fault) were the most effective for ensuring quality: thereby increasing contractor vigilance for fear of altercation. However, he acknowledged that such contracts can reduce willingness to tender for projects, potentially increasing costs. Reflecting further, he suggested that it may eliminate poor quality contractors whose actions could ultimately cost more through variations or remedial works. Regarding incentive-based payments, the SM considered them "*...a double-edged sword.*" In his experience, incentives focused on a single metric could cause other metrics to suffer. He exemplified a subcontractor rewarded for finishing early with no combined incentive for quality: quality suffers when he rushes to finish the work. The SM then stated that: "*I don't think you should reward people for doing their jobs well... ...that's what they get paid to do.*" If this proves a prevailing attitude then implementing incentive based payments in the housebuilding sector may prove problematic.

The DOD believed in a multi-metric approach, stressing that incentives for finishing early or delivering under-budget should be determined after setting a realistic baseline: subcontractors are thereby only rewarded for actual improvement. He suggested that such baselines should be independently verified, otherwise subcontractors can overstate project timelines and budgets to ensure receipt of incentives. The DOD also warned against early payments, believing it incentivised subcontractors to redistribute labour prior to work completion. He exemplified other strategies such as subcontractors, knowledgeable of the company's financial reporting deadlines, intentionally slowing down production so as to be financially incentivised to speed up to meet these targets. He suggested that previously established targets may correct this stratagem as the 'what' and 'when' of incentives are clear from the outset. Overall, he thought incentive based payments could improve all metrics but only when carefully managed, otherwise the opposite may occur. The SLM had used multi-metric incentives with town planning consultants to positive effect, the incentive paid only after achieving planning consent. With consent tied to project viability the consultant was unlikely to compromise the project in seeking easy approval. His experiences suggested that this improved project performance in terms of cost, time, quality and innovation. The PM expressed similar experiences.

### **Collaborative Tools**

All participants responded, agreeing that collaborative tools positively improved cost, time, quality and work environment whilst the PM and DOD also acknowledged improved innovation. No participant offered a definitive opinion on environmental influence. Of the collaborative tools, Information Technology (IT) was brought into focus. The SLM stating: *“a lot of the time staff onsite don’t have access to our IT systems”* an opinion that the SM concurred with. Discussion included desire for centralised Cloud based information repositories (i.e. Internet of Things - IoT) through to full Building Information Modelling systems (BIM). Site-based staff had limited or no access to IT. All believed that staff and external suppliers required fluid access to information, be it through BIM or otherwise: the SM exemplifying a groundwork subcontractor using plan revision 2, instead of 6, resulting in rework negatively affecting project performance. The potential of BIM was acknowledged by the DOD with regards to early clash detection between disciplines, innovation, and buildability. The PM, however, suggested that over-investment in IT could incur inefficiencies if too complex.

Beyond IT, the SLM raised the issue of staff roles in collaboration, suggesting that sometimes *“...it would be good to have a Land person who is accountable for the project all the way through”*: thereby suggesting a current lack of collaboration – a possible constraint of the Classic UK Private Housebuilder organisational structure. He expanded this point and suggested that information is often compromised as it passes through the structure, concluding that the *“Construction (dept.), to an extent, have their hands tied by the information they’re given.”*

### **Performance Evaluation**

The question on performance evaluation produced the most polarised participant responses . The SLM thought (with respect to consultants) that Professional Indemnity insurance reduced quality because it de-risks their role. He felt increased reliance on consultant self-control was likely to reduce quality, increasing project time and cost through errors). Alternatively, the PM stated that with insufficient expertise in-house, consultants were relied upon to check their own work, suggesting that this would not have any influence on project performance.

Regarding subcontractors, the SM suggested increasing self-control made no difference to time, cost or quality and offered two reasons for this opinion. First, subcontractors (in paying third parties to certify their work) have biased the outcomes in their favour. Second, that warranty claims are often difficult to process, creating a culture of poor quality. He

examined an electrical contractor refusing to accept claims on their work because the homeowner had installed a single light fitting, supposedly voiding warranty work for the entire house. The DOD suggested that the issue was less rampant than the SM believed, although he did accept that apportioning liability was difficult because trades overlap. Despite this, he felt that increasing liabilities may promote innovation in product installation, maintenance and design.

