GROUP FORM RECONSIDERED: PHYSICALITY AND HUMANITY OF COLLECTIVE SPACES

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Abstract. *In 1964, Japanese architect Fumihiko Maki presented the need for investigation in housing collective form. The need was explained through his sensitivity towards the dynamic change of society and simultaneous inadequacy of architectural static and fragmented respond. This paper presents the contemporary view on the theory of collective form and its investigation into why and how the group of buildings stands together. It brings forward the need for renewed architectural focus on group form, one of Maki's collective form types, and the social and human reasoning of design decisions. The theory of linkages in group form is related to more recent socio-spatial analytical theories and interpreted as an analytical tool for understanding housing morphologies, configurations, and ~~its~~ social capacity of group form. It is proposed that the morphological and configurational approach can be used in combination for reading and understanding the historical and contemporary housing ensembles and their relation to an urban whole. The aim of the theoretical research is the identification of the analytical framework and design principles of group form based on architectural and configurational elements and their relations, as socially and culturally relevant.*

Key words: *collective space, group form, housing, configurations, linkages, interface*

1. GROUP FORM AND SOCIAL REASONS FOR BUILDINGS TO BE TOGETHER

> "If we accept the hypothesis (advanced since 1992) that it is the collective condition that defines urbanity and that, therefore, the collectivization of spaces and homes, people and institutions, economic movements and activities, is the supreme effect entailed by urbanity, then we would have to think that all the places of the city, public and private, individual or corporative, are partly public spaces since they share the way in which they are appropriate for the citizens (de Sola-Morales 2013)."

The contemporary urban landscapes encompass an uncountable variety of individuals and groups, in so many ways. Even if they do not come from different cultural backgrounds and speak different languages, as if they do in London or Berlin, city dwellers are confronted with a wide range of differences and incompatible views on lifestyles, beliefs and values. Nevertheless, these diverse people share the same urban space and their co-existence has a practical spatial dimension in everyday life. This *physicality* of collective life is an essential part of urbanity. In the context of the thesis of a collective condition of urbanity, the paper will focus on the dwelling culture and the architectural design perspectives on housing ensembles.

Shared and collectively used urban public places are places where proximity with others, diverse urban dwellers, comes to its practical terms. Urban dwelling culture is not only about privacy and about individuality, usually associated with a dwelling unit or home but also about the constant negotiation between private and public domain, individual and collective use of space. Architect Manuel de Solà-Morales brought forward the theoretical and practical confusion resulting from the conventional use of term *public space* to designate the places of these negotiations. "The city is the very place where the private domain can be, and often is, a social domain, just as much as or indeed even more than the public domain. Private buildings as public elements, radiating social meaning and value that extend beyond the actual buildings embody their urban character. Collective spaces are not strictly public or private, but both simultaneously. These are public spaces that are used for private activities, or private spaces that allow for collective use, and they include the whole spectrum in between (de Sola-Morales 2008, p.18)." If we follow this thesis, that urban space is continuous collective space, sometimes used by one, few or many for different activities, the architectural question is what are the spatial elements and appropriate relations between them that define collective space qualities? The specific focus of this research is on the qualities within the dwelling environment, emphasizing social and visual experience.

Continuousness of collective space requires the different design approaches to housing ensembles, or urban space generally, compared to the dominant approach of urban fragments or building oriented approach. Our contemporary design culture keep designers committed to the idea of public space as a precise, delimited place of certain typology. As Solà-Morales points out, architects are losing perspective on collective space as a basic urban structure and giving priority instead to the morphological or environmental singularity of each site as an autonomous urban lot and an occasion for independent formalization (de Sola-Morales 2013). Even in the wider architectural (self) criticism, as noticed by Bill Hiller and Julien Hanson, space is usually considered through surfaces that define the space, rather than space itself. Moreover, it is usually considered at the level of

the individual space, rather than at the level of the system of spatial relations that constitute the building or settlement. "As a result, a major disjunction has developed not only between the public pathology of architecture and the discourses internal to architecture but also between the practical design and experience of buildings and these discourses (Hillier and Hanson 1984, p. 3)."

However, after the experience of 20th-century modernism and in the conscious consideration of urbanization processes of today, it is not possible to conceptualize and construct the urban whole as a unitary model. On the contrary, there is a need to think about the urban whole as adaptable to change and time, and as such, designed and constructed from smaller elements. This paper starts from the collective form considerations by Japanese architect Fumihiko Maki that put forward the new light on the question of urban form as a relationship between architecture and the city. Architects confronted with the "issue of great numbers" after the Second World War or with the problem how to conceive and built housing for a large number of people, considered this question highly relevant (Maki 2008, p.40). How should the collection of buildings stand together? How to start with individual elements and arrive at an urban whole? The one of the collective form paradigms, *the group form*, evolved in the traditional design of settlements, has a strong potential for understanding and resolving these questions.

