Building Information Modelling (BIM) for Facilities Management (FM): The Mediacity Case Study Approach

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ABSTRACT

Facilities Management (FM) as the total management of all services supports the core businesses of an organisation in a building. However, today’s buildings are increasingly sophisticated and the need for information to operate and maintain them is vital. Facility Managers have to acquire, integrate, edit, and update diverse facility information ranging from building elements, fabric data, operational costs, contract types, room allocation, logistics, maintenance, etc. However, FM professionals face challenges resulting in cost and time related productivity, efficiency and effectiveness losses. Building Information Modelling (BIM), that seeks to integrate the building lifecycle, can provide improvements and help to overcome those challenges. Thus, the paper explores how BIM can contribute to and improve the FM profession. It uses the MediaCityUK project as a case study, which is a regeneration project aiming to attract media institutions locally and worldwide and establish itself as an international centre for excellence. For this purpose, the key FM tasks are identified and a BIM model for the new university building in MediaCityUK is developed and experimented with the FM tasks by a group of FM experts. As a result, the paper explains how BIM can support FM tasks in an itemised manner.

Keywords: Building Information Modelling, Building Maintenance, Facilities Management, MediaCityUK, Operational Building Lifecycle, Space Management

1. INTRODUCTION

Building Information Modelling (BIM) as a lifecycle evaluation concept seeks to integrate processes throughout the entire lifecycle of a building. It aims to provide a more streamlined business process, associated project and site management methodologies including complete facilitation of construction knowledge during the full lifecycle of a building (Kymell, 2008). The focus is to create and reuse consistent digital information by the stakeholders throughout the lifecycle. BIM in most simple terms is the utilization of a database infrastructure to encap-
ulate built facilities with specific viewpoints of stakeholders (Arayici et al., 2009). It is a methodology to integrate digital descriptions of all the building objects and their relationships to others in a precise manner, so that stakeholders can query, simulate and estimate activities and their effects of the building process as a lifecycle entity (Gillard et al., 2008).

BIM incorporates a methodology based around the notion of collaboration between stakeholders using ICT to exchange valuable information throughout the lifecycle. Such collaboration is seen as the answer to the fragmentation that exists within the building industry and has caused various inefficiencies (Jordani, 2008) and it has come to a point where change is now eminent (NBIMS, 2007) because BIM can provide the required valued judgments that create more sustainable infrastructures to satisfy owners and occupants. However, it is necessary to realize that while the users and owners can change over the lifecycle of a building within different intervals, the most important aspect is to minimize the impact to the natural environment. While this can be achieved in a variety of ways using maturated BIM integrated construction methodologies, they are not discussed here due to our specific focus on facilities management.

The paper aims to explore and experiment BIM for FM using the MediaCity project, where the University of Salford will have an existence in MediaCity for the conduit of Higher Education, in order to identify the extent to BIM can contribute to the facilities management (Building Maintenance, Building use Management).

2. FACILITIES MANAGEMENT (FM) PRACTICE AND CHALLENGES

Facilities Management is a multi-disciplinary field encompassing multi-disciplines to ensure the functionality of built environment by integrating people, place, process and technology (Cotts et al., 2009). In scenarios such as major relocation of organisations into new buildings, FM for the building lifecycle is the key aspects that should be conducted effectively and efficiently (Nazali et al., 2009). However, there are key challenges in the current practice such as building operational life cycle management, some of which revolves around information collection retrieval and sharing (Cardellino & Finch, 2006). The challenges in FM are revealed more when the information exchange challenges are experienced during design/construction are multiplied across the lifecycle of a facility (Jordani, 2010).

There is a need for optimising the building use from an FM point of view for effective and efficient building lifecycle management. 85% of the lifecycle cost of a facility occurs after construction is completed and the NIST (National Institute of Standards and Technology) Interoperability Study indicated that two-thirds of the estimated cost is lost in the US due to inefficiencies during operations and maintenance phases (Jordani, 2010; Rundell, 2006). The maintenance requirements of a building (hard issues) (Olomolaiye et al., 2004) such as maintenance of window and doors require a managed approach due to the size of the facility. It is also important to identify designed and actual occupant functions (soft issues) (Olomolaiye et al., 2004) and allocate spaces during the building life cycle for operational efficiency. Space reallocation is a consideration that should not be overlooked as the functional requirement of the owner/user may change in time that also underscores building life cycle management. A detailed list of FM tasks against which benefits from BIM is discussed later in the paper.

Rundell (2006) suggested that owners and operators can mitigate their portion of the cost by using the high-quality building information from a BIM design process during the longer, more expensive maintenance and operation phase of the building’s lifecycle, while Azhar et al. (2008) states that BIM may allow facility managers to enter the decision-making process at a much earlier stage, where they can influence the design and construction.