Archival Drawings-Based 3D Reconstruction of Architectural Heritage: The Gio Ponti's Garzanti Foundation

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Abstract

This paper explores the role of 3D reconstruction based on archival drawings as a tool for the interpretation and valorization of modern architectural heritage. The study focuses on the Garzanti Foundation Institution in Forlì (Italy), designed by Gio Ponti in the 1950s and currently unused, for which a rich corpus of original drawings is preserved at the Study Centre and Archive of Communication of the University of Parma. Through the analysis and integration of design documents produced during different phases of the project, a 3D model of the building's original design was developed. The digital reconstruction supports a critical reading of Ponti's design intentions and highlights the transformations between the project and the existing building. Beyond its analytical value, the model is conceived as a resource for cultural dissemination, enabling mobile and AR (Augmented Reality) experiences aimed at communicating the architectural value of the building to a broader audience. The research investigates how archival-based digital models can enhance access to, understanding of, and engagement with twentieth-century architectural heritage.

1. Introduction

This study takes part of a broader on-going research project developed within the framework of the PR-FESR Emilia Romagna 2021-2027 (Priority 1: Research, Innovation, and Competitiveness, Action 1.1.2) through the project "RADICI – Creation of an Aggregation and Digitization Infrastructure for Heritage to Promote Interaction with the Cultural and Creative Industries". The project involves several research institutions and aims to create an aggregation and service infrastructure to integrate regional archives, collections, and cultural heritage (CH) repositories, increasing their digital accessibility for the Cultural and Creative Industries (CCI). Within this framework, one of the main research goals addressed in the project, and presented here, focuses on the valorization of architectural heritage through digital reconstruction based on archival documentation. In this context, three-dimensional models are not intended only as representational outputs, but as interpretative and communicative tools capable of supporting historical analysis, critical reading of design intentions, and the experimentation of new methods for dissemination and reuse of cultural content.

Three-dimensional reconstruction of cultural heritage based on design drawings represents a well-established research field, with applications ranging from archaeological context to the study of damaged or lost architectures (Apollonio, 2025), as well as to the modeling of unbuilt projects (Di Paola, 2024), both historical (Quattrini, 2015) and contemporary (Sdegno, 2022). In many of these cases, digital reconstruction serves as an effective tool to preserve and convey the memory, identity, and design logic of buildings that are no longer accessible in their original configuration.

Depending on the purpose of the project and the nature of the architecture under investigation, methodological choices can be different. In particular, the 3D model can be developed within a NURBS environment (Campofiorito, 2020), implemented in a BIM framework (Barsanti, 2022), or obtained through automated methods (Feist, 2024), according to specific requirements of the research. Such models are continuosly employed in museum and exhibition contexts (Spallone, 2022), or in Augmented Reality researches (Barile 2024), where they support the interpretation of complex architectural structures (Bereczki, 2024) and facilitate the communication of historical development to a broader audience (Fatta, 2016). Regardless of the modeling approach adopted, compliance with the guidelines provided by institutions that support research for societal benefit (e.g., European Commission, UNESCO, etc.) is essential, given the scientific and cultural relevance of these activities. Among the key principles emphasized are the transparency and reliability of data, as well as the traceability of the processes through which data are produced and shared.

In this context, it is particularly useful to stress that the analysis of graphic documentation related to a historic building presents a series of critical issues that require a structured methodological approach. One of the main complexities arises from the variability and heterogeneity of the available documentation, which can differ depending on the period of construction, the historical and cultural context, and the operational practices of the architect. In the case of large-scale or publicly commissioned buildings, the design process could extend over a long period, resulting in highly variable documentation both quantitatively and qualitatively, also reflecting the practices and training of the designer. Furthermore, the progressive definition of the project, traditionally articulated from general schemes to detailed drawings, could involve modifications during different design phases, generating discrepancies between the initial project version and the constructed building. It is also possible that some modifications were implemented directly during execution without being recorded in the drawings, as they were not considered necessary by the authorities. Additional complexity derives from the state of preservation of the documents and the presence or absence of dimensional indications, such as graphic scales, measurements, and construction notes, as well as from potential gaps in the documentation, which require justified interpretative choices. For these reasons, a critical analysis of the iconographic documentation is essential: it allows for the reconstruction of the original design matrices, the identification of transformations that occurred in the building, and the assessment of the impact of such transformations on the architect's original intent.

