

## **Traditional Street Pattern Typology: Case of Korça**

**Egin Zeka**

Epoka University  
Autostrada Tiranë-Rinas, km. 12, Tirane, Albania  
ezeka@epoka.edu.al

**Asst. Prof. Dr. Mehmet Ali Yüzer**

Istanbul Technical University  
İstanbul Teknik Üniversitesi Mimarlık Fakültesi Taşkışla Kampüsü  
34743, Beyoğlu / İstanbul / Türkiye  
yuzerm@itu.edu.tr

### **ABSTRACT**

The city is a very complex phenomenon that is formed under the effect of different actors and their relationships with each other. Urban design, as a discipline that tries to establish the most appropriate models (methods) of city building, is also a complex field that is influenced by various factors. The main determinants that effect the urban design decisions can be summarized as: natural environment; socio-economical structure; technological innovations and the division of land ownership (plot pattern). Besides these elements, another very significant actor that should orientate the urban design decisions is the typology of existing (traditional) urban pattern and its spatial organization, since it is a manifestation of different local values (social, cultural, physical) and the identity of the city. Actually, this fact has been neglected by many urban design practices in nowadays. This paper is a part of a master thesis<sup>1</sup> that tries to develop a methodology for analyzing (understanding) the characteristics of the traditional urban form and its elements. A traditional urban zone in the city of Korça in Albania was chosen as a case study for doing the morphological analyses and understanding the characteristics of this pattern. The paper is focused just on the analysis of the physical features of the street space.

**KEYWORDS:** Traditional Urban form, Street pattern, Morphological Analyses, Korça

### **1 INTRODUCTION**

The city is a medium shaped by physical, social and economical factors. The natural features, different governmental and economical systems, social structure and the technological innovations have been the main determinants of the city space. Any change on the structure of these components has generated new formations of urban space (Lynch, 1960). Different approaches of city planning (or urban design) theories have tried to find the proper ways of city building. One of the main issues that a lot of urban design theories or implementations have failed to achieve is the integration between the old and the

---

<sup>1</sup> Master thesis in the MSc Programme of Urban Design, Istanbul Technical University, 2012.

new city pattern. Many of urban design practices have not paid sufficient attention to the composition of existing cities.

A successful city design is that one which is developed within the local context by respecting the regional characteristics and interpreting them according to the conditions of the present. Regarding this issue, Geddes points out that the new urban developments in any city should reflect the historical and geographical values of the zone and in the meantime fulfill the needs of the present (Tyrwhitt, 1947). The way to achieve this passes through a good understanding of the qualities of traditional urban form, which represent the local values of a city. After that, these characteristics should be adapted to the new socio-economical structure of the city life by providing a harmony between the past and the future.

This study deals with the issues mentioned above by making a detailed morphological analysis of the traditional urban form in the city of Korça by focusing on the street space. The first reason for choosing the city of Korça as a case study is because it is one of the few cities in Albania that has conserved the traditional urban zones. This makes it easier to understand the characteristics of the spatial organization of the traditional urban pattern. Secondly, many cities in Albania, especially after 1990s, have passed through a fast urbanization process which unfortunately is not developed in a planned way. On the other hand, in the city of Korça this kind of urbanization is kept within a limit compared to other cities. This situation provides an opportunity for the city to develop in a proper way.

## **2 PURPOSE OF THE RESEARCH**

There are two main objectives within the scope of this study. The first one is to establish a methodology for analyzing the street pattern and its components. The second aim is to generate syntheses from these analyses in order to emphasize the characteristics of the street form and provide a better understanding of its spatial composition. Though the study is done for city of Korça, the methodology established here can be also applied in the study of other settlements.

## **3 METHODOLOGY**

The methodology used in the purpose of this study consists of four main parts. Firstly, a literature research was done in the context of finding different academic writings that deal with the explanation and evaluation of the street morphology and its components. The second part consist of data gathering and providing information related with the study are and the research topic. The needed data was provided by gathering the materials (written and visual) of the previous works (reports, books, maps, photos) and by making observations on the study are (measurements, photos). The third part consist of analyzing the data and making synthesis in the context of the research purpose. The analyses and synthesis (morphological) were done by using different techniques such as: computer programs (AutoCAD, Photoshop, SketchUp, and Office programs) and hand drawing techniques.

## **4 THE STUDY OF URBAN FORM**

The simplest definition of urban form is this that considers it as a group of buildings and spaces between them. The urban space is a three-dimensional medium surrounded by buildings. In this context, the urban fabric is consisted of two main components; the buildings and outer spaces between them (Liu Quan et al., 2010). Rob Krier goes further by making it simpler when claims that the main elements of traditional settlements are streets and squares (Krier, 1979).

The geographer M.R.G Conzen defines the urban form by dividing it in three main parts: streets, plots or lots and buildings. Streets, plots and buildings footprints refer to the ground plan or the town plan and the building fabric defines the land use and the third dimension of the urban form (Moudon, 1997; Whitehand, 2001; Kostof, 1991).



Figure 2.1 : The urban pattern elements defined by Conzen (Kostof,1991).

