

## **Innovation in the current floor plan: zoning in blocks of flats for the middle class in the first half of the 20<sup>th</sup> century**

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### **Abstract**

In *Nouvelles Impressions d'Architecture*, Libeskind (1998) writes "When architecture no longer deals with Space, all transactions, in which the container and the contained twisted together [...] have come to an end". A systemic analysis can be performed morphologically, functionally or dynamically. The connection between the appearance and the generation of the form, human perception and experience, the processional nature of any system, is considered. The buildings of the Modern avant-garde were raised during a very short time span of 20 years, sometimes just 10 years, in several different parallel, coexisting styles, also coexisting with the newest developments in music, arts, physics, philosophy, economic and social theory and industrialization. One of the nuclei of the movement was built by the housing program, particularly suitable to foster innovation. While in more industrialized countries, ways to solve social problems were sought, in the other European countries the new possibilities were seen as an opportunity to give a more prosperous image to cities, by raising density with blocks of flats for the middle class. This study will concentrate on European features of building stock that have not been covered by previous studies, namely the spatio-functional research of the interior organization of the dwelling in the blocks of flats for the middle class. The study proposes a heterogeneous model in which a zone has a unique function instead of a unique vocation. Zoning results as a structural product in the superposition and interpenetration of textures (sub-systems of the life-frame elements able to respond to the functionally requested situation) of morphologic elements, thanks to the co-operation process of human activities. There is a complex zoning with operational and organizational value. The following case studies will be considered: Milan 1920–1940, Bucharest 1920–1940 and Athens 1919–1939; forerunners of and avant-garde in Budapest 1896–1939.

*Keywords: 20<sup>th</sup> century, housing, Bucharest, Athens, Milan, function, plan.*



## 1 Introduction

In *Nouvelles Impressions d'Architecture*, Libeskind [1] writes “When architecture no longer deals with Space, all transactions, in which the container and the contained twisted together [...] have come to an end”. Morphology means the study of the form. Morphological elements of a system are:

- the ‘container’, the load-bearing scaffold, the frame for a totality of spaces, related in functional-spatial co-operation into the spatial structure. This constitutes a physical level.
- the ‘content’, the lived architectural space, a totality of localised activities, related into the functional structure. This is a phenomenological level.

A systemic analysis can be performed morphologically, functionally or dynamically.

(Structural)-functionally, the analysis starts at the “activity” (ex. residing), closely connected to the use (ex. residential). The “activity” is preceded by the human “mobile”, which evolves during the existence of an organism to a totality of “forces”. Economic, social, political, aesthetic “forces” lead to space determination through decision/action. The human “mobile” gives the initial impulse, but the activity dimensions a space.

Dynamically, the form is a concretization in time and space, static or dynamic, of the phenomenon as a system: spatial forms, forms of organisation and of “life” (psycho-social, economic etc).

The buildings of the Modern avant-garde were raised during a very short time span of 20, sometimes just 10 years, in several different parallel, coexisting styles, coexisting also with newest developments in music, arts, physics, philosophy, economic and social theory and industrialization. It was a unique time when not the aesthetics, but a solution to the problems of society, mainly the lack of adequate, many times of affordable, but sometimes of one suiting the life style, housing. These forerunners of the interwar Modernism prepared the ground for development in the ‘20’s and ‘30’s.

The following case studies will be considered:

- the forerunners of the avant-garde and the interwar architecture in Hungary 1896–1939;
- the Milanese architecture of the Novecento and Rationalism in 1920–1940;
- the Romanian Modernism in Bucharest 1920–1940;
- the architecture between the world wars in Athens, Greece.

Intensive research on the forerunners of the avant-garde in the Austro-Hungarian Empire has been performed by Moravánszky [2]. The architecture between the wars in Hungary, Czechoslovakia and Poland built the subject of a monograph, in which the parts on Hungary were covered by contributions of Leśnikowski et al. [3].

