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The reflection of religious diversity and socio-cultural meaning on the spatial configuration of Traditional Kayseri Houses

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Abstract

Recent studies on domestic spaces have demonstrated that social meaning and cultural values are mostly reflected by means of spatial organizations of houses, thus, in that way, different cultures express themselves through different spatial models. In this respect, space syntax and visibility graph analyses arise as the computational approaches to discover the interactions between space and culture. These methods have essentially been constructed through the relationships of permeability based on movement and visibility based on the perception of a moving observer. In the examination of the entire house or it's certain spaces in the context of introversion and extroversion, they are effective methods which are used to understand the privacy related to spaces, control mechanisms, the level of the internal relations of the household and the relations between the household and the visitors.

In this study, domestic space was examined through twenty-seven traditional houses of Kayseri in Central Anatolia, Turkey, where people from different religious beliefs have lived for long years, within the contexts of space syntax and visibility graph analyses. The houses were analyzed by using the Depthmap-UCL software developed by Alasdair Turner.

After the permeability and visibility analyses, the study focuses on how socio-cultural meanings are reflected on the spatial configuration of traditional Kayseri houses, what common and/or different characteristics are demonstrated by the houses in terms of the spatial configuration and visibility structure, and the importance of permeability and visibility structures in the spatial configuration of houses.

Keywords
Traditional Kayseri Houses, Space syntax, Visibility.

1. Introduction

One of the important research fields in the relationship between spatial organization and social structure is the domestic space. Studies conducted on the domestic space demonstrate that social meaning and cultural values are mostly reflected by means of spatial organizations of houses, thus, in that way, different cultures express themselves through different spatial models. In this respect, the space syntax claims its place in researches as a computational architectural theory and a morphological analysis method that examines the interactions between the society and all kinds of spatial configurations.

The space syntax, proposed by Hillier and Hanson in 1984, implies that the socio-cultural structure and processes exhibit themselves in the space with spatial configuration. According to the theory, the social structure and the space mutually interact with each other. The most essential strategy is to attempt to discover several stable aspects in the spatial configuration and to transform them into cultural human-interaction patterns. This theory, through the departure point that there exists a direct relationship between the spatial organization and the social structure, attempts to explore the ways how people perceive and use the space, depending on permeability in spatial organization and visual fields. A number of computational analysis technique and tool have been developed for the configurational analysis of the space, and they analyze spatial organizations by configurationally defining the entire structure.

In addition, Turner proposes the visibility graph analysis method that is based on Benedikt's isovist concept and the space syntax, and develops the Depthmap-UCL software that is able to carry out this and other spatial analyses within the context of space syntax. İsovist concept initially introduced by Tandy (1967), and was formalized by Benedikt (1979). İsovist is the set of all points visible from a point in the space. The shape and size of the isovist differ according to the observer's point of view and stance (Benedikt, 1979). According to this method, visibility structure of spaces based on the perception of a moving observer, along with the spatial characteristics of spaces based on permeability relations, play important roles in the presentation of spatial configuration. The information provided by visual field in the urban environment and in buildings might help the user find his/her way. In addition, it is possible through visual fields to control the information provided to the user within the system.

Therefore, permeability and visibility relations reveal the spatial organization of all spatial systems including houses, and the ways the household and visitors perceive the house. In addition, the level of the internal relations of the household and the relations between the household and the visitors are arranged through permeability and visibility structures. The level of privacy (interpersonal interaction) within the house can be determined by defining physical or invisible boundaries. While physical boundaries are the ones that control the visibility, that is to say, the movement, invisible boundaries are the control of the visual knowledge provided through physical boundaries such as the prevention of eye contact. Moreover, the level of privacy differs between different societies and cultures. This difference is shaped according primarily to the family's social structure and its relations with visitors. Therefore, analyzing the permeability and visibility structures in houses will help us to understand the level of privacy in that culture and, thus, the interactions within the family and between the family and visitors, and the statuses of the functions that belong to the domestic space within the permeability and visibility structures.

Space syntax and visibility methods, which enable the determination of permeability and visibility structures, lead us to results concerning the relationship between the space and the socio-cultural structure by considering the space and its configuration through the user's movement within the space and his/her visual perception. In this study, these two methods will be used in order to demonstrate how social and cultural meanings are reflected on the spatial configuration of traditional Kayseri houses in Central Ana-

tolia where people from different religion and cultures coexisted for long years.

2. Traditional Kayseri Houses

Kayseri one of the few Anatolian cities in which a substantial Christian minority lived. Towards the end of the sixteen-century there were fifty Muslim, thirteen Christian and nine-mixed town-quarters (Jennings, 1976). In the seventeen-century Muslim quarters declined to thirty-five, the number of Christian quarters was fourteen, while mixed population town-quarters was twelve (Faroqhi,1987). The proportion of Christian population remained more or less the same until the establishment of the Republic. Two groups, Gregorian Armenians and Orthodox Greeks, lived with the Muslims in a friendly and cooperative way (İmamoğlu, 2006).

'The traditional Kayseri house until the twentieth century was a living entity, a process, a natural phenomenon, not a finished product on going organic process within a family lot over several generations. Continuous additions or alterations of room or service spaces on the ground or upper levels were considered natural. As a result, overlapping and intermingled volumes, and superimposed walls and planes were common. Houses were divided among brothers and sisters after their parents passed away, independent units being added at the expense of smaller gardens or courtyards. Nothing stopped this organic process in any period. This flexible and dynamic attitude towards buildings has undergone some changes in the 20th *century with practices borrowed from Europe, generally by the Christian community, who built complete and finished rectangular houses. Even these houses, too, were altered either by adding rooms or service spaces, or changing their functions. In short, spaces grew and spaces died just like their owners, but the family lots were continuously in use. Evolution or change within continuity, perhaps reflecting the essence of life, was implicit principles.'* (İmamoğlu, 2006).

In general, a traditional Kayseri house is the outcome of a natural and unpretentious building process, inward looking and asymmetrically growing a courtyard or a garden. Houses were generally designed and built by masons, according to custom, as well as, requirements and desires of the owner. Many daily activities of the house are carried out in the courtyard except cold days, rooms are oriented towards the courtyard and they have windows looking at the courtyard. Each room generally carries out more than one function; however, the main function of a room is clear. In rooms, especially in halls (*sofa*), there exist room-entrances called "*seki altı*". "*Seki altı*" is lower than the main floor (*seki*). Hall has a different meaning in these houses. Its function to direct the house arrangement and as a space of distribution stays in the background. It has many functions such as being the entrance of the house, a reception place, a guest room, a living room, a prayer place and a bedroom for elders. "*Tokana*" is a space used as kitchen, winter room and storeroom. A cooker is located in the *seki altı* part of the *tokana*. "*Harem* room" is a private place where strangers are not desired to enter. Family members -especially women and children- spend most of the house time

Figure 1. *Examples from Traditional Kayseri Houses and Streets (İmamoğlu, 2006).*