Regarding the work environment, the SM believed that this aspect had limited effect due to wider economics, stating that he can “...kick a man offsite today for being unsafe, and he’ll be back tomorrow because there’s no one else.” He attributed this to the cyclical nature of the construction industry driving demand for subcontractors. This high demand for skills, he believed, reduced client trust in subcontractor self-control. He argued that communication was integral to this trust, yet “...you can take the CSCS [Construction Skills Certification Scheme] in 7 different languages, and everything onsite is in English?.” This, he said, caused frustration when communicating health, safety and environmental requirements to those not fluid in English, further undermining faith in subcontractor self-control. Opinion within this cohort of the housebuilding sector on performance evaluation within the CPP framework is clearly divided hence, no definitive summation can be made.

## **DISCUSSION**

The following discussion is framed around Erickson and Westerberg’s (2011) CPP Framework that consists of seven elements (as outlined previously in Table 1) and is complemented with participants’ key responses.

### **Design Stage**

A review of participant comments shows clear agreement upon the issue integration, specifically client-contractor integration at this stage. This is highlighted by statements that it “*defines scope*”, “*identifies potential overlaps*”, “*sets the whole precedence*” and the like. There was, however, an equally strong recognition that integration was not generally evident, leading to wasting “...so, so much money.” Examples were offered in the form of ground workers particularly, something that aligned with the findings of Dainty *et al.* (2001) who suggest that industry practitioners are reluctant to seek the knowledge of specialist subcontract and supplier companies generally.

The above suggests that this element of the CPP Framework, i.e. that of client–contractor integration during the design stage, is likely to produce positive returns for the housebuilding sector: reflecting Manu’s (2014) report of the positive outcomes experienced

by some large UK-based main-contracting (non-housebuilding) organisations who had implemented supply-chain practices fostering subcontractor participation. Whilst Erikson and Westerberg's (2010, p.905) CPP Framework lists the "*involvement of subcontractors in broad partnering teams*" as an "*optional*" procedure, a broader study may show that for the housebuilding sector, the early inclusion of subcontractors and internal departments in a partnering framework should be a 'core' element.

### **Tendering**

The emphasis behind Eriksson and Westerberg's (2011) procedure on tendering is the reduction of the number of tenders invited. However the only metrical advantage identified to be specific to this element of the framework was time; a determination derived by testing their framework upon the larger construction sectors (Erickson and Westerberg 2011, p.200). Table 1 shows that this holds true for the housebuilding sector as there was conflicting views by the participants on all metrics but time in this regard. A couple of key issues should be noted that led to this finding. Firstly, that lower tendering numbers can potentially lead to collusion between contractors; reflecting Phelps and Horman's (2010) findings of low trust inhibiting collaboration within the construction industry generally. Despite this potential risk, trust of contractors was considered important, but that this took time to develop, and so increased numbers of less know contractors need not resolve the risk. Secondly, stronger relations led to improved communications, and so potential access to new innovations, materials and the like. Finally, although wary of fewer tenderers, there was the belief that tenders were more comprehensive, allowing for improved project certainty, when bidding numbers were low – this because the bidders felt they had a higher chance of winning.

### **Bid Evaluation**

The Framework suggests the inclusion of 'soft parameters' in the evaluation can improve project performance with regards to all metrics except cost. Soft parameters being those that reflect a contractor's credentials as a supplier of quality, environmental consciousness and timeliness rather than just cost effectiveness. The findings reported above show that in general there is accord with this element, though with some minor differences of opinion – some suggesting that cost performance also improved over the lifespan of the project for example. Concern was raised however, that a specialist field of consultants had been created to shape bids around these soft parameters to ensure "*the right thing*" was being promoted. Suggestions were raised on how to overcome "*box ticking*" to ensure that soft parameters were genuine, with the upshot that such evaluations took longer and hence cost more to

undertake. This aligns with Meland *et al.* (2011, p. 2) who noted very early on that focusing on soft parameters in tenders “...increases the complexity of evaluation...” and hence cost.