The Italian architecture of the period 1890–1940 was investigated by Etlin [4] and published in a compressive monograph. Part of this, the Milanese Novecento was the subject of further works, like one published by Burg [5]. The Modern Italian architecture is known mostly through the work of the architect Giuseppe Terragni, about which numerous books have been published, including one by



Zevi [6] and another one by Libeskind et al. [7]. Giuseppe Terragni was the representative of another movement, the one of Rationalism.

In Romania, interwar architecture is a favourite among research topics as well. The works of the architects Creangă [8], Janco [9], Marcu [10] were the subject of individual monographs, while the MIT, who also published Etlin's work on Italian architecture, published a comprehensive monograph on the architecture in Bucharest 1920–1940 [11]. Some other works were published in Romania.

An exhibition was held at the Museum of Architecture in Frankfurt, Germany on Greek architecture of the 20<sup>th</sup> century [12, 13]. The interwar architecture in Greece is linked to that in Romania by the fact that the architecture congress CIAM, held in 1933 in Athens, proclaimed the principles of the functionalist city in the so-called Athens Charter. The Athens charter never found a home in Athens, but the 1934 Master Plan of Bucharest employed its principles, which resulted in a situation, unique in Europe, where the facades of the main boulevards of the capital are Modernist buildings.

In Italy, the urban planning was far from the Athens charter and, instead, followed the so-called contextualism, or reasoned picturesque. One of its representatives was Marcello Piacentini, who, in a study of the state of the Modern in Europe at the beginning of the 20<sup>th</sup> century, gave appreciative words to the forerunners of Modernism in Hungary.

The study will concentrate on European features of building stock which have not been covered by previous studies, namely the spatio-functional research of the interior organization of the dwelling in the blocks of flats for the middle class.

As explained above, functional and spatial-volumetric relationships characterize an architectural program. A residential unit started, what today is generally accepted, to functionally display a “day-zone”, and a “night-zone”. Today, some of these buildings, particularly in Romania, are the subject of interventions due to upgrading to new standards, including seismic retrofit. These change the space and, therefore, a study on how to approach the memory of space is needed.

The social or, in other words, anthropologic perspective of the project consists of the “perception” part. This opens the project to multi- and interdisciplinary aspects of sociology. The systemic approach to be adopted builds a cross-connection with mathematics, since it is a cybernetic approach. Another multi- and interdisciplinary aspect is given by the connection to materials research. The complex spatio-functional shaping of the Modern housing buildings was possible due to the employment of reinforced concrete skeleton structures, which allowed different configurations on different storeys.

Table 1 presents the objectives and the research management of the project.

## **2 Originality and innovative nature of the project, and relationship to the 'state of the art' of research in the field**

The ‘state of the art’ mainly referred to the innovation in the façade, since the Modern avant-garde was also searching for a new style.



Table 1: Research methodology.

Nr.	Objective	Method	Instruments
1.	Documentation of the spatio-functional shaping	Literature research Field trips Archive research	Check-lists Photography Drawing of schemes
2.	Comparison of common features and differences	Comparison tree of features to be compared from the point of view of various disciplines	Comparison tree Comparison criteria
3.	Model for the interior zoning	Systemic analysis and synthesis	Inventory of spaces Project management instruments: operational structure, operational plan
4.	Definition of the character of a zone as result of various space configuring textures	Texture as “word” in an architectural language	Morphological instrument of “texture”
5.	Characteristics to be maintained in contemporary interventions	Classification of space-configuring elements according to their value	Data tables, drawing with highlighting the elements of various values
6.	Lessons learned from the solution to the problems of the society in the Modern times and the environmental problems today	Participation of citizens using an architectural language, then to social problems, today to environmental problems	Social response indicators Environmental response indicators
7.	Dissemination of knowledge	Public presentation and reaction to feedback on findings	Active participation Co-organization of conferences Reviewed publications Web dissemination

New technologies brought by industrial development were a central part of the global movement which was Modernism. Employing advanced construction technology of the time was common place, but not always the possibilities of the materials and systems had not yet been sufficiently researched. Thus, one of the nuclei of the movement was built by the housing program, particularly suitable to foster innovation. While more industrialized countries sought ways to solve social problems, in other European countries the new possibilities were seen as

an opportunity to give a more prosperous image to cities, by raising density with blocks of flats for the middle class. The principles followed were the refuse of an ornamentation lacking sense, the use of modern materials and construction ways, the study of new functionally bound typologies, especially a radical innovation in housing building. The use of the reinforced concrete skeleton made it possible to design different plans in floors laid one above the other. Different from the case of the International Style, the individuality of the architecture and of the individual flat were conserved, as in cases when innovations like the stacked villa or the serial plan were employed.

