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In the phase of global challenges many of the systems created in the past do not meet the contemporary problems of Central European space anymore, nor do they reflect the trends leading towards fulfilment of the sustainable development goals (United Nations, 2015).

Dominant part of them are joint challenges with the other parts of Europe and World resulting from global processes e.g. climate change, urbanisation, societal transformation towards civil society, development of knowledge based economy, digitalization or migration. In addition, the specific historical societal and geographical preconditions derive specific challenges, threats and problems. The broad scale of the problems in the spatial development in central European space is a big challenge for spatial planning practice, theory and education. New tasks and new frameworks, brought by current development of the transformation of society and economy, require the implementation of new approaches, methods and instruments, in some cases not only new but very specific as well, in the spatial development management, new understanding of the role of planning. Cities became hotspots of massive innovation, both social and technological. In order to meet collective global challenges, the sustainability transition movement catalysed worldwide emergence of smart cities. The concept emerged as a reaction to the modern age of intelligent technologies which profoundly changed our perception of future urban development. Those challenges are addressed by current research under broad participation of young generation of researchers in spatial planning, who present their papers in this issue of TERRA SPECTRA.

The effort of presented research work is to contribute towards integrated approaches to sustainable development and the processes of economic, social and cultural transformation. The interdisciplinary research on current problems and challenges is integrated part of the education and training of young researchers emphasizing the integration of landscape-ecological, economic, social and technological aspects.

Research and its outputs in the form of the proposals focused on optimising the spatial structures contribute to the sustainable spatial development, to balancing negative effects of regional disparities and at the same time to preserving cultural and ecological diversity, to improving the quality of life and to strengthening of social cohesion in Europe.

However, in recent years, researchers had recognized the essential role of human and social capital in smart city concepts. As many have indicated, the emphasis on the quality of life in smart cities is grounded in the principles of social innovation. In comparison to technology innovations, discussion on social innovation have gained significant amount of attention not only by researchers but also by policy makers, private businesses as well as civil society actors.

I believe that the papers will find respond among academic society in the field of spatial planning not only in the CEE countries and bring impulses for research and for societal practice as well.

Maroš Finka



Mila Yolova
Elena Dimitrova

TEENAGERS IN URBAN SPACE AND URBAN LIFE: POLICY GAPS AND PLANNING CHANCES IN SOFIA PERIPHERIES

Abstract:

Teenagers form a specific group in society, whose needs and behavioural motivations are broadly neglected by active urban planning practice in Bulgaria. This is also the case in Sofia, the capital and the fastest growing city of the country, tackling problems of socio-economic imbalances and of shrinking public space. Based on literature review and authors' empirical observations in two peripheral housing estates in Sofia designed and built during the socialist and post-socialist period, and with differing socio-economic status of their inhabitants, quality of available services and public places, the paper outlines the usage and appropriation of public urban space by adolescents and discusses probable links to local planning practices and estimated policy gaps.

The authors comment on possible ways for increasing the sensitivity of urban planning to teenagers' needs and preferences and the need to develop innovative planning tools in order to more effectively involve young people into the planning process.

Key words:

urban planning, Sofia, public space, teenagers, participative planning

Introduction

As nowadays urban challenges increase their complexity, policy makers and urban professionals are in a constant surge for better knowledge and tools to make communities more prosperous and cities - better places for their citizens. Integrated approaches in urban planning altogether with broad public participation are claimed in contemporary democratic societies as leading policy principles in addressing urban space. There is, however, a group in society that seems seriously neglected by the urban policy of Bulgarian cities. Teenagers (aged 12–19) are usually not considered a potential stakeholder subgroup by urban planning.

They live in an environment designed for adults or children without being asked about the way they see their city and what their specific needs and desires are. Instead, their presence in public space is very often seen as annoying and problematic, even sometimes loaded with prejudice about danger and crime; restrictive/controlling design is tolerated in order to prevent teenagers' presence in certain public places.

Based on a comprehensive literature review of the planning studies addressing urban diversity and the teenagers' group in particular, the paper outlines the planning and real-life transformations of public space in the residential areas of two residential areas located in different peripheries of Sofia. It discusses potential challenges to teenagers' usage of public space related to deepening social isolation and inequalities alongside the investment pressure in favour of new high-density structures.

A higher sensitivity of urban policy and planning to teenagers' needs is claimed important in order to provide a better-quality environment for teenagers by involving their critical estimation and proactive attitude to the urban process.

The topics that Arnett found valid for contemporary teenagers' life were related to the prevalence of depressive moods, peak crime rates, peer relations and biological development. It is a commonly acknowledged fact today that the years of adolescence are ones of huge physical and psycho-emotional transformations. Some of the major processes during this stage are related to self-affirmation, development of social skills and communication with other members of the society outside the family group. As parents' authority/supervision decreases in this period, the connection with peers increases its importance in terms of acquiring support, acceptance and thus building self-confidence.

Building satisfying social relationships is an important task of adolescence and it is a prerequisite for the development of psychologically healthy adults (Larson & Richards, 1989, p. 503). In this perspective, "hanging out with friends" considered by parents as a waste of time, is a crucial activity for gaining skills on how to become a group member, perform consensus activities and take group decisions. As teenagers become more autonomous in their mobility modes, they are more likely to explore the urban realm. Very often the urban environment becomes the ultimate medium for the activities mentioned above. Teenagers are frequent users of the public landscape, traveling from home to school, workplace and looking for entertainment.



