RELATIONAL APPROACH OF VALUE CREATION FOR CONSTRUCTION PROJECT DELIVERY: A CONCEPTUAL FRAMEWORK

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In the current global and competitive business environment, the delivery of construction projects is a recognized challenge. However, the separation of design-construction-operation responsibilities has been a significant source of issues, resulting in poor 'triple constraint' project performance and negatively impacting long-term benefits realization. Stakeholder theory proposes that organizations can create value by improving stakeholder relationships and a substantial body of literature on strategic and project management proposes that project delivery models (PDM) that recognize and value these relationships better support value creation (VC). In consequence, this study undertakes a systematic review of extant literature and drawing mainly from the stakeholder theory, examines how PDM support the VC process (independently or co-created) in construction projects and their contribution to the project value. This study identifies three fundamental VC drivers for selecting a suitable PDM: early involvement, integration, and contractual agreements. A conceptual VC framework is proposed based on different forms of client-contractor relationships. Four environments called transactional, coordinative, cooperative, and collaborative are recognizable, each with its own characteristics attributable to the degree of interaction and trust between parties necessary to maximize long-term value within construction projects. The framework developed serves as a platform for future knowledge development and research into VC theory in the construction industry.

Keywords: project delivery model, project value, relationships, value creation.

INTRODUCTION

Construction project delivery has always been challenging (Ahola, Laitinen, Kujala, and Wikström, 2008; Forgues and Koskela, 2009; Oyetunji and Anderson, 2006). For example, typically under the schedule pressure commonly found is a major construction project many projects started construction prior to the project scope (i.e. requirements) being clearly defined (Abi-Karam, 2006; Eweje, Turner, and Müller, 2012). Where this happens, the contractor has the motive to behave opportunistically to demand higher than normal margins when accommodating scope change raising the overall cost of the project. Such scope changes are not normally subject to competitive bidding and therefore make it difficult for the client to argue against the variation costs demanded by the contractor. One way to avoid such opportunistic contractor

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behaviours is resulting from unclear scope definition is for the parties (client and the contractors) to cooperate and collaborate closely early in the project's inception (i.e. long before the tendering stage). However, such trusting relationships are rare and habitually designers (representing the client) and construction contractors work separately applying a traditional project delivery model (PDM) that keep the design and construction stages distinct. This model does not allow for requirements uncertainty and so increase project risks and impacts negatively on project value. Accordingly determining the appropriate PDM plays a critical role in ensuring a project creates long-term value for owners and others key stakeholders (Abi-Karam, 2006; Cheng and Carrillo, 2012; Crespin-Mazet and Portier, 2010; Hyvarinen, Huovila, and Porkka, 2012; Leiringer, Green, and Raja, 2009) and reduces the traditional fragmentation of design-construction-operation stages and interested parties (Dainty, 2007; Forgues and Koskela, 2009; Nawi, Nifa, and Ahmed, 2014).

The problem of uncertain requirements is not confined to construction and software/IT have increasingly looked to what are termed agile methods to more flexibly adapt or respond to scope changes. Indeed, some of these methods, such as Scrum, are a simplified form of PDM that is based around a tight-knit team that explicitly includes customer representatives that uses short, time-boxed release-cycles called sprints to regularly deliver value. While many of the characteristics of Scrum and other agile methods are based on the unique flexibility of the software medium, the high rate of adoption of these methods and their ability to reduce the contractual nature of the relationship between customers and developers suggest that similar relationships be explored in construction projects.

Stakeholder theory focuses the value creation (VC) process on maximizing benefits through relationships with stakeholders (Freeman, Harrison, Wicks, Parmar, and De Colle, 2010), where stakeholder engagement and stakeholder cooperation are two main principles that have been underlined. Although the traditional definition of VC is based on activities performed by the focal organization (Harrison and Wicks, 2013; Jensen, 2001), stakeholders may also collaborate closely to create mutual value (Aapaoja, Haapasalo, and Söderström, 2013; Chan, Chan, Chan, and Lam, 2012; Jacobsson and Roth, 2014). Hence, this paper studies the VC process in two dimensions: independent VC, and value co-creation.