Thus, innovation was not to be found in the organization of the plan in some of the co-existing styles. For example, the Italian Rationalism is better known and appreciated abroad than the Milanese Novecento. But Giuseppe Terragni's buildings, the most innovative of the Rationalist style are excellent in regards to the plastics of the façade and the composition of the volumes. The floor plans, however, are rather traditional. In the Novocomum building plan in Como, the first building of Terragni is praised for breaking with the traditional façade and for the way the natural environment, especially the lake, is integrated into common flats and treats the flats unequally; with some of them only having openings towards the courtyard. In the Milanese Novecento the possibilities of the reinforced concrete skeleton were used to the fullest in regards to the typology of the plan of the flat. Therefore, the requirements of the movement that were made better known on European level, also integrated similar movements of the time in other countries. The stacked villa and the serial plan were recognized by Burg [5] to be innovations of the Milanese Novecento. But, similar developments can be found in Romania. The Ottulescu building (1934–35, architect H. Creangă) builds a notable highlight: “the most modern and interesting approach in the whole Romanian interwar architecture” [8]. It is an example of a free plan in a collective apartment block, not in the sense of the flexibility of spaces, but in the disposition of the apartments across the floors. The structural grid is not completely regulated and neutral, as one would expect for a perfect “free plan” example (see the Le Savoye villa by Le Corbusier), but, even if simple and clear, dictated by the spatial order of the 1st and 2nd floor. A two story duplex on ground floor and mezzanine, recessed from the street, takes advantage of the reinforced concrete structure. The relationship between the two can be explained through the existence of “other modernisms”, different from main stream Modernism of the avant-garde. It is the aim of the project to focus on these other Modernisms, to see the interdependencies in different social and environmental contexts and to learn lessons for today.

Hardly can a better layout be conceived, respecting the modern typology, than the Greek block of flats on Zaimi and Stournari streets in Athens (1933–34, arch. Valentis and Michailidis), which “resemble many of the projects of the Italian Rationalists, in applying the constructional rationale of Le Corbusier, and indeed enhance the Corbusian syntax” wrote Constantopoulos [12]. Such affirmations are to be investigated, since, in the context explained, the innovative floor plan resembled Italian Novecento rather than Italian Rationalism. The project will put in context the Italian Novecento movement in the innovation of the floor plan as



a response to the requests of the middle class for multi-storey housing. Similar innovations were called for by similar conditions in Hungary, Romania and Greece, where the innovation of the façade was the main expression of the new style since the new buildings were multi-storey constructions in a street front. It was another Modernism from Western Europe, where Siedlungen appeared at the periphery of the cities and more attention was paid to the volumes.

The study will thus concentrate on European features of building stock which have not been covered by previous studies, namely the spatio-functional research on the interior organization of the dwelling in blocks of flats for the middle class. A novel concept will be developed, which is the new definition of the character of a zone. For this purpose, a modelling will be performed and a new, heterogeneous model proposed. The study proposes a heterogeneous model in which a zone has, instead of a unique function, a unique vocation. Zoning results as a structural product in the superposition and interpenetration of textures (sub-systems of the life-frame elements able to respond to the functionally requested situation, an analytic instrument of morphological decomposition of the structure in architectural theory) of morphologic elements, thanks to the co-operation process of human activities. The character of a zone is defined by all the texture categories encompassed, and by the texture with the highest use value. This dominant character is given by the prior function in the zone, which co-operates with the others through the unifying homogeneity of the structure, assuring the heterogeneity of the “life” and of the “frame”. There is a complex zoning with operational and organizational value.

