

Perception of Cityscape of the Central Part of Kaunas and Sociocultural Aspects Determining it

Vaida Vaitkutė Eidimtienė¹, Jūratė Kamičaitytė², Vilnius Gediminas Technical University¹,
Klaipėda University¹, Kaunas University of Technology², Lithuania

Abstract. This article deals with peculiarities of Kaunas centre cityscape perception and the determining socio-cultural factors. Important elements creating unique view of a location and identity are related to the period's history, culture, political situation, features of the location natural basis, as well as individual's-observer's education, personal qualities, aesthetic and cultural sophistication. The territory of Kaunas city centre was selected for the case study. It is characterized by unique natural, historic, cultural conditions and high information-emotional potential. During the research priority ranking concerning significance of cityscape elements groups and experienced psycho-emotional senses was conducted. Furthermore, the correlations between the distance of object observation, heights of observation points as well as movement mode selection and personal factors such as gender, age, occupation, and education based on statistical dependencies were identified. The obtained results explain the principles of Kaunas centre cityscapes perception.

Key words: urban landscape, cityscape, city view, Kaunas, sociocultural factors.

Introduction

Research of the impact of sociocultural factors on cityscape perception and development is a complicated and versatile field involving distinct subjects. Physical behaviour and emotional perception of individual's surroundings allows understanding the correlation between socio-cultural content of different cities' cityscape spatial structure and geographical location, natural conditions, historic periods as well as spatial, political and economic environment. Investigations of sociocultural nature were conducted by J. Jacobs, K. Lynch, L. Mumford, H. Molotch, W. H. Whyte. In Lithuania sociocultural environment and context over the years have been researched by J. Vanagas, T. Grunskis, D. Bardauskienė, K. Zaleckis. Moreover, R. Buivydas, J. Jurevičienė, V. Petrušonis, J. Kamičaitytė, R. Ribelytė and others have published several articles.

Both locals and incoming observers recognize cityscape via its form, style, configurations of urban spaces, relation with natural basis as well as information coded by time and history symbols of architectural objects. Factors constituting sociocultural environment, namely education, art, culture, religion, recreation, societal activities reflecting peculiarities and level of society's life form the physical environment of the city. Social need for certain objects, areas and activities determines differences of establishing urban and green spaces.

Cityscapes of different cities can be directly perceived via human-created physical objects (their style, composition, form, scale, colours, etc.) and local natural environment (climactic conditions, relief, water reservoirs, flora) as well as panoramas, silhouettes, and local visual spaces formed by anthropogenic and natural components. Landscape perception is also determined by sociocultural factors such as culture, history, education, traditions, religion, etc. All these factors by interacting create a specific model of a city during a historic period determined by certain sociocultural processes prevailing at that time within the society.

The importance of the research from the theoretical point of view is based on priority perception/distinction of urban structure elements within city landscape by K. Lynch. Priorities are arranged on the basis of Kaunas city inhabitants' survey (statistical reliability was identified). The obtained research data can be applied in practical activity of both city landscape design, and urban planning and design.

The main aim of the research is to analyse landscape perception peculiarities in the central part of Kaunas city, determined by sociocultural aspects. The tasks of the research are the following: to establish factors significant for the perception of the landscape of Kaunas city centre and its identity; to assess priority of K. Lynch urban structure elements evaluating their significance perceiving the cityscape of Kaunas central part; to determine the importance of senses experiencing landscape of Kaunas city centre; and to analyse the

correlation between movement modes and the elements of city's mental view as well as the size of perceived visual spaces and priorities of senses.

Methods

The method of bibliographic sources, scientific publications, electronic resources summary and analysis was applied. In addition, sociological surveys, designing mental maps and observation (location photofixation) were employed. Survey results were processed using SPSS software. Category data was analyzed by chi square (χ^2) criterion. Pearson linear correlation coefficient (r_{xy}) was used to identify relations between range variables whereas for evaluation of several independent range samples Kruskal-Wallis test was selected. During the research the obtained data was compared and summarized.

When analysing subjective perception of the environment as well as conducting empirical assessment of attitudes Semantic Differential Scale (SDS) is frequently applied [15]. Semantic Differential Scale is composed by employing polar adjectives, which helps assess individual's reactions to a certain object or phenomenon. The other frequently used research method is K. Lynch's (1960) behaviour method concentrated on a very specific perception categorization of five basic structural elements of the central city part, that is, nodes – squares, crossroads; paths – streets, trails, sidewalks, other pedestrian routes; edges – walls, fences, buildings; districts – large city areas; landmarks – iconic buildings, spatial structures, reference signs. Behaviouristic method (that, is, how a person feels/behaves within the area) helps reveal socio-cultural aspects of cityscape perception and formation while by applying this method in environment formation practice one can ensure psychological acceptability and readability of different city's areas [27]. The importance of this method by assuring legibility of city's spatial structure as one of the most psychologically preferred environment next to coherence, complexity and mysteriousness, [7, 9] determined the application of the method for the research.

Research object – landscape of Kaunas city's central part. The territory was selected due to unique natural, historic, cultural conditions as well as information-emotional potential of the landscape and possibilities of its visual perception.