1.1. Research methodology

Considerations of group form are bringing forward the very essential issues of spatial order through which we can design the continuity of collective space. Maki's investigation in collective form was urged by humanly experienced errors of economically and technologically driven design and construction, especially visible in the dwelling production, even more, today. "… [I]n our inability to order experience, we merely suffer the city and long for some adequate means to comprehend it as a product of human creation—a product of intelligent, ordering forces… At such moments, when one sees only the results of mechanical and economic processes controlling the form and feeling of place, one feels estranged and excluded (Maki 2008, p.58)." Therefore, the group form is not a spatial aesthetic exercise on its own means. Adaptability to change is a very important aspect of urban form, but it is not the purpose of the design as well. As Fumihiko Maki concisely wrote, it is *a humanly significant spatial order* that should be in the center of the architectural design (Maki 2008, p.58).

This paper is bringing together two approaches to the research of housing ensembles: morphological and configurational approaches. The premise is that both are offering conceptual and analytical means for understanding the urban form through the continuity of collective space. Moreover, continuous collective space and the integrity of urban whole is analysed through the traditional housing group form in Bosnia and Herzegovina - Mahala. Criteria for case study selection were defined according to Maki's principles of housing group form. *Mahala* was constituted of small and similar structures of residential architecture, developed spontaneously during the course of time. The layout of the *mahala* settlement was consistent with the topography and is seen as the open-ended composition able to preserve the properties of the whole during the settlement growth.

The *morphological approach* to group form by Fumihiko Maki is based on interpreting the unity of human experience. It is the theory of spatial order rooted in the

necessity of perceptible understanding and reading the urban form by city dwellers, as a basic mean of connectedness with dwelling place. The *configurational approach* by Bill Hiller and Julien Hanson, putting forward the social logic of spatial ordering (Hillier and Hanson 1984).
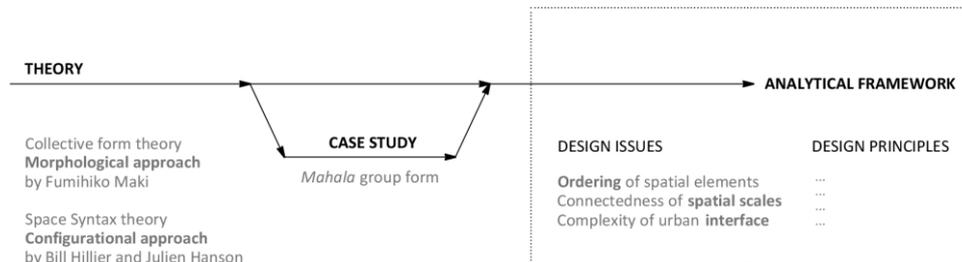
Fig. 1 Research diagram

The main theoretical research hypothesis states that linking of two theories is enabling the setting of an analytical framework for a more comprehensive analysis and design of the housing group form (Figure 1). Three important design issues of the group form are recognized from the theoretical overlapping as the first level of the analytical framework: ordering of spatial elements, connectedness of spatial scales and complexity of urban interface. These are discussed through the next three chapters. Further, the research result is an open-ended set of the design principles for the housing group form, based on the design intentions towards continuity of collective space and the integrity of the urban whole.

## 2. HUMAN ACTIVITIES AND LAYOUT OF BUILDINGS AND OPEN SPACES

This chapter discusses the first design issue – ordering of spatial elements. Human activities and movement through urban space are vital elements of urban living and there is a need to understand them as generators of housing group form analysis and design. These elements and principles of connection can be used for better understanding of the ordering logic in dwelling ensembles and their collective space.

2.1. Morphological approach: three paradigms of collective form

In his influential text *Investigations of collective form* (1964), Fumihiko Maki introduced his morphological and human-oriented approach to urban design. He saw a city and its parts as a morphological unity, as a collective form. Collective form addresses the importance of the whole over the individual buildings or separate open spaces. Spatial, visual and movement linkage is the ordering act of spatial elements into the logical unity from the human perspective.

Maki defines three types of collective form based on different relations or linkages between the single element and the whole (Figure 2). The first one is *the compositional form*. The structure of the compositional form is based on the arrangement of separate buildings and their geometry, so the linkage in composition they form is dominantly on a two-dimensional plane. It is the common way in urban design, starting from the Le

Corbusier's architecture up to today. Compositional form as such is static, because the separate elements, their function and their arrangement are not supposed to change over time.
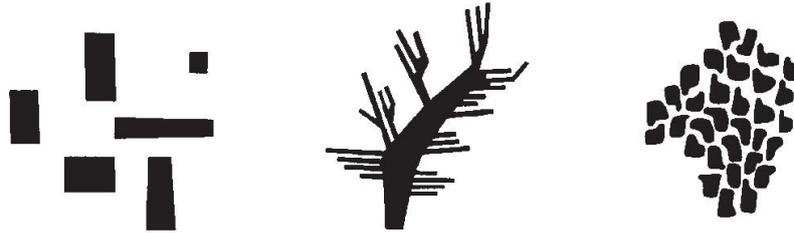
Fig. 2 Fumihiko Maki's paradigms of collective form: compositional form, megastructure, group form (Maki 2008, p.46).