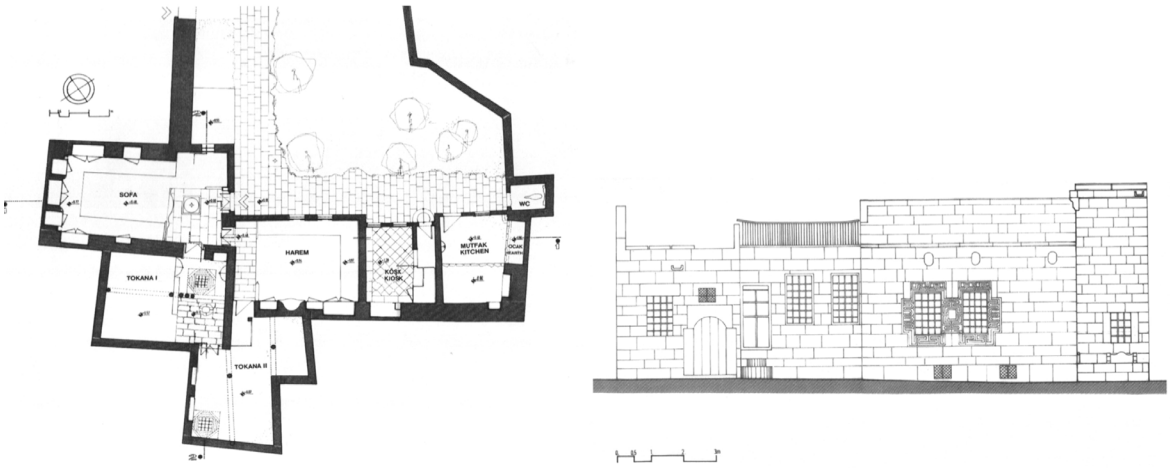


Figure 2. *Examples from Traditional Kayseri Houses, ground floor plan and east elevation of House Öztaşcı House, 19th Century, Muslim house example (İmamoğlu, 2006).*

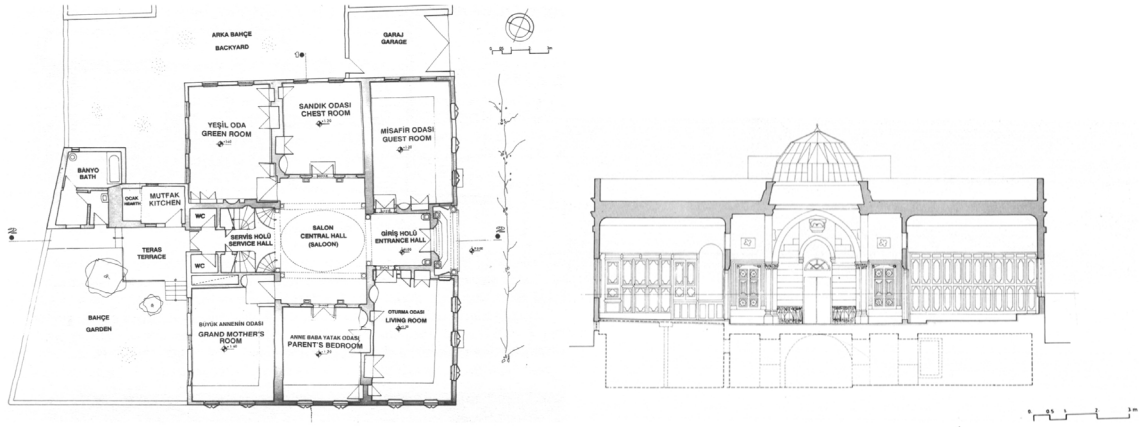


Figure 3. *Examples from Traditional Kayseri Houses, ground floor plan and section of İmamoğlu House, late 19th Century, Christian house example (İmamoğlu, 2006).*

in the harem room. Kiosks (*köşk*) are designed as semi-closed sitting units around the garden or courtyard (İmamoğlu, 2006).

Traditional houses are generally one or two storied. Generally, upper storey started to be seen in examples from the 19th Century. It is stated in the literature that all units of a house have been rendered private by closing the house to other houses and to the street by surrounding it with high courtyard or building walls. It is of high importance especially for Muslim families to protect privacy within the house and the courtyard. It is apparent that security concerns too, along with privacy, play important roles in this attitude. Another reason to shelter houses is the fact that people leave the city in the summer and go to vineyards. Security concerns are in the foreground in houses built before the last century, however, such measures started to be loosened. Traditional houses generally have few and small windows. Basically, stone, wood and iron have been used in the construction of houses (İmamoğlu, 2006).

It is observed that low- and middle-income families in Kayseri live in similar small houses, regardless of their religion. Among high-income families, on the other hand, houses of Muslim families have a simple plan. One of the important features desired in Muslim houses is the privacy provided to women. High walls surrounding the courtyard, low number of windows on the ground floor and the distant position of the living room from the street can be considered to be a set of design rules in order not only to ensure security but also to distinct women from men. In the 19th Century, the Christian minority started to lead a bourgeois lifestyle. In

this period, Christian houses are two-two and a half storied, and have very small gardens or green areas. According to the literature, the plan of these houses started to transform from being inward-looking to outward-looking. In early this century, while well to do Muslim houses continued to have incomplete organic constructs, Christian house plans started to become more organized, symmetric, inclusive of all functions and complete rectangles. Rooms are situated around a courtyard or a central hall. All rooms have been constructed in similar manners without considering or highlighting an order of importance. While Muslim houses have two different entrances and courtyards as harem room and *selamlık* (private and public), Christian houses do not have such a distinction. However, after the establishment of the Republic, Muslim's understanding of privacy started to change gradually, and modern values both in privacy and interactions with the opposite sex have been mostly embraced (İmamoğlu, 2006).

İmamoğlu (2006) explains the difficulty to classify Traditional Kayseri Houses in terms of religion as follows; *'First of all, since Muslims were in a majority, remaining houses are mostly Muslim houses and the number of Christian examples are limited. This limitedness is more explicit for the period before the 1835 earthquake, because the small number of houses that remain from that time belongs only to Muslims. Another reason is the distribution of population according to income. The majority of Kayseri natives, regardless of their religion, were of low and middle income type, living in modest houses, most probably of similar, if not identical character and layout. However, careful researcher with additional information from the community may be able to distinguish between the houses of well-to-do people of different religions.*

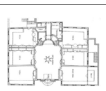
3. Spatial and visual analyses of Traditional Kayseri Houses

Most of traditional Kayseri houses have been destroyed or ruined although they were certified and included in urban protected areas. In this study, a total of twenty-seven houses - seven houses (House 3, 5, 6, 7, 14, 17, 18) included in Vacit İmamoğlu's book (2006) and twenty houses included in Gonca Gündoğdu's master thesis (1986)- were considered. Most of these houses belong to the 19th and early 20th centuries, and only a house from 18th century. Except some of them, religious beliefs of the constructors or owners of these houses remain unclear. Classification of these houses in terms of religion based on information from İmamoğlu's book (2006) and his book review (2006) on Büyükmıhçı's book (2005) (Table 1). Most of the examined houses are courtyard-type houses frequently observed among traditional Kayseri houses. However, three of these houses do not have courtyards (House 1, 5, 9). Three of them exhibit a similar spatial configuration: single-storied, symmetrically designed and having a central hall surrounded by rooms. Also these houses are examples of Christian houses. In houses with courtyards, on the other hand, the shape of the courtyard, its size and place within the house differ. Some of the houses with courtyards are single-storied, some have a semi second storey and some are two-storied completely (Table 1).