#### 4.1 The street and its functions

The street is been considered as one of the main component that forms the structure of the urban form. The definition of the street is related with two main issues; its form and function, since during the history the street has taken different patterns and functions because of many physical and social factors. The word “street” is derived from the Latin word “Via Strata” which carry a meaning of transportation and courtyard (Giritlioglu, 1998). From the simplest meaning of this word, the function of the street can be understood as an element that connects different buildings by providing access to their courtyards. In this context, Rob Krier sees the street and the open spaces as the fundamental elements of urban space. He explains that the street is a result of the extension of a settlement whose houses were built around an open space for the first time. After the all-available area around the open space was filled, the houses spread out and so the street was developed to give access to the individual parcels and to provide a frame for the distribution of land (Krier, 1979).

Jane Jacobs is another scholar who considers the street as a prior component of the city form. According to her, streets and sidewalks are the basic elements of the city and its public life. She says that: “Think of a city and what comes to mind? Its streets. If a city’s streets look interesting, the city looks interesting; if they look dull, the city looks dull” (Jacobs, 1961).

The street is a physical element that serves to different social and economical purposes. There is a reciprocal relationship between the physical form of the street and social structure of the community. The street can affect the socio-economic activity but the social pattern also is a basic factor in the physical formation of the street. For example, in Islamic cities the spatial arrangement of the street is organized in a continuous way ranging from the private, semi-private/semi-public to public space. The streets that serve as the main lines for vehicular and pedestrian movement in e defined area should be designed with a different approach in the quite residential areas where privacy and defensive issues are more important (Rapoport, 1977).

Camillo Sitte also gives more importance to the social activities and the users of the street. He points out that the street should only serve to the human relationships. The street takes different meanings only when it is occupied and perceived by variable users in different times (Sitte, 1889). Meanwhile, Lynch also defines the street as places where people live and move regarding to their casual and occasional habits (Lynch, 1960).On the other hand, Le Corbusier has a very different approach by comparing the street with a machine or a factory. According to him the street is a “machine” or a “factory” which should be completed with its equipments working properly (Marshall, 2005).

The structure and the function of the street have gone through different changes and meanings during the history, especially after the technological developments that came with the modernism in the

field of transportation and infrastructure. Those changes on the city's movement channels have pushed the scholars to make a differentiation between the "street" and the "road". Generally, the road is seen as a motorized line serving to vehicular transportation while the street is considered as a space more for pedestrian movement. One of the characteristics of the road which is not compatible with the street, is the high flow of the vehicular traffic with its engineering equipments. Whereas, the street is defined as an enclosed space or line between two buildings (Moughtin, 2003). Krier also stress the fact that the motorized transportation is a fundamental function of cities but a scenery arrangement is not required around it. He defends the idea that the street is not appropriate for vehicular movement but it is for human circulation and other social activities (Krier, 1979).

The street has served as a connector of three main physical components of the city: the circulation line, the public space and the built area. These elements correspond to different disciplines such that transport engineer is concerned more with vehicular traffic flow while the city planner deal more with the land use of the street and the architect with the third dimension of buildings (Marshall, 2005).

The modernist movement brought another organization of streets and buildings by creating a new layout that separates them from each other. Unlike the compact traditional form where the building and the street is bounded together, the modernist model has a free development of street on its own linear running and the building standing alone in a undefined space (Marshall, 2005).

## 4.2 Principles for a Good Street Form

The street's physical form is a result of different factors effecting its composition and the activities that happen around it. Physical factors like topography and climate, social structure and technological developments can be considered as the main determinants of the street pattern. In this section the focus will be on the explanation of some important elements and features of the street form and its design.

**Topography:** The natural landscape or the topographical condition of an area is one of essential determinants shaping the street pattern. Generally in the hilly terrains the street layout should be developed in a way that fits to the topography. The curvilinear streets follow the topographical lines by giving access to different locations in variable heights and creating panoramic views.

**Climate:** The climacteric conditions affect the street's form in the context of protecting the settlement from different weather conditions. For example, in hot climates the streets are oriented in a position provides an exposition of the area to the local winds. Also the narrow streets surrounded by high buildings prevent the sunlight access. While in cold climates is required the opposite situation.

**Hierarchy:** The hierarchy in the street layout (Figure 2.4) has two basic purposes: the organization of different circulation systems and the location of different land uses. These two issues are related strongly to the street hierarchy. The pedestrian and vehicular traffic can be arranged in a proper way by the hierarchical system. In addition, the land use planning can be organized by locating the commercial uses in the main routes and the residential areas in quieter local streets (Marshall, 2005).

**Scale:** Scale is an important feature in the perception of the street space. The sizes, which are near the human scale, can be observed and read easier and clearly. The main components that assess the scale are the sizes of border elements of the street like buildings or walls and their proportion to the street width. Belt courses, cornices and other design devices can also be helpful in defining street scale and pace. Beside this, location of pausing points or nodes in particular intervals can be useful in determining the street scale (Hedman and Jaszewski, 1984).

**Proportions:** In its broadest mean the concept of the proportions includes the relationship of the street parts to each other and to the dimensions of the whole composition. The ratio of the height of the

bordering element to the street width is essential for good street design. If a street is wide and surrounded by low buildings the sense of space enclosure is lost (Moughtin, 2003). The Essex design guide accepts proposes that for an ideal pedestrian space in the street width should be equal or less to the height of enclosing elements (ECC, 1973).