Independent VC relates to the scenario where the project stakeholders have the knowledge, expertise and resources to solely deliver their specific part of a project's responsibilities without the need to seek contributions from other project partners. Examples of this type of VC include routine building construction projects where the parties know how to deliver their services or products without the need to help from other actors. In contrast, value co-creation refers to the scenario where stakeholders have to work closely together if they are to complete an activity or task. Examples can be found in infrastructure projects where significant risks exist and innovation is required to determine the design that meets the objectives. This necessitates that parties collaborate closely to maximize project value.

Specifically, this study investigates how PDMs support the VC process as independently as co-created in construction projects and what effects it can have on the project value delivered. Despite the importance of these questions, the prior literature is limited and ambiguous, consequently a systematic literature review was undertaken which aims to identify patterns and direct future research in this area.

RESEARCH METHODOLOGY

To answer the research questions, the current study was performed through a review of the literature on PDM and VC. The systematic method was applied within the project management field (e.g. Achterkamp and Vos (2008); Holzmann (2013)) in order to increase methodological rigour for synthetizing and producing reliable knowledge for both researchers and practitioners (Tranfield, Denyer, and Smart, 2003).

Firstly, to ensure high quality of the literature, this review was focussed on peer-reviewed publications (i.e. journal articles and international conference papers). The search criteria included three main parameters: period of publication, key terms, and ranking criterion were used in accessing the Scopus, ProQuest and Google Scholar academic databases. The period of publication for the literature search was the 15 years between 2000 and 2014 because the VC construct is a relative new concept in management literature and different PDMs have been proposed to deliver construction projects during this time. Search terms were defined a priori as: 'project delivery model OR project delivery method OR project procurement system AND value creation'. These main terms could be included in the title, abstract or keywords. Additionally, this review did not apply a high ranking journal criterion for seeking to ensure a broad range overview. Based on first criteria, 362 potential publications were obtained (including some duplications), however only 95 of them (26%) include some main terms in the title, abstract or keywords (second criteria).

Secondly, each article was reviewed with suitable publications were selected to form part of this study based on two considerations: context (i.e. construction/project management context), and relevance (i.e. both academic/research paper and direct relation between constructs: PDM and VC process). A total of 54 publications met the required criteria and formed the dataset for this study.

Lastly, capturing and analysing information of this dataset were realized using NVIVO 10. Information capturing started with a pre-codification scheme (e.g., definitions, factors and, types of VC and PDMs). Relevant information (i.e. sentences or paragraphs) was introduced in actual coding according to pre-code scheme. In the end, analysing information was realized through a descriptive and comprehensive understanding of the selected literature, checking redundancies and reporting.

The result derives in three significant drivers of VC from PDM which could be maximized through four types of stakeholder's relationships. In addition, a conceptual framework of VC in construction is proposed. Next sections explain it in details.

PDM AS PLATFORM TO CREATE VALUE

The fifteen years of strategic and project management literature reviewed has emphasized the relevance of VC from different perspectives, highlighting its critical role in a business model. According to Pekuri, Pekuri, and Haapasalo (2013), business models represent the manner in which organizations create value for clients and others key stakeholders, including benefits to themselves. More specifically, Magretta (2002) [cited in (Davies, Frederiksen, Dewulf, Taylor, and Chinowsky, 2010)] state that a business model describes how all of the components of an organization (i.e., resources, capabilities, strategy) fit together to create value for the firm and its clients. The focus of business models has been mostly on firm level. Meanwhile, project management research emphasises that business models cross intra and inter-organizational boundaries of firms and projects (Wikström, Artto, Kujala, and

Söderlund, 2010). Thus, project-based organizations (PBO) such as construction firms should consider understanding the VC process to different types of projects and developing business models that better meet the needs of specific clients or market segments while it also provide organizational competitiveness (Pekuri *et al*., 2013). In consequence, a business model should be conceived to provide a source of sustainable competitive advantage (Davies *et al*., 2010), representing a critical issue to better address the value created from the project level (Kujala, Artto, Aaltonen, and Turkulainen, 2010; Wikström *et al*., 2010).