Privacy can be addressed as another reason why and how teenagers use public space by having a spot of their own where they can be “themselves”, testing different identities through way of behaviour, fashion or other activities (Owens, 2002, p. 157). The search of one’s self often goes along with an emerging need for independence and might lead to confronting established behavioural norms. In his article “Teenagers and Public Space”, Matts Leiberg (1995, p. 720-744) argues that as teenagers have no right to spaces of their own, they go to outdoor public space where they often encounter conflicts with other groups.

Defining ‘teenagers’ and studying their life in public urban space

The English word “teenager” is commonly used to define a person of 13 -19 years of age. The ‘years of teenage’ or also called ‘adolescence’ were recognized as a specific period in human development only a century ago when G. Stanley Hall, the first president of the American Psychological Association, published his book “Adolescence” in 1904 and was later credited for discovering it (Petersen, 1988, p. 506). The major socio-economic paradigm shifts in the USA that triggered the recognition of this peculiar stage of life, were the mandatory high school education and the criminalization of children’s labour under the age of 16. According to Hall adolescence started from the year of 14 and reached the year of 24. In his article “G. Stanley Halls’ Adolescence: Brilliance and Nonsense” Jeffry Arnett (2006, p. 186-196) presented “reappraisal” of Hall’s work from the perspective of contemporary psychology.

This leads to the problem of physical safety that has different dimensions in relation to age, gender and identity expressed by belonging to a specific subculture (e.g. skater communities, musically influenced groups, etc.). Another perspective of safety is related to seeing teenagers themselves as a threat. Curfew hours and public order regulations are common instruments restricting teenagers’ presence in urban space in countries like USA and UK. The topic of “growing up” in sense of retrieving intellectual knowledge on how to behave in the urban environment very often treats young people as such who need “support and guidance” (Simpson, 1997, p. 908). Simpson questions the status of young people in contemporary society – that of “citizens” or “future citizens”, reflecting on the aspect of law that cannot accommodate the participation of youth in planning. Although the Convention on Children’s Rights (1989) states that children (0-18) hold and exercise rights without the need of adults’ oversight, there are many areas rise issues about the rights that children may claim (Simpson, 1997, p. 907-924).

Children’s life in the city drew the attention of scholars, practitioners and writers in late 1970s. The first research materials documented in the field were developed in the Anglo-American world and belong to the American urban

planner and writer Kevin Lynch (1977); the British author and anarchist Colin Ward (1977), and the American writer Roger Hart (1979), who investigated the way children’s perceptions of their environment affected their behaviour and habits.

Although the “years of adolescence” had been already conceptualized in science in 1904, all these authors focused mainly on the age group of 5 to 11-year-olds. Almost no research had been undertaken until 1990s, when the interest in teenagers’ life was further strengthened by the ratification of United Nations’ Convention on Children’s Rights (UN, 1989). In the following years the research gap was filled with extensive studies in various fields. A large number of publications devoted to children’s exclusion from public space because of crime and vandalism, public order regulations and curfew hour’s violation, gave rise to the discussion on the rights of children (0 -18) to the city.

The topic about the adolescences’ subjective estimation of the quality of the urban environment in relation to their behaviour and participation in the urban planning processes remained largely uncovered. Bulgarian contribution to the topic is still quite scarce. For many years the knowledge about young people has been a subject to scientific study mainly in the fields of psychology, sociology and geography but not in the planning context.

Teenagers in Sofia: current Bulgarian context

YOUNG PEOPLE AND DEMOGRAPHIC DYNAMICS IN THE COUNTRY

The socio-economic and political breakdown that took place in the country during the recent 35 years led to serious negative trends related to population growth. Due to social and economic reasons, according to census data, the country has lost roughly 2 million people between 1985 and 2018, the decreasing population in the age group 0-24 being the most significant (NSI, 2018). There are very few cities in the country with opposite demographic trends and Sofia is the city with the highest population increase for the same period, which shelters nowadays more than 1.3 million people (almost 20% of the population of the country).

This poses high strategic priority to address young people’s needs to public space and to discuss their ‘right to city’ in the context of urban development– a concept introduced for a first time by Henri Lefebvre (1968) and further developed by David Harvey (2008) to become a leading principle in the UN - Habitat policy for inclusive cities (2008).



BULGARIAN YOUNG PEOPLE AND THEIR FREE-TIME ACTIVITIES

A recent report by Friedrich Ebert Stiftung Foundation (2019) provides valuable insight on some tendencies in the behaviour of Bulgarian youth in different areas: family life and leisure, education and employment, socio-economic status and mobility, socio-political attitudes, and political participation. According to the results, the highest percentage of young people in Bulgaria are involved in passive activities (listening to music, watching television and “doing nothing”); the majority prefer spending time with their families.

“Going out with friends” rates on the fourth position, followed by activities such as shopping, going to cafes and other amusement facilities. The use of internet is ranked as more popular than watching TV, which is explained by the opportunities for active communication with peers considered crucial for this age. The preference for “going out with friends” changes with age, being most popular among the 22 and 23-year-olds. In general, the time spent in physical activities decreases with age.