The analyses were carried out on the models of the houses abstracted through the principles of the Depthmap UCL software developed by Turner. In addition, by researching several spatial features of traditional houses, their users, and the era's cultural, social and economic characteristics; the interaction between space configurations and the socio-cultural structure was explored by establishing relations of causality through these data. In order to display and interpret the depth of social and cultural knowledge on the domestic space, two types of analyses were carried out for all houses in the study.

The first type of analysis is convex space analysis that is based on accessibility relations depending essentially on human movement. In this analysis, all spaces are represented as convex spaces in order to see how various functions relate to each other and their positions within the whole. Each house is reduced to fewest and largest convex spaces. Then, convex spaces are related

Table 1. *Traditional Kayseri houses which examined in this study – house names, century of built, religion of owners- R (Muslim – M, Christian-C) and plans of houses.*

House name		century	R	plans		House name		century	R	plans	
				ground floor	Upper floor					ground floor	upper floor
House 1	Ahmet Karaca House	…	C		-	House 15	Hoca Haser House	…..	…		
House 2	Körükçü-oğlu House	late 19th	…		-	House 16	Hacı İbrahim G. House	19th /second h.	…		
House 3	Öztaşcı House	19th /second h.	M		-	House 17	Bezircioğlu House	19th 20th	M		
House 4	Muhittin Gürbaz House	….	…			House 18	Camcıoğlu House	Late 19th	C		
House 5	İmamoğlu House	Late 19th	C		-	House 19	Şükrü Karaca House	…..	…		
House 6	Gavremoğlu House	18th /second h.	M		-	House 20	Yapıkçılar House	…..	…		
House 7	Baldöktü House	19th /second h.	M		-	House 21	D. İzzet House	…..	C		
House 8	Hüseyin Kış House	….	…			House 22	H. Ali Yapaner House	19th /second h.	…		
House 9	Müftü House	late 19th	C		-	House 23	A. Bakkaloğlu House	….	…		
House 10	Hacı Ahmet Ağa H.	early 20th	M		-	House 24	Efendi Ağalar House	…..	C		
House 11	Mustafa Hızırel House	19th /second h.	C		-	House 25	Hacı Türkaslan House	early 20th	…		
House 12	A. Pastırmacı_ oğlu H.	early 20th	…			House 26	Gazioğlu House	19th /second h.	C		
House 13	Nuri Sezer House	…..	…			House 27	Selçukoğlu Osman	early 20th	…		
House 14	Çalıka House	early 20th	M								

to each other depending on the permeability principles among them. After all these stages, the software creates various measurements and maps of these measurements. Obtained measurements are the measurements of the system such as connection, integration, mean depth and controllability. This analysis was carried out in two different types in this study: internal relations of the house were focused in the first analysis without including the

outer space and the relationship of the house with the outer space and changes taking place in its internal structure were focused in the second one by including the outer space. In order to be able to read these results and changes clearly, integration maps of all houses with and without the outer space were obtained and compared. In this map, spaces are colored up from red to dark blue according to their integration levels. Red color represents the most integrated space, while dark blue represents the most nonintegrated space.

The second type of analysis is visibility graph analysis. Through visibility graph analysis, houses were compared according to the spaces they include and visual areas they have, to the visual integration scores obtained from visual area maps, and to the integration scores obtained from convex space maps. In addition, their visual perception and movement relations were investigated. This analysis is based on the visual perception of the moving observer. With this analysis conducted from the eye level, measurements and maps of a space such as visual integration, connection, visual mean depth and visual controllability were obtained. In this type of analysis, as is the case in the convex space analysis, a color interval ranging from red to dark blue is used. While red represents the most visually integrated areas, dark blue represents the most visually non-integrated areas. Measurements and maps obtained from these two types of analysis based on human movement and the perception of the moving observer were firstly evaluated individually, and then by making comparisons within each type of analysis and between each other. In this way, based on the houses' permeability-visibility structures and relationships with each other; it was attempted to understand the interaction between the spatial configuration of Traditional Kayseri Houses and the socio-cultural structure.

3.1. Spatial analysis findings

Hillier and Hanson conceptually define buildings as the regulation of different human categories through a control mechanism. In domestic space, these categories are defined as the household living in the house and visitors. The domestic space, according to this definition, regulates both the internal relations of the household and the relations between the household and visitors through the control and permeability relations between the internal and external parts of the house (Hillier and Hanson, 1984). In this way, the domestic space is essentially related to the regulation of two types of spatial relations in terms of the domestic space accessibility relations. These are the internal relations of the house and the relations between the internal and external parts of the house. In this respect, in order to understand the internal relations of the house and the relations between the internal and external parts of the house, convex space analyses were first carried out without including the outer space and then repeated by including the outer space.

Table 2 demonstrates the ranking of the average integration scores obtained without including the outer space, from the most integrated house to the non-integrated house. In the convex space analysis carried out without including the outer space, the House 1 is the most integrated house with an integration score of 1,192. It is followed by the House 2 and House 3 with integration scores of 1,152 and 1,040, respectively. House 1 exhibits an integrated structure with its integration score within the integration-separation distinction that is based on permeability relations. House 2 and House 3 are situated on the frontier within this distinction. Other houses have non-integrated structures. Therefore, it is possible to conclude that all houses except the first three of them have more tendencies to non-integrated in terms of the composition of their spaces. The first three houses that have integrated structures have completely different spatial compositions. House 1 is one of three houses that have a central hall. House 2 is a double-storied house with a central courtyard, and House 3 is a single-storied house with an organic structure and a fragmented courtyard. Among the other houses, there are examples similar to these three houses. For example, House 5 and House 9 exhibit a spatial composition similar to

Table 2. *Convex space analysis results (House names, century, religion of house owners(R), integration without the outer space, integration including the outer space, controllability-C,) (Atak, 2009).*