On the other hand specifically in construction, PDM is the process through which a project is designed and performed for a client (i.e. owner). This process traditionally includes project scope definition, organization of designers, constructors, sub-contractors, and consultants, design and construction phases sequence definition, execution and, closeout and operation start-up (Gransberg, Koch, and Molenaar, 2006). In the most of the cases, if one of these phases fails or is sub-optimal, the project success could be seriously affected in terms of the 'triple constraint' criteria; budget, schedule and quality. In addition, the PDM helps to define the nature of the relationships between project parties involved, to allocate the risks between them, and to identify which are the contract terms (Nawi *et al*., 2014). However, the most relevant concern to the client and others parties is if the project will achieve the long-term, strategic objectives expressed as economic, environmental and societal goals. In consequence, the PDM is currently also considered as a core component to effectively support the VC process for client (Hyvarinen *et al*., 2012) and others project stakeholders (Aapaoja, Haapasalo, *et al*., 2013). Thus, the focus on construction project delivery is changing from the physical result and the triple-constraint toward a life-cycle VC process. This more holistic view ranges from the front-end (idea, selection, definition, financing) to the back-end (renovation, operation and maintenance) (Abi-Karam, 2006) necessary to achieve project value. The success of a PDM can therefore be measured in terms of both project efficiency (i.e. short-term objectives associated with cost, time and quality) and project effectiveness (i.e. long-term benefits to client, users and, the society).

Suitable PDMs and value creation drivers

If a business model is the means by which a firm creates value for its client and stakeholders, then to PBOs each project delivered is a particular value creation process that it is supported by the specific PDM selected. Indeed, the choice of an appropriate PDM, understanding it as source of value could significantly affect the value created and added for the owner (Ahola *et al*., 2008) and others stakeholders. Table 1 describes three value creation drivers that could be performed for a suitable PDM to impact favourably on value creation process to maximize project value: early involvement; design-construction integration; and contractual agreements.

First, PDM can establish and maintain collaborative inter-organizational relationships (IORs) based on closely and joint interactions between partners (i.e. mainly client and contractor) during whole project lifecycle. Under this relational environment of collaboration main contractor and designer (led by client) can share same goals, processes and practices in order to support an effective and efficient communication, information exchange, risks/gains sharing, and continuous learning and improvement. Under this focus on close collaboration, PDM may engage in early project stages (from design) the contractor and others stakeholders. Early contractor involvement is fundamental to mitigate project risks and future disputes due to design and build differences through constructability, sharing knowledge and learning from and for the

contractor. Additionally, engaging stakeholders early could allow defining clearly users' needs and constraints to improve operability and maintainability.

Second, the integration of design and contraction stages through a suitable PDM eliminate the traditional construction project fragmentation, encouraging to knowledge and information sharing, improving lifecycle project costs and schedule and reducing design-construction issues with proactive solutions. This integration helps to shape a cohesive multiparty team (i.e. contractors, designers, sub-contractors, client and users) that work together from theirs stakes to successfully complete the project in an environment characterized by trust, respectful and 'no-flame' actions.