Gender and socio-economic factors are among the leading ones that determine how young people spend their free time. Bulgarian young people are active consumers of goods and tend to spend less time on sports and travelling.

TEENAGERS IN THE FOCUS OF URBAN POLICY AND PLANNING

The planning system transformations in the 20th and 21 centuries

The urban structure of Sofia keeps the memory of millennia-long history, yet its modern planning and development started in the last years of the 19th century, shortly after the city was declared the capital of the country. The following two decades witnessed the devoted work of many outstanding Bulgarian and European architects and engineers who transformed the oriental town into a modern European capital.

The period of centralized planning, which started after WWII and lasted till the political changes in 1989, left visible traces on the city structure and image. The fast industrialization of the country resulted in the appearance of large industrial zones and motivated large migration flows to cities and particularly to Sofia, where numerous large housing estates were continually built on nationalized agricultural land at the urban periphery to sheltered newcomers to the city. The plans of the estates followed the concept of Modernism and designated abundant areas for social and cultural infrastructure, greenery and open public space.

The national planning system underwent next major transformation after 1989, when the proclaimed shift to democracy, governance decentralization and market-led economy motivated processes of land restitution and

privatization of state-owned industrial enterprises. The socio-economic crisis and the shift to liberalization had a strong effect on both the economy and urban structure of Sofia. The informal urbanization at the city periphery and the lack of financial support for maintenance of the urban infrastructure and the public spaces led to a large-scale physical degradation of the environment.

Bulgarian accession to the EU in 2007 brought next challenges for the capital city of Sofia. The sense of stability and the rise of foreign investments in the country affected all sectors in the economy and particularly that of the construction industry. “The building boom” (2007 to 2009) resulted in numerous large- and small-scale office, retail and housing structures. The territories at the southern periphery of the city were some of the most attractive ones for the investors.

Their development was characterized by high density building stock, lack of urban infrastructure and practically no public/ green space; that resulted in a very controversial quality of the urban environment. EU membership and the synchronization with European policies had, however, a major positive impact on the development of the national planning system. Despite numerous deficiencies in the process, today Bulgaria is already introducing integrated strategic thinking and developing participatory approaches in urban planning.

Conceptualizing the presence of children in urban space. The discussion about children in the city gained popularity in the country in 2000, with the development of sporadic educational projects and workshops intended for children in the age group 5-10 years old - e.g. Children’s City Culture Concept (4C) (British Council, 2009) and SMEN project (Scanning places in need) with a special focus on youth participation, supported by an EEA grant and developed in 2013-2014. The aim of SMEN was to propose a list of activities for urban renewal to the local authorities in Sofia, by activating young people through educational and cultural events, tools and creative medium for interactions. The participants were children in the upper age group (15 - 20), with various ethnic origin and socio-economic status. Another initiative, “Children and the city” (2016), was one of the programmed panels of One Architecture Week festival, intended for children from different age groups (5-12, 8-14, and 10-18).

The initiatives remained as single acts and no research on their results was undertaken. In 2018 Sofia Municipality, in partnership with the University of Architecture, Civil engineering and Geodesy (UACEG), joined in Horizon 2020 project URBiNAT (Healthy corridors as drivers of social housing neighbourhoods for the co-creation of social, environmental and marketable Nature-based solutions). The collaborative approaches in planning and design with broad public participation of stakeholders, including children, are in the focus of the research project.



RESEARCH AIM AND METHODOLOGY

The main research question addressed by the study is: Does the currently existing public space in the residential areas of Sofia provide a relevant environment to their specific group needs and how is that related to the way in which they have been initially planned and designed? Sub-questions focus on the physical characteristics of the spots and the accommodated activities. The methodological approach of the research incorporates desktop research; identification and selection of relevant case studies; elaboration of a matrix for data collection, on-site observations, and comparative analysis of the empirical data.

RESEARCH STEPS DESKTOP RESEARCH

A comprehensive literature review was undertaken on available studies about teenagers in planning theory, and on the two residential areas in Sofia selected as case studies (historic and socio-economic development, demographic and morphological characteristics). Selection of case studies Two areas from two urban peripheries of Sofia – Nadezhda Housing Estate (HE) and Manastirski Livadi residential area, were chosen in order to study and compare the availability and quality of public open space along with teenagers' presence and their modes of behaviour there (Figure 1).

The choice of case studies aimed to outline the differences in the planning approaches initially applied and the consequent use and transformations of public open space as a result of a changing societal context. The choice was also influenced by the availability and accessibility of relevant data due to the research already undertaken within URBiNAT project with a focus on the development of healthy corridors as drivers of social housing neighbourhoods (UACEG, 2017 – ongoing) and in Manastirski Livadi (Comprehensive analysis as a part of an Action plan for Manastirski Livadi – elaborated with a team of the Association of Bulgarian Urban and Regional Planners, 2018).

Nadezhda Housing Estate

This is one of the oldest housing estates in Sofia that emerged as a separate settlement of railway workers, merchants and apprentices. The village named 'Nadezhda' ('Hope' in Bulgarian) was declared in 1923 and later became the centre of a compound commune including several other villages. The contemporary structure was planned in late 1960s and early 1970s when the urban plan for the Nadezhda residential area was elaborated. The plan proposed 9 372 flats, green areas and services for 80 000 inhabitants within an area of 150 ha.