### **Subcontractor Selection**

The reported findings reflect strong agreement with those of Eriksson and Westerberg (2011), suggesting that procedures for subcontractor selection and integration should not differ greatly from that found for the wider industry. The potential advantage for classic UK private housebuilders is with the main-contractor being in-house. Arguably this should ease integration through greater trust levels and transparency. However, the functional reality of this form of builder, as depicted by the respondents of the study, describes something far less cohesive. That is, there is not sufficient trust nor integration within the companies to make good of this potential. In addition, base economics tends to rule, meaning that poor quality contractors are seldom excluded on the basis of past performance because they frequently “...come in the cheapest.” Throughout, the findings suggest that the sector is crying out for procedures akin to those of the Framework in this regard, but that through corporate dysfunction bringing such procedures into reality will not be an easy task: despite multiple lessons exemplifying their need.

### **Types of Payments**

Eriksson and Westerberg’s (2011) procedure for this element recommends that payments based upon incentives relating to project performance improves the performance of all metrics. Overall the participant’s responses show a high level of agreement with this perspective. In addition the participants provided insights on the implementation of such procedures, particularly in relation to establishing baselines and multi-metric based payments. There were, however, some contingences noted, including how risk allocation in a contract may improve contractor vigilance on the one hand, yet reduce willingness to bid for contracts on the other, or possibly raise bid prices to cover potential liabilities.

Concern was also noted regarding single metric focused incentives, exemplifying incentives for time, without quality being a concomitant factor, leading to poorer quality outcomes. For this sector, a multi-metric approach is considered the preferred option. Tied into this was the perceived need for independently established baselines for time and budget to reduce deliberate overstatements. Earlier in the interview (whilst responding to Question 1), the DOD suggested that programs should be rationalised, including grouping tasks, supporting Eriksson and Westerberg’s (2011) Framework preference for incentivising group performance. This focus by the participants upon independently verified baselines and multimetric based incentive payments is reflected in existing literature by the likes of

Womack *et al.* (2008, p.151) who describe this as a “*market price minus*” system rather than a “*supplier cost plus system*”, and more recently in practice by the National Health Service’s Procure 21+ framework (NHS, 2016). Support by the participants for this element of the framework is therefore clear, but with the override that incentive based payments must be carefully managed both contractually and in application.

### **Collaborative Tools**

The use of collaborative tools such as Building Information Management (BIM) systems, more basic online or ‘Cloud’ based repositories that may be mutually accessed, and simple procedures ensuring interdepartmental collaboration and information sharing, were the focus of this procedure. Eriksson and Westerberg’s (2011) Framework suggests that such tools will improve all metrics including environmental impact. Though this latter metric was not disputed, it was not supported either. With regards to the other metrics, the participants show strong agreement that the outcomes should be positive. There was stated concern over some Information Technology (IT) tools, however, with the suggestion that IT knowledge, experience and onsite access can be limited and that overly complex systems may lead to inefficiencies. Coordination of the information throughput was considered equally or more important to by one respondent, suggesting the need for one individual to be accountable for the project “...*all the way through*”; something that is currently missing. Forgues and Koskela (2009) acknowledged this issue in finding that a ‘Project Director’ improved project oversight and integration. The findings of this study suggests that the organisational structure, and staff roles within it, should also be viewed as ‘collaborative tools’. Whilst the participants showed a high level of agreement with this Framework procedure, there was little discussion of risk sharing with suppliers through contractual arrangements or joint project offices.

### **Performance Evaluation**

Evaluating performance based upon a contractor’s self-control or own quality control as suggested by the Framework is clearly questioned heavily by several of the participants. Some suggest that no improvement to the project can be expected through deployment of this path, indeed proposing that quality in particular can be compromised. Other voices were more neutral, believing that no change, positive or negative would result from implementation of this element of the framework. Opinion between participants of this study regarding the performance evaluation aspect of the Framework is clearly divided. As such, no definitive summation can be made for its support or otherwise.

## CONCLUSIONS AND RECOMMENDATIONS

This study set out to determine, from the [UK](#) housebuilder's perspective, the appropriateness of the CPP Framework to their sector. This was done in a very limited manner as part of a pilot study with [the](#) express purpose of opening the way for, or triggering, broader research of a more action based [d](#) form into the area i.e. research that effects change.

As Table 2, and the above discussion shows, with the exception of tendering and performance evaluation, there was a high rate of consensus amongst participants that the CPP Framework is appropriate to the sector. This suggestion of appropriateness was demonstrated in the expression of improvements or enhancements that the procedures were deemed to deliver to the sector over and above those provided by the existing systems. The disagreement on tendering being is offset by the observation by all participants that the only distinct benefit of selected tendering was time: there was no suggestion, however, that the other metrics would be compromised by this procedure. The conflicting arguments between participants regarding performance evaluation, however, leaves that element of the CPP Framework open for further inquiry.