Table 1: Value creation drivers in construction projects

VC Driver, description and benefits	Researcher(s) and year
Early (contractor or stakeholder) involvement: Maintaining close and strong collaborative relationships between partners and incorporating the contractor and key stakeholders in the entire project lifecycle. It could produce: clear definition of responsibilities; sharing of risks and rewards; effective informal control through mutual trust, flexibility and solidarity; reduction of possible risks; reducing negative effects on the behaviours of project actors (e.g. opportunism); resolving proactively disputes; understanding what clients want and how suppliers can help them achieve their goals; sharing vision; enhancing exploratory innovation; developing joint objectives with a win-win perspective; facilitating communication and information sharing; enduring continuous learning and improvement; enabling to cost and time savings and project quality; creating a no-blame culture and high levels of responsiveness; improving the design from the contractor's experience and knowledge; finding solutions that best meets the requirements and the constraints; mitigating risks; enhancing constructability; enabling a strong leadership and proactive contractor; increasing pain/gain sharing; sharing knowledge about the end-users enhancing product's function and usage; and, producing efficient operations according to the user's needs.	Aapaoja, Haapasalo, et al. (2013); Aapaoja, Herrala, Pekuri, and Haapasalo (2013); Abdirad and Pishdad-Bozorgi (2014); Abi-Karam (2006); Ahola et al. (2008); Caldwell, Roehrich, and Davies (2009); Chan et al. (2012); Cheng and Carrillo (2012); Crespin-Mazet and Portier (2010); Eriksson (2013); Errasti, Beach, Oyarbide, and Santos (2007); Kujala et al. (2010); Nawi et al. (2014); Ndoni and Elhag (2010); Tillmann, Ballard, Tzortzopolous, and Formosa (2012) Walker and Jacobsson (2014); Walker and Lloyd-Walker (2013); (Zimina, Ballard, & Pasquire, 2012)
Design-construction integration: System designed to allow the client, contractor and other parties may develop clearly defined and challenging mutual objectives through an effective project team. It could help: reducing traditional fragmentation; encouraging continuous improvements; better constructability and maintainability; resolving potential problems; allowing a focus on long term exploratory design issues and short term exploitation in efficient build activities; merging knowledge and information; sharing mutual interests and incentives; and, sharing expertise and responsibilities to join decision-making process.	Aapaoja, Haapasalo, et al. (2013); Aapaoja, Herrala, et al. (2013); Chan et al. (2012); Crespin-Mazet and Portier (2010); Eriksson (2013); Forgues and Koskela (2009); Leiringer et al. (2009); Nawi et al. (2014); Tillmann et al. (2012).
Contractual agreements: They are an essential part of projects which include patterns of formal relationships as well as informal. It could create: reducing hazards of opportunism behaviour; establishing formal controls to deploy safeguards through contractual enforcement and monitoring; reducing asymmetric information, promoting cooperative, long-term, trusting relations; providing legal enforceability; and, establishing mechanisms to relationship termination and conflict resolution issues.	Aapaoja, Haapasalo, et al. (2013); Caldwell et al. (2009); Chan et al. (2012); Forgues and Koskela (2009); Jacobsson and Roth (2014)

Finally, although some empirical studies have demonstrated that contractual arrangements could be detrimental to foment close IORs, these agreements are an essential part of PDM as a platform to create value because includes mainly patterns of relationships between partners. Within formal agreements, contractors and owners may reduce opportunistic behaviour and asymmetric information through defined controls and often monitoring, as well as fomenting trust, cooperation and long-term win-win relationships by means of legal enforceability.

CREATING VALUE THROUGH RELATIONSHIPS

Stakeholder theory focuses on maximizing benefits through relationships with stakeholders (Freeman *et al*., 2010). Although economic and financial viewpoint currently represents the main value measure of success to organizations, value maximization through stakeholder's satisfaction increases returns (i.e. benefits) in long-term (Harrison and Wicks, 2013). Justly, this study takes stakeholder theory as theoretical foundation because, as analysed above, the PDM configure a relevant platform to value creation considering close relationships and interactions between key stakeholders (mainly client-contractor dyads). According to a seminal research of Spekman, Kamauff, and Myhr (1998) and the extant literature reviewed, four types of client-contractor relationships, namely transactional, coordinative, cooperative and, collaborative are suggested as follows.