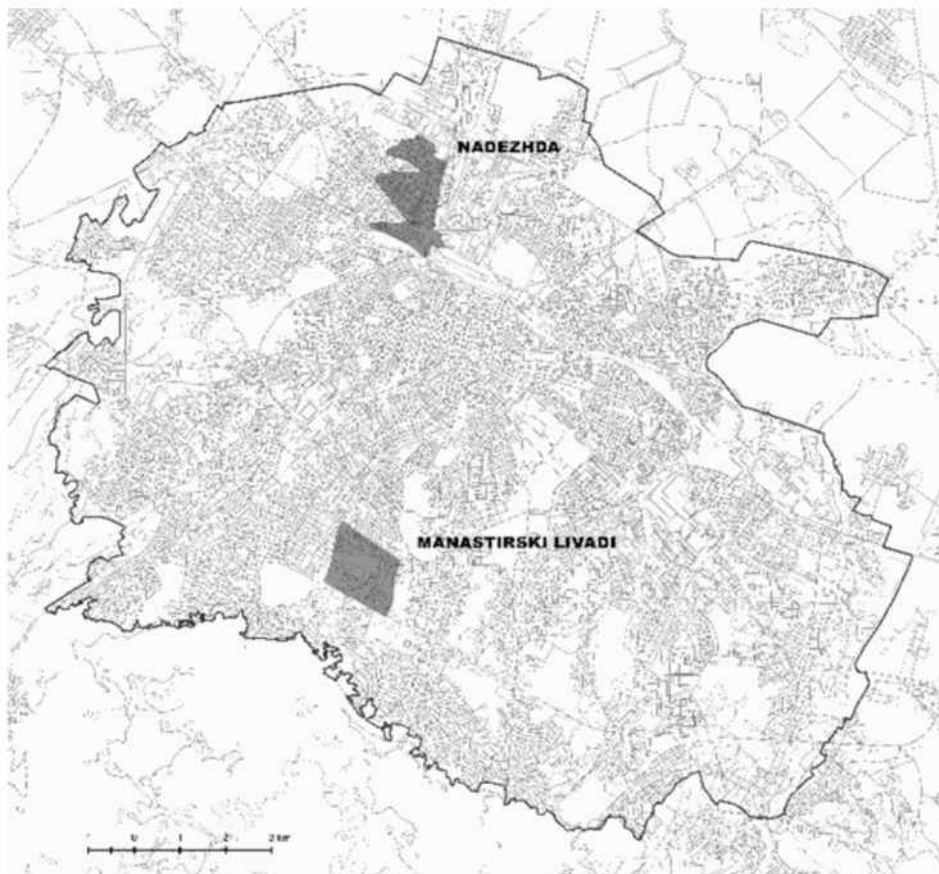


Fig. 1. Location of the two case study areas in Sofia;
source: authors



The implementation of the detailed plan resulted in the mass construction of prefabricated panel buildings; 8 to 15 storey blocks of flats were erected; the area was well supplied with public buildings such as schools, kindergartens and a small community centre. According to census in 2011 the population in Nadezhda Administrative District is 67 905 people (NSI, 2012). The number of the inhabitants in the territorial scope of the study accounts for 35 000 people evenly distributed among three neighbourhoods - Tolstoy, Svoboda, Nadezhda. The Integrated plan for Urban Regeneration and Development of Sofia (2014) designated Nadezhda Housing estate as part of the “Social zone” meeting criteria such as: high level of poverty and social isolation, negative trends of unemployment and educational rates, bad physical condition and low level of energy efficiency of the building stock. According to published average prices of housing properties provided by a local real estate platform, the interest towards buying or renting a residence in Nadezhda housing estate is one of the lowest among the housing estates in Sofia. The problems of the area are related to a degrading building stock, lack of maintenance in the public space and serious negative trends in levels of crime, deepening unemployment and social isolation.

Manastirski Livadi Housing Estate

This is one of the newest housing estates in Sofia, characterized by fast-paced development over the last 10 years. Although located only 7 km away from the city centre, the neighbourhood is part of the southern periphery of the capital, located at the foot of Vitosha Mountain, in an area adjacent to the Ring Road. The area had been an object of several development concepts since late 1970s, none of which reached realization.

The area stood non-built, although estimated to be among the city locations with potentially best living quality. In early 1990s two important laws were adopted, namely the Act on Restitution of Nationalized Real Estate Property and the Act on Ownership and Use of Agricultural Land, which thoroughly changed the rules under which the territory was to be developed. A new detailed plan adopted in 2001 regulated the street network, the sites for public functions and fixed the building parameters for the new housing stock according a vision for “a combination of the advantages of the big city with those of a small town”. The adoption of the General Master plan of Sofia Municipality in 2007 challenged that vision, allowing owners of individual plots and investors to strive for higher building parameters. The lack of funding for the allocation of public services and number of missed funding opportunities by the local administration led to the current state of Manastirski Livadi. Although 2/3 of the territory is still unbuilt, the area resembles a construction site because of the intensive process of urbanization with high density structures and gated communities lacking technical infrastructure, public space and green areas.