The present study focuses on a specific case study: the Garzanti Foundation Institution in Forlì (Italy). Designed by the Italian architect Gio Ponti (Ponti, 1957) in the 1950s, the building is closed and no longer in use. It represents a particularly significant case study, both for its architectural importance and for the extensive documentation preserved at the Study Centre and Archive of Communication (Centro Studi e Archivio della Comunicazione – CSAC) of the University of Parma. Although the building had been investigated by numerous studies in recent years, this research aims to provide a novel critical and graphical interpretation of Ponti's project. At this stage, the primary goal of the research is to digitally reconstruct the original version of the project, enhancing the value of archival documentation as a primary source for historical and architectural research. Starting from this reconstruction, it will be possible to carry out a comparison with the current version of the building. As a secondary outcome, the study also considers the potential applications of the resulting 3D model for communication and dissemination purposes.

2. The Garzanti Foundation

2.1 The Garzanti Foundation complex

The Garzanti Foundation, commissioned by the publisher Aldo Garzanti with the aim of providing the city a hospitality center for artists with hotel facilities (Vasumi Roveri, 2005), is located in the historic center of Forlì, directly facing Corso della Repubblica. The complex, constructed from 28 September 1954 and inaugurated on 12 October 1957 (Pasquali, 2026), occupies an area of approximately 4,600 m² and is composed of a series of interconnected buildings (Canali, 2006). Within the complex, it is possible to identify different forms, volumes, and functional uses (Figure 1).

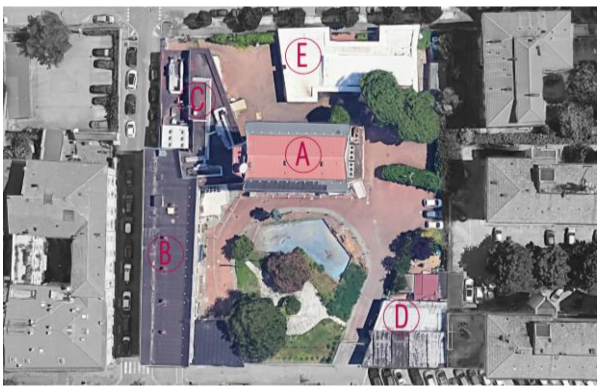

Figure 1: Site plan indicating the buildings of the Garzanti Foundation complex: A – Garzanti Foundation Institution; B – Garzanti Foundation Hotel; C – Entrance; D – Shop building; E – Engineer Bosisio Pavilion.

The present study focuses on one of the buildings within the complex, the Garzanti Foundation Institution (Building A), which is considered an architecture of particular interest within Gio Ponti's design. As the tallest structure of the complex, rising six storeys above ground, the building is distinguished by an extremely regular rhythm of openings and by an architectural language based on geometric clarity and rigorous compositional principles. These characteristics are clearly expressed in the façades, which are defined by a systematic arrangement of hexagonal-shaped windows. The ground floor of the Institution was originally intended as a large hall, while the upper levels were designed to accommodate rooms, in keeping with the hospitality and cultural function assigned to the entire complex. Since 2009, the building has been subject to heritage protection, and since 2015 the entire complex has been closed and remains unused to this day (Figure 2).

Figure 2: On the left: external photograph of the Garzanti Foundation Institution. On the right: internal view of one of the rooms inside the building.

2.2 Iconographic Documentation preserved at the CSAC

With regard to the Garzanti Foundation project, the Study Centre and Archive of Communication (CSAC) of the University of Parma preserves an extensive documentary *corpus* consisting of more than one hundred drawings, including technical drawings, sketches, and views. It is interesting to note that the entire collection, characterized by the presence of drawings on tracing paper, pounced drawings, and heliographic prints of differen dimensions, underwent a restoration process thoroughly documented in the volume edited by C.R. Romeo (Romeo, 2015). This intervention finished in the framing of the drawings with passe-partout.

For the purposes of the present study, particular relevance is attributed to the series of drawings included in the "*List of Foundation Garzanti drawings"*, which represents the primary documentary reference for the analysis proposed here. These materials, created on tracing paper between 1953 and 1956, document in detail the design process of the entire complex. The analysis of the list led to the identification of seventy-five drawings classified as complete, based on the presence of stamps, headings, and other technical data. Among these, twenty-six drawings resulted directly relevant to the building examined in this study and were consequently used as the primary source for the three-dimensional reconstruction. The rest of drawings relate to the building B. Within the selected set, seven drawings refer directly to the building as a whole, while eight specifically document the openings (doors and windows). Six drawings focus on selected construction details, such as the main entrance, the eaves, or the gate, whereas the remaining five are dedicated to the furniture of the hotel room. The examined documentation covers the full range of architectural representation scales, from general drawings at a scale of 1:100 to detailed drawings at scales of 1:50, 1:20, 1:10, and 1:1. This

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variety attests to the complexity of the design process and to the careful attention devoted to both the architectural organism and its furniture elements.

