BIM-FM Implementation: An Exploratory Investigation

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ABSTRACT

Considerable amount of research has been developed that investigate the benefits of Building Information Modelling (BIM) for design and construction. However, as suggested in the UK Government Strategy, the relevant gains and difficulties related to the adoption of BIM in the operational stages of the project life cycle are considerably less explored in the available literature. In this respect, a gap of knowledge exists in relation to the value that design and construction information modelling can generate after construction is finished. Moreover, the difficulties involved in shifting from traditional to BIM-Based FM processes are not known. In this article a discussion is proposed that address some of the issues involved in the adoption of BIM from an owners’ perspective. In addition, enablers and barriers to BIM implementation in FM are identified. The discussion is drawn from the results of a case study carried out during the design and construction stage of a major re-development project in Manchester, UK. Data was gathered through interviews with designers, contractors and client’s representatives, real-time observation of BIM development and use and documental analysis. Results indicate a lack of awareness related to the benefits that BIM can offer to FM processes. It also suggests that guidance is necessary for the establishment of the necessary steps for the implementation of BIM for FM purposes such as the identification of key deliverables (capabilities), the establishment of the level of integration, the definition of the maturity level and the standard BIM protocols.

Keywords: BIM Implementation, Building Information Modelling (BIM), Construction, Design, Facilities Management (FM)

1. INTRODUCTION

In the UK and all over the world the race for better results in architectural / engineering / construction (AEC) industries has been supported by an improved and instrumental information modelling system – Building Information Modelling (BIM). In North America (in particular), more and more successful cases of BIM implementation start being reported (McGraw Hill, 2008). In Europe, the adoption of BIM has increased considerably in the last five years (McGraw Hill, 2008) as BIM implementation is seen as extremely beneficial to AEC clients. More recently, this subject has also attracted the attention of AEC clients, who

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can benefit the most from BIM adoption, thus playing pivotal role influencing change in AEC industry (Eastman et al., 2011).

To date, it is still difficult to define what BIM is and involves. As discussed by Succar (2005) “The boundaries of Building Information Modelling as a term-definition, set of technologies and group of processes is fast changing even before being widely adopted by the industry. As a term, BIM seems to have somehow stabilised now, but as a set of technologies/processes, its boundaries are rapidly expanding”. In this article, BIM is the result of a step change towards better-integrated information and processes, enabled by technology and collaborative working practices across and within disciplines and functions of a project, organisation or industry.

The interdisciplinary and inter-functional characteristic of BIM within and beyond AEC demands a series of actions from all members of a project team pre and post construction. For instance, the design and construction team must establish standard protocols that support information being exchanged across teams within different phases. Also, inefficient processes must be identified up-front so implementation can target relevant problems and results can be measured afterwards. Moreover, the level of integration needs to be defined and required changes in processes to support integration agreed. Despite some understanding about what is required to adopt BIM, quite often the necessary actions for extending the use of BIM to the operational phase of the project life cycle are not clear. Thus, lessons have to be drawn from what is known about BIM as applied to design and construction.

With regard to BIM lessons, these have been framed into several different subjects according to what is needed for its implementation or in relation to what the benefits are from its adoption at project and organisation levels. In regards to guidance for its implementation, textbooks and articles in this filed discuss issues such as BIM implementation at strategic (Smith & Tardif, 2009) and operational levels (Kiviniemi et al., 2007; Underwood & Isikdag, 2010; Eastman et al., 2011) including the support it provides to design (Ma et al., 2005; Treeck & Rank, 2006; Brandon & Kocaturk, 2008; Sacks & Barak, 2008; Barack et al., 2009; Cetiner, 2010; Kocaturk & Medjdoub, 2011), production management (Koo & Fisher, 2000; Dawood et al., 2003; Jongeling & Olofsson, 2007; and Russell et al., 2009) or to achieve improved sustainability (Azhar et al., 2011) and interoperability (Lertlakkhanakul et al., 2006; Olatunji & Sher, 2010). In relation to operations and facilities management (FM) from both project and organisational perspectives, examples include CRC (2007), Sabol (2008), Smith and Tardif (2009), Onyenobi et al. (2010), Rebolj et al. (2010), Autodesk (2011) and Forns-Samso (2011).

With regards to BIM for FM in particular, the UK Government Strategy indicates that the relevant gains from BIM adoption will be perceived in the operational stages, where more efficient processes for managing the utilisation of public assets can be established (BIM Industry Working Group -IWG- 2011). However, evidence that sustain the predicted operational gains does not exist and research addressing the implementation of BIM for FM purposes remains scarce. Thus, this article aims at contributing to this theme by exploring issues emerging in the implementation of BIM for FM purposes. The research presented here differs from the previously mentioned research as it was based on the investigation of a case where a bottom-up approach to the implementation of BIM for FM started being considered by the client in the early stages of design and construction. Several aspects were investigated including those related to BIM standard protocols, maturity levels, scope of work, collaboration pathway, implementation process and benefits from adoption. The necessary background and the findings of the research are presented in the following.
Disease, Death, and the Body Politic: An Areal Interpolation Example for Political Epidemiology
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