

# A framework to analyse historic buildings and interiors

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## Abstract

Analysing and understanding the historic environment gives us the possibility to deeply grasp the inseparable relations between form, structure, and material, which gives historic buildings a unique character and defines architectural identity. But understanding all these underlying issues needs a critical and active engagement with the built environment. Evaluating the historic environment with an intuitive approach can feed the design process but it may also lead to the undervaluation of certain issues, which may in fact be very important in terms of cultural significance. This paper aims to develop a framework to analyse historic buildings by focusing on space more than the architectural being. Therefore, it proposes to analyse the historic environment with a continuous approach starting from urban scale to interior scale. The use of such a framework aims to structure the analysis of the historic environment with a concentric approach on human experience and it targets to feed the adaptive reuse process and related design activities.

*Keywords: historic buildings, cultural significance, spatial analysis, adaptive reuse, interior space, human experience.*

## 1 Introduction

One of the most important issues in the reuse process of architectural heritage is determining compatible use, which is defined as a use, which respects the cultural significance of a place (The Burra Charter [1]). But understanding the cultural significance of a building needs a deep involvement to it. So, spatial analysis can be regarded as the initial step in determining compatible use and defining the priorities and limitations of the intervention in adaptive reuse. There are many different methods in analysing architecture, which have different



concerns. Joedicke [2] analyses buildings through a framework, which consists of context, structure, plan section relationship, spatial envelope and light. He mainly focuses on the relationship between form and space by applying his method to several historic structures in order to understand spatial order. In his book “Analysing Architecture” Unwin [3] structures architectural elements into two groups as basic elements of architecture and modifying elements of architecture. While basic elements are mostly involved with physical properties of architectural space, modifying elements include light, color, temperature, sound, smell, texture etc. which define spatial atmosphere. Clark and Pause [4] develop a more systematic framework, which include structure, geometry, massing, circulation, light, organization and spatial order and they try to understand the architectural quality in leading historic and contemporary buildings. In his book “Drawn to Design” Jenkins [5] develops a method, which proposes to analyze buildings in 5 basic steps including plan, section, facade, detail and context. His main intention is to explore the need to examine a building, space or designed object as an experience. He discusses that drawing and sketching is a way of digesting the environment in order to come away with a more in-depth understanding of how the environment might have been formed, what it contributes or does not contribute and what lessons might be embedded in it. Unlike the casual glance or photograph, even the fastest, literal drawing is an inherently careful and active engagement.

This paper aims to develop a framework for analyzing existing buildings in order to determine the most compatible purpose and way of using it. So the priority of the method is to understand the architectural and spatial potentials embedded within the building and its components. Adaptive re-use does not always concern the building as a whole. But even if adaptation proposes partial use, understanding the building as a whole is necessary. While the context of any architectural structure is the city or the landscape it is defined in, the context of every interior is the building it is situated in. So this work proposes a framework, which is composed of two main steps:

- Analyzing the building as a whole;
- Analyzing interiors.

Previous works about architectural analysis mostly focus on analysing the building as a whole so this work differentiates from them because of its main concern. Even during the first step while analysing the building as a whole, it

Table 1: The framework for analysing historic buildings and interiors.

<b>Analysing the building as a whole</b>	<b>Analyzing interiors</b>
Context	Spatial envelope
Tectonic order and material	Materials
Geometric relations	Interior details, furniture, accessories
Spatial organization	Human scale
Spatial circulation	Spatial atmosphere
<b>Architectural potentials</b>	<b>Spatial potentials</b>

tries to develop a different point of view, which focuses on space more than the architectural being. The second step, analysing interiors, aims to develop an understanding of the spatial character of architectural interiors and their roles in the building.

While analysing historic buildings of course it is very difficult to use the same method or framework for every building because all architectural structures have their own priorities and potentials to be underlined depending on their cultural significance. So this work tries to help the architect or designer to develop an individual method in order to appreciate the quality embedded in historic buildings and recognize the underlying spatial issues, which are difficult to comprehend by an intuitive approach. Therefore analysing historic buildings vary according to

- The cultural significance and heritage value of the building;
- The priorities and approach of the architect;
- The intention of the intervention.

If we define analysis as looking at an entity by different filters and trying to understand the roles of different layers that make up the whole, we can say that analysis and sketching have a lot in common. A photograph has equivalent focus on every layer that make the whole but a hand drawing has focus on what we look at. That is why a formal survey and photographs cannot be enough to understand the underlying issues in historic buildings. So, hand drawing can be regarded as the methodological counterpart of architectural and spatial analysis.