2.3 Iconographic documentation of the Garzanti Foundation Institution

The twenty-six drawings related to the Institution building can be classified according to their scale of representation. At the 1:100 scale, the drawings provide a general overview of the building, including plans, elevations, and a transverse section. The 1:50 scale is used for more detailed drawings of plans, transverse section, and the entrance canopy. At the 1:20 scale, the documentation includes detailed rapresentations of the room and the public entrance. Finally, the detail scales, 1:10 and 1:1, are dedicated to technological, constructional, and furniture elements, including openings, doors, façade components, stairways, canopies, building services details, and furniture.

Focusing on the seven drawings related to the building, two main typologies can be identified. The first group consists of two boards at a scale of 1:100 (Board n. 1 and 5), which include the representation of four plans (the basement level, ground floor, typical floor, and roof plan), a transverse section and four elevations. The second group is composed of five drawings at a scale of 1:50 (B. 15 - 19), which develop in detail some of the representations contained in the previous boards, in particular the four plans (Figure 3) and the transverse section. In this second series of drawings, however, a detailed representation of the elevations is not included.

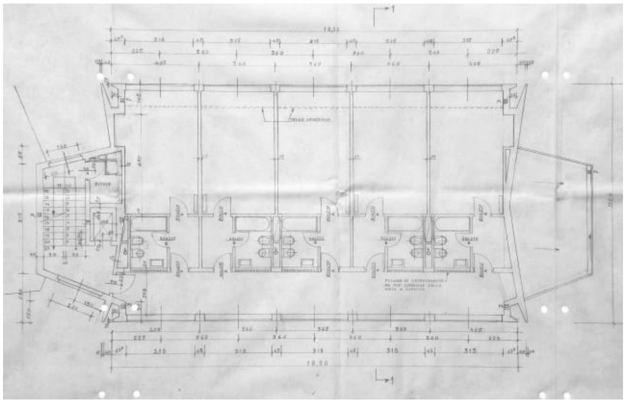

Figure 3: Part of the original drawing of the Garzanti Foundation Institution in Forlì (Board n. 17. Typical floor plan, CSAC, University of Parma).

The comparative analysis of the two sets of drawings clearly highlights that they were produced during different design phases and with specific purposes. The 1:100 scale drawings are clearly focused on the generic representation of the building, whereas the 1:50 scale drawings represent the final project. Indeed, the latter provide detailed information, such as planimetric and altimetric dimensions, window and door types, the layout of sanitary fixtures in service areas, and, in some cases, the intended use of rooms.

A particularly interesting aspect concerns the differences identified between the two sets of plans, which reflect the evolution of the project over time. The main discrepancies can be summarized according to the following levels:
- Basement level: the final drawings introduce new internal partitions to delimit technical rooms within the main building space. In the eastern stairwell, a service block was added, accessible from an intermediate landing connecting the basement with the ground floor. In the western part, the distribution of spaces beneath the staircase has been reconfigured;
- Ground floor: in the final drawings, the eastern block was extended to align with the service block added at the basement level, featuring a height increase of 85 cm relative to the main hall;
- Typical floor: in the final drawings, the corridor originally planned for the loggias on the north façade was removed, resulting in larger rooms with direct visibility to the northern garden;
- Roof level: the final drawings include inspection hatches for the lighting fixtures, support elements corresponding to the load-bearing structure, and three extraction units.

Regarding the single vertical section present in both sets of drawings, the differences observed are entirely consistent with the changes noted in the plans. The only significant discrepancy concerns the roof: the preliminary version included a raised roof supported by two longitudinal walls, whereas in the final version the roof rests directly on the top floor slab, thereby simplifying the structural solution.

2.4 Graphical documentation of the furniture

The reference drawings for the hotel room furniture consist of five boards: N. 28, 34, 35, 69, and 70. The first board is related to a general representation of the room at a 1:20 scale, complemented by vertical sections showing the four sides of the room, thereby offering a comprehensive and detailed view of the spatial organization of the furniture (Figure 4). The remaining boards are dedicated to individual furniture elements, drawn at a scale of 1:10 and supplemented by construction details at 1:1 scale. In particular, nine elements are documented: desk, small table, shelf, desk chair, armchair, chest of drawers, bedhead, bed, and wardrobe. Each drawing includes the dimensions necessary for defining the furniture, and in some cases, annotations regarding the materials specified by the designer.