In addition, though not directly aligned with the inquiry's main purpose, the data on industry norms evidenced resounding sentiment that the sector replicated wider industry in not progressing in adoption of this framework despite being open to it. Further, broader, research is needed to confirm this finding. Very much aligned with its purpose, the study found several factors influencing the perceived appropriateness of the CPP Framework's procedures. The integration of groundworker subcontractors at design-stage, for example, is notable for its potentially simple implementation. Future research may demonstrate that this is where significant improvements can be made, opening the way to pilot partnering agreements with groundworkers specifically. Research into design-stage integration with other subcontractors is not discounted, however groundwork is highly site specific, therefore future research into the influence of this area on project performance is considered significant.

The effectiveness of warranties in ensuring project quality is also of interest. The suggestion that warranties are not effective tools of subcontractor self-control needs further inquiry. It may prove a challenge unique to the sector, however what influence, if any, this has upon project quality is a critical area for future investigation. The study also suggests a re-examination of the Classic UK Private Housebuilder's organisational structure. Commentary by the SLM, suggesting for example, that a Project Director improved oversight and integration. Should a broader study likewise reveal poor levels of integration between

departments in this sector, particularly the Commercial and Construction departments, then the introduction of such a role may prove beneficial. This ties in with groundworker integration previously discussed: the value of their knowledge only being leveraged if the Construction Department has design stage involvement. Research is therefore required on the contemporary Classic UK Private Housebuilder's organisational structure as possibly inhibiting integration.

It was likewise useful to identify the belief of certain managers that incentive based payments must factor multiple performance metrics framed with agreed and independently verified baselines. Whilst the previously explored research, and contemporary procurement, already holds this as best practice, what remains unknown is how far the sector has progressed with this procedure within the CPP Framework. As a pilot study, with its inherent limitations of time and small group sampling, this research was deliberately framed to stimulate further and deeper research into the applicability of the CPP framework. With clear avenues for greater analysis being identified, it is recommended that these be pursued to fully ascertain the relevance and applicability of the CPP Framework to the UK Private Housebuilding sector. Moreover, future work should give due consideration to international research in this area and identify how this might impact upon this current study; indeed a comparative analysis between countries may reveal new opportunities to augment contemporary practices or define further areas of research.

## REFERENCES

- Aagaard, A., Eskerod, P. and Madsen, E. (2015), "Key drivers for informal project coordination among sub-contractors: A case study of the offshore wind energy sector", *International Journal of Managing Projects in Business*, Vol. 8 No. 2, pp. 222-240.
- Akintoye, A., McIntosh, G., and Fitzgerald, E. (2000), "A survey of supply chain collaboration and management in the UK construction industry", *European Journal of Purchasing & Supply Management*, Vol. 6 No. 3-4, pp. 159-168.
- Alvesson, M., Skoldberg, K. (2018), *Reflexive Methodology: New Vistas for Qualitative Research* (3<sup>rd</sup> ed.), Sage, London, UK.
- Ball, M. (2010), *The housebuilding industry: Promoting recovery in housing supply*, Department for Communities and Local Government, available at: <http://webarchive.nationalarchives.gov.uk/20120919132719/http://www.communities.gov.uk/documents/housing/pdf/1526670.pdf> (accessed 17 April 2017).
- Ball, M. (2014), *Rebuilding Construction – Economic Change in the British Construction Industry*, Routledge, Abingdon, UK.
- Barlow, J., Childerhouse, P., Gann, D., Hong-Minh, S., Naim, M. and Ozaki, R. (2003), "Choice and delivery in housebuilding: lessons from Japan for UK housebuilders", *Building Research & Information*, Vol. 31, No. 2, pp. 134-145.
- Barker, R. (2006), "Waste assessment and application of improvement techniques in UK private housebuilding supply chains", UMI ProQuest, Ann Arbor, MI, available at: <https://orca.cf.ac.uk/55605/1/U584035.pdf> (accessed 15 April 2017).
- Barker, S. (2016), "Brexit will hit housebuilder numbers: SMP", *Mortgage Strategy* (online edition), 22 November, available at: <https://www.mortgagestrategy.co.uk/brexit-will-hit-housebuilder-numbers-smp/> (accessed 12 April 2017).
- Beach, R., Webster, M. and Campbell, K. (2005), "An evaluation of partnership development in the construction industry", *International Journal of Project Management*, Vol. 23 No.8, pp. 611-621.
- Black, C., Akintoye, A. and Fitzgerald, E. (2000), "An analysis of success factors and benefits of partnering in construction", *International Journal of Project Management*, Vol. 18, No. 6, pp. 423-434.
- Bresnen, M. and Marshall, N. (2000), "Partnering in construction: a critical review of issues, problems and dilemmas", *Construction Management and Economics*, Vol. 18 No. 2, pp. 229-237.
- Callcutt, J. (2007), *The Callcutt review of housebuilding delivery*, Department for Communities and Local Government, Eland House, London.
- Commane, R. (2016), "Housebuilders predict growth despite uncertainty", *Mortgage Strategy* (online edition), 31 October, available at:

