ABSTRACT

The use of Building information modelling for the design and construction phase of a building has been thoroughly looked into by researchers and practitioners and there is evidence to support that it is beneficial for reducing cost, time and improving communication. Yet the potential use of BIM for the operational and management phase (Facilities management), besides maintenance schedules and equipment information and location, is still not clearly identified. The UK Government, institutional clients and major private owners are now demanding for BIM for new construction and major refurbishment but given that 70-75% of the current UK building stock will still be in use in 2050, a significant part of the existing facilities will not have an information model till the next major refurbishment, creating a major gap in the built environment. This paper presents a new framework aimed at creating information models for facilities management requiring minimal BIM skills and discusses the impact that models created for the operational stage would have on the whole life cycle of a building.
1. INTRODUCTION

The number of companies using BIM for the design and construction of new buildings is constantly growing (Bryde, Broquetas, & Volm, 2013; Underwood & Isikdag, 2011): this technology is developing fast and it is used to accommodate the growing complexity of new construction projects (Bryde et al., 2013). BIM is an information management process (Underwood & Isikdag, 2011) that can be used at all stages of a building’s life-cycle: from understanding the project needs of the owner, to evaluate designs, manage the construction process and operate the building until decommissioning (Grilo & Jardim-Goncalves, 2010). A building information model can reduce costs, provide support to a more efficient project delivery process (IFMA, 2013) and enhance collaboration and knowledge sharing (Ho, Tserng, & Jan, 2013; Kivits & Furneau, 2013). The many benefits of BIM during design, planning and construction (Eastman, Sacks, Sacks, & Liston, 2011; Gray, Gray, Teo, Chi, & Cheung, n. d.) have been studied both by practitioners and academics but for building operations and facilities managers, BIM is still a relatively new topic: its potential is still not fully understood and there is little interest regarding what happens once the building model is completed and handed over, and how BIM will be used to manage the facility beside the possible use for enhanced building maintenance (SmartMarket Report, 2008). BIM awareness and adoption growth has been significantly influenced by the UK Government strategy for the construction industry (SmartMarket Report, 2014). BIM Level 2 mandate for all Government projects by 2016, is based on a collaborative digital environment and focuses mainly on design and construction, while BIM Level 3, now Digital Built Britain, “will extend BIM into the operation of assets over their lifetimes” (Digital Built Britain, n. d.). The full collaboration between all disciplines involved in a construction project aimed for BIM Level 3 will get facilities managers more involved with the modelling technology. Only recently, researchers have started looking at the possible integration of BIM and FM but the main focus is on new constructions rather than existing buildings (Gray, Gray, Teo, Chi, & Cheung, n. d.). However, given the number of existing buildings in the UK estimated to be in use by 2050 (70-75%) (Ravetz, 2008) there is the need to address the problem of creating building information models for existing estates. Facility managers are constantly challenged to improve and standardize all available information to address day-to-day operations and life-cycle management (IFMA, 2013). Nowadays, building information is often incomplete or obsolete (Becerik-Gerber, Jazizadeh, Li, & Calis, 2012; Gursel, Sariyildiz, Akin, & Stouffs, 2009) hence during operation “an inordinate amount of time is spent locating and verifying specific facility and project information” (O’Connor, Dettbarn, & Gilday, 2004). BIM provides integration of data systems during the building’s life cycle (IFMA, 2013), therefore there is an opportunity for facilities managers to improve the current practice and use BIM as a decision making tool. There are several potential benefits of using BIM during operation and maintenance that confirm the importance of extending BIM to facilities management practices and create models for existing buildings: the availability of as-built information (Eastman et al., 2011), the development of maintenance schedules, the opportunity to track and maintain lifecycle information about the building structure (Carbonari & Jones, 2014) together with the opportunity to improve various aspects of performance (IFMA, 2013).

The purpose of this paper is to present the initial stages of the development of a new framework aimed at creating building information models for existing buildings. Section 2 discusses how the information model should be developed according to the Publicly Available Specification (PAS) 1192. Section 3 focuses on the technologies currently available to create models for existing buildings. Section