



ERCIM "ALAIN BENSOUSSAN"
FELLOWSHIP PROGRAMME



Scientific Report

First name / Family name

Seyed Reza Hosseini Raviz

Nationality

Iranian

Name of the *Host Organisation*

NTNU - Norwegian University of
Science and Technology

First Name / family name
of the *Scientific Coordinator*
Period of the fellowship

Sobah Abbas Petersen

01/05/2019 to 30/04/2021

I – SCIENTIFIC ACTIVITY DURING YOUR FELLOWSHIP

I received ERCIM Alain Bensoussan Fellowship and I started to work at Norwegian University of Science and Technology (NTNU) as a Research Fellow at Department of Computer Science, Faculty of Information Technology and Electrical Engineering. The topic that I focused on this fellowship program was smart hospital architecture and I worked on facility management by using BIM. The research was focused on Enterprise BIM (EBIM) that is the use of BIM in organizational processes during the entire building's lifespan. EBIM obeys and follows the strategy in which all buildings in a complex are described and communicated in a uniform OpenBIM standard during building lifecycle. EBIM seeks to establish a clear and transparent communication and knowledge sharing throughout organizational structures. The main goal is a comprehensive achievement towards rational and logical digital management of buildings which can reflect the engineering structures and performance of buildings in the best way possible. In this regard, EBIM forms the basis for the future strategic real estate management by using virtual models and open standards.

Using the EBIM method, the traditional boundaries between project and owner are eliminated by the way in which, the owner implements the project into the digital platform

of the enterprise and not as a single standalone building project. This ensures rational and logical digital management of buildings which can reflect engineering structures, performance of buildings and infrastructure from registered demand to demolition. Accordingly, by using EBIM approach, the health care industry can establish a virtual building information structure that is capable to support day-to-day maintenance, tracking objects and providing different views to the end user. Three-dimensional models and BIM are already in widespread use in construction projects. Enterprise BIM or EBIM is a continued solution with an emphasis on digital collaboration and sharing of all building-related information where core businesses and building owners can use the potential of ownership of information throughout the lifetime of the building. Enterprise BIM is the concept where the virtual building and building processes are used throughout the lifetime of the building, and the outdoor environment is combined with sensors and the companies' own work processes. Consequently, building owners will have a unique decision basis for optimizing the use and operation of the building stock. Hence, EBIM acts as a virtual comprehensive representation of the buildings and infrastructure that is aimed to optimize and improve business management, knowledge sharing, digital interaction, and connection in the different phases of the building life cycle. our study shows how EBIM could support an organization's core business operationally and strategically. In fact, EBIM is aimed to support the building's entire life cycle and in this approach facility management (FM) is considered as a necessity. we tried to demonstrate that FM is not a dedicated or a separate system and it uses the same data as those required for business operations.

One of the topics that we focused on was the indoor positioning system (IPS) as a key enabling technology for IoT applications, which uses smart and non-smart mobile devices (object tags and beacons) with the aim of positioning and objects tracking that lead to a smart approach in the field of facility management (FM). Hence, the research surveyed the joint use of IPS, and BIM in FM based on the concept of enterprise BIM (EBIM). EBIM forms the basis for the future strategic real estate management using virtual models and open standards. As a result, we gained the ability to collect positioning data continuously, save them in a BIM database, and present them on two-dimensional (2D) maps that leads to use data collection effectively for FM as an organizational function in large and complex buildings. In this regard, the mechanism of performing of EBIM/IPS leads to a systematic review of results and regular evaluation that helps the healthcare industry to create and plan hospitals based on a conscious attitude, which results in the support of good services and functional efficiency enhancement.

II – PUBLICATION(S) DURING YOUR FELLOWSHIP

"Enterprise BIM: A Holistic Approach to the Future of Smart Building". 25th International Conference on Urban Planning and Regional Development in the Information Society (REAL CORP 2020: SHAPING URBAN CHANGE, Livable City Regions for the 21st Century). Aachen, Germany. pp. 251-260. ISBN:978-3-9504173-8-8 (CD), 978-3-9504173-9-5 (print) <https://conference.corp.at/index.php?id=4&L=0>

"Enterprise BIM: An All-Embracing View Towards to Life Cycle Building Information Management". 18th International Conference Architectonics: Mind, Land and Society. Barcelona, Spain. (Abstract presentation) <http://www.architectonics.com/>

"Leveraging on Enterprise Building Information Models in Health Care Services: The Case of St. Olav University Hospital". PRO-VE 2020, Valencia, Spain. Publiser i Boosting Collaborative Networks 4.0, Springer.

Sustainable Development in The Healthcare Enterprises Management Through BIM and FM Interaction Based on a Holistic Aspect Structure (Accepted July 2021) in Real Corp 2021.

"Smart Facility Management: Future Healthcare Organization through Indoor Positioning Systems in the light of Enterprise BIM" Smart Cities Journal, section: Smart Health - mHealth in Smart Cities, MDPI, (Accepted: 23 July 2020).
https://www.mdpi.com/journal/smartcities/sections/Smart_Health

III – ATTENDED SEMINARS, WORKHOPS, CONFERENCES

Poster Presentation: Smart Hospital and Enterprise BIM – CATCH IDI 2020, February 2020, Trondheim, Norway

Virtual conference, Real Corp 2020

IV – RESEARCH EXCHANGE PROGRAMME (REP)

Unfortunately, I could not do my REP due to the corona pandemic.