Due to the bad condition of the transport infrastructure,

and the scarce presence of greenery, the neighbourhood became popular as the “luxurious ghetto” of Sofia. The ownership of plots is crucial for the development of the area especially in terms of providing public facilities and infrastructure. According to the cadastral maps and the land register, in 2018 about 90 % of the total number of plots in the area are privately owned and only 10% are municipal property; from the overall 190 ha of the neighbourhood, only 29 ha (15%) were owned by the municipality. The Analysis Report on the territory revealed that within only 33% of the area, the number of residences had already reached the number envisaged by the detailed plan from early 1990s for the whole area. There is only scarce data about the number of current inhabitants. The latest official census-based statistics from 2011 reported 5000 inhabitants with prevailing young and well-educated groups.

About 55% of the overall population held a university degree. The socio-economic data about the area is also quite scarce. The information is mostly indirect, coming mainly from on-site observations. The different parts of the neighbourhood are in visible contrast – luxurious gated community complexes neighbouring one-family houses from the 1930s evidence for the informal and uneven development undergone during the recent 20 years. The high-rise structures of the shopping malls, business and hotel buildings alongside with colourful newly built housing structures indicate for the presence of financial capital that does not seem to care about the environment in the adjacent areas.

Evaluation matrix An evaluation matrix was elaborated in order to support the fieldwork with the inventory of the existing urban furniture and the activities performed by the teenagers and to estimate the places in terms of the conditions they provide for performing active/passive social activities in individual or collective form. (Table 1).

Tab. 1: INVENTORY AND EVALUATION MATRIX

CRITERIA	INDICATORS	
TYPOLOGY OF PLACE (Tp)	Programmed (green spaces, playground, small plaza, other)	
	Non-programmed (stairs, curbs, windowills, fences)	
ACCESSIBILITY BASED ON LOCATION (Lc)	Proximity to a shopping/commercial facility	
	Proximity to a public transport stop	
COMFORT (Cc)	benches	number/ position / state
	Shelter structures	number/ type/ condition
	Trash bins	number/ condition
	Sport facilities	type/ number/ condition
	Playgrounds	type/ condition
	Grounding	type/ condition
	Trees	number/type/condition
SAFETY (Sa)	Parked cars	Y/N
	Streetlights	working/ non-working
	Stray animals	Y/N
LEVELNESS (Ll)	Presence of Teenagers	number/ gender
	Presence of other groups	Y/N
PRIVACY (Pr)	Place is exposed/ hidden	Y/N



The activities focused upon were classified as passive ones (talking, sitting, and consuming food and drinks, browsing on smart devices, taking pictures, listening to music, playing cards or board games, smoking cigarettes; and active (playing informal games, dancing, exercising, illegal activities (graffiti, breaking furniture, etc.). Field work and on-sight observations The field work and the on-site observations were accomplished in one month during the period August – September 2019. They included preliminary visits to the areas in order to: 1) confirm the spots with presence of teenagers, and 2) to test the application of the criteria matrix. Due to the summer season and the high temperatures, the field work and the on-sight observations were conducted during the late afternoon and evening hours (17:00 – 20:00h).

On-site observations on selected spots Six observation spots were selected in the two residential neighbourhoods and their adjacent areas. The main selection criterion was related to the presence of teenagers observed during preliminary studies. Their size and their programmed / non-programmed functions were not taken into account. (Figure 2).

Four of the spots in Nadezhda housing estate are enclosed by blocks of flats that are furnished to provide everyday leisure activities for the locals. Due to the lack of

maintenance for most of them the physical environment there is of bad quality; there are some traces of random improvement though “do it yourself” interventions by the local people (Figure 3).

In most of the places signs of vandalism are visible; they are quite polluted by garbage. The places vary in size but have very similar characteristics with slight differences in terms of number of benches, playgrounds or sport facilities. The other two spots are located in local public parks out of the residential area (“Nadezhda” Park and “Urban Culture” Park). “Nadezhda” Park is very popular among the local inhabitants and a favourite place for leisure.

The spots selected in ‘Manastirski Livadi’ neighbourhood are mainly non-programmed and “appropriated” by teenagers as public space is quite scarce in this area (Figure 4). The only two sites programmed as public ones belonged to the shopping mall and are part of its plaza. In this case all the spots have different characteristics; they include: a little plaza with dry fountain (in front of the shopping mall), pocket spot along one of the facades, a “letter corridor” (a corridor-spot formed by the name letters of the mall, a windowsill (providing contact with the street, a fence (part of a housing building), and a curb of a sidewalk.