The conception of cityscape

Urban landscape dates back to the emergence of the first cities. It developed together with cities [9]. Famous American landscape architect, journalist Frederick Law Olmsted (1822-1903) was the first to use the concept of urban landscape as a specialized term [17, 6, 10]. The famous landscape architect identified urban landscape with different green spaces and their elements of various purposes. In the 19th century he put the basis for contemporary conception of the city as a unified part of the ecosystem.

In the middle of the 20th century influential British architect T. G. Cullen, who developed the new methodology and theory of city's visual analysis and design, based the concept of urban landscape encompassing visual and structural integration of buildings, streets, and places that constitute the city environment. The author described urban landscape as the harmony/art of proportions of all these elements. The other famous British landscape architect professor B. Hackett (Brian Hackett 1911-1998) called landscape as the view (i.e. buildings, pavements, trees, grass, topography, etc.), which can be overlooked by a human eye. He divided urban landscape into green (soft) and hard, by emphasizing the importance of the former and related it to opportunities of improving citizens' social behaviour as well as physical and mental health.

The terms "urban landscape" encompassing the words of different meanings defines the quality of environment's physical factors [2], develops relationship between city environment and a human being [3], established by certain social processes [14, 12].

Lithuanian engineer-architect, habilitated doctor of humanitarian sciences K. Jakovlevas-Mateckis in the first volume of his monography "Urban landscape architecture" provides explanation of urban landscape (anthropogenic, urbanized) as changed, affected, maintained and developed by a human being. The author indicates that in scientific literature such a type of landscape is frequently known as urban landscape. Literal formulation of the conception developed by the author is used in the Description of Landscape Policy Directions of the Republic of Lithuania (2004–2020).

A significant part of world and Lithuania's urbanism and architecture theoretists (L. Mumford, K. Lynch, G. Cullen, T. Turner, S. Bell, G. Daniulaitis, K. Zaleckis, Konstantinas Jakovlevas – Mateckis, A. Vyšniūnas, etc.) use the term *cityscape* for urban landscape. The term *Cityscape* (international Encyclopaedia Britannica) was first used in 1856. It is introduced as a shorter version of urban landscape equivalent. A. Vyšniūnas (2013) suggests using Lithuanian terms that are closer to international ones in order to avoid misinterpretations. He defines urban landscape as landscape architecture in the city. By emphasizing

multifaceted relation between the city, its culture and deep cultural processes K. Zaleckis (2002) extends the boundaries of urban landscape definition from the city view to the processes occurring within the city, reflection of cultural phenomena and changes by calling it a hologramic view allowing visual perception of invisible phenomena.

Summarizing one can claim that urban landscape (cityscape) combining different periods, urban compositions, architecture, parks, garden styles, colour gamut, developed by different natural conditions and historic circumstances is further changing. Such a peculiar view, frequently recognized from unique dominants and their ensembles, distinguishes the city from the other: by historic sense it reflects different periods of the city's past; from social sense it complies with political, economic, cultural needs of the society during different periods while from a philosophical point of view it reflects city's events, positive and negative changes as well as the relation between the city and a human being. The concept of cityscape in the article will be analysed as a visually observed part of the city formed by different sociocultural processes.

Cityscape perception

Cityscape can be perceived in two ways, namely mentally and physically. These two ways closely interact with each other. K. Lynch regards mental experience process as important to an individual and considers it as the product of direct sense, past experiences and memory. He constructs urban view from three constituents: identity (recognition of separate objects), structure (spatial relations between objects) and meaning (abstract information). These three components act together and are significant for an observer both practically and emotionally. By assessing the environment of the cityscape, a city observer creates his/her individual city view/image, which can change with time regarding the circumstances. Individual city images can be combined into one collective image [12], which finally creates local identity and spirit, peculiar atmosphere of a location known as *Genius loci*. According to S. Kirvaitienė (2004), mental perception of cityscape develops when an individual directly or indirectly faces a city and its environment. It is a changing process perceived by one's mind and developing by layering of all senses rendered by individual's sensory organs (images, perception of physical, social, virtual environment, multisensorial units).

An individual receives 70–80 % of information about physical environment by sight [1]. City view (physical) is seen, covered and perceived more easily during direct visual contact. In his conception of cityscape K. Lynch (1960) marks separate visual accents, which facilitate reading of city images, develop the easily memorized sign system that helps guide himself/herself within the city. The city view is described by physical objects organized into mental maps, composed of five basic elements such as paths, streets, other pedestrian routes; edges, perceived or observed like walls, fences, buildings; districts, relatively big city quarters distinguished by their identity and character; nodes – the main and local intersection points; and easily identified objects – landmarks. J. Vanagas (2008) specifies observer's capacity to cover certain parts of the urban object. "Artistic image of such an object in observers and city dwellers' consciousness is established as a chain of local symbols, i.e. the sum of visual nodes, spaces and volumes constituting city signs and representing the object". The author considers the central part to be the most important element of the spatial structure of the city and the medium of material and spiritual culture, where normally the most significant socially buildings featuring exclusive architecture as well as streets, squares, equipment, monuments and green areas are found, and intense inhabitants' societal and social activity is happening. Towers, high-rise buildings, domes, dominants create individual expression peculiar for a specific city and mark the core location of the city.