If a street has a 1:4 ratio of height to width the sense of space and enclosure is very weak because the within the normal range of vision there three times as much sky as wall. When the ratio is 1:2 the visible sky and wall are equal. This ratio provides sufficient enclosure for a three-dimensional space. If the street is designed with 1:1 ratio a stronger spatial definition can be provided. In this case the visibility of the sky is very limited and the viewer is focused more on the surrounding buildings. When the street wall height to width ratio is increased to 3:2 or more the sky is no more visible without a change of the vision angle. This section creates a very enclosed space (Hedman and Jaszewski, 1984).

**Length:**Defining the length of the street is very important in the contexts of providing a human scale, reducing the feeling of infinity and creating a sense of space. The topographical features or curvilinear street layout are significant determinants of the street length but beside this other space arrangements can be used (Hedman and Jaszewski, 1984).). For example the location of different uses or nodes in particular intervals (200-300m) can be good devices in defining the horizontal scale of the street (Marshall, 2005).The Essex design guide recommends that the apparent length of a street can be reduced using offsets in the border elements of the street (ECC, 1973). While Hegemann and Peets suggest the use of gates: ‘The strong Gothic and Renaissance gates with their deep shadowed arches formed effective terminating features(Hegemanand, Peets, 1992).

**Unity:**Unity is another requirement in the street design. There are a lot of elements that contribute to the unity of the street but possibly the characteristics of the buildings along the street are the most important. Their form, size, materials, height or architectural elements can be designed in a way that provides unified street space. For example, the application of a common roofline and the use of repetitive bays can create a unified frame of the street space (Marshall, 2005). In the context of unity in street space,Gibberd says that: ‘The street is not building frontage but a space about which dwellings are grouped to form a series of street pictures’ (Gibberd, 1955).

What is important here is to establish a balance between unity and diversity. The use of the very similar features can create monotony, while, the use of very different characteristics may bring out a very fragmented space.

## **5 MORPHOLOGICAL ANALYSIS IN KORÇA**

### **5.1 The Study Area**

The study area is located on the south-east part of the city of Korça (Figure 4.1). This area located beside the city center, is developed in the early ottoman period and is the oldest district in the city. As mentioned before, the reason for choosing this zone as case study area is because it has mostly preserved its original pattern, especially the street structure. This fact creates the opportunity to make morphological analyses on a traditional settlement and generate a typology of different patterns. In the first view it may be seen as an irregular pattern without a systematic organization but the observations done later has shown that this zone has a rational spatial organization in the context of street structure and arrangement of open spaces and building layouts.

The area consists of an organic street frame which is continuous and forms variable shapes of settlement blocks. The intersections of streets form small open spaces with particular shapes and sizes. Regarding the buildings layout, generally it consists of low rise private courtyard houses (1-3 storey) that form a very compact and dense settlement.

The figure 4.1a shows the location of the study area in the urban context and its relations with public buildings (schools, institutions, cultural buildings etc.) and green open spaces. Since Korça is a small city, it can be said that these public spaces can be accessed easily from the area. The study area covers approximately 11.5 hectares and has a population around 1200 people with a density of 100 people per hectare.

The figures 4.1b and 4.1c show the urban pattern of the study area in closer view. The image on the left (b) represents the old pattern while the map on the right (c) shows the actual situation. As can be seen the most part of the area has not changed except the zone on the northwest. This zone has changed after some interventions on the later periods where the boulevard on the northwest was widened and a considerable mass of buildings were demolished and replaced by some institutional buildings (the area where now the cathedral and prefecture building are located). In addition, some changes are done in the southwest part by the construction of Fan Noli Boulevard and some new buildings and very limited changes are done in the inner part of the area. The old pattern (b) is used as the base for the most part of the morphological analyses done in this study (especially for street pattern analyses). The analyses are done in three different contexts: analysis of street pattern, open spaces and building layouts. All of these analyses are elaborated in different levels (or scales) by starting from the upper scale (the whole study area) and going into detailed analysis of different elements.

