

## Digital transition applied to the integrated and intelligent management of healthcare buildings: the pandemic legacy

### Summary

Facility Management (FM) is a professional activity that integrates people, spaces, processes, and technology within the built environment, and the main objective is to ensure its utmost functionality. Notwithstanding, the management of buildings in usage conditions should be efficient during their life cycle, with a sustainable way of considering the new challenges of the Europe Union (EU): resilience and digital transition, so FM contributes to achieving these goals. Furthermore, 85% of the project's total life cycle cost is spent on these activities and covers more than 50 years of the whole life span.

Also, since the beginning of 2020, the COVID-19 pandemic has generated unprecedented impacts on the management of hospital buildings, namely the growing need to (i) provide space for patients, medical staff and equipment storage, (ii) imposition of access limitations/restrictions on the FM teams, (iii) development of digital tools for management and, (iv) monitoring of assets in real-time, (v) adapted the space and its functionality quickly and efficiently, (vi) ensure continuous control of air quality and adequate ventilation of spaces.

Besides, the global technological trends point to a commitment by players in FM sector to the integration of digital technologies, the adoption of new processes, and a clear focus on efficiently managing during the building life cycle. This industry is experiencing a boom due to integrating new technologies, concepts, and approaches. However, there is a low level of technological maturity of companies in the FM sector, betoken a slow adoption of modern technologies and tools to support O&M management.

Thus, the research project combines the benefits of an interoperable BIM viewer, which allows displaying all the building information while monitoring the state of a pilot case in real-time, with a low-level sensor system cost connected to an optimization module. Besides, the PhD project work proposes to contribute to the discussion of the following questions: (i) What are the FM needs in the integrated management of buildings in the usage condition? (ii) How can the digital transition improve the management of the operation and maintenance of infrastructure in hospital buildings? (iii) What is the legacy for the FM teams in this post-COVID-19 management of hospital buildings? Therefore, to achieve the main objective of this study, sub-objectives were determined and mapped: (i) digital maturity of the FM; (ii) Product data template for BIM-FM integration; (iii) Use case definition; (iv) BIM-FM-IoT Integration; (v) Optimized and intelligent maintenance model.

Finally, the expected outputs are: (i) Understanding the digital maturity of the FM sector and the main challenges to overcome; (ii) Development of a product data template with the key parameters/indicators to be considered in a BIM object; (iii) Improvement of the BIM-IoT-FM integration process based on the web semantic; (iv) Development of a Digital Twin for FM activities in healthcare buildings.

### Keywords

Healthcare facility management, digital transition, FM, buildings, tools, in-service conditions, IoT, artificial intelligence, BIM, digital twin.



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