The other two collective forms are based on organic principles of growth. *Megastructure* paradigm became relevant in the sixties, very much disseminated by the post-war Japanese architecture movement called *Metabolism.* The overall technological advances made possible design of the megastructure as a large spatial frame in which all the functions of a city or part of a city are housed. World Design Conference held in Tokyo in 1960, discussing the issues of mass urbanization in Japan, recognized the relevance of megastructure for environmental engineering, as design of multifunctional complexes and infrastructure. Rayner Banham's book *Megastructure: Urban Future of the Recent Past* (1976) is one of the influential books about the megastructures' design methods and meanings. In spite of Metabolists' aspiration for organic growth, Maki indicates megastructure as rigid, because it allows the infills change, but the main structure itself can fall into disuse and then the entire system becomes obsolete (Lin 2010, p.164). More organic and more flexible alternative Maki finds in the third collective form - *the group form*.

Group form "evolves from a system of generative elements in space" (Maki 1964, p.14). This type of collective form Maki recognised in the existing examples of buildings and spatial elements distribution in traditional settlements. According to Maki, several factors determine the spatial organization of historical towns seen as a group form: spontaneous, but minor variations in physical expression, the use of geography and topography in a wise and dramatic way, and sequential development of the open-end composition. The authors of this research interpret the group form as a totality structured by small elements on proportionally small distances. Through the layout of houses and open space is possible to accomplish the sequential development of the open-end composition. Moreover, sequences are the result of repetitive use of certain visual elements, such as walls, gates, and towers.

In the group form one can recognise the clear relation between the elements and the whole, between the human activities, movement and the form, between the time passage and the form. "There exists unquestionably a clear structural relationship between the village and the houses, between village activities and individual family life, and between the movement of villagers and cows. Here the house unit is the generator of the village form, and vice versa. A unit can be added without changing the basic structure of the village. The depth and frontage of the unit, or the size of the court or barn, may differ from unit to unit, but an understanding of basic structural principles in making the village prevails (Maki 2008,

p.52).” In conclusion, there are two important criteria concerning the collective form according to Maki: clear reciprocal relation between the human activities, movement and form, and the ability of collective form to grow over time according to same structural principles. The compositional form is fulfilling neither criteria, the megastructure only the criteria of movement compatibility and the group form fulfils the both.

2.2. Configurational approach

Bill Hillier and Julienne Hanson developed the analytical theory that formulates the principles of the social logic of space. According to this theory called Space Syntax, architecture and urban structures are spatial *configurations*. The relationship between the parts in configuration and the way we link them together are much more important than any individual part, from a social point of view. There is a clear idea about the urban whole, as much as in the Maki's approach.

The theory of space syntax assumes that buildings are not just physical objects or artefacts, composed of single elements that together define a particular form. Buildings also form and organize empty volumes of space in between. The spatial distribution of buildings and empty volumes mediate relations between people in the area, namely groups, separates and connects them. According to the theory, buildings are sociological objects in two ways: they form a social organization of everyday life through a spatial configuration we live in and are moving through, and they represent a social organization as the spatial configurations and elements that we see. Buildings are, therefore, social objects through their own forms and not only through their role as visual symbols (Hillier and Hanson 1984).

Interdependence between spatial configuration and patterns of use Hillier explains for the case of three buildings with courtyard (Figure 3). Each building has the same number of spatial units, morphologically distributed in the same way. The only spatial difference is the position of openings, the position of connections between the spatial units. The difference is sufficient to produce various patterns of use of the space within three buildings. These patterns of uses are schematically presented by justified graph (j-graph) that shows sequences of use (third column in Figure 3). A starting point is marked by *x* sign within the circle. The circle is a sign for each spatial unit and simple line signs each connection. The first configuration shows a linear sequence of use, the second configuration is a tree-like and the third one contains multiple possibilities even for circular movement.

The conclusion from this configurational analysis is that *the permeability pattern* driven from the position of entrances is a critical point in the creation of different patterns of spatial use. Configuration with multiple use possibilities (moving and wayfinding options) also offers various scales of privacy and publicness. The value we can read from the j-graph is *the configuration depth* and presents distance between the base point of departure and end spaces. Each cell within configuration belongs to first, second, third…n^{th} level of depth related to the configuration base. Beside configuration depth, there is a possibility to identify another value from the same configurational way of urban space's analysis, and that it is *the integration value*. The space that has the shortest distance to all other spaces within configuration has a highest integration value (Hillier 2007). This is the place where the most paths meet.
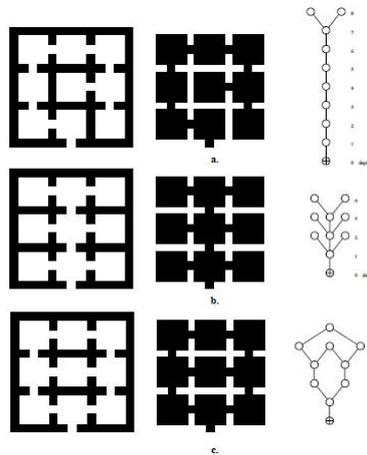
**Fig. 3** Architecture and space as the configuration (Hillier 2007, p.22).