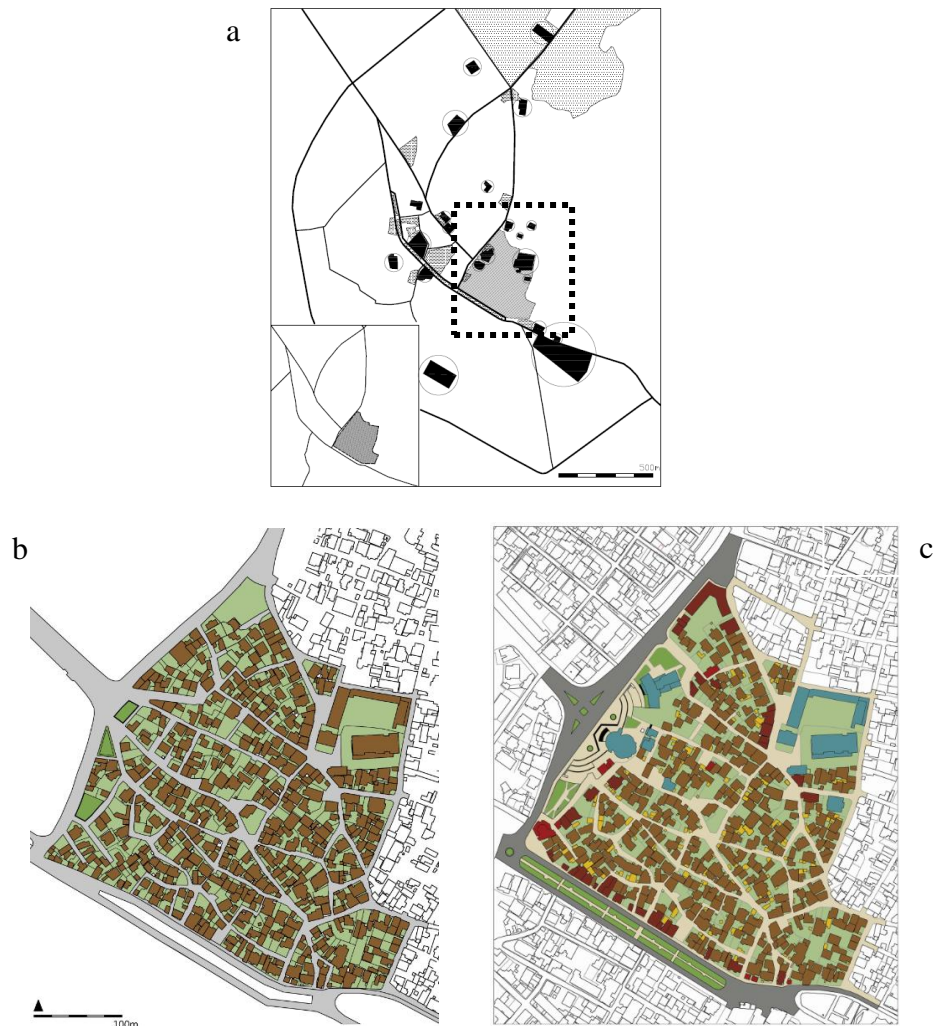


Figure 4.1 : The location of the study area, (a), the old pattern, (b), existing situation(c).

## 5.2 The Street pattern

As mentioned before, the old street pattern (Figure 4.2b) is mostly preserved, except of the area in the northwest part where some changes are done by the interventions on this zone. As a result, the part which can be seen in the old street pattern, where paths are continuous and connected to the boulevard, is now replaced by a larger open space which cuts the continuity and where the streets end up in a undefined form. The southwest part has also gone under some transformations by the construction of new boulevard while the inner part did not have considerable changes. Though these transformation, generally, the traditional street pattern is conserved.



Figure 4.2 : Street pattern, existing situation (a) and old pattern (b).

The organic structure of the street makes it difficult to do very definitive observations and measurements. Despite this, by trying to find the logic and rational basis of this arrangement, some systematic relations can be found between the street pattern and the factors forming it. For example, the effect of climate can be seen in street orientation. The streets are oriented in northwest-southeast direction to take the local winds coming from this side and are intersected with other streets in northeast-southwest direction in particular intervals. The topography does not have a considerable effect on the street form and its orientation because the area has a very low slope arising from the west to the east. The difference between the lowest and highest point is approximately 10 meters in a distance about 400 meters which means that the slope is nearly 2-2.5%. (Figure 4.3).



Figure 4.3 : Site section showing the topography.

There are some dead-end streets but they are not very noteworthy in the whole structure. Moreover, a little symmetry can be seen in the middle of the area and in the side streets that are connected to the boulevard on the northwest side, however, this is not a total geometry that can affect the variety of arrangements and create monotony. Some of the streets are wider than others and this forms a kind of hierarchy and some main routes in the street system. However, the most of the area does not have a hierarchy between streets. This is an organic pattern which has a consequent spatial arrangement with streets that form a variety of spaces with different characteristics.