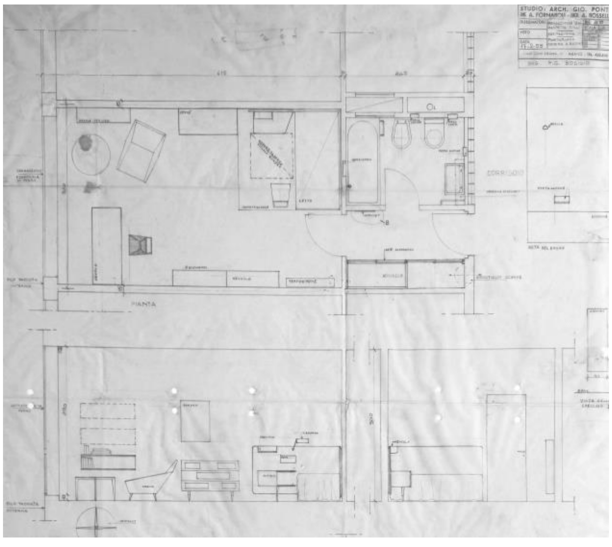

Figure 4: Part of the original drawing of the Garzanti Foundation Institution in Forlì (Board n. 28, Room and bathroom detail, CSAC, University of Parma).

Although the furniture elements are no longer present in the building (with the exception of the wardrobe), having been sold during recent years, it is still possible to conduct a comparative analysis based on photographic documentation and auction catalogs. The analysis highlights that some of the furniture currently available from specialized retailers shows small differences compared to the original drawings. It is plausible to assume that these elements were produced at a later stage, likely based on additional execution drawings.

3. Archival drawings-based 3D reconstruction

3.1 Methodologicaal choices and purposes of the 3D model

Before starting the 3D reconstruction phase, it was necessary to clearly define the goals and the intended uses of the digital model. In this specific case, the model was conceived to fulfill three complementary purposes. First, it aims to digitally reconstruct the original design of the Institution, using archival documentation as a primary source for historical and architectural analysis. Within this framework, the model has also been conceived as a tool for visualizing elements of the building that, although included in the original design, were never cconstructed. The digital reconstruction thus functions as an interpretative tool, aimed at a deeper understanding of the original design intentions. Second, within the RADICI project, the model will be shared on the dedicated platform to make it accessible and reusable by the creative industries, encouraging new forms of production, interpretation, and valorization of cultural content. Finally, the model is also intended for heritage dissemination through the experimental use of mobile-device viewers. This solution will enable broader and more immediate access, promoting interaction with a non-specialist audience and supporting on-site consultation activities.

In this context, a consolidated workflow in the field of digital architectural reconstruction from archival drawings was adopted. The methodological workflow consists of a series of interconnected phases, which can be summarized in three main stages: (1) data collection; (2) data interpretation and two-dimensional redrawing; (3) three-dimensional reconstruction. The first phase involved the systematic gathering and analysis of available bibliographic and iconographic sources, followed by the acquisition of graphic materials. The second phase consisted of a critical analysis of the collected materials to assess and verify the completeness and consistency of the available documentation. Subsequently, the most relevant drawings were redrafted within CAD environment. This stage of the workflow involved a detailed examination of the redrawn materials, with particular attention to proportional studies and the spatial relationships among the various components of the project. The third phase focused on the development of the 3D model, according to the level of detail was intended to achieve. Once the model was completed, a verification phase was conducted to ensure its internal consistency. The model was then further enhanced by integrating additional data and metadata, with the aim of improving its readability and usability (e.g., original drawings were linked to the 3D objects).

3.2 Two-dimensional redrawing phase

The digital reconstruction of the building was carried out based on archival drawings, which served as the primary documentary reference for the development of the 3D model. It is important to note that, in light of the differences observed between the two sets of drawings, the 1:50 scale sheets were primarily used for the redrawing of the building, as they were more consistent with the current configuration of the structure.

Prior to the redrawing process, it was necessary to digitize the original drawings. High-resolution scans (300 dpi) of the drawings were employed to preserve legibility and graphical detail accuracy. Moreover, the drawings were adequately dimensioned, allowing direct reference to the measurements. It is important to note that these dimensional annotations made it possible to assess the quality of the digitization process: despite the inevitable deformations of the original supports, sample measurements taken from the scans proved to be consistent with the dimensions indicated in the drawings.