According to the theory, encounters, gatherings, avoiding, interactions, and dwelling are not individual acts, but patterns or configurations formed by a group of people. Urban space from the configurational point of view can be organized in a way to offer more possibilities for a variety of social group interactions instead of separating the individual territories (Hanson and Hillier 1987, p.251-273). The spatial precondition for that to happen is the complexity of configuration. Variety of configuration depths and the existence of the spaces with higher integration value are desirable conditions for the higher social value of urban space. The spatial linkage in the urban whole understood as a configuration, is constituted by the permeability pattern – number and distribution of direct spatial connections between the open and closed units of space. Therefore, the space syntax theory directs us towards the importance of the architecture of the boundary, as well.

2.3. Learning from the historical context: *mahala* as a group form

> „...architecture from our close past...its principles, which are ours, good and modern, and to transfer them to today's life. Why? Because they are human, because they strive for a connection with nature, because they respect the neighbour, because they are democratic, smooth and unpathetic (Grabrijan and Neidhardt 1957, p.13). "

Further inquiry into group form ordering principles is done by analysing the collective space of traditional dwelling groups in the local context – Bosnia and Herzegovina's cities. As relevant example, the traditional residential part of the city named *mahala* was chosen. *Mahala* is the model of the earliest urban neighbourhoods in Bosnia and Herzegovina and is dating to the times of the Ottoman Empire rule. Unfortunately, they are rarely preserved in their original urban layout and architectural structure. Juraj Neidhardt and Dušan Grabrijan, Yugoslavian architects, have done an extensive survey on the traditional architecture of Bosnia and Hercegovina with a focus on living in and building the cities. They aimed to understand the qualities of heritage for creating possibilities of incorporating them in contemporary architectural design. Neidhardt makes

specific reference to the city of Sarajevo and identifies three functions with corresponding urban and architectural principles: buildings with social functions spread over *as points* of gatherings (sacral buildings), production and retail organised in *row* buildings (*čaršija*) and residential buildings arranged *in groups* intertwined with nature (*mahala*). Similar to results of Maki's analysis of traditional Japanese village group form, Neidhardt finds that mahala reflects two important principles of architectural and urban design: (1) building for human "who hears, feels and is capable of watching" and (2) building with the awareness that one human cannot do anything if he does not connect with the other (Grabrijan and Neidhardt 1957, p.149-150).
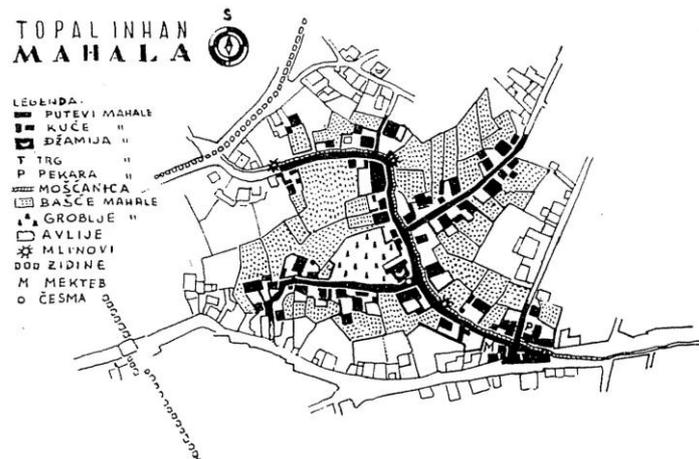
Fig. 4 Group form of *mahala. Topal inhan mahala* in Sarajevo, drawing by architect Juraj Neidhardt. Drawing categories in order of appearance: roads in mahala, houses, mosque, square, bakery, water channel, gardens, graveyard, house yards, mills, walls, Islamic school, and fountain (Grabrijan and Neidhardt 1957, p.144).

Interrelation of houses and other spatial elements is important in a *mahala*. Each house has a fence around it (with the house surrounded by the garden), that makes a plot basic element of the *mahala's* group form. The households are dispersed in several buildings and even more than one courtyard according to oriental cultural understanding of relations between the man and women, inhabitants and strangers, and between the neighbours. It is possible to recognise the great virtue of design in human scale done by small distances between buildings but with enough privacy for everyone and with, as much as possible, an open view towards the street and landscape.