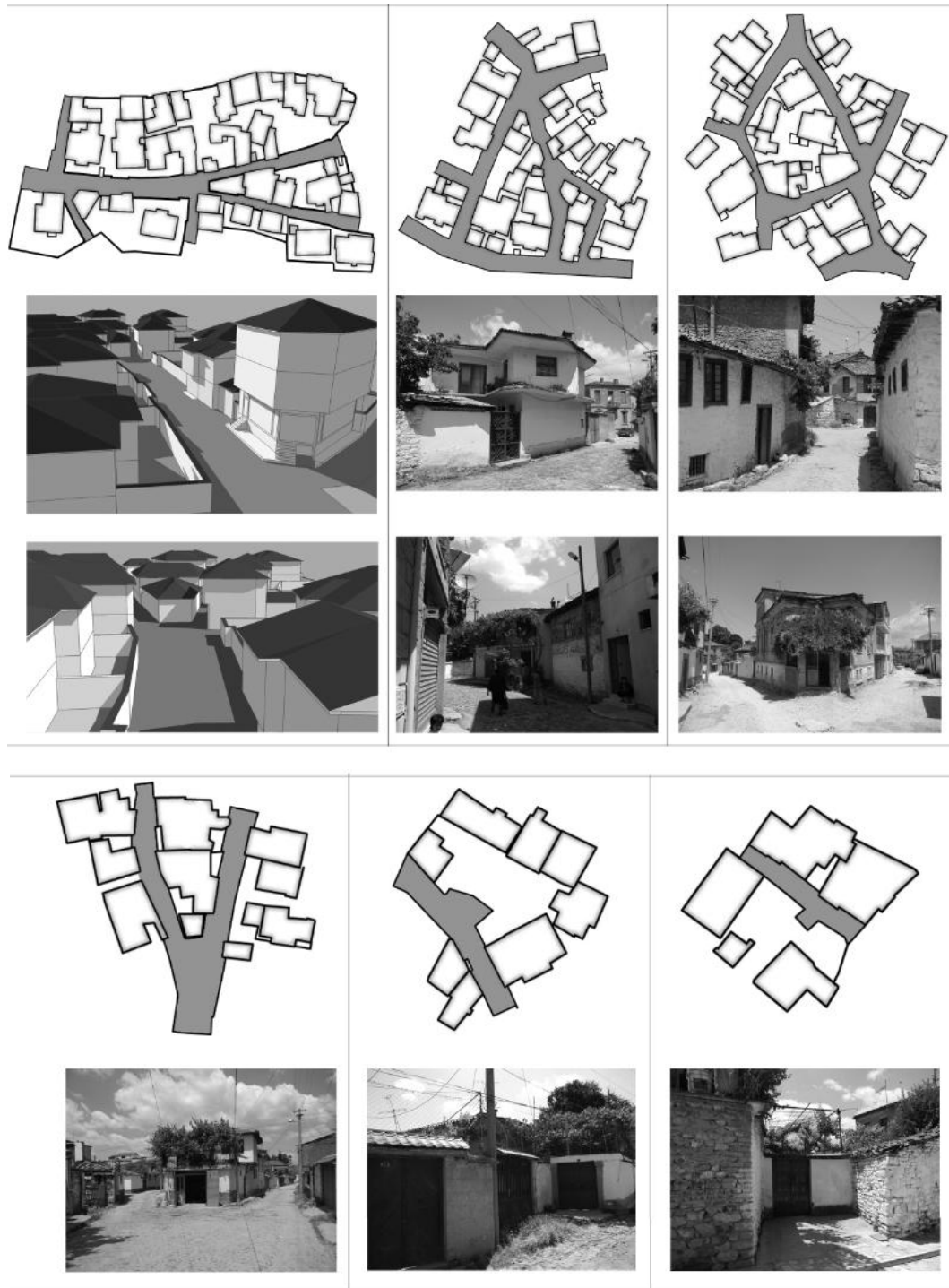


Figure 4.4 : Examples from different street fragments in the study area.

Regarding the width of the street it is also not possible to define it exactly because of the widening and narrowing of the street in different parts (Figure 4.7).

This characteristic of the street have some positive effects such as: creating more dynamic space; fragmenting the space, breaking the monotony and absolute symmetry; decreasing the depth of the street, providing diversity; encouraging the pedestrian slowness; and obtaining a better integration of buildings



with the street space. But, these changes on the street line (widening and narrowing) should be within a particular frequency. Otherwise, it may have some negative effects like: reducing the sense of continuity; formation of very fragmented space and decreasing the clarity of space perception. The measurements show that the width of the streets within the district are developed within a wide variety that changes between 1,5m to 9m. The width of 3m, 6m and 9m have a high frequency but the most used width is between 5-6m. While the broadness of the main boulevards on the northwest and southwest side varies between 12-15m.

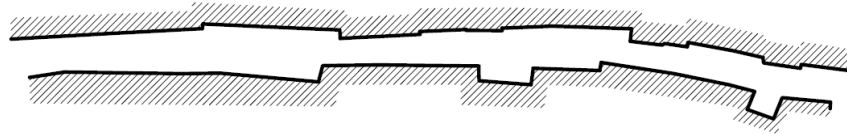


Figure 4.5 : The changes of the width along the street line.

The street lines have a variety of directional changes in distinctive intervals as shown in figure 4.8. The directional changes have different angles that vary between  $90^\circ$  to  $150^\circ$ . The most common angles are:  $105^\circ$ ,  $133^\circ$  and  $145^\circ$  but the most repeated is the directional change with an angle of  $133^\circ$ . The change of the direction generally occurs on street intersections or near them. The distances between two changes of direction vary from 30 to 70m. These changes during the street line are important because they provide more definite and human scale street space by fragmenting it within a particular frequency. Another effect of orientation change within these angles is on increasing the diversity in street space and maintaining the continuity in the same time. Finally, they contribute on creating rich perspective views along the street space.

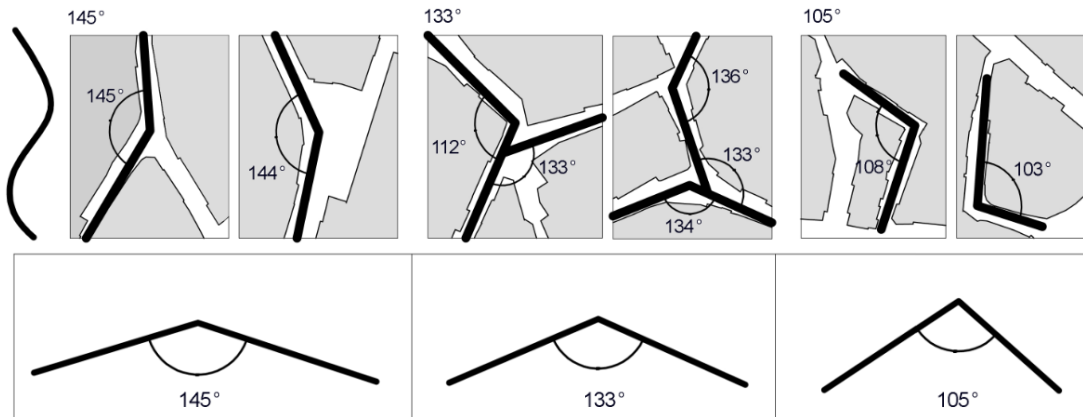


Figure 4.6 : Directional changes on street lines.