According to K. Zaleckis, I. Gražulevičiūtė-Vilėniškė, J. Vitkuvienė in history of urbanistics there are a lot of examples where cityscape is treated as cultural artifact on the basis of its characteristics. Authors claim that such reading is equally important for a representative of a specific culture using its spaces and a guest since the qualities determining cityscape reading are essential as far as cultural identity is concerned.

Results

Empiric sociological investigation of Kaunas centre landscape perception correlations

In order to analyse aspects of perceiving separate elements in Kaunas centre cityscape which are determined by the sociocultural context empiric-sociological research was conducted. The research object was landscape of Kaunas city (Lithuania) centre. The research data was collected during the period between 02 11 2019 and 23 03 2020.

The method of selecting sociological research sample was based on the random principle, i. e. all population individuals have the same possibilities to be chosen as samples. Non-probability sampling was

employed to select the research groups, i. e. the distribution of subjects in the population group is not known and the group is composed randomly.

Qualitative research method – respondents' survey (conducted by the questionnaire) was employed. The data of the questionnaire was processed and analysed by quantitative methods, i. e. using statistical data package SPSS 19, Microsoft Excel and Likert scale. The scale is used in psychology, statistics, marketing, sociology as psychometric scale, with help of which one can record intensity of feelings for a certain object/phenomenon. For research of sociological nature the size of sample is identified regarding the error of 5 % (K. Kardelis, 2005). The size of the sample was defined by the formula: $n = 1/(\Delta^2 + 1/N)$

where: **n** – a number of cases in the selected group, **N** – general set, Δ – the size of the error. General set is composed of the number of Kaunas inhabitants, namely 286.7 thousand. In order to make the survey representative and reliable (5 % error), 380 respondents' questionnaires were used for the research ($n=1/(0.0025+ 1/286.700)$).

Category data was analysed by chi square (χ^2) criterion. Differences of research findings were considered statistically significant when Asymp. Sig. $p \leq 0.05$. To identify the correlation between range variables, Pearson linear correlation coefficient (rxy) was used, which normally assesses the strength of linear correlation. The scale of correlation coefficient values is as follows: 0 – no correlation found, from 0 to 0.2 – very weak correlation, from 0.2 to 0.5 – weak correlation, from 0.5 to 0.7 – average, from 0.7 to 0.9 – strong, 0.9 to 1 – very strong linear correlation.

When conducting correlation analysis, correlation (r) strength and statistical significance were evaluated. When verifying if the obtained correlation is not coincidental, **p value** was calculated, which shows if correlation is statistically significant. P value obtained from SPSS to evaluate statistical significance of correlation was compared to the value $\alpha=0.05$ (which shows the level of significance). Correlation was considered statistically significant if p value calculated by SPSS was <0.05 .

To assess few independent range samples, i. e. by researching the correlation between movement modes and the significance of city's mental view elements as well as the size of perceived visual space according to the observation radius and senses priorities, Kruskal-Wallis test was applied. Kruskal-Wallis criterion is non parameter equivalent of ANOVA one factor disperse analysis. It allows comparing two and more independent sampling groups and identify statistically significant differences if **Asymp.Sig. p-value is < 0.05**. 387 respondents participated in the research of Kaunas city cityscape perception, out of whom 380 filled questionnaires appropriately and they were used for the research. 213 women (56 %) and 167 men (44 %) were surveyed. The smallest respondents' group, i. e. 7.4 % was composed of individuals older than 66 whereas there were 16 % of individuals aged 46-65, 31.6 % of individuals aged 26-45 and 45 % younger than 25. 22.1 % of respondents have higher education degree. 27.6 % have higher non-university degree. 40.6 % have completed secondary education and 9.7 % have finished only vocational school. As far as occupation is concerned, more than a half of respondents are employed (54.5%), students constituted 37.9 %, 6.8 % are retired, and 0.8 % are unemployed.

By observing cityscape objects, selection of movement modes is important. Going by bus was selected by 41.8 % (57.2 % females and 42.8 % males). 27.4 % prefer going by car (63.5 % females and 36.5 % are males). Travelling on foot is preferred by 26.1 % (49.5 % females and 50.5 % males) and going by bike was chosen by 4.7 % (38.9 % females and 61.1 % males). Comparing movement modes in the central street of Copenhagen [4] and the centre of Kaunas one can notice obvious priorities for means of transport. In Copenhagen people mostly move by bike, even 37 %, whereas in Kaunas only 5 % of individuals choose this mode of movement (currently the system of cycling tracks is being rapidly developed, companies "Bolt" and "CityBee" have started delivering electric scooters and bikes and, therefore, in the future the number of users is going to grow significantly). Approximately the same number choose a bus in cities, that is, 28 and 27 % respectively. In Copenhagen 31 % choose cars while in Kaunas it is 42 % and on foot the values are 4 % and 26 % respectively. By investigating the correlation between movement modes and education statistically significant (assessed by significance level $\alpha=0,05$) weak (**0.2**) Pearson correlation was found among respondents with higher education degree and choosing moving on foot and by bus within Kaunas city.