Subsequently, the digitized files were imported into *AutoCAD 2025*, where they were scaled and used to produce the two-dimensional drawings. Methodologically, a manual redrawing of the five 1:50 scale drawings was performed (plans at levels, +50, +305, +1165, +2700 roof plan, and a cross-section of the building), ensuring precise control throughout the process. This operation went beyond a simple graphic transposition: it involved a crucial interpretative phase in which each element was analyzed and verified, comparing available information and correcting inconsistencies observed in the original drawings. Based on the previously mentioned boards (four plans and one 1:50 section) and integrating information from the 1:100 scale drawings, the four elevations of the building and a series of vertical sections were produced (Figure 5). The high number of sections was necessary to thoroughly document the internal layout and spatial configuration, which were essential for the subsequent phase of three-dimensional modeling.

Figure 5: Section–elevation of Gio Ponti’s original Institution design, reconstructed from archival documentation (original scale of the drawing 1:50).

Finally, in a concluding phase, the drawings were enriched with detailed elements, such as doors and windows, to achieve a complete and accurate representation of the building. Among the twenty-six drawings analyzed, one-third specifically address the topic of the openings (windows: boards n. 23, 23 bis, 45; doors: boards n. 25, 50, 51, 58, 62). Based on these drawings, it was possible to reconstruct a complete window and door schedule, which was fundamental for the completion of the building’s graphic documentation.

Once the redrawing of the all two-dimensional drawings necessary for the building modeling was completed, it was possible to proceed with the redrawing of the hotel room furniture. Following once again an interpretative phase, based on the integration of information derived from the design drawings and technical boards of the individual elements identified in auction catalogs (Bertoni, 2012), their representation in triple orthogonal projection was carried out. This representation was further enriched with detailed sections, particularly for elements with higher construction complexity.

3.3 Organization of the 3D reconstruction model

The modelling process was developed in the *Rhinoceros 3D* environment, version 8, by Robert McNeel & Associates, selected for its flexibility in managing complex geometries and for its ability to integrate metadata associated with objects. This choice directly addresses the needs of the creative industries, which generally do not adopt platforms and methodologies typical of the BIM domain. Nevertheless, it is important to emphasize that the adoption of *Rhinoceros* does not preclude a potential transfer of the model into a BIM environment. Such integration is in fact possible through the use of the *Grasshopper.Inside.Revit* plug-in, which enables interoperability between the two environments and the evolution of the model towards a structure compliant with BIM standards (Costantino, 2022).

From the earliest stages, a stratified model structure was adopted, organized through hierarchical layers, with the aim of developing a system capable of supporting progressively higher levels of develompment. In particular, layers of the model are grouped into macro-groups, each corresponding to a specific level of the model. This represents an incremental system, in which each macro-group does not replace the previous one but rather integrates and enriches it. Within each macro-group, multiple thematic layers are included, referring to different categories of elements but sharing the same level. This organization allows for a dual mode of reading the model: on the one hand, a vertical reading, following the progression of levels (from L1 to L5); on the other hand, a horizontal reading within each macro-group, in which the different layers describe homogeneous components of the building system.

- 01_Structural | **L1 – Level 1**
  - 01_Str_Beams-Slabs (horizontal elements)
  - 02_Str_Pillars-Walls (vertical elements)
- 02_Architectural | **L2 - Level 2**
  - 01_Arch_Slabs (horizontal elements)
  - 02_Arch_Walls (vertical elements: int and ext)
  - 03_Stairs and railings
  - 04_Doors_simplified
  - 05_Windows_Simplified
  - 06_Arch_Roofs
- 03_Architectural | **L3 - Level 3**
  - 01_Doors_Detailed
    - 01_Frame
    - 02_Panel
    - 03_Fittings
  - 02_Windows_Detailed
    - 01_Frame
    - 02_Glazing
    - 03_Fittings
- 04_Architectural | **L4 - Level 4**
  - 01_Furniture
- 05_Architectural | **L5 - Level 5**
  - 01_Furniture_Metadata

Figure 6: Hierarchical organization of the 3D model layers.

In this specific case study, five levels of model were defined, labelled L1–L5 and characterized by an increasing degree of complexity, ranging from the most synthetic level (L1) to the most in-depth level (L5) (Figure 7).