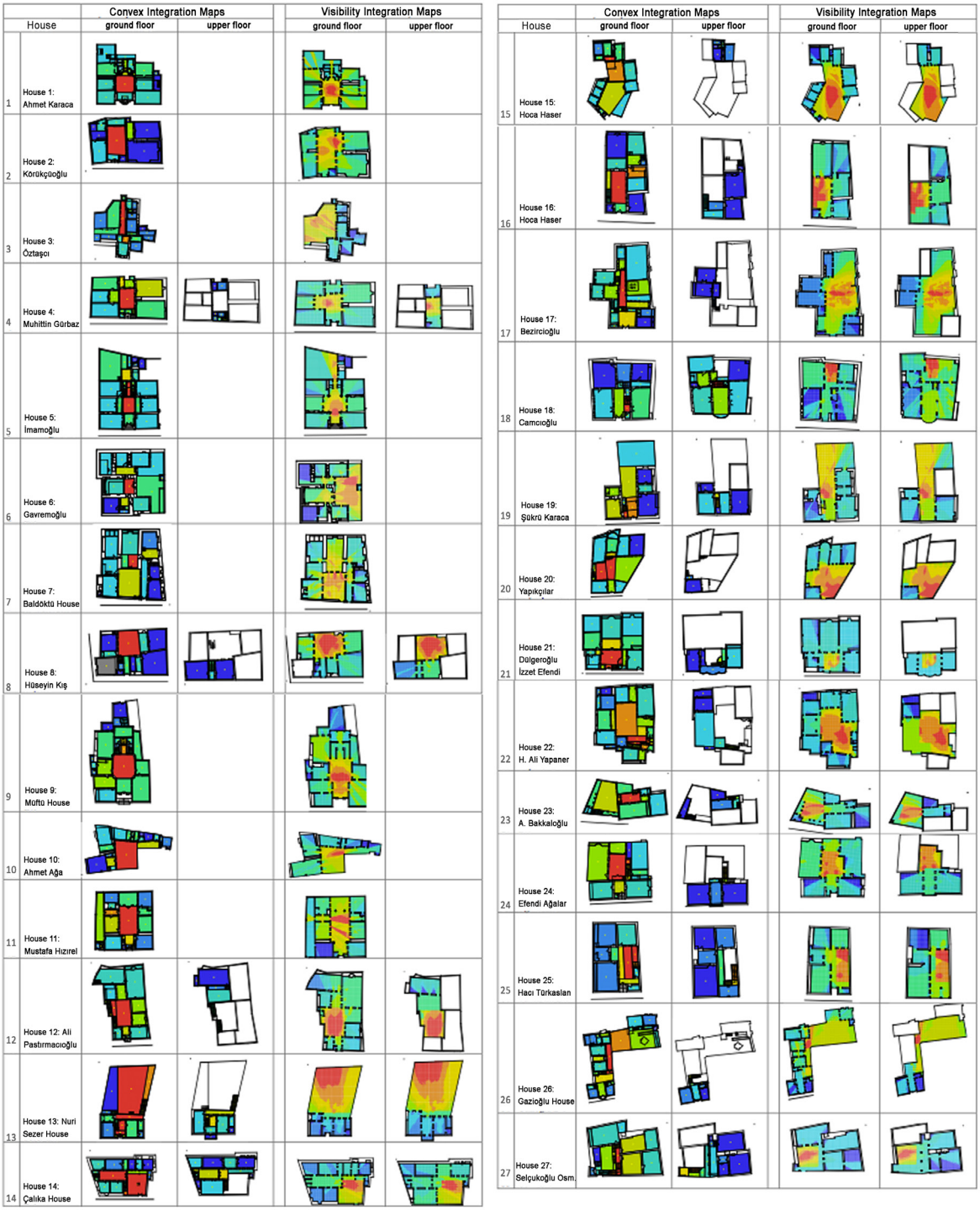
nr	House Nr.	Houses	Century	R	Integration (HH)			Integration-outer space			C
					Averag	Min.	Max.	Average	Min.	Max.	
1	House 1	Ahmet Karaca H.	…..	C	1,192	0,616	2,157	1,183	0,619	2,177	0,118
2	House 2	Körükçüoğlu House	late 19th	…	1,152	0,653	2,611	1,056	0,562	2,312	0,135
3	House 3	Öztaşcı House	19th /second h.	M	1,040	0,592	2,045	1,021	0,597	2,015	0,152
4	House 4	Muhittin Gürbaz	….	…	0,963	0,469	1,875	0,969	0,475	1,917	0,133
5	House 5	İmamoğlu House	Late 19th	C	0,931	0,419	1,679	0,907	0,420	1,610	0,117
6	House 6	Gavremoğlu House	18th /second h.	M	0,922	0,480	1,811	0,940	0,488	1,883	0,117
7	House 7	Baldöktü House	19th /second h.	M	0,914	0,551	1,653	1,088	0,650	1,734	0,176
8	House 8	Hüseyin Kış House	….	…	0,907	0,597	2,091	0,976	0,631	2,079	0,114
9	House 9	Müftü House	late 19th	C	0,889	0,468	1,579	0,928	0,484	1,686	0,129
10	House 10	Hacı Ahmet Ağa H.	early 20th	M	0,873	0,533	1,782	0,849	0,493	1,693	0,175
11	House 11	Mustafa Hızırel H.	19th /second h.	C	0,857	0,507	1,610	0,878	0,521	1,530	0,121
12	House 12	A. Pastırmacıoğlu H	early 20th	…	0,853	0,408	1,470	0,849	0,408	1,485	0,156
13	House 13	Nuri Sezer House	…..	…	0,843	0,514	1,148	0,856	0,520	1,210	0,135
14	House 14	Çalıka House	early 20th	M	0,824	0,559	1,210	0,808	0,521	1,214	0,106
15	House 15	Hoca Haser House	…..	…	0,804	0,532	1,335	0,807	0,529	1,332	0,126
16	House 16	Haci İbrahim G. H.	19th /second h.	…	0,802	0,584	1,286	0,812	0,576	1,343	0,160
17	House 17	Bezircioğlu House	19th 20th	M	0,771	0,413	1,347	0,790	0,425	1,367	0,119
18	House 18	Camcıoğlu House	Late 19th	C	0,768	0,534	1,278	0,781	0,538	1,299	0,140
19	House 19	Şükrü Karaca House	…..	…	0,757	0,489	1,152	0,785	0,498	1,219	0,135
20	House 20	Yapıkçılar House	…...	…	0,702	0,396	1,166	0,721	0,401	1,223	0,158
21	House 21	D. İzzet House	…...	C	0,692	0,341	1,125	0,731	0,350	1,175	0,144
22	House 22	H. Ali Yapaner H.	19th /second h.	…	0,691	0,391	1,042	0,695	0,397	1,040	0,164
23	House 23	A. Bakkaloğlu H.	….	…	0,671	0,381	1,125	0,679	0,400	1,125	0,145
24	House 24	Efendi Ağalar H.	…..	C	0,630	0,387	1,007	0,653	0,389	1,083	0,137
25	House 25	Hacı Türkaslan H.	early 20th	…	0,619	0,404	0,827	0,640	0,402	0,948	0,140
26	House 26	Gazioğlu House	19th /second h.	C	0,612	0,360	1,033	0,622	0,363	1,060	0,142
27	House 27	Selçukoğlu Osman	early 20th	…	0,548	0,351	0,800	0,552	0,349	0,814	0,166

that of House 1. Although these houses exhibit a similar spatial composition, they have non-integrated structures. Therefore, it is apparent that it is not possible to draw general conclusion on whether these houses have integrated or non-integrated structures departing from differences such as having courtyards or central halls, having complete or incomplete geometrical forms.

As Table 2 demonstrates, in the convex space analysis, integration scores of houses differ when the street -that is considered to be the outer space- is included. Integrated ones among these houses (House 1, House 2 and House 3) show a tendency to non-integrated when the outer space is included in the analysis. Therefore, it can be argued that these houses have inward-looking structures. While the integration scores of seven houses decreased after the inclusion of the outer space to the analysis, those of twenty houses increased. Hence, less than one-third of the examined houses have inward-looking structures, and more than two-third of them have outward-looking structures. Two of three houses that have halls exhibit a more inward-looking structure; the third one has an outward-looking structure and most of the houses with courtyard exhibit outward-looking structures.