For the consumer (both local and visiting), cityscape as the whole of nature, history, culture, and traditions in a specific location is perceived via easily identified objects, namely landmarks/dominants (sacred buildings, exceptional architecture, squares, memorial places, monuments), parks, water reservoirs, recurring events, festivals, and local spirit. Having conducted the survey, data comparison with J. Kamičaitytė -Virbašienė and Rūta Ribelytė 2016 research findings was carried out. Objects and factors significant for perception of the city centre landscape and location identity were selected for comparison. Respondents assessed the significance of each object and factor by points from 1 to 5 (5 means very significant). Comparing the data in table 1 (the first provided belongs to J. Kamičaitytė -Virbašienė, and R. Ribelytė, 2016; the second is attributed to V. V. Eidimtienė, the result of the research conducted in 2020), in

principle the same results were obtained having assessed the importance of sacral buildings (10% and 9%), parks (9% and 10%), local spirit, aura (10% and 8%), memorial sites (7% and 10%). There was little difference in the assessment of events, festivals (13% and 8%), sports buildings and complexes (1% and 4%), and museums (14% and 9%). Rather big differences are observed comparing the impact of water reservoirs, that is 1 and 7 % respectively. It can be explained by already implemented riverfronts management projects (The project of Santaka park management, 2018, The bank of the Old Pier, 2018, new segments of cycling tracks, Sakura park on Nemunas island as the symbol of friendship between Kaunas and Japan, 2018). The significance of exceptional architecture grew by 6 % as well in 2020. It might have been influenced by newly constructed buildings in the centre, namely large volume dominants (administrative building “Nemuno 3“, 2017, business centres “Happspace Arka“, 2018, “Magnum“ 2019, Piliamiestis quarter – under construction). Squares, alleys, pedestrian streets were assessed less than 5 % if compared to 2016. The result can be related to respondents’ dissatisfaction by repair works, work quality as well as conflict situations because of tree cutting and certain temporary inconveniences. The importance of cultural heritage objects in 2020 was assessed even 8 % less though the number of objects as well as visiting conditions or access have remained unchanged. Shopping places in 2020 were assessed relatively higher and constituted even 6 %. The assessment could be affected by the age of respondents. The group of respondents of 18-25 years old regarded the big supermarkets as popular recreation and meeting points.

By investigating statistically significant correlation between respondents with higher university degree and local identity establishing factors, i. e. sacred buildings, memorial places, and water reservoirs, it was very weak, whereas with parks, cultural heritage, and exclusive architecture it was weak. Between respondents with higher non-university degree and sacred buildings as well as events, memorial places, exclusive architecture and museums very low correlation can be observed. Very low correlation was found between respondents having secondary education and cultural heritage, sacred buildings, and squares while low it was with parks and water reservoirs. Between respondents containing vocational education very weak correlation with sacred buildings, squares, memorial places, water reservoirs and weak with exceptional architecture and museum assessment was found.

TABLE 1

Comparison of assessing factors that determine Kaunas landscape perception and establish local identity, in %

FACTORS	Parks	Objects of cultural heritage	Sacred buildings	Events, festivals	Squares, pedestrian streets	Sport centres	Shopping places	Memorial places, monuments	Exclusive architecture	Museums	Water reservoirs	Local spirit
2016	9%	19%	10%	13%	11%	1%	0%	7%	5%	14%	1%	10%
2020	11%	11%	9%	8%	6%	4%	6%	10%	11%	9%	7%	8%

By investigating the factors that determine attractiveness of local objects by the selected criteria, aesthetics was regarded as the most significant (34 %). Historic value (23 %) and being well known (21 %) were equally important. Then there was functionality (15 %) while access was assessed as the least important (7 %). In age groups relation between certain factors and age category was observed, for example, aesthetics was considered as the most important by 67 % of respondents aged 18-25 whereas being well-known was selected by 56 % (26-45 age group) and access seemed more important (52 %) for individuals aged 18-25. Aesthetics criterion was indicated as the most important by respondents with secondary education (56 % of all respondents). Historic value seems more important for those who have higher non-university degree (38 %) while access (41 %) and function (55 %) appealed more for those with secondary education. On the other hand, well-known status is equally important for all groups.

General cityscape is best perceived by observing from the selected special sites (70 %). There are more than 10 observation places in Kaunas city which overlook the city panorama, 4 of them are suitable for the viewing the central part of the city (fig. 1). The most popular ones are Milikonys hill (69 metres), Aleksotas observation site opened at the beginning of the year (71 m), Kaunas Christ’s Resurrection Church (70 m), Jiesia mound (Napoleon hill) observation site (63.6 m). There are other potential high observation spots in the city (for instance, the upper terrace of artist’s A. Žmuidzinavičius museum patio ~70 m, Neurosurgery clinics surroundings (~66m above the sea level), which overlook views not discovered by photographs and tourists (the data of relief height was taken from <https://www.arcgis.com/>). No correlation with respondents’ age, gender or education was discovered.