Transactional VC approach

Transactional relationship is the traditional way to deliver projects. It represents an exchange relationship based on short-term, limited and price-based interaction between actors where each transaction is becoming a new one (Pala, Edum-Fotwe, Ruikar, Doughty, and Peters, 2012). In this context, the projects are organized as a sequential process, where various actors participate only when their specific work is to be done (Zimina *et al*., 2012), fomenting often adversarial relationships within a competitive context (Crespin-Mazet and Portier, 2010). The primary focus is on efficiency (Walker and Lloyd-Walker, 2013). In construction projects, a transactional mode is delivered when client receive what was specified through traditionally a design-bid-build (DBB) model (Walker and Jacobsson, 2014) where the owner (by means of designer or consultant team) leads the design process but no participates actively during construction process, maintaining almost none interaction with the contractor (Walker and Lloyd-Walker, 2013).

Accordingly, we propose that this transactional VC approach is performed to situations where parties do not need to interact with others to complete their tasks. It evidently represents an independent VC process where contractual agreements are the main source to create value. In this approach, the exchanged product adds value per se to the client and the impact on project value is only in terms of efficiency (i.e. on budget, on schedule, and on scope).

Coordinative VC approach

Coordinative relationship results when there are more mechanisms to interact between actors and processes, fundamentally through those related with monitoring and controlling (Pala *et al*., 2012). This kind of interaction is based on information sharing to ensure project performance (Cheng and Carrillo, 2012), making that the relationship to be more systematic and structured than a transactional by means of administrative procedures (Pala *et al*., 2012). The main focus of this relationship is on a fair process and common propose (Walker and Lloyd-Walker, 2013). An example of coordinative relationship is the construction management (CM) at risk model, where owner contracts separately designer and contractor but an overlapped design-construction sequence is performed to assure information sharing, frequent monitoring and anticipated problem resolution (Oyetunji and Anderson, 2006).

Thus, we propose that a coordinative VC approach is commonly delivered to situations where parties need clear interfaces to share or transfer information in order to control the progress and to complete theirs tasks. The VC process is independent

for each part. Contractual agreements are fundamental to define actions that fomenting interchange of relevant information. Constant monitoring between the parties adds value to client and it impacts positively on the project performance (i.e. efficiency).

Cooperative VC approach

The relationship based on cooperation integrates different actors and their activities under procurement procedures that encourage joint specification multi-criteria partner selection and incentive-based payment to more creative and innovative problem solving (Eriksson, 2013). In this type of relationships, there are more intensive interactions characterized by long duration, integration, early involvement, gain/pain sharing and focus on both project and client requirements (Pala *et al*., 2012). Additionally, this cooperative work is facilitated through the alignment between the project process and information-sharing technologies (Sandhu and Gunasekaran, 2004). Integrated on common platforms is the main focus of this relationship (Walker and Lloyd-Walker, 2013). Design and construction (D&C), engineering-procurement-construction (EPC) or early contractor involvement (ECI) models are typically examples of cooperative arrangements in construction projects.

Hence, we propose that a cooperative VC approach appears within situations where parties need proactively to engage other parties in order to achieve goals within the terms of the contract. Main VC drivers are early contractor involvement during design, and design-construction integration. Actions of co-creation such as value management and/or building information modelling (BIM) are necessary to ensure project objectives and stakeholder's benefits. Early and innovative changes in design could provide some added value, impacting efficiency but mainly project effectiveness (e.g. client satisfaction, business success and beneficial usage).

