Computable and Incomputable Patterns
The Dialectics of Urban Form and Urban Life in Keszthely, Hungary

Melinda Bognár[1]

[1] Public Building Design Department, Faculty of Architecture, Budapest University of Technology and Economics, Hungary

Abstract

Urban morphology formed over the years is challenged by current social needs. City scale resilience is not only the question of the present, but it should also operate between the given boundaries of the past. The tensions between the static physical built environment and the dynamic flux of users called for the research of the dialectics of urban form and urban life.

This paper will inspect the Hungarian city, Keszthely by the method of space syntax in line with questionaries. The twofold methodology shows meaningful correlations of the changing measurable and intangible urban patterns. The mental map of the users and the structural analysis of the street network do not necessarily overlap, differences may indicate points of intervention.

Keyword: morphology, pattern, spacesyntax, data, quantification

Introduction

The research investigates the comparison of the urban morphology examined by space syntax method and the results of the questionnaire filled by 100 inhabitants of the Hungarian city of Keszthely. The study does not aim to evaluate the appropriateness of each research method, rather it seeks to show how morphological results given by the built environment can differ from the subjective perception of people.

The juxtaposition of the urban and social pattern, the two determinative elements of the city show the correlation of computable and incomputable components in a given scene. Initiating interventions usually build on predictions, where the measurable factors are more evident to forecast, while the intangible human factor is usually hard to predict.

This paper will represent the results of two different research methods analysing Keszthely's morphological and mental urban structures. The comparison of space syntax and the results of questionaries will indicate the differences of users' perception and the physical urban fabric.

Background

The one-year long cooperation with Keszthely was targeting the development of the town. To provide appropriate proposals at the building scale, the examination of the current urban features was crucial. To this end, at the Budapest University we first tried to map out the places that formed identity for the residents

or their lack with a questionnaire survey. It can be assumed that urban groups with different identities use city spaces differently. Condensations and centres can form. Does each well-distinguished group of urban users have its own place, which for some reason is decisive? If there are any, how do they relate to each other, can any pattern be discovered in it?

We approach the solution from two directions. On the one hand, the use of the city is shown on the mental map of the users, but it can also be analysed by examining the structure of the city. The two layers do not necessarily overlap, differences may indicate points of intervention.

Background of the questionnaire

The questionnaire entitled "Visions about the future of Keszthely" was prepared in the autumn of 2020 in the framework of the cooperation between the Municipality of Keszthely and the BME Doctoral School of Architecture. Thinking about the future and architectural environment of Keszthely is inconceivable without involving the locals. The aim of the questionnaire was to map the urban use of the locals, to get to know the important places and possible shortcomings. The contact was made in various internet forums with anonymous questions. The main topics examined were: favourite place / identity, popular activity, settlement relations / regional situation, place attachment study. The questions asked are related to each other, in some places the topics overlap.

105 responses to the questionnaire were received. Gender was almost equally represented among the respondents. In terms of age, we managed to address the active adult population; the vast majority of respondents are between 27 and 65 years old. Nearly three-quarters of the respondents live in Keszthely, the majority of the others live in nearby small towns or settlements. Many indicated work or family attachments outside their place of residence. Respondents vary widely according to occupation, a great diversity can be observed, a total of 46 different occupations were named, which are further explored to form different clusters, with an emphasis on intellectual professions, teachers affiliated with universities or other educational institutions, and traders, entrepreneurial groups.

Background of space syntax

Space syntax analysed the urban structure, which formation is dating back to pre-conquest times including remnants from the Ottoman Empire. The structure still visible today mainly reflects the influence of the aristocratic constructions of the 1700s. The Festetics family put a lot of energy into tidying up the outdated, debt-laden estate. To meet his professional needs, in 1797 he founded the first agricultural college in Europe, the Georgikon. The infrastructure of the town was also shaped by the railway, built in the 1860s. By the beginning of the 20th century, Keszthely was once again a thriving city and a popular holiday destination. In the unfavorable economic situation after the First World War, the development of the city came to a halt. World War II did not cause serious physical damage to the city.

The costal location next to the Lake Balaton, the railway network around the lake and the 18th century aristocratic historical centre along with the 1980s housing estates are the main physical context of the city. This structure was examined using Depthmap software. The melange of the various built environment of the rich historical background showed clear patterns of the structurally most frequently visited and abandoned locations across the town.

Methodology

Exploring the relevance of the method in academic research, stating free after Marshall McLuhan the method is the message. As the apparatus determines the meaning, different research methods guide the research into different directions. Every methodology has their own limitations and perspectives guiding the flow of the study. In this paper two different approaches will be synthesized.

Urban Structural Analysis - Space Syntax Method

One of the tools for learning about urban identity is urban structure analysis. For this, we used the space syntax method, which is based on the analysis of spatial configurations. The space syntax approach examines the spatial appearance of social patterns, prioritizing the formal appearance of architecture. Society sees urban structures as a graph of space use, where street networks show traces of human connectivity.