Figure 1. The best observation places of the central part of the city

Visibility of separate cityscape objects was assessed according to A. Tauras (1974) proposed classification of perspectives (close perspective – the object is distanced from a spectator 150 m, average perspective – visibility distance ranges from 150 to 400 m, and remote perspective – the distance exceeds 400 m). Separate cityscape elements are best perceived from a small distance (when walking around the object). 64.8 % of respondents selected *close* and 20.5 % chose *average* whereas 14.7 % selected the level of *panoramic* perspective. Correlation with age was observed. This property can be attributed to respondents aged 66 and over, who are most likely to selected the way of observing the object at close (82.1 %). By investigating statistically significant coefficients between respondents with secondary and vocational education, a very low correlation with close observation of an object, i. e. up to 150 m was found. Analysing the relationship between movement modes and visual space size statistically significant correlation was discovered (Table 2). Moving both by bicycle and on foot Kruskal Wallis test shows low up to 150 (**p-value** 0.000<0.05) and average from 150 to 400 m (**p-value** 0.000<0.034) distance selection dependence. It confirms the previously raised hypothesis that separate elements of cityscape are best perceived at a short distance. Travelling by bus, the correlation between a short distance and selecting far perspective (**p-values** 0.000<0.05) was identified. Travelling by such a mode one can reach remote points of cityscape though observation at close still remains important because individuals pay attention to details. No significant correlation between choosing a car and selecting the size of visual space could be found since the observer is free to choose all options.

TABLE 2

Correlation between selecting visual space size of cityscape observation and modes of movement

Perspectives of observed objects	Asymp. Sig. p - value			
	On foot	By bike	By bus	By car
Remote, more than 400 m	0.000	0.657	0.000	0.667
Average 150 – 400 m	0.034	0.000	0.079	0.450
Close up to 150 m	0.014	0.000	0.000	0.750

By observing the cityscape from inside, the impact of five basic elements on perception and orientation was investigated using Likert scale (from 1 to 5, when 5 means very important): paths – streets, tracks; edges – walls, fences, buildings; districts – big city quarters, nodes – the main and local intersection points, and easily identified objects – landmarks. 19.7 % of respondents consider streets and paths as very important for orientation. 54.7 % say it is important; 21.1 % believe it is moderately important and 4.5 % regard them as of little importance. None of the respondents claim that paths are not significant at all. Gender, education, and occupation did not have significant impact on the assessment.

The significance of edges (walls, fences and buildings) within general perception of cityscape was assessed as moderately important (3 points; 41 %) and less significant (2 points; 31.6 % respondents). 14.5 % indicated that it is absolutely not important (1 point) whereas 9.5 assessed this element by 4 points and 3.4 % marked it as a very important choice (5 points).

The names of Kaunas city elderships/quarters like the Old Town, the New Town, Šančiai, Vilijampolė are well-known in Lithuania and are occasionally used as city synonyms like Brera in Milan (Italy), Montmartre (in French *Montmartre*) in Paris (France), Ciutat Vella in Barcelona (Spain). Such quarters are mostly

assessed by 3 (43.4 %), 4 (24.2 %) and 2 (18.7 %) points. 9.5 % of respondents assessed this element by 5 points and 4.2 % regarded it as totally insignificant for general cityscape perception. No statistically significant difference between education, occupation, gender and the assessment of the latter element was recorded.

The main and local intersections as well as the most significant urban and natural nodes, the view of which remains in human memory for a long time such as squares and crossroads were mostly assessed by 2 (39 %) and 3 points (29.4 %). 19 % of respondents assessed nodes by 4 points and regard them significant whereas 2.6 % treat them as very important and 10 % believe they are not important.

City views are mostly perceived and memorized by easily identifiable objects-landmarks (iconic buildings, dominants of spatial structure, groups of exclusive signs). Kaunas is famous for its architecture from interwar period (in 2017 the application of Kaunas modernist architecture "Kaunas 1919-1939: The Capital Inspired by the Modern Movement" was submitted to the preliminary heritage list of the member states of the UNESCO World Heritage Convention) (Fig. 2).

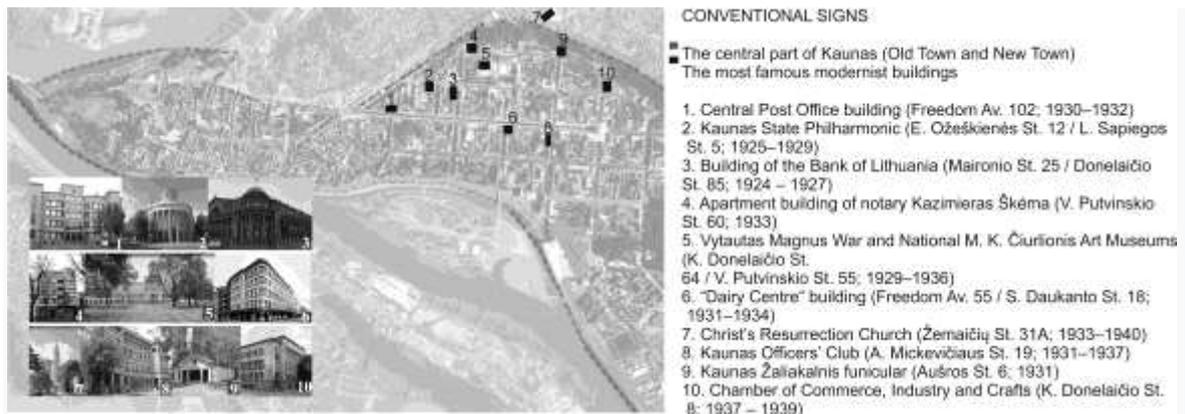


Figure 2. The most famous modernist buildings in the central part of Kaunas (photos are taken from <http://earth.google.com>)