If a place has a large visual area that is composed of numerous points, the environment can be controlled easily. This measurement in convex space analysis is based on permeability relations. The minimum controllability among the examined examples belongs to House 14 with a controllability score of 0,106 in Table 2, and the maximum controllability score belongs to House 7 with a score of 0,176. It means that House 14 has a weaker composition while House 7 exhibits a stronger structure in terms of controllability. However, it should be noted that there is not a big difference between these minimum and maximum scores. For House 14, it can be stated that the upper storey of this house is used as extensively as the ground floor and, therefore, the con-

Table 3. *Convex space integration maps and visibility integration maps (Atak, 2009).*



trollability between storeys becomes difficult to achieve. Although House 7 is a house non-integrated as *harem room-selamlık* and the *selamlık* part has low integration and -thus- controllability scores, there exist alternative passageways to the other spaces of the house. It can be argued that this situation caused the house to get a high controllability score in terms of accessibility. What is important here is the role of multiple alternative transitions in the controllability measurement that is based on accessibility. In this respect, high controllability scores of the courtyard and central hall are associated with the existence of transitions from many other spaces to these spaces.

Table 3 demonstrates the houses' convex maps from the most integrat-

ed to the non-integrated and visibility integration maps. The most integrated space is the central hall in houses with central halls (House 1, 5, 9), and the whole or some parts of the courtyard in almost all houses with courtyards. The general conclusion obtained from the spatial analysis based on accessibility relations is that the courtyard plays a key role that holds together all units of the house and connects them to the outer space. In other words, the house that is intensively used is of a character that controls the movement and activities or various spaces in it, and structures these relations. It is observed that this function is carried out by the central hall in houses that have central halls.

As indicated before, this measurement in convex space analysis is based on permeability relations. However, visible areas play significant roles for the controllability of a space. When inner spaces have a composition that does not allow them to see each other, it is possible for the controllability score obtained in convex space analysis to yield similar results with the score obtained in visibility measurement. However, it is not clear whether the same results will be obtained or not with the controllability score obtained in convex space analysis in the existence of permeable units such as windows and glass walls as well as doors that allow spaces to see each other. In the examined houses, there exist windows in inner spaces opening to the courtyard or to each other. In this respect, it is expected to obtain significant results by comparing the integration and controllability scores of houses obtained through convex space and visibility graph analyses.

3.2. Visibility graph analysis findings

In revealing the social logic lying behind houses, visibility relations play roles as significant as those of accessibility relations. The visibility graph analysis carried out by using the Depthmap UCL software provides several special measurements representing local and global visual characteristics of houses. The measurement scores of traditional Kayseri houses obtained through visibility graph analysis are presented in Table 4. The table demonstrates the ranking of the houses, from the most visually integrated house to the non-integrated one. It is evident that the visual integration ranking is different from the integration ranking obtained through permeability analysis. The most visually integrated houses are those that have a big courtyard and/or a garden, which can easily be seen from other spaces. Another factor is the existence of high numbers of windows opening from spaces to each other and especially to the courtyard. In addition, the upper storey, if any, of the house has a visual relation with the yard as well. Houses having central halls (House 1, House 5, and House 9) occupy lower ranks in terms of visual integration. These three houses are Christian house samples. This situation stems from the lack of numerous windows in inner spaces of houses that make visual connection, as it is the case in houses with courtyards.

Most of the houses have outward-looking structures in terms of permeability relations and inward-looking structures visually. Facades of houses, especially of Muslim houses, do not have many windows and courtyard walls are very high. However, these houses have sides looking at the courtyard and these sides have many windows. Therefore, spaces within the house for the common use such as courtyards have significance in terms of visibility. Therefore, houses' visual integration scores might yield more sensitive and different results than the integration scores based on permeability. Moreover, while spaces other than doors such as windows are not important in permeability relations, these spaces and their sizes are important in visibility analysis.

The visual controllability measurement differentiates the spaces that can be visually controlled easily. If a place has a large visual area that is composed of numerous points, it is possible to define the environment as controllable. The controllable amount of the space decreases towards points with fewer spaces and especially towards doorsides in corridors. On the other hand, controllable spaces are spaces that cannot see other spaces much, but can eas-

Table 4. *Visibility analysis results (House Names, Century, Religion of house owners –R,Visual Integration, Visual Controllability-VC, Visual Coefficient Clustering -VCC) (Atak, 2009).*