The first level (L1) includes a representation of the building limited to the load-bearing structure, incorporating the essential elements required to define the building's primary structural framework. In this case, the definition of the structure plays a particularly significant role also in relation to the openings, as the building represents an example in which the architectural form determines their configuration.

The second level (L2) integrates the structural system with the main architectural elements, modelled in a simplified form. At this stage, horizontal elements (floors and roofs), vertical partitions (external and internal walls), and vertical circulation elements (stairs) were introduced. In order to provide a complete visualization of the entire building, a simplified representation of the openings was also included at this level. The goal is to deliver a coherent representation of the building's spatial organization, while avoiding the introduction of details that might unnecessarily increase the complexity of the model.

The third level (L3) further enriches the model by including architectural components characterized by a higher degree of detail, such as openings, specifically doors and windows. These elements, which are well documented in archival drawings, make it possible to approach a more faithful representation of the building in its original configuration.

The fourth level (L4) represents the most advanced stage in terms of geometric modelling and includes all elements from the previous levels, integrated with furniture components derived from the designer's drawings, particularly those related to the rooms. This level enables a more complete and articulated representation of interior spaces, supporting more in-depth functional and spatial analyses.

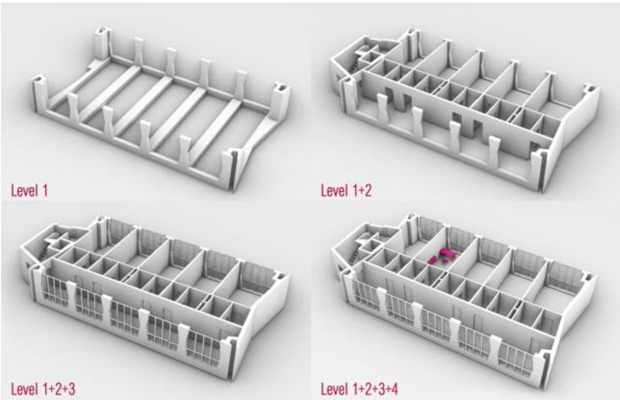

Figure 7: Hierarchical organization of the 3D model (representation of the typical floor of the building with different levels).

Finally, the fifth level (L5) represents an informational evolution of the previous level (L4). It is characterized by the systematic association of metadata and precise references to the sources used for the reconstruction of the furniture (links to design drawings, historical photographs, and informative metadata). This informational enrichment ensures full traceability of the modelling process and guarantees a high level of methodological transparency. Regarding the metadata associated with individual elements, these were organized as textual attributes. As an example, the case of a desk is presented. The informational attributes were structured according to a hierarchical criterion, from general to specific: starting with a general description of the furniture, followed by its geometric and material characterization, including dimensions and materials employed. The cataloguing concludes with a description of the iconographic documentation in which the element is recorded, including the number of reference drawings, their archival location, the titles of the sheets, the scale of representation, the types of drawings available, and any relevant notes. Finally, a set of bibliographic references was included to support the information provided (Figure 8).

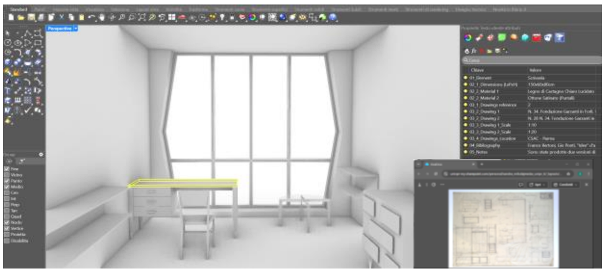

Figure 8: Internal view of the 3D model reconstructing the original project of the hotel room in the Garzanti Foundation Institution in Forlì, with an indication of the iconographic documentation and the informative metadata assigned to the furniture element (desk).

3.4 Development and implementation of the 3D model

From an operational point of view, the 3D modeling phase was started by importing the two-dimensional drawings into *Rhinoceros*, appropriately oriented in space to ensure correct geometric correspondence across the different levels. Subsequently, the elements were constructed using standard operations such as extrusions, surface generation from boundary curves, and direct solid modeling. From the early stages, it was considered essential to organize the modeling according to the previously identified levels, ensuring a clear distinction between the various components and coherent management of the entire model. For example, in defining the floors, a single polysurface was not created; instead, distinct volumes corresponding to the beams and non-structural parts were modeled. This approach allowed accurate visualization and reading of the floor both at level L1 and the upper levels, effectively distinguishing the structural elements from the infill. Particular attention was also paid to creating correctly closed volumes, an essential requirement to avoid issues during subsequent export phases and interoperability with other modeling or analysis platforms.