In the Old Town surrounded by unique nature there are numerous Gothics, Renaissance, Baroque style buildings – historic, architecture and cultural monuments: The Church of the Assumption of St. Virgin Mary (or Vytautas the Great Church) (Aleksoto St. 3, ~1400), St. George the Martyr Church (Papilio St. 9, 1487), Kaunas Castle, 14th century, Kaunas Town Hall (Rotušės Sq. 15, 16th century), Kaunas Cathedral Basilica of the Apostles St. Peter and St. Paul (Vilniaus St. 1, 15th century) and others.

By assessing the importance of well-known landmarks respondents most frequently selected 4 (48.4 %) and 5 points (29 %). 19.5 % chose 3 points and 2 points were selected by 3.1 %. No respondents who believe they were insignificant could be found.

Comparing the average of all five basic elements, the landmark significance was rated the highest (4). Then subsequently paths (3.9), districts (3.2), nodes (2.7) and edges (2.6) could be ranked. By investigating the correlation between different moving modes and mental image elements of the city such as paths, edges, districts, nodes and landmarks, statistically significant differences were found (Table 3). On the basis of the research data one can claim that the correlation between moving on foot and paths (**p-value** 0.001<0.05) as well as moving on foot and district awareness (**p-value** 0.043<0.05) are statistically significant (*Kruskal Wallis* test). According to the obtained results, one can claim that for individuals moving on foot the most important factors for orientation in the city environment are paths and tracks. The data are important and could be used when designing Kaunas city infrastructure projects seeking quality solutions of pedestrian traffic (for those moving on foot, regardless of the age, health condition and movement possibilities).

Analysing the data of the research concerning the correlation between moving by bike and perception of city's mental view elements no statistically significant results were found (*Kruskal Wallis* test).

On the basis of the research data, one can assert that correlation between going by bus and district perception could be observed (**p-value** 0.002<0.05) and it is statistically significant (*Kruskal Wallis* test). The relation is quite clear since while going by bus one does not need to follow turnings of the road and finds direction concerning the next stop from audio information (if the district is selected properly, due to short distances it is convenient to reach the next bus stop on foot).

The research data shows statistically significant correlation between going by car and paths (0.000<0.05) (*Kruskal Wallis* test). The correlation is very strong and obvious, which was confirmed by respondents who participated in the mental mapping survey and first and foremost drew the main streets of the city centre and Freedom Avenue.

TABLE 3

Correlation between perception of city's mental view elements and modes of movement

Mental view elements	Asymp. Sig. p - value			
	On foot	By bike	By bus	By car
Paths	0.001	0.302	0.390	0.000
Edges	0.092	0.944	0.487	0.392
Districts	0.043	0.908	0.002	0.145
Nodes	0.328	0.154	0.904	0.678
Landmarks	0.676	0.832	0.337	0.580

Cityscape is perceived emotionally as well because certain environment elements create positive or negative emotions, which are associative and remain for a long time [20, 21]. The experiences fixed in one's memory are related to sight, taste, smell, touch and hearing senses, and reinforce mental image of cityscape. It is confirmed by 98.7 % of respondents, who assessed the importance of sight by the highest point (5) whereas only 1.3 % chose 4 points, which means that the average score is 5. Tactile senses, i. e. the possibility to touch the object (material and fabric are important) were in the second place – the average point was 3.5. 53.4 % of respondents regarded it as moderately important and 29.5 % treated it as important (4 points). 11.8 % (5 points) considered it as very important and 54.3 % chose 2 points, which means it bears little importance.

Taste and smell senses are closely related. The importance of smell (3.2) and taste (3.2) was assessed equally. The dominating assessment value of taste were 3 (62.1 %) and 4 points (26.3 %). 3.2 % respondents treated taste as very important, i. e. 5 points. 8.2 % indicated little significance (2 points) whereas 0.3 chose it as insignificant at all (1 point). The importance of smell was mostly assessed by 3 (56.6 %) and 4 points (36.8 %). 5.8 % of respondents regarded it as of little significance (2 points) and 0.8 % regarded it as a very significant element (5 points). On the basis of observations [22] smell in cityscape is more important and frequently determines the selection of the route and location. According to J. Stefanou and A. Vasilara, smell is the main element of cityscape, local identity structure and all region character's perception, which should be managed on the scale of city planning.

