

# Chapter 1

## BIM and Cultural Heritage: Compatibility Tests on Existing Buildings

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### ABSTRACT

*Since it spread on the market, the professionals consider building information modelling as one of the most efficient methods to handle and manage a building and its entire life cycle, including costs, energy simulation, construction production data, and more. Thanks, also, to the legislation of the past few years, it is possible to say that this approach is known almost by everyone in the new construction field, and its employment is growing. The current use of BIM software is mostly referred to new buildings, made of regular elements and standard parameters. Is it possible to use the BIM process for the maintenance and the conservation of cultural heritage? The only way to answer this question is to research the academic environment, starting to train the professionals of tomorrow earlier, and proposing interesting cases studies on the subject. This chapter explores BIM and cultural heritage.*

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## **INTRODUCTION**

The aim of the research, in progress today, is to investigate, with real data and real case studies, the BIM process and highlight the difficulties to improve it. In particular, the target is to test different methods and software, which satisfy the requirements of the new buildings, and see if they can also be successfully used in complex situations. The restoration work on Cultural Heritage, where it is necessary to consider the unicity of the architectural and archaeological elements, the construction systems and materials (not standardizable as the new ones), the damage to the structures and the environmental conditions, represents definitively, a prominent example.

Nowadays, there is a constant diffusion of BIM systems among different fields of application. Building Information Model is not a single software, but it is a process that supports both the information sharing and the maintenance of buildings, during their life-cycle. Harpaceas (2017) states that the BIM modules are three: “Authoring”, including all the software that build the 3D model; “Tools”, used for the computes and the information about the materials in the construction site; “Review”, checking the final model implemented by all the information, ensuring that the structural, architectural and plant models correspond.

It is clear that the potential which, until now, has been used mostly in the new constructions field, can be adapted and refined in the CH area.

The restoration work aims at the conservation of the authenticity of the object, handing down the object as it has come to us, in its aesthetic, artistic and historical reach. It treats the built as a historical document, carriers of information that, even if not recognised, cannot be lost. As with a historical record, it must be guaranteed readability to future generations as well.

Ultimately, the conservation project is a sustainable project, considering that the preservation of the material is obtained by keeping it in situ, with the use of eco-friendly materials and techniques, entail the reduction of the risks (including environmental) and the costs associated with the demolition and the management of the wastes.

The maintenance work could be considered as an epistemological problem: during its development it is necessary to choose how deeply must be its knowledge, starting with the ontological question of the object itself. It means that, from one side, it is necessary to define how and how much deeper this object can be described. On the other hand, if there is a need to examine it in its entirety or considering different levels of knowledge for each portion or element, (planning survey activities according to the aim of the project).

Any conservation project, as well as a maintenance project, requires the knowledge of the object and requests specific competencies and equipment, whose application needs a schedule to optimising resources, including the financial ones.

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