A special focus is built by the wish to learn lessons useful for architecture today. Today, the social purposes of the early 20<sup>th</sup> century translate into participative and communicative approaches. An early example of approaching the problem of participative planning is that of Alexander et al. [14]. In the project, the way his systemic approach could be adapted to analyze the functional structures in interior spaces of housing units of the early Modern will be investigated. Alexander’s systemic approach also aims to give a key to solve environmental problems today. Today, environmental problems are the central focus of housing design, the way social problems were in the first half of the 20th century.

### **3 Timeliness of the project**

Although many publications feature research on the architectural heritage of the Modern Movement, these focus, as already mentioned, on the innovation in the façades and in the composition of volumes which was brought by the co-existing styles. Some publications include building plans, but they are far from being a useful source for the project, thus archive research will be needed. Throughout this project, the research proposed will complete results achieved by previous endeavours on the European level.

Comparative studies to the heritage of the Modern Movement tend to be performed in geographically close areas, like the one mentioned from Central Europe, and not on typologically related movements. The study will integrate



those movements of ‘other Modernisms’ which relate through the architectural program (block of flats for the middle class) and, subsequently, through the innovation that evolved from this.

As explained, functional and spatial-volumetric relationships characterize an architectural program. A residential unit started during early Modernism, exhibits what is generally accepted today, to functionally display a “day-zone”, and a “night-zone”. Zoning is a division into parts in the functionality of a recognizable unitary character, actively reported to the ambiance. Functional requirements regarding the vicinity of spaces can largely be met in well designed residential projects. Given the amount of new constructions in countries like Romania, Hungary and even Greece, the findings in the project can also be a lesson to be re-learned. For all countries, in intervention projects of existing buildings, lessons can be learned from the social perspective of the 1920’s and 1930’s that can be applied to the environmental issues of today.

#### **4 Research results regarding the analysis of zoning**

After a comprehensive typological study, zoning models in typical housing buildings in Athens, where the charter of the 4<sup>th</sup> CIAM was proclaimed, and respectively Bucharest, where the Charter was applied in the shortest time, were established. Both Greek and Romanian apartment buildings feature mixed use, with commercial functions at ground floor and residential above. This development was not only the consequence of the proclamation and respective adoption of the Athens Charter, but of its interpretation in frame of the growth induced by economic development, framework also given in Italy in Hungary, which went hand-in-hand with the possibility to employ new technologies, namely that of reinforced concrete. The spread of reinforced concrete and the problems connected to the conservation of early reinforced concrete housing buildings in earthquake prone countries like Greece, Romania and Italy was the subject of the Marie Curie Intra-European Fellowship project which preceded this project. Figure 1 presents the exterior view and the innovation in the façade, which is the subject of most studies in the history of architecture. The analysis for blocks of flats in Hungary is not yet completed.

##### **4.1 Greece**

After 1929, when legislation was introduced regulating the architectural characteristics and ownership systems for multi-storey buildings in urban centres, the apartment block type begun to extensively develop in Greece, enjoying, according to Giacumacatos [13], an unprecedented development to the present day. First, apartment blocks appeared in the 20th century, but were built en masse in the 1930s as “polykatoikia” (multi-residence). The design proposals elaborated by Greek architects were towards “the Europeanization of the Athenian built environment and fostered the corresponding social recognition of the owners of the properties” [13]. With their investments in the new multi-storey housing building sector they commissioned designs from prominent





Figure 1: Typical Modern Movement buildings in Greece: apartment block at Zaimi and Stournari Streets, architects Valentis and Michailidis, 1933–1934 (left), Romania: Elena Ottulescu building, architect Creangă, 1934–35 (middle), Italy: housing building in Via Domenichino, architects Lancia and Ponti (right).