According to R. M. Schafer's (1993) classification of sounds in cityscape, all types of sounds can be faced (geophony, biophony, antropphony, technophony). On the basis of the research findings, the average score of sound perception within cityscape was 2.6, which meant the fifth place. 7.9 % thought that it is important (4 points) and 0.3 % believed it is very important. By investigating the correlation between different modes of movement and sense priorities (taste, smell, sight, touch, and hearing) statistically significant differences were found (Table 4). According to research data, the observed correlation between moving on foot (**p-value** 0.006<0.05), by bike (**p-value** 0,007<0.05), by bus (**p-value** 0.011) and taste, is statistically significant (*Kruskal Wallis test*). The relationship between certain location and culinary heritage is significant because food is one of the essential elements of touristic experience. Social and cultural significance of food is commonly acknowledged whereas food tourism strategy worldwide is considered as an important tool for regional development since tourists spend on food one third of the incomes devoted for the trip [13].

Travelling by bus (**p-value** 0.049<0.05), the importance of sight is emphasized. Choosing this mode it is most convenient to observe city views that are encountered by following the route.

TABLE 4

Correlation between movement modes and sense priorities

Sences	Asymp. Sig. p - value			
	On foot	By bike	By bus	By car
Taste	0.006	0.007	0.011	0.109
Smell	0.706	0.163	0.098	0.847
Sight	0.082	0.616	0.049	0.524
Touch	0.527	0.524	0.588	0.202
Hearing	0.971	0.956	0.123	0.070

Cityscape (natural and urbanized) is commonly recognized using all sensory cognitive processes [22] (*receptors and nervous system process signals of the external environment*) and is subsequently followed by perception and mental state. Deeper analysis of Kaunas city psycho-emotional senses could be used for the development of tourism infrastructure by increasing competitiveness of the tourism sector and improving the quality of local inhabitants' services.

Conclusions

1. Elements that establish location identity are important for perception of cityscape. For the majority of respondents (ranking the means of assessment in the respondents' answers downwards), they are associated with cultural heritage, parks, exclusive architecture, memorial places, and sacred objects. Dominants of historic architecture are related to symbols of time and power and are important for the development of city's identity. In cityscape they are visually distinguished by height, form, colour while objects for visiting are selected by their historic value, well-known status, and aesthetic view. Their perception is mostly related to the history, culture, political situation of the period and features of the location natural basis, and largely depends on individual's education, personal qualities as well as aesthetic and cultural sophistication.

2. During the research the statement was confirmed that separate elements of cityscape are best perceived at a short distance (64.8 %), whereas general cityscape is best perceived when observing from higher points at the level of remote perspective. The dependence between moving on foot and by bike and a short distance up to 150 m as well as average distance from 150 to 400 m of observing objects could be found. While going by bus the correlation between a short distance and far perspective was identified whereas by choosing a car there was no statistically significant correlation.

3. Observing cityscape from inside (according to K. Lynch's subdivision of five basic elements within the city area) and comparing the mean of all five basic elements assessment one can rank them by the importance: the highest assessment was chosen for the importance of landmarks (iconic buildings, dominants of spatial structures, exclusive signs). Subsequently there were paths (streets, tracks, other pedestrian routes), districts (large city quarters), urban and natural nodes. Edges had the lowest impact on perception of the environment (walls, fences, buildings). Having investigated the significance correlation of different movement modes and the city's mental view elements, the following links were found: relationship between travelling on foot and perception of paths, travelling on foot and by bus and perception of districts, and travelling by car and perception of roads.

4. Cityscape is perceived emotionally as well since separate parameters of the environment create positive or negative emotions, which are associative and remain for a long time. Experiences fixed in memory are related to senses of sight, taste, smell, touch and hearing and reinforce the mental image of the city. Sight was assessed as the most important sense in the perception process of cityscape chosen by 98.7 % of respondents. In the second place (the mean was 3.5) tactile senses could be found, i. e. the possibility to touch surrounding objects, feel the material and fabric. Smell was in the third place (mean 3.3) while taste occupied the fourth position (mean assessment 3.2). Hearing was in the last place (mean assessment 2.6). Having investigated the correlation between different movement modes and sense priorities, the correlation between moving on foot and by bike with taste was found whereas while travelling by bus the significance of sight was emphasized.

5. Psychoemotional senses are very important elements of perceiving local identity and regional character, which could be considered at urban design and planning level. It would contribute to implementation of Kaunas city economic development promotion programme (Strategic plan of 2020-2022), to develop tourism infrastructure, increase competitiveness of a tourism sector and improve the quality of services for local inhabitants.

References

1. **Bruce Goldstein, E.** *Sensation and perception (9 th ed)*. Belmont, Calif, Wadsworth Pub. Co. 1980.
2. **Cowan, R.** *The dictionary of urbanism*. Norfolk: Streetwise Press, 2005, p. 61.
3. **Cullen, G.** *The Concise Townscape*. London: Architectural Press, 1990, p. 193-196.
4. **Gehl J.** *Cities for People*. London: Islandpress, 2010, p. 9-19.
5. **Hackett, B.** *Opportunities in city landscape*. In :Grove, A. B., Cresswell, R. W. *City Landscape*. University Press, Cambridge, 1982, p. 1-3
6. **Jakovlevas–Mateckis, K.** *Miesto kraštovaizdžio architektūra, t. I: Miesto kraštovaizdžio architektūros raida ir teorijos pagrindai*. Vilnius: Technika, 2008, p. 8.
7. **Kaplan, R., Kaplan, S. & Ryan, R. L.** *With People in Mind*. Island Press, USA, 1998.
8. **Kauno miesto savivaldybė.** Kauno miesto savivaldybės 2020–2022 metų strateginis veiklos planas. [online 20.10.2020] <http://www.kaunas.lt/administracija/veikla/planavimo-dokumentai/strateginiai-veiklos-planai/>
9. **Kaymaz, I, C.** *Landscape Perception* [online 26.11.2018]. http://cdn.intechopen.com/pdfs/37563/intech-landscape_perception.pdf
10. **Keshkaran, R.** Urban landscape: A review of key concepts and main purposes. *International Journal of Development and Sustainability*. Vol. 8 No. 2, 2019. p. 141-168.
11. **Kirvaitienė, S.** Disertacija. *Miesto įvaizdžio formavimo galimybės ir uždaviniai plėtojant centro aplinką*. Vilnius, 2007. VGTU, p. 30.