There is a hierarchical differentiation of roads following the terrain configuration. Justified graph of the *mahala's* collective space is usually a tree-like (Figure 4). Public life happens mostly on crossroads as places with higher integration value. Sacral buildings, grocery store and bakery are built around the main crossroad. The street is the *mahala's* backbone. The street curved like meander creates a series of sequences in motion, a change of vision from a pedestrian perspective. The meandering street makes easier to capture the good view from surrounding buildings' first floors, as well. One can

monitor the street life and simultaneously enjoy the beauty of the open landscape view. A layout of the buildings is an equally important element that creates three-dimensional meander like shape of the street. Such relations of the houses and other buildings with open spaces make a mahala worth calling the group form in the Maki's sense. Mahala also grows over time according to same structural principles. If we add the honest respect to neighbours in a spatial sense (distances, privacy, right to the view) that makes the *mahala* dwelling group form deeply related to the notion of collective life.

3. CONNECTEDNESS OF SPATIAL SCALES: ARCHITECTURE AND CITY SCALE OF THE GROUP FORM

The housing ensembles were dominantly conceptualized and constructed as *the compositional form* in the second half of the 20th century. The same concept was applied in the Bosnia and Herzegovina in the renewal after Second World War. Already after the first phase of the massive construction, real-life problems began to emerge. Universal spatial principles applied around the world were confronted with a different social-political and cultural context, and consequently produced the various complex relationships between urbanism and the social environments (Urban 2012). It seemed that the practical application of the concept of *the neighbourhood unit* and its compositional form has not always succeeded in generating community ideal and, contrary to that, it contributed to social fragmentation at the city level (Legeby 2010).

The basic thesis of social and planning criticism formulated after the sixties is that rational, comprehensive planning model for collective housing gives an advantage to a static and hierarchical spatial form over social processes (Jacobs 1992[1961], Lefebvre 2003[1970], Sennett 1991, 1992). Starting from the neighbourhood unit concept developed in the USA, to the planning of post-war neighbourhoods in Europe, the spatial order of urban and architectural elements that together define the neighbourhood community we can see as an instrument of establishing the desired social order and organization. However, the relationship between urban form and social relations was conceived as a very simplified, one-way oriented and insensitive to future change.

In the same period, the sociological concept of *community*, established as a political imperative of social stability and prosperity in after war renewal in different socio-political systems, will go through critical rethinking as well. The theoretical model of opposite categories rooted in the theory of German sociologist Ferdinand Tönnies from 1887 (Tonnies 2011[1887]), will be reconsidered in the intellectual discussions of the second half of the century. The discourse will be developed around the question of whether *urban sociability* is coming from close community ties (*Gemeinschaft*) or arising from the rich social diversity of modern times (*Gesellschaft*)? What spatial implications does this social dichotomy bring to the design of the dwelling group form?

3.1. Urban sociability in relation to spatial scale

The concept of urban community is often stigmatized as a dangerous myth of social unity and integral identity, in the recent rethinking of urban sociability (Sennett 1992, Sennett 2003[1977], Harvey 2005, Young 1986). As opposed to the social relations of close neighbours brought forth by the sense of personal affiliation and close connection,

researchers and theoreticians of a heterogeneous urban society find anonymous and distant relations as a basis of urban sociability. These theories are based on the empirical experience of the social and cultural diversity of contemporary large cities - diversity in class, gender, age, race, and lifestyles.

These theories give special attention to the relations between people who do not know one another, between strangers. Strangers are in direct visual and physical contact in collective space, with the option to stay strangers to each other, but with the awareness of the potential interaction. For sociologist Richard Sennett, one of the essential political, sociological and psychological values of the city is a project of *collective coexistence with strangers* or urban coexistence outside the community. In this context, the public space of the city is recognized as a place of mixing of the group and individual differences, the "culture of the city" as defined by Sennett, and as such is offering the perspective on the various possibilities of personal reinvention (Sennett 1991). Thus, within sociological theories that reject the normative social relations of the community and embrace the social and cultural diversity as the basis for the advancement of social relations, public space or in Sola Morales terms collective space is defined as an important place for generating the modalities of urban sociability. In that sense, collective space is a highly important spatial structure for the social life of dwelling group forms.

Sociologist Steven Brint leaves a significant theoretical possibility according to which the positive features of urbanity as diversity - constant variability, diversity in contacts, possibilities, and opportunities, mental freedom, are not opposite to the positive characteristics of community - feeling of belonging, safety, and solidarity (Brint 2001, p.1-23). The author advocates "more relaxed, occasional and ad hoc" social ties that he sees as possible in *communities of place* that show a combination of close relationships, with few restrictions on personal freedoms and low levels of resistance to people outside the community. This thesis is particularly important for housing ensembles shared as a dwelling territory by a group of people brought together by minimal spatial distances of a dwelling place. At the same time, housing ensembles are part of the larger urban landscape, dependant on many other global urban systems. In the context of Brint's thesis, the dwelling group form could be conceptualized as one of the basic social-spatial forms that have the potential to put in practice this kind of urban sociability - *a community within diversity*.