This strategy was developed in London in the 70s and 80s, with Bill Hillier as his greatest pioneer. We chose this strategy as one of our research methods because, in addition to our other research method - which is the analysis of the answers to the questionnaires - we are curious about how consistent the mental map of current city dwellers is with the rules indicated by the Keszthely street network. So what overlaps and differences do the urban structure and current urban use have developed over history.

The mutually constructive relationship between society and space is evident in every cityscape. The space syntax method can also be used to predict the likely effects of architectural and urban space on users. The consequences of new street networks and new spatial layouts can also be demonstrated for the operation of the city. Of course, this method, just like any scientific method, is subject to criticism, thanks to which the method is constantly evolving and updating.

The three most common ways to analyse a street network are integration, choice, and distance. During the tests, it is also possible to consider the scale in which radius circles we want to study. We examine 500, 1500 or 5000m zones of pedestrian, bicycle, car approach based on the above categories. For this, space is usually represented in two ways: axial - axis analysis or segment analysis.

Urban Use Analysis - Questionnaire

The answers to the questionnaire on the future of Keszthely prepared by the Doctoral School of Architecture reveal the important places of the city. We have begun to examine them in terms of popularity, as this can

lead to territorial foci in the city. The current users are not necessarily aware of the spatial forces hiding in the street network, their perception is more intuitive and practical, based on everyday needs.

Results and Discussions

What are the means of adaptation in a rigid urban environment? Instead of centred urban structure, multipolar networks can run the city. From the past centralized mechanism through the present decentralized state towards the distributed blockchain network. Instead of physical scale resilience, the scale of flexibility can hide in the invisible networks and operation of the city.

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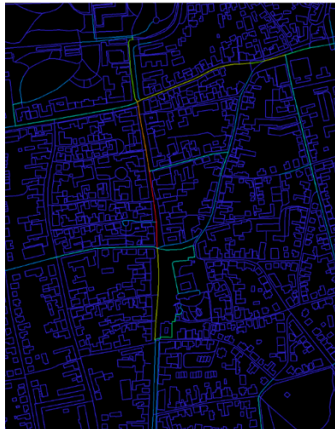

Figure 1. Space Syntax segment analysis - choice - R = 1200m / Keszthely Fő utca. This image shows the most popular main street of the city. Melinda Bognár, 2020.

Figure 2. Space Syntax segment analysis – number of nodes - R = 800m / Keszthely. Melinda Bognár, 2020.

Figure 3. Space Syntax segment analysis – total depth - R = 800m /Keszthely. Melinda Bognár, 2020.

Applying these methods, in connection with the first analysis of Keszthely, it turned out that the middle section of Kossuth Lajos Street is the most frequently chosen route, it is most often used by pedestrians and medium-distance travelers. Also, in connection with segment analysis, it became apparent in both node and depth analysis that the coastal section was poorly integrated into urban fabric.

Optimally, the spatial integration indicated by street networks is in line with the places most fre-quently visited by the users. Thus, the most popular places are also geometrically an integral part of the urban fabric. In this context, the use of space by local residents is shown by the analysis of the answers to the questionnaires.

Another way of learning about urban identity is urban use analysis. A methodological foreshadowing of our questionnaire research can also be discovered in Kevin Lynch's book, The image of the city (1960). We examined one of the defining foundations of post-modernist urbanism theory from the direction of urban identity. One of the basic theses of Lynch's book is that the essence of a city's lovability, or even lovability, goes beyond the physical nature of the built environment. The author calls this complex conceptual system of the city a mental overview.

Lynch believes that the mental overall picture of a city is provided by three basic pillars: the concept of identifiable, the interpretability of structure or urban fabric, and the meaning of the meaning associated with the former two concepts by the user. Part of the identifiable are urban landmarks, which are the built elements with a defining character. Structure is an important prerequisite for orientation in the city. The user image of a good city can be formed if the system of the city is readable. His patterns, on the other hand, should be neither too loose (chaos, meaning of disorientation) nor too rigid (unfriendly, lifeless, anti-democratic meaning).

The questionnaire gives a picture of the readings of the city, the mental map of the people of Keszthely became drawable when examining its results. When naming the favorite or important places, the "landmark" type built elements of the city became clearly defined, and the pattern emerging from them carries information about the structural use of the city. The space syntax analysis described later also provides important information about the structure of the settlement.
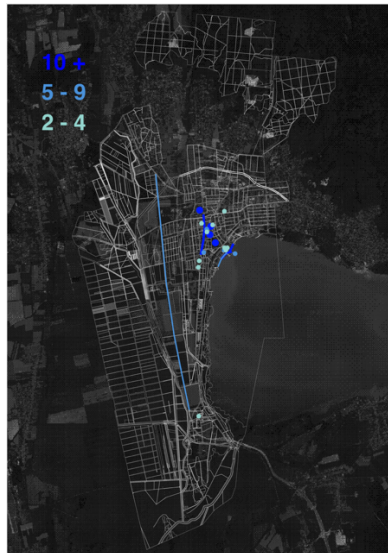
Figure 4. Overview map - the most popular locations based on the answers to the questionnaire.
Mercédesz Nagy, 2020.