12. **Lynch, K.** *The Image of the City*. MIT Press, Cambridge MA. 1960, p.116-125.
13. **Michael Hall, C., Sharples, L., Mitchell, R., Macionis, N., Cambourne, B.** *Food Tourism Around The World*. Butterworth-Heinemann Elsevier Ltd, Oxford, 2003, p. 1-24.
14. **Molotch, H.** *The City as a Growth Machine: Toward a Political Economy of Place*. *American Journal of Sociology*. The University of Chicago Press, Vol. 82, No. 2 (Sep., 1976), p. 309-332.
15. **Osgood, C., E.** 1964. *Semantic Differential Technique in the Comparative Study of Cultures I*. *American Anthropologist*, 66, Issue 3. Wiley. p.171-177.
16. Pasirinktų Kauno miesto žiūrėjimo taškų reljefo aukščio indentifikavimo duomenys pagal HNTBaltic_Data - [online 30. 06. 2020] <https://www.arcgis.com/>
17. **Pilkaukas, R.** *Kraštovaizdžio architektūra Lietuvoje*. Acta Academiae Artium Vilnensis, I 33, Vilnius, 2004, p. 7–49.
18. **Ribelytė-Knistautienė, R., Kamičaitytė-Virbašienė, J.** Subjective identity of Kaunas cityscape: research results and their relation with objective indicators of urban structure. *Journal of sustainable architecture and civil engineering = Darnioji architektūra ir statyba*, Vol. 17, iss. 4. Kaunas: Technologija, 2016, p. 5-14.
19. **Schafer, M. R.** *The Soundscape: Our Sonic Environment and the Tuning of the World*. Rochester. Vermont: Destiny Books, 1993.
20. **Simonds, J. O.** 1998. *Landscape Architecture: A Manual of Site Planning and Design*. McGraw Hill Professional, p. 5-9.
21. **Stauskas, V.** *Architektūra, aplinka, atostogos*. Kaunas: Vytauto Didžiojo Universitetas, 2012.
22. **Stefanou, J., Vasilara, A.** *Non visual aspects of landscape odour landscape*. *Journal "Sustainable development, culture, traditions"* Vol. 2/2013 [online 20.06.2020] <http://sdct-journal.com/images/Issues/2014/1.pdf>
23. **Tauras, A.** *Landšafto architektūra kaime*. Vilnius: Mintis, 1974, p. 26.
24. **Vanagas, J.** *Urbanistikos pagrindai*. Vilnius: Technika, 2008, p. 52-112
25. **Whyte, H. W.** 1980. *The Social Life of Small Urban Spaces*. Santa Monica, CA, Direct Cinema Ltd, p. 10, 32, 46, 48.
26. **Zaleckis K., Kamičaitytė-Virbašienė J.** 2012. Darnus urbanistinių struktūrų vystymasis: Kauno miesto atvejis., *Kūrybos erdvės*, Šiauliai, nr. 16, p. 46–69.
27. **Zaleckis, K.** Kai kurie teoriniai ir praktiniai bendrai suvokiamo ir įsivaizduojamo miesto vaizdo nustatymo klausimai. *Urbanistika ir architektūra*, Vol. (26)2, 2002, p. 96-106.
28. **Zaleckis, K., Gražulevičiūtė-Vileniškė, I., Vitkuvienė, J.** *Miestovaizdžio skaitomumas kaip tapatumo rodiklis*. 2018. [online 29.04.2020] http://archmuziejus.lt/lt/miestovaizdzio-skaitomumas-kaip-tapatumo-rodiklis/#_ftn4

INFORMATION ABOUT THE AUTHORS:

Vaida Vaitkutė Eidimtienė – PhD student of joint doctoral studies in Vilnius Gediminas Technical and Klaipėda Universities, Lecturer of Landscape Architecture and Recreation Department, Faculty of Forestry and Landscape Architecture, Kaunas Forestry and Environmental Engineering University of Applied Sciences, Girionys LT - 53101, Lithuania; e-mail: v.eidimtiene@kmaik.lm.lt

Jūratė Kamičaitytė – PhD of Environmental Engineering and Land Management, Professor at the Faculty of Civil Engineering and Architecture of Kaunas University of Technology; Studentų St. 48, Kaunas LT-51367, Lithuania; e-mail: jurate.kamicaityte@ktu.lt