The configurational theory of urban space is based on the tendency to overcome the model of corresponding relations between spatial territories and social groups (the correspondence model), usually applied in the design of communities of place (Hanson and Hillier 1987). Urban space understood as the configuration can be designed in a way that increases the likelihood of encounters between people of different social groups, rather than to give them the corresponding territory, and to separate them. Accordingly, Henson and Hillier state that the relationship between the local organization of space and the global structure of the city, which is producing the probability of encounters, is a basic spatial issue in the context of vitality, sociability, and safety. According to the authors, it is important to create a spatial strategy for the design of local configuration and properly integrate it in the global urban system, rather than to localize space to the enclaves.

If we put the graphic representation of cells and connections in *Figure 3* in the context of the relations between neighbours (spatial groups connected with the proximity) and strangers (those who pass and visit), we can establish sociological references for all spatial elements of the configuration. Spatial unit or cell is the category of urban space that belongs, or it is

controlled by someone who is an inhabitant. The spatial boundary forms the cell and at the same time, it is a spatial mean of control and discretion. The space outside the boundaries is the domain of strangers and the entrance is the liminal area of potential social relations between inhabitants and strangers. The entrance thus becomes a mean of establishing the identity of the inhabitants, as well as a mean of transforming the stranger into a visitor. The more integrated is the outside space into a global system of urban space, the more strangers potentially will be present. The more permeable the boundary, the more potential there is for outside space to become a negotiating place of inhabitants and strangers.

The general argument of space syntax theory is that urban sociability is the product of a global spatial order that organizes the presence of inhabitants and strangers and that it is not exclusively the product of local spatial patterns. Considering the dwelling group form as a distinct spatial-social unit, at the same time a local dwelling space and part of a wider urban area, it demands the simultaneous local spatial identification and integration at the global level of the city.

3.2. Co-presence in collective urban space

The key sociological concept within the configurational theory of space is the concept of the simultaneous presence of people in space. The *co-presence* is much closer to the desired design outcome because it is a necessary condition for the occurrence of interaction, communication and the formation of social relations (Marcus and Legeby 2013). The theory of space syntax points out that the patterns of co-presence, (its size in numbers and inhabitants/strangers ratio), are largely a result of architectural and urban form, and therein lies the importance of this concept, as the essential link between space and social capital.

The space syntax theory recognizes the principle of convex and axial organization of space. In most cases, strangers are moving through the settlement, while the inhabitants have a much more static attitude towards the local system. Axially elongated segments of public space introduce and let strangers into the system, while convex public space is static area overlooked by inhabitants. This principle of the spatial relationship between the inhabitants and strangers is the basic determinant of settlement growth during the time, according to configurational theory (Hillier and Hanson 1984, p.17).

The issue of safety in a collective space closely relates to the same principle. The spatial system is letting strangers into the public area of settlement. At the same time, closeness of housing units' layout provides visual control over strangers in public areas. In this way, strangers oversee the collective space, and the inhabitants oversee strangers. The sense of safety in the collective housing form derive from the routines of everyday movement and the co-presence, with the possibility of an encounter with both the neighbours and strangers.

The size of co-presence (number of people in collective space) and the constitution of co-presence (inhabitants/strangers ratio) we can directly relate to different modalities of urban sociability (Marcus and Legeby 2013). Researchers are proposing the use of space syntax techniques for measuring the size and the constitution of co-presence as an indicator of the potential type of social capital. Collective spaces of dwelling ensembles with fewer strangers refer to spatial isolation or even the social segregation of the neighbourhood, where the inhabitants are more directed to local social and economic resources (Marcus and Legeby 2013). Therefore, the spatial distribution and connection of axial and convex open spaces and their relation to indoor spaces have a crucial role in the formation of the social life of the dwelling ensembles.
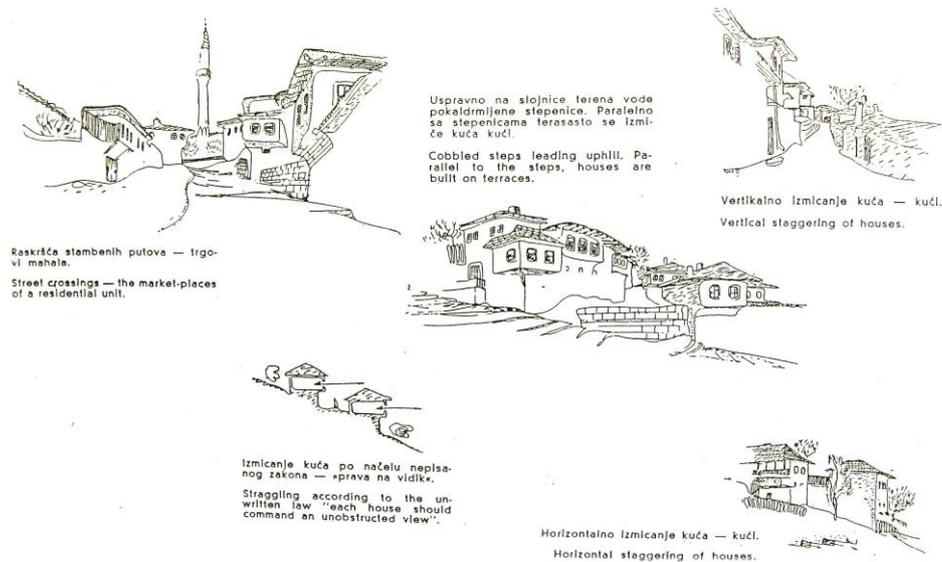
4. COMPLEXITY OF AN URBAN INTERFACE