The section of the street is a fundamental tool in analyzing its pattern in third dimension. The drawing of the sections can help to understand the characteristics of street border elements and the relationships between the vertical and horizontal lines.

The proportion of the height to the street width is another significant factor the effect the perception of the street space. The figure 4.10 shows the different ratios of the height to the street width. They are grouped in three main street widths: 9m, 6m, and 3m streets. The most common proportions are those shown in the 6m street. While the proportions shown in the 9m and 3m streets are not very frequent and can be seen only in few parts of the street. In the 9m street the ratios of height to street width are 1:1.5 and 1:3 which decreases the sense of enclosure. The 6m streets have a higher sense of enclosure in the ratios of 1:1 and 1.5:1 (height: street). While, in the 3m streets, the sense of enclosure is even higher especially when it is bordered by 2 or 3 storey buildings..

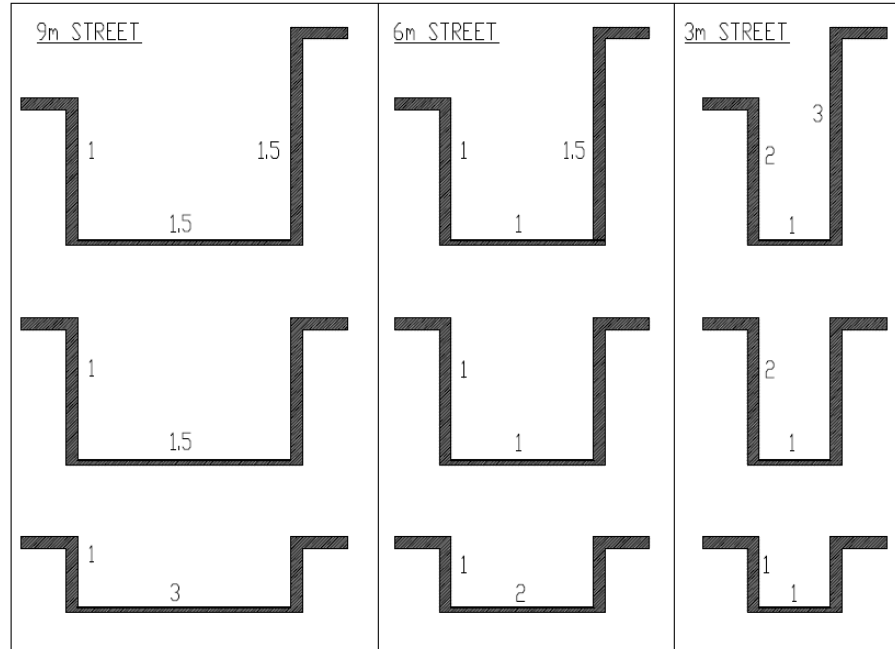


Figure 4.7 : The proportions of height to street width in different streets.

The border elements of the street and their features are the most fundamental determinants of the street space characteristics. In the study area there are three main border elements: walls and gates; rails or fences; and building facades. All of these components are seen along the street in different forms and combinations which create a very rich street space.

The wall is the most used surrounding element which separates the street space from the courtyard area. Generally, it has a height of 2m from ground and is constructed by using different materials like: stone, brick, concrete, tile and wood. The use of the wall as border element can have both positive and negative effects on the space composition. Its positive impact is on: well defining of the street space; increasing the sense of unity, continuity and enclosure along the street; increasing privacy and the sense of security in the inner spaces (courtyard and house); protecting from cold winds in winter; and creating harmony with the buildings by using the same materials and colours (roof tiles, stones etc.) In the other hand, the use of the wall has some disadvantages such as: reducing the expose of the building's architectural features; preventing the view to the street from inside spaces; preventing the access of winds into the courtyard in summer; and sometimes can create a monotonous space if it is very long and not fragmented by other elements

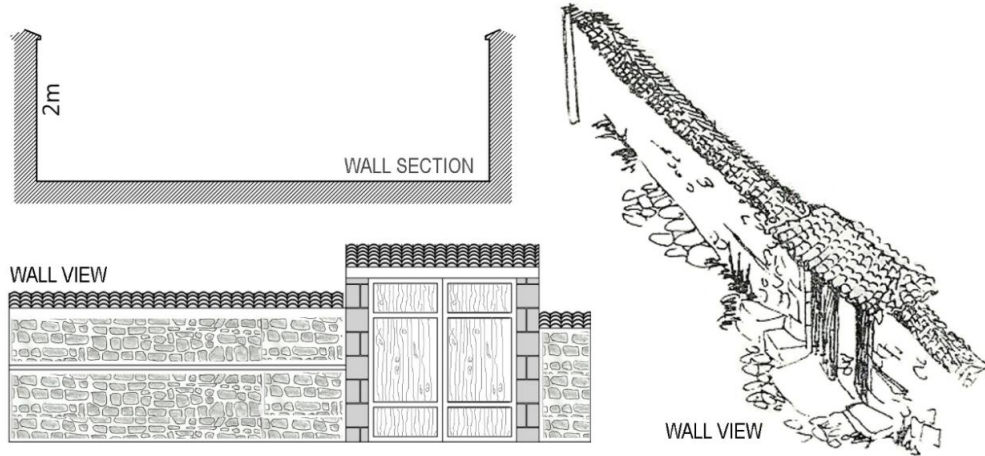


Figure 4.8 : Illustrations of courtyard surrounding walls.