The spatial imprint of the favourite places named in the questionnaire can be perceived along two emphatic axes in terms of urban structure. The pedestrian street that crosses the city connects the architectural values of different historical eras, two really significant points of which are the Gothic church and the main square in organic connection with it, as well as the Baroque castle ensemble. The route that continues as a continuation of the pedestrian street runs all the way to the shores of Lake Balaton. From this main axis (as a timeline) branches of different emphases (castle, civic town, villa district, coast) branch off, including the waterfront, where the only surviving example of the old bathing culture, the Szigetfürdő, is located, together with the associated accommodation buildings. It is important to note that along this axis line the landmark points that form the basis of the historical and cultural identity of Keszthely, and at the same time are important for tourism.
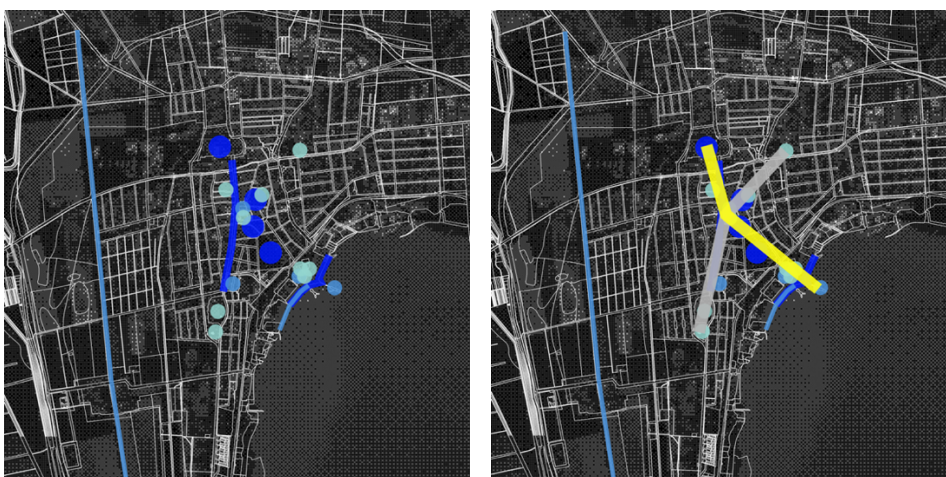

Figure 5. Linear and concentrated / point locations axes drawn from the questionnaire and analysis.
Mercédesz Nagy, 2020.

At the same time, another axis parallel to the coast is emerging, which is interesting because it has several important places for everyday city use. The intersection of the two lines is in the main square, which is thus clearly the centre of the city.

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Conclusions

Morphological and social patterns tend to differ because of the different nature of the two methods. One is measurable, the other is not. Should live in symbiosis with one and the other, where distributed virtual networks of the city should not be restricted by the physical boundaries of urban forms.

Fragmented urban structure usually occurs when the ruptures of a rich history cannot find their continuity in the physical forms of the built environment. These finally result in multipolar networks, without a single focus, which mimics one of today's main concept, the blockchain. The zeitgeist embodies in commodities such as in urban forms and the infrastructure of cities. Turning to a distributed network challenge many formal centralised settlements with long past development. While the physical form still indicates certain focuses, the user's perception already includes invisible, virtual patterns.
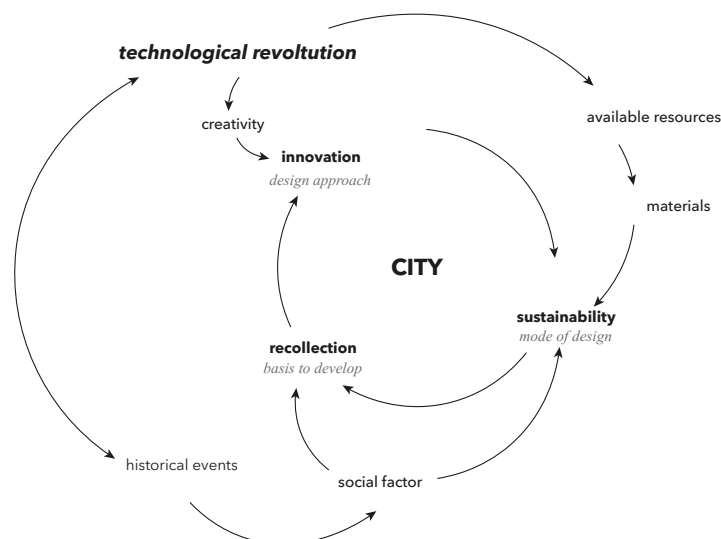
Figure 6. Symbiotic circulation of cities. Melinda Bognár, 2020.

In order to see a city as a whole, the simultaneous examination of numerous elements is inevitable. The current state of a city is constructed by historical events triggered by past zeitgeist, social factor mirroring the present, and today's innovations along with the aim of sustainability. (Fig.6.) These factors are both measurable and unmeasurable, thus some of them are predictable, while others are not. Computability helps predictions, while the always present incomputable factor, the users are filling the rigid boundaries with life, resulting in an eternal flux. The dialectics of urban form and urban life give cities their own unique particular characters, which today is extended in virtual.

Acknowledgements

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