Elaborated two-dimensional plan of spatial configurations is necessary, but not sufficient for a design of a meaningful environment. Therefore, if we observe the configuration in three dimensions, we come to the importance of individual spatial elements on a local scale, not only their integration into the global urban system. Following the Maki's argument that the city as a physical place and social system depends on the autonomy of individual elements and search for possibilities for every single element to participate in the whole (Maki 2008, p.42). As mentioned above, spatial boundaries play a very important role in the structuring of continuous collective space. Architectural modelling of the boundary is the potential way to control physical and visual connection between the spatial units and at the same time the issues of safety, transition and overlapping of private and public domain. In that context, spatial boundaries are the interface of urbanity, as Miloš Bobić called them (Bobić 2004).

Three of five Maki's linkage acts in group form we can relate to the architecture of interface: to mediate, to repeat, and to make a sequential path (Maki 1964). Coming from configuration theoretical discussion and *mahala* considerations, the two most relevant principles for interface design are physical and visual connectedness between the exterior and interior and changes in sequence. However, there is a need for a more physically specific way of defining the interface and more related to patterns of use.

One can contribute to the continuity and use of collective spaces in housing ensambles through shaping the space in the scale of the interface. "Any form of configuration contributing to a gradual transition between the street and a group of houses may be seen as a collective interface (Bobić 2004, p. 77)." The physicality of division between interior and exterior space plays important role in giving more privacy to individual space, connecting it with the collective and providing the higher level of people co-presence in collective space, all at the same time. How to define this transitional form and what are the principles for designing it? "In general, collective transition areas are combined with individual interfaces of the buildings, and together they maintain a gradual transition. Superimposition of these two levels of scale throughout the design maintains both a livable housing environment and desirable level of urban character (Bobić 2004, p. 78)." According to Miloš Bobić, there are two important factors for defining the space and location of the transition from city to house, from collective to individual space. Those are the building's position relating to public space and the definition of a transitional area in location and size. Spatial, visual and psychological claims upon private and public domain are not simply overlapped with each other territories. There are bigger chances for social complexity or higher level of collectivity if common claims arise upon the transitional area. The space of interface is a spatial difference between street room and street profile (Bobić 2004, p. 63).

The coherence of the interface in the *mahala* arises from the defined relationships of spatial elements on a larger scale. Street meandering as a design principle at the level of the whole results in the specific physical appearance of the interface. A meandered street room in *mahala* creates a layered interface between the individual and collective space. The physicality of the interface is manifested both in the horizontal and vertical plane. Relations between the house and the street are defined with multiple architectural elements resulting in pervading and separating of the static domain of privacy (house and garden) and dynamic domain of public street life (Figure 5). According to Neidhardt,

Usuprayno na slojnice terena vode pokaldrmljene stepenice. Paralelno sa stepenicama terasasto se izmi- če kuća kući.

Cobbled steps leading uphill. Pa- rallel to the steps, houses are built on terraces.

Vertikalno izmicanje kuća — kući.
Vertical staggering of houses.

Raskršća stambenih putova — trgo- vi mahala.

Street crossings — the market-places of a residential unit.

Izmicanje kuća po načelu nepisa- nog zakona — »prava na vidik«.

Straggling according to the un- written law "each house should command an unobstructed view".

Horizontalno izmicanje kuća — kući.
Horizontal staggering of houses.

Fig. 5 Juraj Neidhardt's drawings. Relations between houses, street, and landscape in *mahala* (Grabrijan and Neidhardt 1957, p. 151).

there are gates, ramps before the gates, green lines between the wall of the house or fence and the street, *doksat*, loggias, roof terraces, among other examples (Grabrijan and Neidhardt 1957, p. 145-146). *Doksat* is the element of the house that visually connects the individual and collective space. It is on the first floor of the house and enters into the street room. Architectural composition of *mahala* show us that the interface needs to be designed as a three-dimensional physical space and as such, it will result in the richness and the integrity of the experience. From one side, visual continuity could be the result of a unified approach to the street-house border. On the other side, the layout of the complete housing area with backbone roads that are curved and meander like shaped, brings a variety of sequences for pedestrians.

