

BIM Concepts to Unveil 19th Century Housing in the Venetian Ghetto

Paolo BORIN, University of Padua, Italy

Ludovica GALEAZZO, Villa I Tatti, The Harvard University Center for Italian Renaissance Studies, Italy

Keywords: HBIM, Ghetto, Reconstruction, Augmented Reality

The exhibition Venice, the Jews, and Europe: 1516-2016 organized on the occasion of the fifth centenary of the creation of the Venice Ghetto aimed to describe the many processes that led to the creation, implementation, and transformation of the first 'fence' for Jews in the world (Calabi, 2016). The Ghetto represented a city within the city, as has often been pointed out, an area that was completely self-sufficient and autonomous. Within its precincts, Jews of different nations gradually established the social and economic structures vital to community life.

Several examples show how the process of building narratives for cultural heritage involves heterogeneous information deriving from multi-disciplinary sources. In order to manage the complex transformation of information from data to narrative, the research group has used a parametric BIM environment (Bonsma et al., 2016). This choice was driven by the necessity of improving the collaboration and coordination of data.

This study focused on two buildings in the north part of Ghetto Nuovo, both demolished during the 19th century but well-documented thanks to structural intervention made by the Republic in 1770.

The paper explains the methodology adopted by the multidisciplinary research group, basically art historians and digital modelers. The research started with the collection of data, including textual documents about owners and tenants, drawings, GIS-based historical phases, as well as a digital survey of the current state of the area. These heterogeneous data have been fundamental for the construction of the BIM model, but they necessitated of a continuous interpretation in order to create a coherent solution, from a tectonic, historical, and geometrical point of view.

On an architectural scale, BIM model easily allows structuring the information from the 18th-century survey. For example, on one of them the first issue is coordinating four versions of plans of the 5 floors (Fig. 2), and two elevations, one depicting the situation outside the Ghetto and one inside the main square. The information about the other building was represented by two vertical sections.

More than a simple 3D representation, the BIM model embodies a fundamental tool for historical researches (Giordano et al., 2015). Given its typical hierarchical structure, it allows the organization of information (building, stories, rooms) by assigning parameters to a group of objects (i.e. rooms linked to tenants). Moreover, this implicit ability to spatially manage information linked with parametric features leads to create multiple reconstructions. Collaboration methods, as enabled for the construction industry, allow the research group to perform checking operation online, giving historical researchers 3D models and data.

In conclusion, comparing with traditional CAD methods, BIM-based reconstruction, thanks to its parametric features, saved time for creating alternatives (Fig. 1). It also gave the opportunity to easily analyze data about the building itself, from the height of each level to the dimension of the riser of the stairs, which described Jewish housing condition in the Ghetto before 18th century. The two models represented a key point for building the library that could lead to the reconstruction of all the demolished buildings in the actual Ghetto area.



a



b

Fig. 1. Models are reconstructed from 18th survey data: building 7399 (a); building 7385-7387 (b) (© Paolo Borin)

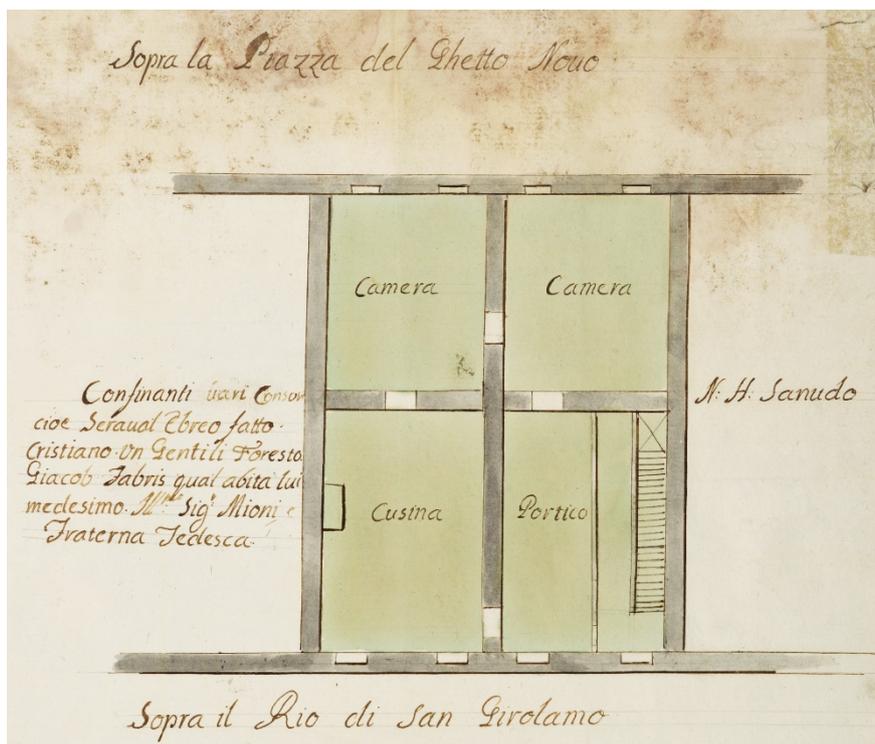


Fig. 2. Second level plan of the building 7388 in Napoleonic cadastre (© Archivio di Stato di Venezia)

References

- Bonsma, P., Bonsma, I., Ziri, A. E., Parenti, S., Leronés, P. M., Hernández, J. L., Maietti, F., Medici, M., Turillazzi, B., Iadanza, E., Murtiyoso, A., Grussenmeyer, P., Koehl, M. and Freville, T. (2016). 'INCEPTION Standard for Heritage BIM Models.' In Ioannides, M., Fink, E., Moropoulou, A., Hagedorn-Saupe, M., Fresa, A., Liestøl, G., Rajcic, V., and Grussenmeyer, P. (eds) *Digital Heritage. Progress in Cultural Heritage: Documentation, Preservation, and Protection*. Cham: Springer International Publishing, pp. 1–12.
- Calabi, D. (2016). *Venice, the Jews, and Europe: 1516-2016*. Calabi, D. (ed.). Venezia: Marsilio.
- Giordano, A., Borin, P. and Cundari, M. R. (2015). 'Which survey for which digital model: critical analysis and interconnections.' In *XIII International Forum. Le vie dei Mercanti*, pp. 1051–1058.