To facilitate model management and improve the legibility and efficiency of information, specific organizational strategies were adopted (blocks of repetitive elements, division of the model according to the floors, etc.). These strategies reflect a broader consideration on the relationship between the level, the number of elements, and the computational weight of the model. Increasing the number of elements across levels L1–L4 results in a progressive rise in the number of three-dimensional entities and the complexity of polysurfaces, directly affecting model performance during visualization, querying, and export. Therefore, the definition of levels was guided by a preliminary assessment of the balance between geometric articulation and operational sustainability, with the aim of ensuring a scalable, coherent, and manageable model over time.

4. Use of the 3D model for communication purposes

4.1 Comparative analysis between the original design and the existing building

The model was also structured to support the visualization of design components that were either not realized or executed differently from the project documented in the drawings presented here. In line with established approaches in the field of critical project representation and three-dimensional modelling applied to architectural heritage, these elements were clearly distinguished within the model to highlight the differences between the design configuration and as-built state. It should be noted that, at this stage of the research, the comparison between the design and the built condition was conducted exclusively at a typological and configurational level, based on on-site surveys that allowed verification of overall dimensions and the general layout of the building. A detailed metric comparison, supported by more accurate survey daa, is planned for a subsequent phase of the research.

In particular, regarding the elements represented in Ponti's drawings that were not costructed, the following can be identified: the eastern entrance canopy, the dormers on the roof for the bathroom ventilation system, the rectangular elements designed adjacent to the columns on the basement and ground floors of the south façade for the bathroom drain columns, and the storage room accessible from the ground-floor hall. In relation to the known transformations (either during construction or subsequent modifications), the following can be noted: the installation of the window frames (the Curtisa company, which produced the windows, respected Ponti's design intentions in terms of geometry, although slightly modifying the windows for construction-related reasons), the replacement of most doors, the altered configuration of the eastern stairwell, the introduction of a suspended ceiling in the hallway leading to the rooms, and the removal of the shutters in the rooms.

To this aim, within the *Rhinoceros* environment, a differentiated visualization strategy was adopted, based on the assignment of textures, in order to highlight elements that were either not realized or executed differently, without altering the overall geometric coherence of the model (Figure 9). This approach allows for an immediate reading of design discrepancies, while preserving the model as an interpretative tool as well as a descriptive one.

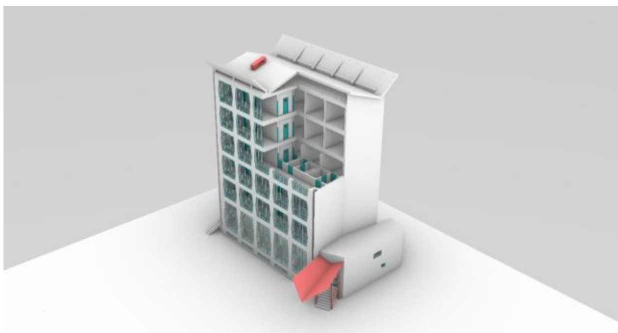

Figure 9: Visualization of building components not constructed (red color) or constructed differently from Gio Ponti's original

design (green color), highlighted in the 3D model to support the comparison between the project and the as-built configuration.

4.2 Visualization of the 3D model for dissamination purposes

Regardless of the future use that may be assigned to the complex, which remains currently unused, it is essential to convey to the public knowledge of the original project by architect Gio Ponti, making legible the design intentions that guided the configuration of the building.

As previously mentioned, the 3D model is intended to be used within the dedicated platform, with the goal of making it accessible and reusable by the creative industries, fostering new forms of production, interpretation, and valorization of cultural content. Since the platform is still under development and testing, at this stage of the research the focus has been on experimenting with the potential use of the model for architectural communication and heritage dissemination through mobile device viewers. For this purpose, the free native viewer of the modeling software, *iRhino3D*, was selected. The model was imported into the viewer and tested on two different devices: tablet and smartphone.

The first simulation refers to the experience of a potential visitor who, during a tour of the complex, uses a tablet to explore the configuration of the building designed by Gio Ponti. This approach enables interactive consultation of the 3D model, providing support for spatial and distributive understanding of the architecture during on-site use (Figure 10).