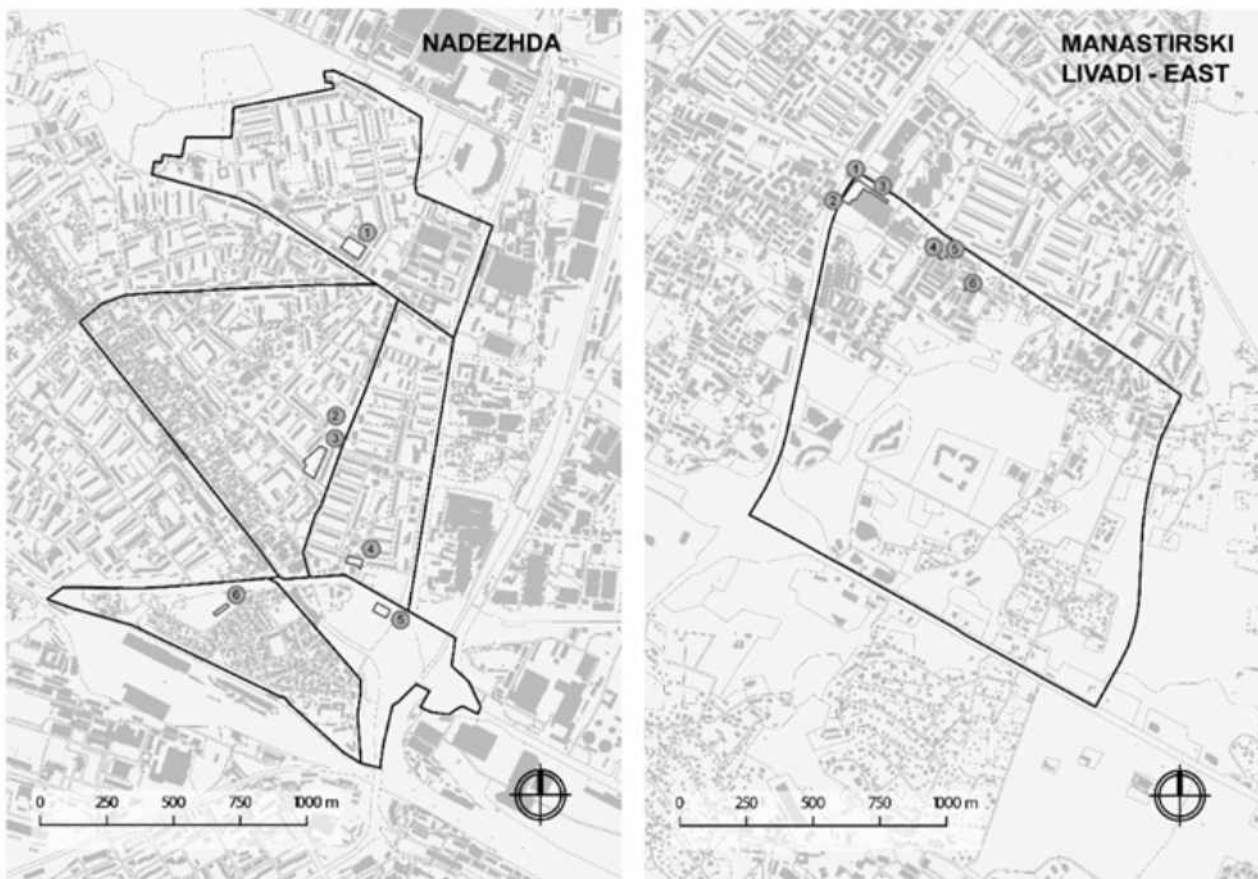


Fig. 2. Observation Spots (source: authors)



Fig. 3: Spots 1 and 4 in Nadezhda HE, August, 2019
(Source: authors)

Results and discussion

A comparative analysis was undertaken, based on the developed evaluation matrix. Each spot was assessed through the quantitative and qualitative indicators related to the criteria. The findings related to the Typology of place criterion showed that all the observed spots in Nadezhda are programmed - they are public spaces, intended for social activities and leisure. In Manastirski Livadi only two of them are programmed.

This could be explained with the difference in the morphological structure of the two neighbourhoods resulting from the planning practices following two different paradigms – modernist and the market-oriented.

The Accessibility criterion is related to the factor of location with a specific focus on the proximity of commerce facilities and stops of the public transport. For most of the cases in both the neighbourhoods there are small or larger shopping and entertainment facilities next to the places chosen by teenagers. In Manastirski Livadi this is the case for four of the spots.

In Nadezhda only two had local shops nearby and other two were “out of the residential area” situated in the two local parks. The Comfort criterion is among the most important ones because it determines the duration of teenagers’ presence and the type of activities they choose to involve in.

The comparison outlined that Nadezhda provides much better environment for outdoor stay. All the spots are equipped with benches although they are not in a very good condition, there are trees that provide shade, background or cover in the different cases. In Manastirski Livadi the lack of greenery is more than evident. As only two of the spots are programmed like the mall plaza, and the pocket space along one of the facades, only these provide benches for visitors. In the other cases, the spots (a windowsill, a curb of a sidewalk and a fence) are adapted by their users. Although the shelter was not always present in the case of Manastirski Livadi, there was a place where to hide in case of bad weather. In Nadezhda the presence of gazebos in some of the spots provided a “second room” for activities that required privacy.



Fig. 4: Spots 1 and 6 in Manastirski Livadi - East, August, 2019
(Source: authors)



The proximity to sport facilities not only provided the users with additional activities but also with a place to see and meet other peers. These places in Nadezhda had more users than others. Very often the teenagers' spots were close to children playgrounds. No signs of disturbance between teens and parents with smaller kids were observed. In the later hours the children facilities were also appropriated by the adolescence in Nadezhda. In Manastirski Livadi there are no specially designated facilities for outdoor activities for children and adults.