## **2 Analysing the building as a whole**

### **2.1 Context**

In order to understand a building, it is necessary to grasp the exterior forces that shape it. Buildings that are situated in urban context needs to be analysed in terms of urban continuity. Therefore the relationship of building mass to the urban space in which it is defined in can be regarded as the initial phase of contextual analysis because generally urban space is one of the most important determinants of the architectural shell, which is an interface between the building and the city. Urban infrastructure also plays an important role in the determination of the buildings entrances and orientation. While analysing the relationship between the building and the urban space that surrounds it, it is necessary to look at the urban spatial envelope, predominant paths, density, important buildings, structures and landmarks around the building. In Figure 1, a building (shown in black) in Piazza della Signoria in Florence is analysed in terms of its relation to the square. Respectively, illustrations show the square, its envelope, predominant pedestrian paths, pedestrian density, landmarks and the area from where the building is perceived.

In this case the building and all its interiors on the façade have a direct relationship to the square and we can talk about a continuity from inside to outside and from outside to inside. Especially ground floor interiors give meaning to the square to which they are attached.



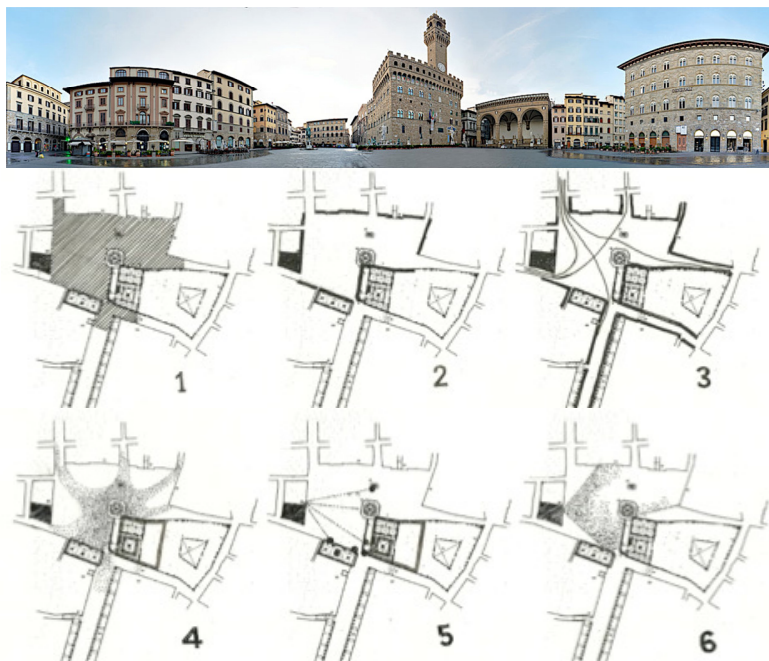


Figure 1: Analysis of a building in Piazza della Signoria in terms of its relationship to the square.

## 2.2 Tectonic order and material

The most important deficiency of today's architecture and spatial design activities can be regarded as the detachment of construction from the realities of matter and craft. According to Meiss [6], in architecture, the question of truth and untruth refers to the relationship between form and construction. In this sense historic buildings expose the way they are structured in both elementary and holistic point of view (Figure 2). In most historic buildings especially in those of Renaissance the nature of material was the basic element that determined constructional principles and beauty was the result of the logical proportional relations and constructional principles that respected the nature of material [7].

Material is much more than a follower of form. It is the strongest instrument of the architect in order to create a unique architectural language. Its structural capacity, physical and aesthetic aspects determine tectonic order and constructional principles. As tectonic order is accomplished by material, it is to be analyzed always in relation to material.

Tectonic order arises from the relationship between architectural elements that come together with the principles of gravity. Gravity helps to define a hierarchy, which is vital for the consistency of the building. This hierarchy can be easily read in section starting from top towards the ground by looking at architectural components, elements and the ground. In figure 3, the tectonic order



Figure 2: A window opening in Borro, Tuscany.