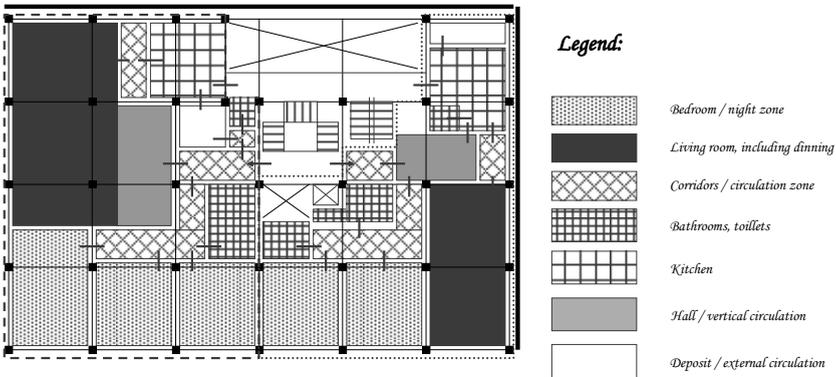


Figure 2: Functional floor plan scheme for a building of the Modern Movement in Greece.

architects (Fig. 1). Constantopoulos [12] sees the case of Greece to be unique in Europe during the period, as almost all the most interesting housing architecture projects in the 1930s, blocks of flats for mainly middle-class inhabitants of Athens, “who identified new architecture with the demand for social modernization” [13], were in the hands of the private sector. This situation is, however, little different than that in Romania and Portugal, where similar typologies emerged. The typology of the apartment block developed quickly. Figure 2 presents the mentioned Greek block of flats on Zaimi and Stournari streets in Athens (1933–34, arch. Valentis and Michailidis), Many Greek architects were trained in Germany, and the training provided at the NTUA was

organized in a manner corresponding to German models; however, there has also been some French influence [13].

## 4.2 Romania

Similarly to the case of Greece, Romanian architecture of apartment buildings “had a greater impact on the urban environment than any other housing in Bucharest after the First World War” [11]. “The expanding market for comfortable dwellings, villas or apartment buildings, with ample space, reflected Romania’s strong economy during this period. Low-cost housing of minimal size, which elsewhere in Europe was the focus of considerable research and development, was fairly uncommon” [11], as it also was in Greece. In Romania, the spread of modernism was achieved not by public programs, but mainly by private enterprise and speculation [11]. Deviations from mainstream European Modernism were thus dictated by the market. The typical flat has two entrances: a main entrance and a service entrance and large rooms. The typical flat was designed for liberal professions, such as doctors, lawyers, with an office near the entrance. The blocks of flats were built in “condominium”, which meant that each apartment was the property of another and the inhabitants were owners, not tenants, a scheme existing till today in multifamily housing in Romania. Introducing the “condominium” was a huge break with the housing tradition in Romania, where single family housing was the rule before. The analysis of the Ottulescu building plan zoning (1934–35, architect H. Creangă) is presented in Figure 2 and the volumetric in Figure 1.

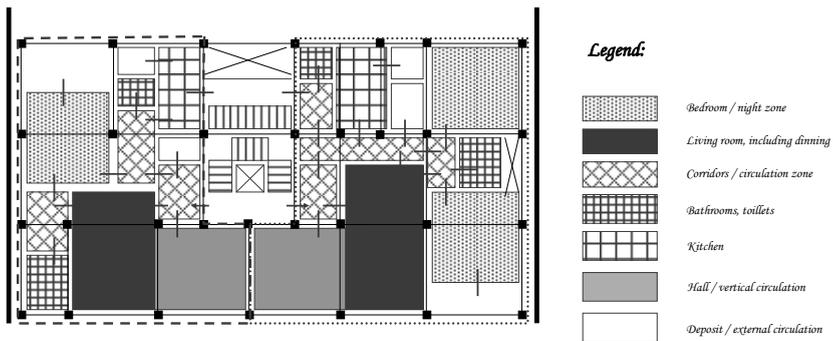


Figure 3: Functional floor plan scheme for a building of the Modern Movement in Romania.