5. DESIGN PRINCIPLES FOR MAKING HOUSING GROUP FORM

The group form is reaffirmed as the adequate framework for design thinking in todays fragmented city and its dwelling and public space. The paper emphasise the Fumihiko Maki's explanation of the group form as the basis for designing continuous collective spaces and meaningful dwelling environment.

Considerations of group form are bringing forward the very essential reasons for spatial order through which we can design the continuity of collective space. What are the architectural elements and their relations that define the quality of continuous collective space? Can we define that quality by identifying the basics of spatial language? Human experience and social logic (of collective space) are generators of such design process. To make everything more comprehensive and more design applicable we found useful to emphasise measurable principles grounded in the Space Syntax theory. Furthermore, for

identifying specific values rooted in context and culture of living, we find important to recognize and analyse the local group form – the *mahala* as a traditional housing area of the city. Both addings together, with reconsidered Maki's concept of group form, made possible the identification of design principles set for humanly appropriate dwelling environments (Figure 6). Each of proposed design principles is addressing one or more primarily defined design issues: ordering of spatial elements, connectedness between spatial scales and complexity of urban interface.

design principle	design issue
use of geography and topography wisely and dramatically	connectedness between spatial scales
layout of small elements on proportionally small distances but with sufficient privacy for everyone and with, as much as possible, open view	ordering of spatial elements complexity of urban interface
respect to neighbours in a spatial sense (distances, privacy, and right to the view)	ordering of spatial elements complexity of urban interface
right to view for everyone	ordering of spatial elements connectedness between spatial scales
variety of configuration depths	ordering of spatial elements complexity of urban interface
higher number of spaces with higher integration values	connectedness between spatial scales
local configuration integrated with the global urban system	connectedness between spatial scales
visual connectedness between the exterior spaces and between exterior and interior spaces	ordering of spatial elements complexity of urban interface
serial vision - sequential changes in pedestrian's experience	ordering of spatial elements
complexity of transitional area between building and public space	complexity of urban interface ordering of spatial elements
interface as three-dimensional physical space	complexity of urban interface ordering of spatial elements
sequential development of open-end composition or growing architecture	connectedness between spatial scales ordering of spatial elements

Fig. 6 Housing group form design framework

6. CONCLUSION

The analysed theories, their linkage and the case study resulted in setting of an analytical framework for comprehensive understanding and design of the housing group form. Three important design issues of group form are recognized from theoretical overlapping as the first level of the analytical framework: ordering of spatial elements, connectedness of spatial scales and complexity of urban interface. The second level of the analytical framework is an open-ended set of the design principles for the housing group form, based on the design intentions towards continuity of collective space and the integrity of urban whole.

Theoretically, this paper has contributed to expand the existing theories about urban form and spatial configurations by elaborating on them from the design perspective. Methodologically, research is conducted by overlapping the findings from theoretical research with the case study related to specific social and cultural context. The findings are instructive for urban theory and urban design practices when designing urban dwelling environments and its collective spaces. Some limitations of results are obvious when building the research based on single case study. Therefore, with the aim to generalize or contrast these findings further researches are recommended. More case studies in other cultural and social contexts would surely provide useful insight in proposed housing group form design framework.

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ZNAČAJ I ULOGA GRUPNE FORME:
FIZIČKA I LJUDSKA DIMENZIJA KOLEKTIVNOG PROSTORA

Japanski arhitekta Fumihiko Maki je 1964. godine ukazao na potrebu za istraživanjem kolektivne forme u stambenoj arhitekturi. Potreba je proizašla iz arhitektove osjetljivosti prema dinamičnim promjenama u društvu i istovremeno neadekvatnim statičnim i fragmentarnim reakcijama arhitekture. Ovaj tekst predstavlja savremeni pogled na teoriju kolektivne forme i istraživanje o tome zašto i kako zgrade treba da stoje zajedno. Tekst naglašava važnost ponovnog fokusiranja arhitekture na grupnu formu stanovanja i odluke u dizajnu uslovljene društvenim i ljudskim aspektima. Teorija veza u grupnoj formi je povezana sa novijim društveno-prostornim teorijama i interpretirana kao analitičko sredstvo za razumijevanje morfologije, konfiguracije i društvenog kapaciteta stanovanja. U tekstu se predlaže kombinovanje morfološkog i konfiguracijskog pristupa prilikom tumačenja tradicionalnih i savremneih stambenih ansambala i njihovih veza sa širim urbanim prostorom. Cilj teorijskog istraživanja je identifikacija analitičkog okvira i principa dizajna grupne forme zasnovanih na društveno i kulturološki relevantnim relacijama arhitektonskih i konfiguracijskih elemenata.

Ključne reči: *kolektivni prostor, grupna forma, stanovanje, konfiguracije, veze, interfejs*