Collaborative VC approach

Collaborative relationship demands that actors (called also partners) from different organizations jointly work as an integrated team towards common objectives and mutual benefits as well as sharing risks and gains (Aapaoja, Herrala, *et al*., 2013). In addition, an environment of collaboration generates that partners find long-term relationships based on trust and 'no-blame' behaviours (Pala *et al*., 2012). The value focus is on committed relationships (Walker and Jacobsson, 2014) to enable project performance through cost and time savings, and project quality (Errasti *et al*., 2007; Ndoni and Elhag, 2010) but also to achieve tangible and intangible benefits for the client, contractor and others stakeholders (Ahola *et al*., 2008; Tillmann *et al*., 2012). Some collaborative PDMs have been proposed and applied in a construction context, for instance integrated project delivery (IPD) (Aapaoja, Herrala, *et al*., 2013; Abdirad and Pishdad-Bozorgi, 2014; Tillmann *et al*., 2012) and, project and strategic alliancing (Davis and Love, 2011; Walker and Jacobsson, 2014).

Consequently, we propose that this collaborative VC approach is applied to situations where close interaction, joint conflict resolution and risks/gains sharing are required to maximize value. Close client-contractor relationships and design-build integration are two drivers to create value for partners. Evidently, this approach is based on co-creation where client, contractor and others key stakeholders work together (alliance) during whole project lifecycle to achieve long-term benefits. For this reason, collaborative mode impact greatly on effectiveness.

Finally as shown in figure 1, a conceptual framework of VC in construction projects is proposed where VC process has been categorized as independent creation and co-

creation. Also, it is related with VC drivers and the four types of client-contractor relationships through a continuum from transactional (the lowest interaction) until collaborative (the highest interaction).

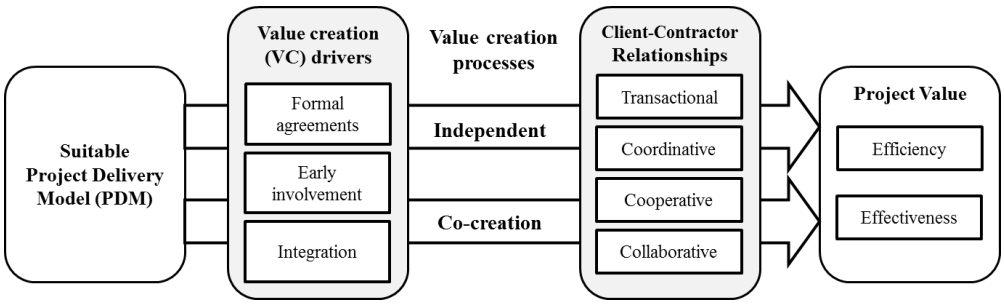

Figure 1: A conceptual framework of value creation in construction

CONCLUSIONS

Underpinned by stakeholder theory, organizations can create greater value from projects where client and others key stakeholders form close relationships. This statement is the foundation of this conceptual study. Supported by a systematic literature review within construction and project management contexts, this paper recognizes that PDMs support the process of VC during whole project lifecycle through three fundamental drivers: early contractor/stakeholder involvement, design-construction integration, and contractual agreements. Furthermore, it discriminates and clarifies four types of relationships between parties to more effective support that lifecycle, namely: transactional, coordinative, cooperative, and collaborative.

Each one of them has own characteristics that could be effective based on the degree of interaction necessary to maximize value from construction project to client and others stakeholders. Accordingly, a conceptual framework has been proposed which takes in account these types of relationships as a continuum starting from low interaction (i.e. more independent VC) to high interaction (i.e. more value co-creation). The effects of PDMs under each VC approach demonstrate that an independent VC process results from transactional or coordinative environments focussed mainly on project efficiency; while cooperative and collaboration relational approaches support co-creation between partners (e.g. client-contractor), contributing more significantly to project effectiveness.

Determining which PDM is best suited to a customer's requirement is extremely important to successful delivery of construction projects. Recognizing their different VC approaches taken by a PDM can reduce the project's risk of failure and help maximize project value. Little empirical analysis on the effects of the more relationship intensive PDMs on project value has been conducted and the efficiency and effectiveness of different PDMs needs further investigation. The conceptual framework presented in this paper will serve as a model for future theoretical and empirical knowledge development within the construction industry.

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