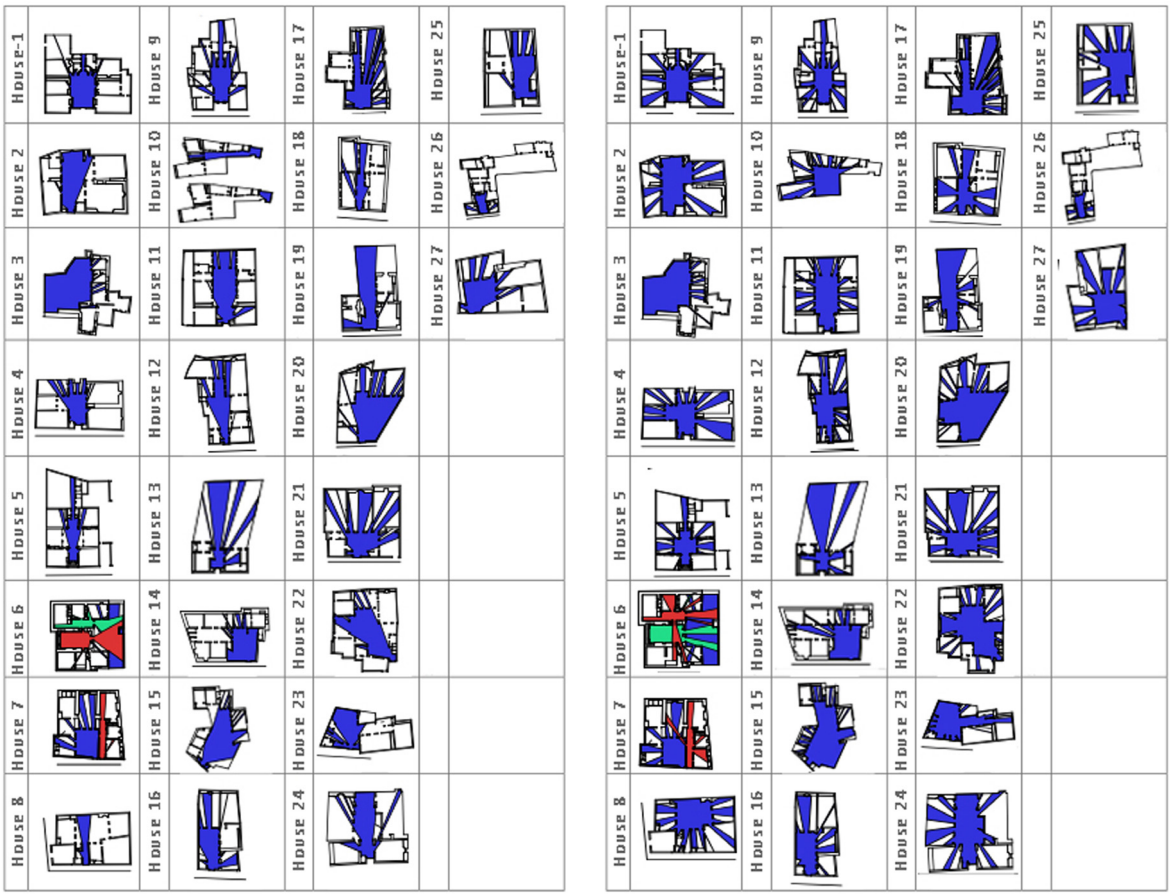
Nr	House Nr.	Houses	Century	R	Visual Integration (int.HH)			VC	VCC
					Average	Min.	Max.		
1	House 13	Nuri Sezer House	…..	…	34,290	5,625	50,958	0,711	0,855
2	House 17	Bezircioğlu House	19th 20th	M	24,867	6,711	43,980	0,599	0,765
3	House 20	Yapıkçılar House	…...	…	20,647	7,195	30,195	0,563	0,767
4	House 15	Hoca Haser House	…..	…	20,546	4,815	31,670	0,560	0,798
5	House 2	Körükçüoğlu House	late 19th	…	17,125	5,763	27,967	0,370	0,645
6	House 22	H. Ali Yapaner H.	19th /second	…	17,031	5,305	27,685	0,521	0,750
7	House 3	Öztaşcı House	19th /second	M	16,152	5,828	27,009	0,423	0,764
8	House 12	A.Pastırmacıoğlu H.	early 20th	…	15,113	4,862	24,490	0,458	0,685
9	House 23	A. Bakkaloğlu	….	…	14,820	5,315	27,215	0,491	0,756
10	House 19	Şükrü Karaca House	…..	…	14,600	5,600	23,410	0,430	0,762
11	House 21	D. İzzet Efendi	…...	C	13,760	5,417	30,416	0,468	0,716
12	House 8	Hüseyin Kış House	….	…	13,676	5,031	20,844	0,435	0,714
13	House 10	Hacı Ahmet Ağa H.	early 20th	M	13,488	4,733	24,540	0,345	0,696
14	House 4	Muhittin Gürbaz H.	….	…	13,342	4,866	24,119	0,372	0,687
15	House 24	Efendi Ağalar	….	C	13,132	6,456	21,155	0,440	0,648
16	House 16	Hacı İbrahim G. H.	19th /second	…	13,076	5,458	21,866	0,403	0,741
17	House 27	Selçukoğlu Osm. H.	early 20th	…	12,477	5,465	25,703	0,407	0,725
18	House 9	Müftü House	late 19th	C	11,399	5,066	18,488	0,249	0,602
19	House 25	Hacı Türkaslan H.	early 20th	…	11,210	3,834	19,153	0,449	0,715
20	House 7	Baldöktü House	19th /second	M	10,948	4,849	17,188	0,259	0,680
21	House 14	Çalıka House	early 20th	M	10,835	3,637	20,090	0,346	0,665
22	House 18	Camcıoğlu House	Late 19th	C	10,684	6,067	17,386	0,365	0,599
23	House 6	Gavremoğlu House	18th /second	M	10,634	4,677	16,742	0,341	0,711
24	House 1	Ahmet Karaca	…	C	10,466	1,886	18,108	0,227	0,663
25	House 11	Mustafa Hızırel	19th /second	C	9,681	4,050	16,190	0,333	0,691
26	House 5	İmamoğlu House	Late 19th	C	9,162	3,185	16,796	0,318	0,752
27	House 26	Gazioğlu House	19th /second	C	8,728	3,130	14,459	0,495	0,772

ily be seen from other spaces. House 13 has the highest controllability in terms of the visual integration score. The lowest score belongs to House 1 with a score of 0,227, which has a central hall and which is ranked first in the integration ranking based on permeability relations. It is seen that other houses that have central halls have low controllability scores (House 5, 9). In short, it is possible to conclude that visually integrated houses and spaces have high visual controllability scores. Coefficient clustering measurement, on the other hand, shows how long the visual area of an observer will remain the same and to what degree the spatial perception of the observer will change at the end of his/her movement from a point to a more distant point. If there will occur a big loss of visual knowledge after the observer becomes distant, the coefficient clustering score becomes low. The highest score (0,855) belongs to House 13, which has the highest visual integration and controllability scores, while the lowest score (0,599) belongs to House 18.

The visual integration maps in Table 3, while the most visually integrated points are represented in red on the map, the most non-integrated points are represented in dark blue. It is observed that courtyards, gardens and central halls are mostly more integrated spaces. These spaces are followed by spaces for common use such as halls and kiosks. Spaces such as toilets, storerooms, upper-storey rooms and kitchen (*tokana)* are more visually non-integrated spaces. Another important situation is that the *selamlık* part of houses that are non-integrated as *harem room* and *selamlık* is rendered visually different from the other units of the house. This situation is also seen in convex space analyses based on permeability relations. In addition, it is observed that more visually integrated spaces have higher visual controllability scores.

In addition, isovists were produced from points determined in several spaces within houses. Isovist defines the visual knowledge that an observer obtains by rotating 360 degrees on a vantage point. Firstly, isovists were produced from entrances of all hous-

Table 5. *İsovists, (a) from entrance of houses and (b) the center of these spaces (Atak, 2009).*



(a) (b)

es in order to determine what kind of a visual knowledge is obtained and what spaces are seen as one enters the house. Then, they were produced from the central points of these spaces in order to determine the visual knowledge that is obtained as one arrives at the centers of entrances (Table 5). Isovists obtained from house entrances demonstrated that the first person who enters the house perceives the whole or a large part of the entrance space seen as a courtyard or a central hall. In addition, other spaces can also be seen, although to limited degrees, through openings on their surfaces looking at the entrance. However, this visual knowledge provided through door and window openings in spaces such as rooms is a controllable knowledge. In houses having *harem room-selamlık* distinction, isovists obtained from the entrances of these parts show that they have a very limited visual relationship with each other. This might be an example of a deliberate visual distinction. Isovists obtained from the centers of entrances indicate that the whole entrance space and large parts of other spaces are perceived from this space, although to limited degrees. While spaces open to public use such as halls and kiosks are spaces that can easily be seen from this space, spaces such as rooms and *kitchen* allow a limited and controllable vision through their openings.

4. Discussion and conclusions

Space syntax and visibility graph analyses are the methods effectively used in the examination of a house or some parts of a house in terms of inwardness-outwardness, and the determination of spatial privacy, control, social hierarchy within the household and the degree of relations between the household and visitors. These methods have essentially been constructed through the relations of permeability based on movement and visibility based on the perception of a moving observer.

Permeability and visibility relations

reveal the spatial mechanisms of houses and the ways the household and visitors experience these systems. In addition, the level of the internal relations of the household and the relations between the household and the visitors are arranged through these relations. The level of privacy within a house can be determined by defining physical or invisible boundaries. While physical boundaries are the ones that control the visibility, that is, the movement; invisible boundaries are the control of the visual knowledge provided through physical boundaries such as the prevention of eye contact. However, the level of privacy ensured through the control of these knowledge areas differs between different societies and cultures. In this respect, in the fieldwork, in order to reveal the spatial configuration of traditional Kayseri houses and the social and cultural knowledge lying behind this configuration, both of these analyses were carried out together; and the houses' spatial and visibility structures' characteristics that support each other and their differences were explored.

