

Chapter 7

Demystifying Collaboration in BIM–Based Projects Under Design–Build Procurement: Clash Detection as a Use Value

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ABSTRACT

Building information modelling (BIM) tools and workflows, new procurements methods, and emerging management practices are being adopted on projects to overcome collaboration barriers and improve project performance within the architecture, engineering, construction, and operation (AECO) sector. Academic literature and industry reports recommend the use of collaborative procurement methods such as design and build (DB) procurement and integrated project delivery (IPD) when adopting BIM workflows. However, to date there are little operationalization and empirical evidence of the value realization potential when using BIM in conjunction to these procurement methods. This chapter draws upon five case studies of BIM-based DB projects to analyze and quantify the potential of value realization using clash detection as a use value. The results reveal potential hurdles inhibiting BIM from reaching its full potential. Accordingly, recommended changes to the current processes are suggested to facilitate BIM in enhancing value on DB projects.

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INTRODUCTION

The construction sector of the US, UK, and other countries has been suffering from a constant decline in performance while manufacturing and other industries have been continuously experiencing a boom in productivity (Sveikauskas et al., 2014; Teicholz et al., 2001). The construction sector has consistently been scrutinized for its inefficiency and failure to meet stakeholder expectations and values. The Construction Industry Training Board (CITB) (2016) reveals that both time and cost for design and construction processes are inconsistently predicted and are adversely affecting project stakeholder satisfaction.

The construction sector is built on the interactions and collaboration of multi-disciplinary teams whose processes and information are intertwined. Communication, integration and alignment of values are key success factors given the growing interdependence and complexity of design and construction tasks (Knotten et al., 2015). Reports spanning across several decades (e.g. Latham, 1994; Egan, 1998; Constructing Excellence, 2009; Cabinet Office, 2011) identified the need for improving project communication and changing adversarial contractual and procurement structures as critical strategies for the construction sector.

One of key process, technology and policy innovations that emerged within the construction sector is Building Information Modeling (BIM). BIM tools and workflows enable project stakeholders to digitally model facility, simulate its performance, and manage information flows across the whole project lifecycle. BIM is increasingly adopted or mandated by central government around the world. For example, the UK government's construction strategy stated that all centrally funded public sector projects needed to achieve Level 2 BIM by April 2016. According to this strategy, the adoption of Level 2 BIM processes is expected to promote the full alignment of supply chains with the people responsible for operating and maintaining the assets (Her Majesty's Government [HMG], 2013). The idealized benefits of BIM in many strategy documents and industry reports (GCCG, 2011) prompted many scholars to investigate the benefits of BIM (Bryde et al., 2013, Love et al., 2014). The collaboration benefits from BIM have been partially operationalised or measured using either quantitative or qualitative key performance indicators (Liu et al., 2016, Oraee et al., 2017, Papadonikolaki et al., 2017, Papadonikolaki and Wamelink, 2017). However, there is still a dearth of studies that investigate collaboration benefits of BIM in conjunction to the procurement framework of projects.

Motivated by Eastman et al. (2008)'s proposition that the use of BIM is clearly advisable in conjunction to Design-Build (DB) procurement, this study aims to address whether the value realization potential of BIM is achieved within DB projects. DB

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