

Chapter 11

HBIM Data Management and Visualization for Healthcare Facilities

Matteo Del Giudice

Dipartimento di Ingegneria Strutturale, Edile e Geotecnica, Politecnico di Torino, Italy

Daniela De Luca

Dipartimento di Ingegneria Strutturale, Edile e Geotecnica, Politecnico di Torino, Italy

Anna Osello

Dipartimento di Ingegneria Strutturale, Edile e Geotecnica, Politecnico di Torino, Italy

ABSTRACT

BIM and VAR represent technological frontiers able to innovate the building industry in the drawing field. Through multidisciplinary approach, their integration requires multidisciplinary skills that have to find a significant framework in the representation field. The SAM4Care (Smart Advanced Modelling for Care) project aims at enhancing the use of innovative technologies investigating data management and visualization topics. Through a selected case study, BIM and VAR were evaluated, testing possible ways to innovate healthcare system buildings developing a digital model, following HBIM methodology. In this way, different information can be provided to satisfy user's needs through participatory planning able to improve people awareness for healthcare building stock.

INTRODUCTION

In the last years, several researches investigated the role of digital technologies for data management optimization related to the building industry that is in a transition period oriented to the digital era.

According to European Commission, this digital transformation is characterized by a fusion of advanced technologies and the integration of physical and digital systems, the predominance of innovative business models and new processes, and the creation of smart products and services. Certainly, adopting

DOI: 10.4018/978-1-6684-7548-5.ch011

HBIM Data Management and Visualization for Healthcare Facilities

a set of mainly technological, cultural, organizational, social, creative and managerial changes allows users to improve their conditions of daily well-being and providing tools to improve awareness of the built environment.

Focusing on these topics, Architectural Engineering and Construction (AEC) industry is going to be upgraded adopting and integrating Information and Communication Technologies (ICTs) in order to share all the needed information related to the whole building life cycle process. In these terms the adoption of Building Information Modelling (BIM) to manage data at building and urban level is one of the most investigated strategies to achieve this goal. It is characterized by a set of processes composed by a set of processes applied to create and manage information based on a 3D representation of the physical and functional characteristics of a facility.

Adopting this innovative strategy, different kind of graphical and alphanumerical information can be collected using a graphical dataset as unique repository that can be linked to others such as Geographic Information Systems (GIS) and Internet of Things (IoTs) platforms.

Although this argument is often associated to new buildings, it is currently used for the existing ones that mainly compose the majority of the building stock. For this reason, the need to develop historical virtual buildings check to reality implies the use of informative models able to reproduce their geometrical and alphanumerical characteristics.

From the drawing discipline point of view, developing BIM models, able to provide different data to be visualized to different end users, represents an innovation technology to discovery reality according to innovative dimensions. In this context, Virtual and Augmented Reality (VAR) technology can be considered a right tool to taste real word in different way, offering the opportunity to display different kind of information using computer graphics. Unfortunately, both AR and VR adoption and usage remain very low because of technology has not been mature enough to be viable in mass market applications. Thus, the development of virtual environments able to be explored with these technologies is an actual research topic that aim at evaluating its strengths and weaknesses proposing possible practical applications that can be exploited in the construction sector.

In this context, VAR tools can play an important role to enhance the architectural heritage and in particular health facilities, improving the management of information that can be provided to different users to achieve different goals.

As the use of Health Information Technology (HIT) in Europe is still moderate, this contribution aims to investigate the interaction between building industry and health sector through these visualization tools creating a model of virtual healthcare structure where the involved users (e.g. doctors, patients, relatives, employees, technicians, maintainers) are the center of information management.

In this context, VR simulations are focused on a generation of a digital spatial model that facilitates various activities where healthcare facilities are optimized for safety, quality and efficiency (Gaba, 2004). In the last decade several researchers are investing the goodnees of using VR for rehabilitation as this system offers the opportunity to bring the complexity of the physical world into the controlled environment of the health laboratory (Keshner, 2004).

As this contribution examines historical building heritage especially with particular attention to the Italian healthcare real estate, Historical BIM (HBIM) methodology was investigated in relation to health sector. Several researchers explored this argument proposing different definition about it evaluating different aspects such as modelling workflow, performing historic 3D objects libraries, data management and planned and preventive conservation. Of course, the role of interoperability has been evaluated in order to assess the proper information to be displayed according to different devices the user's needs. For

20 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:
www.igi-global.com/chapter/hbim-data-management-and-visualization-for-healthcare-facilities/315453

Related Content

Collaborative Environmental Knowledge Management

Haohui Chen and Ian D. Bishop (2013). *International Journal of E-Planning Research* (pp. 58-81).

www.irma-international.org/article/collaborative-environmental-knowledge-management/76292

Forensic Technologies in the Courtroom: A Multi-Disciplinary Analysis

Vincenzo Antonio Sainato and Jessica A. Giner (2018). *International Journal of Smart Education and Urban Society* (pp. 15-28).

www.irma-international.org/article/forensic-technologies-in-the-courtroom/214051

From High School to Higher Education: Learning Trajectory for an Inclusive and Accessible Curriculum for Teachers and Their Students

Francesco Maiorana (2021). *International Journal of Smart Education and Urban Society* (pp. 36-51).

www.irma-international.org/article/from-high-school-to-higher-education/288414

Searching Through Silos: Assessing the Landscape of Participatory Mapping Research Using Google Scholar and Web of Science

Shelley Barbara Cook, Logan Cochrane and Jon Corbett (2020). *International Journal of E-Planning Research* (pp. 23-39).

www.irma-international.org/article/searching-through-silos/261847

Organizational Culture, Knowledge, Learning Organizations, and Innovation on Sustainable Organizations: Strategic Implications

José G. Vargas-Hernández and Muhammad Mahboob Ali (2022). *Smart Cities, Citizen Welfare, and the Implementation of Sustainable Development Goals* (pp. 239-263).

www.irma-international.org/chapter/organizational-culture-knowledge-learning-organizations-and-innovation-on-sustainable-organizations/290134