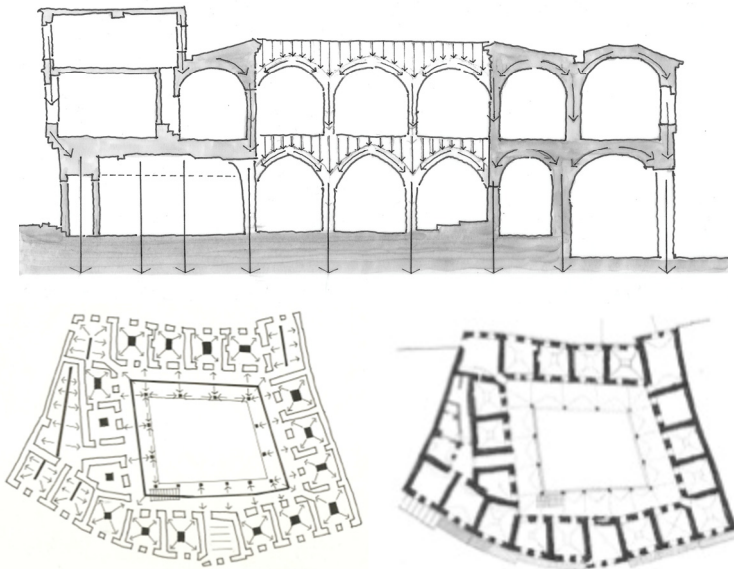


Figure 3: Ali Paşa Hanı, Istanbul, tectonic order in section, vault types and loadbearing walls in plan.

of a Han in Istanbul, Ali Paşa Hanı, can be observed both in section and plans. While the plan on the left side shows the vault types, the other plan shows the loadbearing walls.

### 2.3 Geometric relations

Resolving geometries in a building is one of the most important steps of architectural analysis because all buildings are defined by the togetherness

of basic or complex geometric forms and these geometries create spatial forces according to their articulation. The geometric relations of different parts of a building can be discussed in terms of building mass, façade, plan, section and interiors. Figure 4 shows the geometric relations in Ospedale degli Innocenti in Florence by focusing on basic overall geometric forms, modular geometries, the overall geometric grid and geometries of interior envelopes.

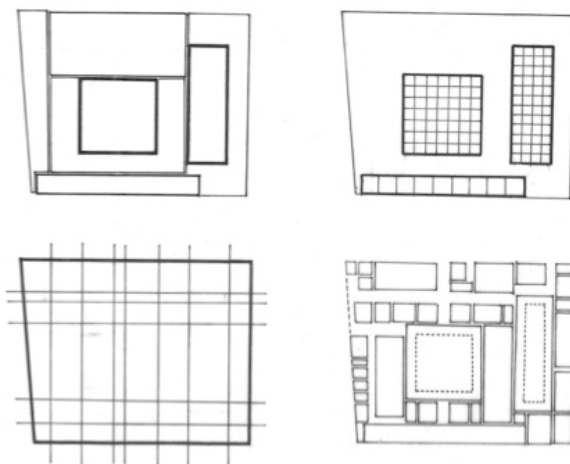


Figure 4: The geometric relations in Ospedale degli Innocenti, Florence.

## 2.4 Spatial organization

Spatial organization is defined by the relationship of spaces that make up the building. In a building program spaces with different intentions and priorities come together. In this sense in most buildings there are spaces that are analogous or similar and there are spaces that differentiate from the rest. These differences define a hierarchy and every space is defined in the system by its role. Ching [8], defines 5 organization types which are centralized organization, linear organization, radial organization, clustered organization and grid organization. Usually in historic buildings different spatial organization types are used together in order to define spatial hierarchy. In figure 5, in Ospedale degli Innocenti (Florence), we can observe centralized organization around the main courtyard, linear organization through the entrance axis, linear organization around the secondary rectangular courtyard and again linear organization through the axis that connects two courtyards.

## 2.5 Spatial circulation

Spatial circulation is the way or path that is predefined by the architect in order to create hierarchical access for all spatial components in a building. While spatial organization is much more about the relationship of spaces, circulation is about the relationship of paths and spaces. In order to understand spatial

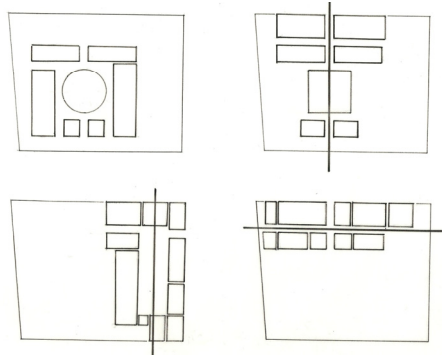


Figure 5: Different spatial organization types in Ospedale degli Innocenti, Florence.

circulation it is essential to consider the starting point, the layout and the architectural definition of the path. Figure 6 shows an analysis of the circulation system in Ospedale Degli Innocenti (Florence) in plan and definition of the path. In order the analysis in plan show the circulation areas, relationship of path and spaces, main and service circulations, open (cold) circulation areas, circulation density, relationship of courtyards and circulation.