<https://www.mortgagestrategy.co.uk/housebuilders-predict-growth-despite-uncertainty/>  
(accessed 12 April 2017).

- Constructing Excellence (2009), Collaborative Procurement, Constructing Excellence, Warwick House, London, available at [http://constructingexcellence.org.uk/wp-content/uploads/2015/01/Collaborative\\_Procurement\\_Guide.pdf](http://constructingexcellence.org.uk/wp-content/uploads/2015/01/Collaborative_Procurement_Guide.pdf), (accessed 9 Jan 2019).
- Dainty, A., Briscoe, G., and Millett, S. (2001), "Subcontractor perspectives on supply chain alliances", *Construction Management & Economics*, Vol. 19 No. 8, pp. 841-848.
- Daniel, E.I., Pasquire, C., Dickens, G., and Ballard, H.G. (2017), "The relationship between the last planner® system and collaborative planning practice in UK construction", *Engineering, Construction and Architectural Management*, Vol. 24 No. 3, pp.407-425.
- Denzin, N.K., Lincoln, Y.S. (2018) (Eds) *The SAGE Handbook of Qualitative Research* (5<sup>th</sup> ed.), Sage, Thousand Oaks, California.
- Doody, O., and Doody, C.M. (2015). "Conducting a Pilot Study: Case Study of a Novice Researcher", *British Journal of Nursing*, Vol. 24 No. 21, pp. 1074-1078.
- Edwards, D. J., Pärn, E. A., Love, P. E. D. and El-Gohary, H. (2017) Machinery, manumission and economic machinations. *Journal of Business Research*, 70, pp. 391-394.
- Egan, J. (1998), *Rethinking Construction: The Report of the Construction Task Force*, available at: [http://constructingexcellence.org.uk/wp-content/uploads/2014/10/rethinking\\_construction\\_report.pdf](http://constructingexcellence.org.uk/wp-content/uploads/2014/10/rethinking_construction_report.pdf) (accessed 10 December 2016).
- Eriksson, P.E., and Westerberg, M. (2011), "Effects of cooperative procurement procedures on construction project performance: A conceptual framework", *International Journal of Project Management*, Vol. 29 No. 2, pp. 197-208.
- Farmer, M. (2016), *The Farmer Review of the UK Construction Labour Model, Modernise or Die*, Construction Leadership Council, London, UK, available at: <http://www.constructionleadershipcouncil.co.uk/wp-content/uploads/2016/10/Farmer-Review.pdf> (accessed 15 January 2017).
- Fellows, R.F. and Liu, A.M.M. (2015), *Research Methods for Construction*, Wiley Blackwell, Chichester, UK.
- Fischer, M., Ashcraft, H.W., Reed, D. and Khanzode, A. (2017), *Integrating Project Delivery*, John Wiley & Sons Inc, Hoboken, NJ.
- Forgues, D. and Koskela, L.J. (2009), "The influence of a collaborative procurement approach using integrated design in construction on project team performance", *International Journal of Managing Projects in Business*, Vol. 2 No. 3, pp.370 – 385.
- Hartmann, A. and Caerteling, J. (2010), "Subcontractor procurement in construction: The interplay of price and trust", *Supply Chain Management: An International Journal*, Vol. 15 No. 5, pp. 354-362.