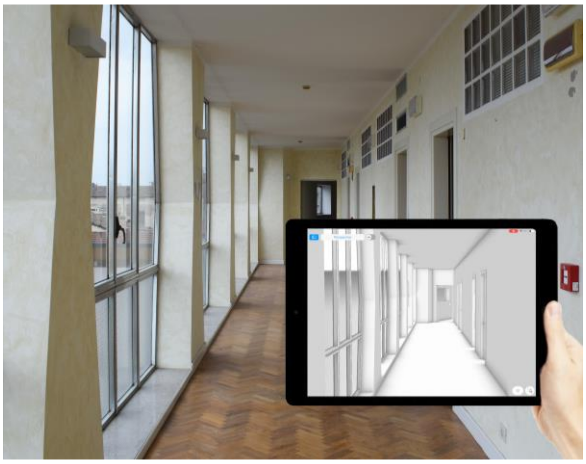

Figure 10: Simulation of 3D model visualization on a mobile device during a visit inside the Institution building.

The second simulation involves the use of Augmented Reality (AR) technologies, which allow the digital furniture to be visualized within individual rooms. In this context, the visitors can, using their own smartphone, overlay the digital furniture onto the real space, achieving an integrated perception between the physical environment and virtual content (Figure 11).

In parallel with the visualization simulations, an additional phase was conducted on the use of generative Artificial Intelligence (AI) models to support the texturing phase. This phase was developed in accordance with a clearly defined hierarchy of sources: the 3D clay-render model represented the scientific base of the work, as it is derived from verified and controlled data; historical photographs were considered primary sources for formal and material verification; catalogue images and typological references were regarded as secondary sources, employed to support the interpretative process. In this specific context, a mixed *text- and image-to-image* approach was adopted, combining controlled textual prompts with historical photographs and catalogue images of the furniture. This strategy aimed to guide the generative AI models through the integration of descriptive, visual, and typological information, thereby supporting a more informed and constrained texturing of the 3D clay-render view. The obtained image was integrated into the 3D model and made accessible within the visualizer, enabling a direct comparison between the clay-render model and the textured versions, both on tablets and smartphones, in continuity with the mobile usage scenarios described in this section (Figure 11).

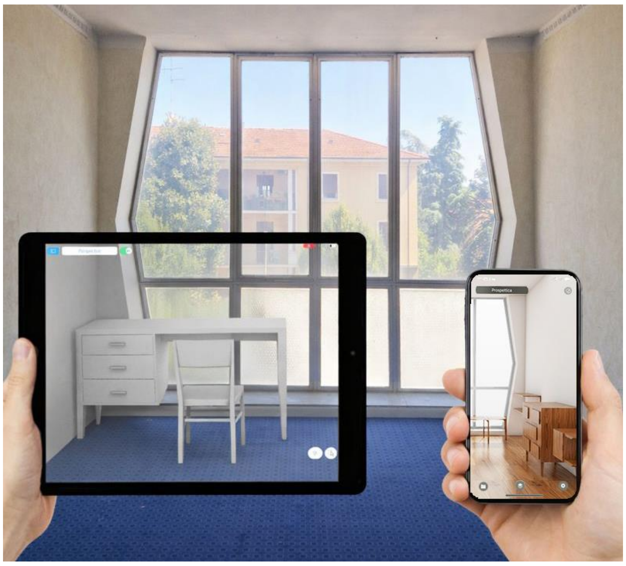

Figure 11: Simulation of the visualization of the 3D model on a mobile device in AR modality to display the original furniture of the room (on the left) and of the textured image obtained with AI within the 3D model (on the right).

5. Results and conclusions

This research addressed the topic of three-dimensional reconstruction of modern architectural heritage based on the analysis of design drawings, focusing on the Garzanti Foundation Institution in Forlì as a case study. The study lead to the creation of a digital documentary corpus that reflects the original design configuration. The outcomes included complete traditional two-dimensional drawings and a three-dimensional model of the building. The latter was further enriched with additional metadata, making it an important tool for the understanding and valorization of the building.

The future developments of this research are numerous. First, the model will be uploaded onto a digital platform to assess its usability by creative industries and other stakeholders. Second, a comparison with survey data of the existing building could be carried out to validate the accuracy of the construction from a metric point of view. The methodological approach could also be extended to the remaining parts of the Garzanti Foundation complex, ensuring a more comprehensive digital documentation. Furthermore, generative modeling tools could be used to create audiovisual content for heritage dissemination, while AR applications could enhance public engagement and

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provide interactive experiences. These developments would consolidate the 3D model as a versatile tool for research, education, and cultural promotion.

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