The next three criteria and their indicators are interrelated. The issue of Safety in terms of incidents of crime and physical threat also depend on the Liveliness and the level of Privacy that different spots provide. The working streetlights were the indicator that received lowest marks in Nadezhda. Some of the spots were missing light or lights were insufficient. The overgrown greenery also contributed to the dark environment. In Manastirski Livadi only the three spots around the mall were well lit and had camera control. That was, however, also a reason why these spots did not motivate longer stays. The rest relied on streetlights that were not bright enough. The proximity of parked cars was determined as a problematic in terms of safety only for one spot – the curb of the sidewalk in Manastirski Livadi. In terms of Liveliness it was interesting to know which of the teenagers' places were shared with other users. It turned out that half of the spots in each of the neighbourhood were shared with other people but only in specific hours. Although the Mall's plaza in Manastirski Livadi is also a meeting point, the level of liveliness was not as high as expected due to the summer season and attractors that usually keep citizens away from indoor activities. In the inner part of the neighbourhood the level of liveliness was determined by the number of pedestrian passers-by that was also low. The spots in Nadezhda had higher level of liveliness due to the existing community and their everyday practices. In most of the cases teenagers' spots were visible but did not seem to gain much attention. There was only one spot in Nadezhda that was measured low in terms of liveliness and that was the "Forest culture" park. The presence of dog park's facilities had turned the green area into a place for people with dogs who were present only in particular hours. The exuberant greenery and the lack of visitors are some of the characteristics that make the place ideal in terms of privacy, which is the last criterion. The data from the on-sight observations showed that roughly half of the spots in both areas were semi-exposed and visible. There were only two spots in each of the neighbourhoods, which provided some "hideaway" environment.

In both neighbourhoods' passive occupations of the teenagers prevailed. Although there were sport facilities in Nadezhda, observations showed that most of the young people preferred spending time talking with their peers. That main activity was accompanied with the usage of smart devices - taking photos, listening to music or other. Smoking, consuming food and drinks were also observed. The spots with highest level of privacy was full of empty beer bottles.

Observed activities that suggested physical movement comprised unformal games (chasing games) and outdoor fitness. The fitness facility located in Nadezhda and the spot in the "Forest culture" park were occupied only by males.

Conclusion

The topic about teenagers' presence in and perceptions of the urban environment is still scarce in the Bulgarian context. Although some attempts for setting attention to children have been made, it still lacks enough knowledge and research. Foreign good practices and research results in the filed have confirmed that the concept of playgrounds as primary places for young citizens is too narrow and needs to be re-thought. The lack of education and knowledge on life in the city is a serious gap that leaves the group of teenagers without a voice about their right to urban public space relevant to their needs.

The current study is a step to conceptualize and operationalize teenagers' right to the city by documenting their presence in the open public space of differing residential areas at the periphery of Sofia. The research results clearly outlined that the newly built residential areas in Sofia following the same market-led model as Manastirski Livadi are less likely to provide a relevant environment for teenagers. The lack of programmed public spaces there has motivated shorter outdoor stays and turning the act of shopping into a main way for meeting peers. Despite Nadezhda HE presents an overall different image, the activities observed there do not differ significantly.

Public spaces, which are empty of functions and lack maintenance because no public funding is available, result in a dull environment that is often subjected to vandalism. That is why the public sector in Bulgaria needs strategic urban planning with a more sensitive approach and broader participation of various social and age groups, including teenagers. Teenagers' perspective on the environment could provide valuable knowledge to policymakers, urban planners and urban designers in their attempts to improve the city. By entering public dialogue with teenagers and responding to their claims, local authorities and professionals would also contribute to strengthening their sense of belonging to the urban communities and for nurturing their responsible attitude of citizens to their city.

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Michal Hajduk

„SPOMENICI“ - THE FORGOTTEN ICONS OF CONCRETE UTOPIA

Abstract:

“Spomenici”, the forgotten brutalist icons of Tito’s Yugoslavia became one of the new focuses of discourse of historians, sociologists or architects. Their significant role in the collective memory as well as their ambiguous and multidimensional semiotics has been thoroughly analysed and re-interpreted. Monuments erected in places of big victories of Tito’s partisan forces significantly contributed to the shaping of physical as well as mental landscape of Western Balkan countries. Our contribution is analysing their architectural language, semiotics as well as their significance for current Balkan societies. Monuments of Kosmaj, Vukovar, Tjentište, Kozara, Ilirska Bistrica, Podgarić, Kadinjača and Jasenovac are entirely analysed. Invaluable depth of their artistic content is being challenged by current transformation of society in the countries of Western Balkan.

Icons of specific “Yugoslav” modernity, stuck in their “in-betweenness” of the Yugoslav society of the 1960s and 1970s are today not only the symbols of partisan victory but they became the symbols of division of society. Once official one-dimensional interpretation had been replaced by plural and sometimes ambiguous interpretations. Still standing in the magnificent Balkan landscape, they are not only the masterpieces of modern architecture and landscape design but they are also the silent witnesses of the times when it was vitally important to forget and not to forget. To forget the unimaginable atrocities of the WWII in order to move on and not to forget in order to thwart the repeating of horrible events. Unfortunately, they failed in this ultimate mission.