- Hinton, M.A. and Hamilton, R.T. (2015), “Competitive tendering and individual behaviour in the construction industry: convenient immorality at work”, *Construction Management and Economics*, Vol. 33 No.11-12, pp.880-889.
- Hong-Minh, S.M., Barker, R. and Naim, M.M. (2001), “Identifying supply chain solutions in the UK house building sector”, *European Journal of Purchasing And Supply Management*, Vol. 7 No.1, pp. 49-59.
- Kahneman, D. (2011), *Thinking, fast and slow*, Farrar Straus and Giroux, New York, NY.
- Kesidou, S.L., Sorrell, S., 2018. Low-carbon innovation in non-domestic buildings: The importance of supply chain integration. *Energy Research & Social Science*, Vol. 45 pp. 195-213, <https://doi.org/10.1016/J.ERSS.2018.07.018> (accessed 9 Jan 2019).
- King, N. and Horrocks, C. (2010), *Interviews in Qualitative Research*, Sage, London.
- Kvale, S. (1996), *Interviews: an introduction to qualitative research interviewing*, Sage, Thousand Oaks, Calif.
- Latham, M. (1994), *Constructing the Team, Final Report on Joint Review of Procurement and Contractual Agreements in the UK Construction Industry*, available at: <https://pdfs.semanticscholar.org/bed6/02d037ee26af24746b3021bbaf7184374d12.pdf> (accessed 10 March 2017).
- Manu, E. (2014), “Supply chain management practices in construction and inter-organisational trust dynamics”, (Online), Ph.D. University of Wolverhampton, Available at: <http://wlv.openrepository.com/wlv/handle/2436/333133> (accessed 14 Dec 2017).
- Mason, J.R. (2007), “The views and experiences of specialist contractors on partnering in the UK”, *Construction Management & Economics*, Vol. 25 No. 5, pp. 519-527.
- Mason, M. (2010), “Sample size and saturation in PhD studies using qualitative interviews”, *Forum Qualitative Social Research*, Vol. 11 No. 3, pp. 1-19.
- Meland, O.H., Robertson, K.R. and Hannas, G.H. (2011), “Selection criteria and tender evaluation: The equivalent tender price model (ETPM), *Management and Innovation for a Sustainable Built Environment*, Amsterdam, The Netherlands, available online at: <https://repository.tudelft.nl/islandora/object/uuid:1824f03d-6191-49c6-9e60-458a056f3eeb/datastream/OBJ>, (accessed 9 Jan 2019).
- Meng, X. (2013), “Change in UK Construction: Moving Toward Supply Chain Collaboration”, *Journal of Civil Engineering and Management*, Vol. 19 No. 3, pp.422-432.
- Mlecnik, E., Straub, A., Haavik, T., (2018), “Collaborative business model development for home energy renovations”, *Energy Efficiency*, pp. 1-16, <https://doi.org/10.1007/s12053-018-9663-3> (accessed 9 Jan 2019).
- Mohamed, M., Edwards, D. J. and Pärn, E. A. (2017) “Brexit: measuring the impact upon skilled labour in the UK construction industry”, *International Journal of Building Pathology and Adaptation*, 35(3), pp. 264-279.