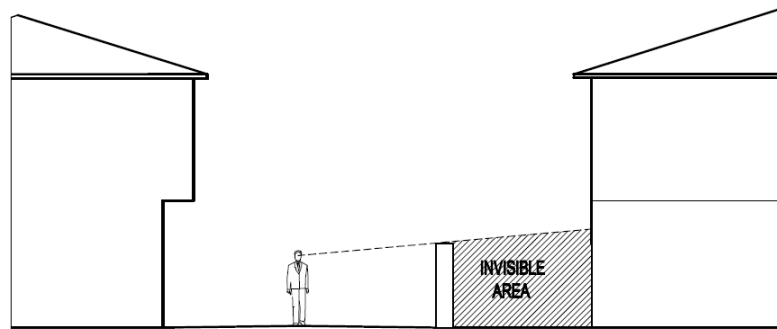


Figure 4.9 : The wall provides privacy in inner spaces.

Another issue that should be mentioned is the location of the gates along the street and the position with each-other. As can be seen from the figure 4.14, the gates are located in different frequencies, generally in a diagonal position with the opposite sides. One of the main reasons of this kind of arrangement is to prevent the view to the internal spaces and provide privacy when both of the gates are opened.

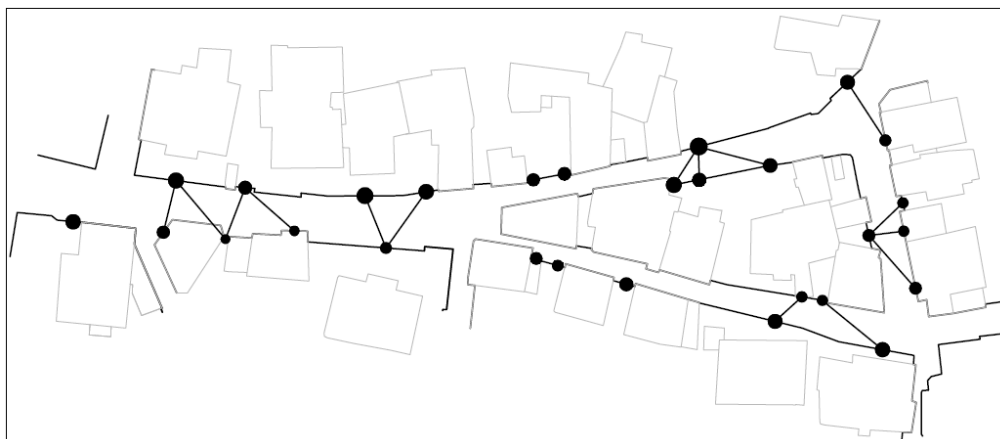


Figure 4.10 : Location of the gates along the street and relationship with each-other.

In some cases the iron fences (rails) are used as courtyard surrounding elements (Figure 4.15). This type of construction combines both the wall and the rails. Generally, the wall (stone, brick or concrete) is raised 0.5-1m upper the ground level and the other part (1-1.5m) is completed by using railing structures.

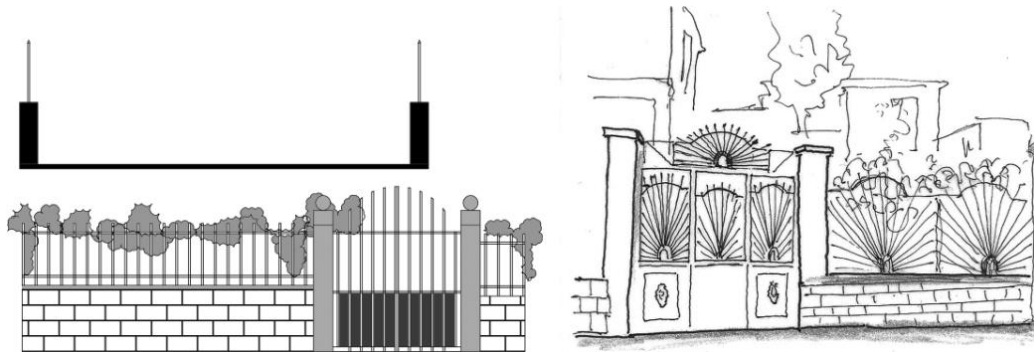


Figure 4.11 : Examples of railings as border elements.

It can be said that the use of railings has the opposite effects of the use of wall as a border element. Therefore, it has some advantages like: being more decorative than the wall by different designs; being a transparent element, it provides more view to the buildings architectural features and different plantings in the courtyard; creating a stronger integration between internal and external spaces; and obtaining more wind access in summer. In the other hand, it has some negative sides such as: decreasing the privacy in internal spaces; reducing the sense of continuity and enclosure along the street; taking cold winds; not enclosing and defining the street as well as wall does; decreasing the sense of security in inner spaces. It can be said that the use of wall provides more advantages for private activities in internal spaces while the use of railings has more advantageous for street users (outside).

The most important border elements of the street space are the buildings located along it, which create a very rich pattern with their diverse façade compositions. Regarding the location of the building along the street – as can be seen in the figure 4.16- they are positioned in three different ways: the front façade faces the street (with bay window); the side of the building; or the back façade oriented to the street.