In the sample, the dominant presence of the courtyard-integrated spatial theme is clearly apparent. In two groups from different religious, common house type is courtyard-house type. Courtyard still remains the importance in these centuries for two groups. However in early 20th century, while well to do Muslim houses continued to have incomplete organic constructs, Christian house plans started to become more organized, symmetric, inclusive of all functions and complete rectangles. Rooms are situated around a courtyard or a central hall.

The general conclusion obtained from the spatial analysis based on accessibility relations is that the courtyard plays a key role by not only connecting all units of the house to the outer space by holding them together, but also structuring the main spaces of the house. Central halls play this role in a small number of examples having central halls. However, the central hall does not have a function similar to that of the courtyard. Almost all of the examined houses show a tendency of separation in terms of the ways their spaces come together. In addition, while two-third of the houses exhibit outward-looking structures, only one-third of them exhibit inward-looking structures. This finding demonstrates that traditional Kayseri houses, which are defined as inward-looking houses, actually exhibit an outward-looking structure in terms of accessibility relations. This finding might be correlated with the extroversion trend observed in the social structure in the 19th and 20th Centuries. However, the information that is essentially needed is about the question of in what terms the houses will be characterized as inward looking.

In spatial analysis; ground-floor rooms, upper-storey rooms in houses that have upper-storey, *kitchens*, toilets, storerooms and the outer space are predominantly located in the "non-integrated" side of houses' integration averages and, on the other hand, courtyards, central halls, arcades, kiosks, entrance halls, halls and *seki altı* parts of *kitchens* are located in the "integrated" side. However, it is seen in most of outward-looking houses that the outer space gets a score very close to the integration average and it is sometimes located in the integrated side of the average. It is known that almost all daily functions of traditional Kayseri houses except sleeping are carried out in the courtyard especially when the weather is good. This is a fact that renders meaningful the position of the courtyard as the most integrated space within the system. In addition, hall and kiosk are the other spaces where visitors are received and the daily time is spent. Moreover, doorstep and street are social spaces where relationships are established with neighbors.

In revealing the social logic lying behind houses, it is apparent that visibility relations that are based on the perception of the moving observer play roles as significant as those of permeability relations. It was observed that the houses were ranked according to their integration scores obtained in visibility analyses in a manner different than that in the spatial analysis. The ranking demonstrated that houses that have large courtyards, windows looking at the courtyard or at other inner spaces,

and alternative passageways in the inner space are more visually integrated, while houses that have central halls and contain more than one dwelling are more visually non-integrated. Courtyards, gardens and central halls are predominantly more visually integrated spaces. These spaces are followed by spaces for common use such as halls and kiosks, while spaces such as toilets, storerooms, upper-storey rooms and *kitchens* are more visually non-integrated spaces. However, the point that needs to be emphasized is that while most of ground-floor rooms exhibit a more non-integrated structure in terms of permeability, they exhibit a more integrated structure in terms of visual integration. However, it is necessary to note that this information can be controlled by closing doors and windows that render rooms more visually integrated, that is, privacy can be established by visually separating spaces. Numbers of windows on the façades of traditional Kayseri houses are not high even though they increased in the 19th and 20th Centuries. However, there exist many windows and doors opening to the courtyard. Taking this situation and houses' visible area structures into consideration, it is concluded that houses are indeed inward-looking in terms of their visibility structures.

As indicated before, houses' integration and visual integration rankings are not in parallel with each other. This situation essentially stems from the fronts and windows that houses have in their inner spaces. In spatial analysis, surfaces that allow visibility but are not permeable are considered no different than other frontiers; however, these openings are included in the analysis in visibility analysis. These two analyses are expected to yield similar results when houses do not have windows in their inner spaces. However, the situation in the sample is different. As a result of this characteristic of the houses, it is apparent that drawing conclusions about the spatial configurations of houses on the basis of only the accessibility relations will be inadequate. It is important to demonstrate the visibility structures of these houses due to the window openings they have in the inner space. Although the spatial and visual integration rankings do not support each other, it is seen that spatially and visually integrated spaces fit into each other. This situation indicates that the permeability and visibility structures of the inner spaces of houses function together.

In conclusion, this study examined the accessibility and visibility structures of the traditional Kayseri houses. It was seen that visibility analyses are more sensitive than permeability analyses since they yield significant results by considering variables such as the openings other than the openings that makes transition possible between spaces and sizes of these openings. As the knowledge obtained through the permeability and visibility analyses demonstrate, in traditional Kayseri houses in particular and in courtyard-type houses in general, exploring the spatial configurations of houses on the basis of only the permeability relations will yield limited and inadequate results. In this respect, it is apparent that visibility analyses have important roles in such studies. It is expected that this study will be a guide to studies to be conducted on similar spatial organizations and to new designs.

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Dinsel çeşitlilik ve sosyo-kültürel anlamların Geleneksel Kayseri Evleri'nin mekân organizasyonuna yansıması

Kentleşmenin ve kentlerde nüfusun ar Mekân organizasyonu ve sosyal yapı arasındaki ilişkinin en belirgin görüldüğü çalışma alanlarından biri, evsel mekândır. Evsel mekân üzerine yapılan birçok araştırma, sosyal anlam ve kültürel değerlerin büyük ölçüde konutların, mekân organizasyonları aracılığıyla yansıtıldığını böylece farklı kültürlerin farklı mekânsal modellerle kendini ifade ettiğini ortaya koymaktadır. Bu noktada, mekân dizimi ve görünür alan analizleri bina ölçeğinden kent ölçeğine varan her türlü mekân organizasyonu ile toplum arasındaki etkileşimi inceleyen hesaplamalı yöntemler olarak karşımıza çıkmaktadır. Bu yöntemler temel olarak harekete dayalı erişim ve hareketli gözlemcinin algısına dayalı görünürlük ilişkileri üzerinden ortaya konulmuştur.

Hillier ve Hanson tarafından 1984'de ortaya konan mekân dizimi, sosyo-kültürel yapının ve süreçlerin, tek başına olmasada mekânsal düzenleyim ile kendilerini mekânda ortaya koyduklarını; sosyal yapı ve mekânın karşılıklı etkileşim içinde olduğunu ifade etmektedir. Bu anlamda mekân dizimi yönteminin en temel stratejisi, mekân örüntüsündeki bir takım değişmezleri keşfederek bunları kültüre özgü insan etkileşim örüntülerine dönüştürmeye çalışmaktır.

Bunun yanı sıra Turner 2001'de, temeli Benedikt'in isovist tanımlaması ve mekân dizimine dayanan görünür alan analiz yöntemini ortaya koyar. Görünür alan mekânda belirlenen bir noktadan görünen bütün noktaların takımıdır (Benedikt,1979). Bu yönteme göre mekân organizasyonunun ortaya konulmasında, mekânların erişim ilişkilerine dayanan mekânsal tanımlamalarının yanı sıra hareketli gözlemcinin algısına dayanan görünürlük ilişkileri de önemli rol oynar. Kentsel çevrede ve binalarda görsel alanlarla sağlanan bilgi, kullanıcının yol bulmasına yardımcı olabildiği gibi görsel alanlarla

kullanıcıya sağlanan bilginin kontrolü de mümkündür.