## 4.3 Italy

Between the wars, two parallel movements characterized modern Italian architecture: the so-called Novecento Milanese and the Italian Rationalism, the latter better known throughout European histories of architecture. The Milanese Novecento can be seen as ‘another modernism’; however, in terms of functional shape of the houses, it was more progressive than Rationalism. Rationalism

brought innovation mostly in the volumetric of the buildings and the façades, while the building plans remained conventional [15]. The Novecento architects studied new function bound typologies, especially a radical innovation in housing. Within Novecento, the building shape was studied to optimize the typology of the plans in order to ensure the scope was in relation to modern life and technology. First typological investigations were done in the work on artists' ateliers [5, p. 42]. Then, the manifesto of the Milanese Novecento, the Ca'Brutta by Giovanni Muzio was an example of the most modern use of construction materials and methods, technical equipment and the start of the typological development in housing. The prototype for the "condominium" was introduced to Milan with this building, a style found in all Novecento housing buildings, and widely spread today. The plans were divided into clear function groups (representative living spaces, dormitories, secondary spaces, service areas), and advantageous conditions for light and air were created (Burg [5], p. 50). Also, in the buildings of the Novecento Milanese we found the double entrance, main and service, with access for automobiles. The kitchen and the service rooms had a separate entrance. The first building of Lancia and Ponti in which all criteria for the innovation in housing planning were met: intensive use of the ground, economic efficiency, construction, equipment and plan optimization, was the one on Via Domenichino (Figures 1 and 3).

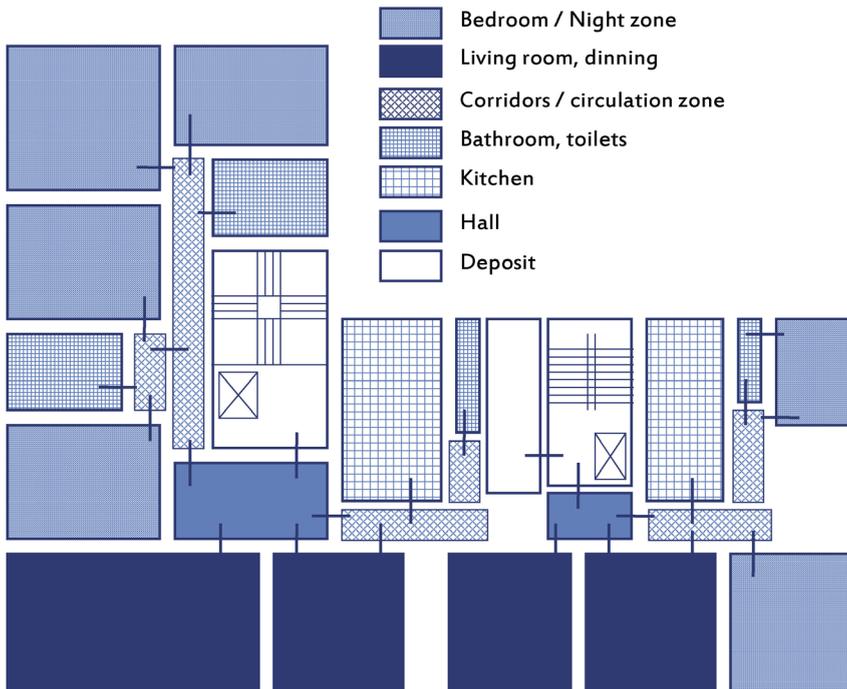


Figure 4: Functional floor plan scheme for a building of the Modern Movement in Italy.

## 5 Conclusions

This paper presents the purpose, the set up of the research and the first research results of the PIANO project dealing with zoning in blocks of flats for the middle class in the first half of the 20<sup>th</sup> century. In the first half of the 20<sup>th</sup> century the avant-garde proposed social housing, and luxury blocks of flats were the exceptions: the “other Modernism”. However, this scheme can be found in several cities which experienced rapid economic development in the interwar time, such as Athens, Bucharest and Milan. Common to them is that they feature generous spaces for the social middle class, in condominium property form, served by main and service staircases. It can be talked of as “another Modernisms”. This development can also be seen in connection with the spread of reinforced concrete at the beginning of the 20<sup>th</sup> century in housing building; however, this will be the subject of another paper. The subject of this paper was the innovation, reflected in the organization typology and the zoning in flats, in such luxury condominium housing. It was also a break in tradition of the usual, single family housing in these cities. Despite being spread in different countries, the typologies are similar, unified by “the other Modernism”.

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