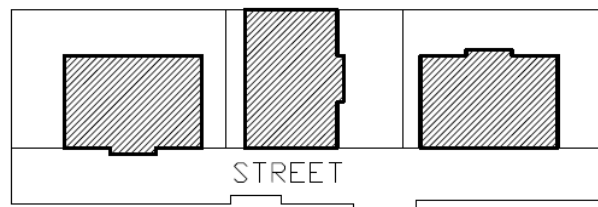


Figure 4.12 : Different positionings of buildings on the street side.

The facades facing the street are designed within a wide variety but they can be grouped into three main types: straight facades; facades with bay windows; and facades where the whole upper floor is extended toward the street (the whole façade is a bay). The figure 4.17 illustrates an example where the three typologies can be seen.

The facades with bay windows in the upper floors (second or third) can be seen frequently along the street in the study area. Bay windows, high frequency of narrow windows, decorative elements (wood, stone, marble) in the second floor have a high contribution to the street pattern and create a very rich texture. The repetition of this kind of structures along the street provides a rhythmic street composition and rich perspective views from different points (Figure 4.23).

The bay windows are positioned on the middle or on the side of the façade and have an extension of 50-120cm and a width between 3-5m. They have windows in all sides which provide street views from inside the house. The windows continue also along all façade in high a frequency. In some cases a continuous wood cornice connects all the windows by strengthening the unity of the façade composition. Also the bay has a wood cornice on its corners which makes it more emphasized. The bay windows that are located on the second floor provide a more human scale while those located on the third floor have more monumentality. The figure 4.19 shows two examples of bay windows details.



Figure 4.13 : Three different types of facades facing the street.



Figure 4.14 : Examples of baywindows

Another type of façade is formed when the entire second floor is extended toward the street and forms a kind of bay. This form appears as a result of the need to enlarge the space on the second floor. As shown in figure 4.20 the extensions on the second floor are developed in two forms: in the first one the upper floor is extended in parallel with the ground floor; and in the second one it shifts its direction by forming a triangular extension. The reason of the second arrangement is because the ground floor does not have a geometric rectangular shape resulting from the parcel form. Therefore, the shape is rearranged into a rectangular form in the upper floor.

## 6 CONCLUSION

The main objective of this study was to develop a methodology for analyzing the street pattern, in this case a the traditional zone. A clear methodology would provide a useful framework for understanding the qualities of the spatial organization of the urban space, which was the second aim of this work.

The detailed surveys on these components, done in different levels(scales), were very helpful for understanding and defining the characteristic of the traditional street pattern in Korça. These analyses and their synthesis have shown that:

- The traditional street space in Korça is developed within rational system that provides a coherent spatial arrangement of different components.

- It is developed within a contextual form by respecting the local features of physical and social environment. For example the orientation of streets, their widths and materials takes into consideration the climatic factors (wind, sunlight access). Besides this, spatial organization of private and public space reflect the characteristics of the social life (the sense privacy, neighborhood relationships etc.). Moreover, different form qualities like, scale, length, proportions, enclosure, unity and diversity are realized in a very proper way which creates a good urban environment.

Finally, it is important to mention the fact that though this study was done for the city of Korça, the methodology that is developed here can be also used in the same studies for the other cities.

## REFERENCES

- Essex County Council , 2005. The Essex Design guide, Essex Planning Officers Association. Essex, UK
- Essex County Council, 1973.A Design Guide for Residential Areas, The Anchor Press, Essex, UK.
- Gibberd, F., 1955.Town Design, Architectural Press, London, UK, 2.ed. p.230.
- Giritlioğlu, C., 1998. ŞehirsclMekanÖgcleriveTasarımı (The design of Urban Space and its Elments), I.T.U, Istanbul, Turkey.
- Hedman, R., Jaszewski, A., 1984. Fundamentals of urban Design, Planners Press, American, Planning Association, Washington, D.C. Chicago, Illinois, USA.
- Hegemann, W., Peets, E., 1992.The American Vitruvius, An Architect's Handbook of Civic Art, Benjamin Blom, New York, USA.
- Jacobs, J., 1961. The Death and Life of Great American Cities, Vintage Books, New York, USA.
- Kostof, Spiro., 1991.The City Shaped, Urban Patterns and Meanings Through History, Thames and Hudson, London, UK.
- Krier, R., 1979. Urban Space, UMBAU-VERLAG, Germany.
- Lynch, K., 1960. The Image of the City, M.I.T Press, Massachusetts, USA.

- Marshall, S., 2005. *Streets and Patterns*, Spon Press, London, UK.
- Moudon, A. V., 1997. Urban morphology as an emerging interdisciplinary field, *Urban Morphology*, 1(1), 3-10.
- Moughtin, C., 2003. *Urban Design: Street and Square*, Architectural Press, Burlington, USA.
- Quan, L., Nianfei, X., Wowo, D., 2010. *Study on Mapping the Urban Textural Characteristic*, ISUF, Hamburg, Germany.
- Rapoport, A., 1977. *Human Aspects of Urban Form: Towards a Man-environment, Approach to Urban Form and Design*, Pergamon, Oxford, UK.
- Sitte, C., [1889] 1945. *The Art of Building Cities: City Building According to its Artistic Fundamentals*, Reinhold, New York, USA.
- Sitte, C., 1889. *The Relationship between Buildings, Monuments, and Public Squares and The Enclosed Character of the Public Square*, in: *The City Reader* (1996), Routledge, New York, USA.
- Tyrwhitt, J., ed., 1947. *Patrick Geddes in India*, Lund Humphries, London, UK.