Dolayısıyla mekân dizimi ve görünür alan analizleri, tüm mekânsal sistemlerin ve özel olarak konutların mekânsal olarak işleyiş ve kullanıcılar yani hane halkı ve ziyaretçiler tarafından deneyimlenme biçimini erişebilirlik ve görünürlük ilişkileri üzerinden ortaya koymaya çalışmaktadır. Konutun tamamının veya belirli mekânlarının içe kapalılık - dışa dönüklük bağlamında incelenmesinde, sosyal anlamda mekâna ilişkin mahremiyet, kontrol, hane halkı ve hane halkı ile ziyaretçiler arasındaki ilişkilerin düzeyini kavramada kullanılan etkin yöntemlerdir.

Mahremiyet seviyesi (kişiler arası etkileşim) fiziksel veya görünmez sınırların tanımlanması ile belirlenebilir. Fiziksel sınırlar, erişilebilirliği yani hareketi kontrol eden sınırlar olurken, görünmez sınırlar göz temasından kaçındırma gibi fiziksel sınırlar aracılığı ile sağlanan görsel bilginin kontrolüdür. Ayrıca mahremiyet düzeyi her toplum ve kültürde farklılık gösterir. Bu farklılık başta ailenin ve ait olduğu toplumun sosyal yapısı ve ziyaretçileri ile olan ilişkilerine göre şekillenmektedir. Bu yüzden, özellikle geleneksel evlerde erişebilirlik ve görünürlük yapılarını incelemek, o kültüre ait mahremiyet seviyesini anlamaya, böylelikle aile içi ve ziyaretçilerle olan etkileşimi, evsel mekâna ait işlevlerin erişilebilirlik ve görünürlük yapıları içindeki durumunu ortaya koymaya yardımcı olacaktır.

Çalışma kapsamında evsel mekân, uzun yıllar farklı dini inanışlara sahip halkın bir arada yaşadığı Kayseri kent merkezinde yer alan 27 geleneksel ev üzerinden ele alınmıştır. Bu evlerin sadece 14 tanesinin sahiplerinin hangi dini inanışa sahip olduğuna ilişkin bilgi elde edilebilmiş diğerlerine ilişkin ise bilgi elde etmek mümkün olmamıştır. Ele alınan evlerden Müslüman evi olarak bilinen evlerin birçoğu avlulu ve daha organik bir yapı sergilerken, Gayrimüslim evi olarak bilinen evlerin birçoğu merkezi hollü evlerdir. Ancak bunu bir genellemeye dönüştürmek doğru olmayacaktır; çünkü bu genellemeyi bozacak bazı örnekler bulunmaktadır ve ele alınan evlerin ancak yarısına ilişkin bu anlamda bilgi elde edilebilmiştir.

Evlerin analizinde Turner tarafından geliştirilen Depthmap yazılımı kullanılarak her iki analiz türü birden gerçekleştirilmiş, evlerin mekânsal ve görünür alan yapılarının birbirini destekleyen özellikleri ve farklılıkları ortaya konulmuştur. Bu analizler sonucu avlu-bütünleşik mekânsal temanın baskın varlığı net bir şekilde görülmektedir.

Geçirgenlik ilişkilerine dayanılarak avlunun, güçlü bir merkezi kontrol noktası olarak konuttaki ana ve yardımcı mekânları bir arada tutarak dış mekâna bağlayan ve bir taraftan da konutun ana mekânlarını yapılandıran kilit rolü üstlenmekte olduğu sonucuna ulaşılmıştır. Merkezi hollü örneklerde ise merkezi hol bu görevi görmektedir. Ancak merkezi hol işlev bakımından avlu gibi bir işleyişe ve kullanıma sahip değildir. Ele alınan evlerin hemen hemen hepsi, mekânlarının bir araya geliş biçimi açısından ayrışma eğilimi gösterir. Ayrıca evlerin üçte ikisi dışa dönük bir yapı sergilerken sadece üçte biri içe dönük bir yapı sergilemektedir. Bu durum çoğunlukla içe dönük bir yapıya sahip olduğu sıklıkla vurgulanan Geleneksel Kayseri Evleri'nin özellikle avlulu evlerin (çoğunluğunun Müslüman ailelere ait olmasından ötürü de daha içe dönük olarak değerlendirilen evlerin), aslında erişebilirlik ilişkileri açısından bakıldığında dışa dönük bir yapı sergilediğini ortaya koymaktadır. Bu durum, evlerin tarihlendiği geç 19. ve 20. yy.'larda, sosyal yapıda görülen dışa dönüş ile ilişkilendirilebilir. Ancak temel ulaşılması gereken bilgi, evlerin hangi açıdan içe veya dışa dönük olarak nitelendirileceğidir.

Evlerin, görünürlük analizlerinde elde edilen bütünleşme dereceleri açısından, diğer analizden farklı bir sıralamaya sahip olduğu görülmüştür. Sıralamada, büyük avlulu ve avluda ve iç mekânda pencereleri ve alternatif geçişleri olan evlerin görsel açıdan daha bütünleşik sırada yer aldığı, merkezi hollü evlerin ise daha ayrışık sırada olduğu görülmüştür. Baskın eğilim olarak avlu, bahçe ve merkezi holler görsel açıdan daha bütünleşik mekânlardır. Üstünde durulması gereken önemli bir nokta zemin kat odalarının büyük bir kısmının erişilebilirlik açısından daha

ayrışık bir yapı sergilerken görsel bütünleşme açısından daha bütünleşik bir yapı sergilediğidir. Ancak odaların görsel açıdan daha bütünleşik olmasını sağlayan pencerelerin ve kapıların kapatılarak bu bilginin kontrol edilebileceğini yani istendiği takdirde görsel olarak da daha ayrıştırılarak mahremiyetin sağlanabileceğini belirtmek gerekir. Geleneksel Kayseri Evleri'nin dış cephelerinde yer alan pencere sayıları, 19. ve 20. yy. da artış göstermesine rağmen yine de sayı olarak çok fazla değildir. Ancak avluya açılan pencere ve kapılar çok sayıdadır. Bu durum göz önünde bulundurulduğunda ve görünür alan yapılarına bakıldığında, evlerin aslında görünürlük yapıları açısından içe dönük olduğu sonucuna ulaşılmaktadır. Daha önce belirtildiği gibi evlerin bütünleşme ve görsel bütünleşme sıralamaları birbiriyle paralel değildir; ancak mekânsal ve görsel açıdan bütünleşik mekânlara bakıldığında, bu mekânların birbirleri ile örtüştüğü görülmektedir. Bu durum, evlerin iç mekânlarının erişilebilirlik ve görünürlük yapılarının beraber işlediğine işaret eder.

Bu çalışma mekân dizimi analiz sonuçlarını, geleneksel Kayseri evlerine ilişkin elde edilen tüm bilgilerle yorumlamaya çalışarak sosyo-kültürel anlamların, evlerin mekân kurgusuna nasıl yansıdığını ortaya koymaya çalışmaktadır.