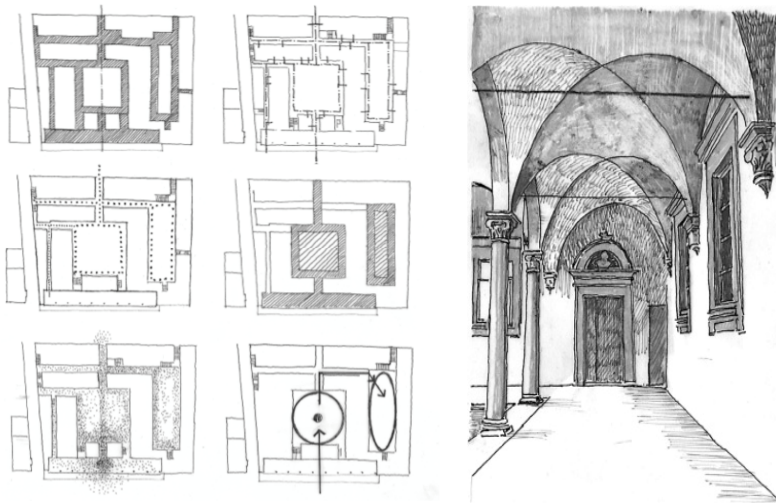


Figure 6: The analysis of circulation system of Ospedale degli Innocenti, Florence.

### 3 Analysing interiors

#### 3.1 Spatial envelope

The spatial envelope helps to define space by separating it from its surroundings. It is composed of surfaces with different roles. The ground acts as the most important component of the spatial envelope because of its role as the supporter of human activity. According to Meiss [6], the ground is the only indispensable component of space. Walls as the first surfaces to be perceived in space, have a different role with their power to orientate human activity. The openings on wall surfaces create forces from inside to outside and from outside to inside. Figure 7 shows the analysis about the spatial envelope of a room attached to the main courtyard of Ospedale degli Innocenti. Successively the graphics represent the spatial envelope, the space defined by the envelope, the entrances, the paths, the spatial forces and flow of natural light.

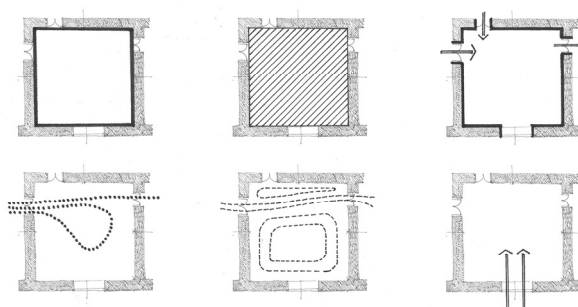


Figure 7: Analysis of the spatial envelope of a room attached to the main courtyard of Ospedale degli Innocenti.

The ceiling is the most challenging surface to be built and its most important role is to create spatial enclosedness. It also has the potential to orientate human activity depending on the form of the surface. The height of a room is much more important than the width and length because of its role in the determination of spatial identity.

#### 3.2 Material

The spatial envelope cannot be fully understood only by discussing geometric relations, openings and dimensions. Material is the physical reality of space and it is one of the most important determinants tectonic order. The surfaces that define the spatial envelope of interiors also come together in tectonic hierarchy so material also determines this hierarchy by its strength and resistance. The color, transparency, opacity, texture and other superficial properties of material also play an important role in the definition of spatial atmosphere. Figure 8 shows the use of Pietra Serena in Sacrestia Vecchia di Brunelleschi in the church of San Lorenzo in Florence. Pietra Serena known as the stone of Renaissance framings is used to underline the structure of the interior envelope.





Figure 8: The use of Pietra Serena to underline the structure of the spatial envelope in Sacrestia Vecchia, San Lorenzo, Florence.

### 3.3 Interior details, furniture, accessories

The required hierarchy in historic interiors can only be achieved if the existing structural details, furniture, fittings, accessories, objects and their roles in the definition of spatial identity are discussed. Existing interior elements that contribute to the cultural significance of the building and interiors need to be preserved and utilized if possible (Figure 9). So, their physical properties and the way they interact with the spatial envelope needs to be analyzed. On the other hand, adaptation also necessitates the use of various new spatial elements in order to support human activity. So, interventions on historic interiors usually define new layers on existing spatial layers. These new layers are defined for shorter periods in order to adapt space to new uses and requirements. So, they need to be differentiated from existing layers in design language and material. These elements can be fixed or free standing according to the spatial properties and functional requirements.



Figure 9: Knob of one of the doors opening to the courtyard of Ospedale Degli Innocenti, Florence.