- Naoum, S. and Egbu, C. (2015), “Critical review of procurement method research in construction journals”, *Procedia Economics and Finance*, Vol. 21 8th Nordic Conference on Construction Economics and Organization, pp.6-13.
- Naoum, S. and Egbu, C. (2016), “Modern selection criteria for procurement methods in construction: A state-of-the-art literature review and a survey”, *International Journal of Managing Projects in Business*, Vol. 9 No. 2, pp. 309-336.
- Nathaniel Lichfield & Partners (2015), *The Economic Footprint of UK House Building*, House Builders Federation, London, available at: [http://www.hbf.co.uk/uploads/media/Economic\\_Fotprint\\_BPF\\_Report\\_March\\_2015\\_WEB.pdf](http://www.hbf.co.uk/uploads/media/Economic_Fotprint_BPF_Report_March_2015_WEB.pdf) (accessed 10 September 2018).
- Ng, S.T., Rose T.M., Mak, M., and Chen, S.E. (2002), “Problematic issues associated with project partnering — the contractor perspective”, *International Journal of Project Management*, Vol. 20 No. 6, pp. 437-449.
- NHS (2016), *Procure 21+*, Executive Summary, Department of Health, Leeds, available at: <http://www.procure21plus.nhs.uk/executive-summary/> (accessed 26 November 2016).
- O’Cathain, A., Hoddinott, P., Lewin, S., Thomas, K., Young, B., Adamson, J., ... Donovan, J. (2015) “Maximising the impact of qualitative research in feasibility studies for randomised controlled trials: Guidance for researchers”, *Pilot and Feasibility Studies*, Vol. 1 No. 1, p. 32.
- Packham, G., Thomas, B., and Miller, C. (2003), “Partnering in the house building sector: a subcontractor's view”, *International Journal of Project Management*, Vol. 21 No. 5, pp. 327-332.
- Pärn, E. A. and Edwards, D. J. (2017) “Conceptualising the FINDD API plug-in: a study of BIM-FM integration”, *Automation in Construction*, Vol. 80, pp. 11-21.
- Phelps, A. and Horman, M. (2010), “Ethnographic Theory-Building Research in Construction”, *Journal of Construction Engineering & Management*, Vol. 136 No. 1, pp. 58-65.
- Porwal, A. and Hewage, K. N. (2013), “Building Information Modeling (BIM) partnering framework for public construction projects”, *Automation in Construction*, Vol. 31, pp. 204-14.
- Project Management Institute (2008), *A guide to the project management body of knowledge (PMBOK guide)*, Newtown Square, Pennsylvania Project Management Institute.
- Reina, P. (2016), “UK 'Brexit' Vote May Threaten Access to Workforce Talent”, *ENR: Engineering News-Record*, Vol. 277 No. 1, p. 12.
- Russell, E., Lee, J., and Clift, R. (2018) “Can the SDGs Provide a Basis for Supply Chain Decisions in the Construction Sector?” *Sustainability 2018*, Vol. 10 No. 3, pp. 1-19.

- Samp, A. (2016), "Impact of EU exit on our UK industry forecasts", 2016, Economic Outlook, Vol. 40 No. 3, pp. 10-12.
- Sarhan, S. and Fox, A. (2013), "Barriers to implementing lean construction in the UK construction industry", *The Built and Human Environment Review*, Vol. 6 No.1, pp. 1-17.
- Shafik, M. and Martin, P. (2006), "The impact of procurement methods on the Scottish housebuilding industry". In: Boyd, D (Ed) 22nd Annual ARCOM Conference, 4-6 September 2006, Birmingham, UK, ARCOM, pp. 81-90, available at: [http://www.arcom.ac.uk/-docs/proceedings/ar2006-0081-0090\\_Shafik\\_and\\_Martin.pdf](http://www.arcom.ac.uk/-docs/proceedings/ar2006-0081-0090_Shafik_and_Martin.pdf) (accessed 28 November 2016).
- Shang, G. and Low, S. (2014), *Lean Construction Management: The Toyota Way*, Springer, Singapore.
- Stake, R. E. (2008), "Qualitative Case studies", in Denzin, N.K. and Lincoln, Y.S. (Ed.), *Strategies of Qualitative Inquiry*, 3rd edn, Sage, Thousand Oaks, CA, pp. 119-149.
- Womack, J.P., Jones, D.T. and Roos, D. (1990), *The Machine that Changed the World*, Rawson Associates, New York, NY.
- Womack, J.P., Jones, D.T. and Roos, D. (2008), *The Machine that Changed the World*, Simon & Schuster, London, UK.
- Wood, G.D. and Ellis, R.C.T. (2005), "Main contractor experiences of partnering relationships on UK construction projects", *Construction Management and Economics*, Vol. 23 No. 3, pp. 317-325.