### 3.4 The human factor

The human being is always and necessarily conditioned in his life by his behavior in relation to a surrounding space [9]. He interacts with space based on both his physical and sensorial capabilities. Space and spatial elements are understood only in relation to human scale and human activity. Therefore while analyzing physical properties of space, the proportional relationship between human scale and the spatial envelope has vital importance as space has functional value only in relation to human body (Figure 10).

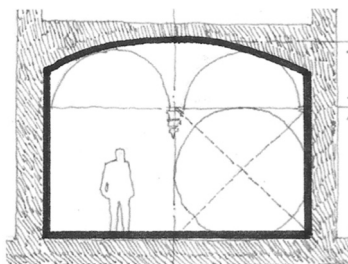


Figure 10: The spatial envelope and human scale in Ospedale degli Innocenti.

### 3.5 Spatial atmosphere

When architecture is built, it is given physical form. But when human experience comes into scene, we start talking about spatial atmosphere. According to Unwin [3], in our experience of architecture, basic architectural elements and the places they identify are modified by light, color, sound, temperature, air movement, smell and the qualities and textures of the materials used. Possible configurations of basic and modifying elements are probably infinite. Therefore as time goes on and spatial experience changes, the same space appears to be different. The spatial atmosphere changes continuously with the modifying elements of architecture. Therefore when we analyze interiors we need to take into account the effects of all these modifying elements in order to understand how they change. Sometimes these elements can be much more important than the physical definition of space as they stimulate all our senses. In figure 11, we can see the glow of light and the spatial effect it creates in Pantheon.



Figure 11: Interior of the Pantheon (en.wikipedia.org).

## 4 Determining architectural and spatial potentials

One of the most important objectives of spatial analysis in historic buildings is determining their architectural and spatial potentials in order to define a compatible use. At the end of analysis the architect needs to consider certain issues that will guide the intervention.

- the role of the building in its context/the role of interiors;
- spatial restrictions, limitations;
- spatial properties to be underlined;
- factors that determine architectural and spatial identity;
- values of cultural significance.

Architectural or spatial role may refer to the use of a place and its contribution to a social system. Use means the functions of a place, including the activities and traditional and customary practices that may occur at the place [1]. Every building or structure can be evaluated as a part of a bigger spatial organization and it has an individual role in this system. This role can change in time or it can stay the same according to its location and spatial properties. Likewise, interiors also have roles in the spatial organization of a building. According to the spatial factors that have been discussed above, an interior might have an innate role that is hard to change.

In historic buildings, determining spatial restrictions and limitations is very important in order to define the type and extent of the intervention. These restrictions may result primarily from tectonic logic and the fabric of the building. But interventions on historic buildings are not to be determined only by physical restrictions but also by a cautious approach that proposes spatial change only if necessary.

Especially in buildings with considerable historic and cultural background we talk about the togetherness of certain architectural and spatial values and layers. As discussed before analysis is looking at an entity by different filters and trying to understand the roles of different layers that make up the whole. In time as a result of damage, alteration or inappropriate interventions, a lack of hierarchy and correlation can be observed among these layers. In this case all layers that are of cultural significance need to be organised in hierarchy by underlining certain spatial properties that determine architectural and spatial identity.

The most important objective of analyzing historic buildings is to determine the values that contribute to the cultural significance of the building. According to the Burra Charter [1] cultural significance may change over time with use as a result of new information. Every period, every different use has its signs and effects on the building itself. So as time goes on, the cultural significance changes. Therefore in analyzing historic buildings, layers from different periods needs to be evaluated with a contemporary point of view.

## 5 Conclusion

According to Schulz [10], architecture exposes itself at the meeting point of interior and exterior uses and space. The built and natural environment is an inseparable structure from urban scale to interior scale. It works just like a living organism under the effect of forces from inside to outside and from outside to inside. What generates this continuity is spatial experience that is structured in relation to time and space. The city, the architectural structures, urban spaces and all interiors are connected to each other through human experience. If human is at the center of architecture, the entire environment that supports his activity must be analysed in relation to each other with a concentric focus on human experience. Otherwise we cannot fully understand the ever-changing interaction between human, time and space.

The notion of interior architecture in this concentric and holistic approach is to donate interiors with spatial elements that support human activity and enrich human experience. Historic buildings already have the potential to enrich human experience but they need to be adapted to contemporary needs and expectations in order to be integrated into contemporary life. They need to be a part of human experience. What is critical at this point is the analysis of all underlying issues and spatial values that are part of their cultural significance. Every intervention on historic buildings introduces new spatial elements and materials that can be regarded as new layers of adaptation. In order to differentiate these layers from existing layers and consider them in authentic hierarchy, systematic analysis is the most prevailing tool of the architect.

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