**Table 1 | Conceptual cooperative procurement procedures by Eriksson and Westerberg (2011)**

Procedure #	Aspect	Proposed collaborative procurement procedure and positively affected project metrics
P1	Design stage	The higher the level of integration between client and contractors in the design stage, the better the project performance in terms of: <ul style="list-style-type: none"> <li>• Cost</li> <li>• Time</li> <li>• Quality</li> <li>• Environmental impact</li> <li>• Work environment</li> <li>• Innovation</li> </ul>
P2	Tendering	The fewer the number of contractors that are invited in the selected tendering process, the better the project performance in terms of: <ul style="list-style-type: none"> <li>• Time</li> </ul>
P3	Bid evaluation	The higher the focus on soft parameters in the bid evaluation, the better the project performance in terms of: <ul style="list-style-type: none"> <li>• Time</li> <li>• Quality</li> <li>• Environmental impact</li> <li>• Work environment</li> <li>• Innovation</li> </ul>
P4	Subcontractor selection	The higher the extent to which both client and contractors are jointly involved in subcontractor selection and integration, the better the project performance in terms of: <ul style="list-style-type: none"> <li>• Cost</li> <li>• Time</li> <li>• Quality</li> <li>• Environmental impact</li> <li>• Work environment</li> <li>• Innovation</li> </ul>
P5	Types of payments	The more the payment is based on incentives related to the project performance criteria, the better the project performance in terms of: <ul style="list-style-type: none"> <li>• Cost</li> <li>• Time</li> <li>• Quality</li> <li>• Environmental impact</li> <li>• Work environment</li> <li>• Innovation</li> </ul>
P6	Collaborative tools	The higher the usage of collaborative tools, the better the project performance in terms of: <i>“Example of collaborative tools are: joint objectives, joint office building, team building activities, partnering facilitator, joint IT-tools, joint risk management, and a partnering agreement”</i> (Eriksson and Westerberg, 2011, p.202). <ul style="list-style-type: none"> <li>• Cost</li> <li>• Time</li> <li>• Quality</li> <li>• Environmental impact</li> <li>• Work environment</li> <li>• Innovation</li> </ul>
P7	Performance evaluation	The more the performance evaluation is based on contractors’ self-control, the better the project performance in terms of: <ul style="list-style-type: none"> <li>• Cost</li> <li>• Time</li> <li>• Quality</li> <li>• Work environment</li> </ul> <p>Examples of contractor self-control are: contractors being relied upon to quality-check and certify their own work, including being liable for defects; and contractors having the authority to stop work if potential hazards are identified (Eriksson and Westerberg, 2011, p.202).</p>

**Table 2 - Influence of Performance Evaluation on Framework - Participant Perception**

**Design Stage**

	Design stage (Question 1)				Type of tendering (Question 2)				Bid evaluation (Question 3)				Subcontractor selection (Question 4)				Type of payment (Question 5)				Collaborative tools (Question 6)				Performance evaluation (Question 7)							
	P1				P2				P3				P4				P5				P6				P7							
	PM	SLM	SM	DOD	PM	SLM	SM	DOD	PM	SLM	SM	DOD	PM	SLM	SM	DOD	PM	SLM	SM	DOD	PM	SLM	SM	DOD	PM	SLM	SM	DOD	PM	SLM	SM	DOD
Cost	A	A	A	A	D	D	-	D	D	A	-	D	A	A	A	A	A	A	-	A	A	A	A	A	-	D	D	A				
Time	A	A	A	A	A	A	-	A	A	A	-	A	A	A	A	A	A	A	A	A	A	A	A	A	-	D	D	A				
Quality	A	A	A	A	D	D	-	D	A	A	-	A	A	A	A	A	A	A	A	A	A	A	A	D	D	D	A					
Environmental impact	A	A	A	A	D	-	-	-	-	-	-	A	-	A	A	-	A	-	A	A	-	-	-	-	-	-	-	-				
Work environment	A	A	A	A	D	D	-	D	A	-	-	A	A	A	A	A	A	-	A	A	A	A	A	-	-	D	A					
Innovation	A	A	A	A	D	D	-	D	A	A	-	A	-	-	A	A	A	A	A	A	A	A	-	-	A	-	-	-	D			
Rate of agreement*	100%				46%				92%				100%				100%				100%				63%							

**KEY**

	Probable positive effect
	Probable negative effect
	No probable effect
	Did not answer or had no opinion
A	Agrees with Eriksson and Westerberg (2011)
D	Disagrees with Eriksson and Westerberg (2011)
-	Does not disagree with Eriksson and Westerberg (2011)

**PROFESSIONAL ABBREVIATIONS**

- PM = Planning Manager
- SLM = Senior Land Manager
- SM = Site Manager
- DOD = Divisional Operations Director

\*Includes instances where participants did not disagree