Key words:

spomenik, Yugoslavia, brutalism, architectural semiotics

Introduction

„Spomenici“ (singular „spomenik“) are forgotten and sometimes abandoned Yugoslav monuments dedicated to partisan victories and tragic events of WWII, spread across the territory of Western Balkan. Series of photographs of Belgian artist Jan Kempenaers (Neutelings 2010) from 2006-2009 was the first attempt of their passportisation and reflection in 21st century. Later the influential article of J. Surtees (2013) in the Guardian (“they are like the fields of peace amidst the land of nobody....witnesses of landing of extraterrestrials...circles in the corn fields or psychedelic cover albums of Pink Floyd!”), stunning visual elegy of N. Robert (2016) (www.yomadic.com/yugoslavian-monuments-map) and deeply elaborated database by Donald Niebyl: Spomenik Monument Database (2018) contributed to the fact, that these brutalist monuments and landmarks got into the spotlight. Further valuable

contributions were the intriguing project Unfinished modernisation: Between Utopia and Pragmatism (Mrduljaš and Kulić 2012), monography Modernism In-Between: The Mediatory Architectures of Socialist Yugoslavia (Kulić et al. 2012) and finally the exhibition Towards Concrete Utopia: Architecture in Yugoslavia (1948-1980) in MoMA New York (Stierli and Kulić 2018).

The world rediscovered the lonely, wild and melancholic beauty of these iconic stars of concrete utopia. They are standing beyond our time and space...like coming from the other world, which we will never grasp. Some of them are maintained, some are damaged and some are slowly losing last traces of their existences. Retrofuturism, abstract brutalism or totalitarian monumentalism? None of these labels is fully fitting. What is still persisting is their wild, all scales exceeding beauty and terrible ambivalence, which had not petered out even after decades. These magnificent structures are airing the uncontrolled

„Yugoslavia was like a sample from other world. It has not resembled anything what was present at that time either in Europe or worldwide. Eerie and lonely solitair stuck between West and East. By the Tito’s death (1980) this story comes to an end. Some leftovers of its heritage had been lost in wars of 1990s, some are still there but they are day after day slowly disappearing in the fog and one day there will be nothing left. Unfortunately and thanks God at once...“

(M. Jaššo, M. Hajduk, M. Husár)



Fig. 1: **Kosmaj Monument**
(Photo: authors)

emotions of agony, sacrifice, loss and remembrance (Iovine, 2018). They are silent symbols of unspoken atrocities, which were externalised in these places. The bloodsheds in the territory of Yugoslavia in years 1939-45 were beyond any measure and scale. 1 million people (predominantly civilians) lost their lives in fratricide fights among chetniks, ustashe, homeguards, partisans, wehrmacht forces and Italian fascists. Tito's communist regime after big victory in May 1945 initially emulated the guidelines of soviet socialist realism and monuments from late 1940s and early 1950s are very formal and descriptive – partisans with weapons, stylised faces of soldiers going to battle etc. After Tito's rift with Stalin there is a sudden digression – while Soviet architects continued in formal monumentality, in the Yugoslavia the pure abstraction was born. Monumental silent poetry of raw concrete blocks, futuristic allusions of forthcoming atom age and utopian society became the blueprint of Yugoslav third way modernity with its inbetweenness (term of Vladimir Kulić, see Mrduljaš and Kulić 2012).

Why this artistic and architectural language prevailed in the Western Balkans?

Transition towards pure minimalistic abstraction was one of the deliberate decisions of Tito's regime how the differentiate itself from heavy formalistic monumentality of Soviet type (see e.g. Jacobs, 2013 alebo CarloR, 2019). Tito was a kind of Anti-Stalin. Exactly the same totalitarian in thinking, but different in expression. Need for reconciliation in Yugoslavia demanded highly symbolical and abstract architectural language (Putt, 2019; Niebyl, 2018). The authors tried to express the main motive of brotherhood and unity, which was the only form of societal inclusion (Renz 2014). "Spomeniks represent the ironic contradictions of the former Yugoslavia. They're reminders of an unspeakably painful past, and an uncertain future. Physically, they're bold, concrete, and heavy. Conceptually, they're even heavier. Built at locations of immense tragedy, representing death, victory, unity and peace, they're often edifices that recall deep pain and the absolute worst of humanity" (Robert, 2016).

There is a certain stylistic unity of spomeniks: despite being different in many details and circumstances, the most of them do have common characteristics of minimalistic artistic language and daunting atmosphere. They are works of various authors (V.Bakić, D.Džamonja, B.Bogdanovič, M.Živković, V.Stojić etc.) and they had different destinies in tragic 1990s. Some of them were commemorated as the symbols of brotherhood and unity of 1960s/1970s, some of them were damaged and vandalised as the symbols of Serbian dominance over other nations in former Yugoslavia. Especially spomeniks in Croatia and Bosnia were heavily suffering in 1990s.

„Spomenici“ were built all across the territory of former Yugoslavia – from Nova Gorica (Slovenia) till Gevgelija (Northern Makedonia). Correspondence with locality is of utmost importance not only in terms of historical proximity but also in terms of landscape architecture.



Few of them are placed directly in the urban environment (Maribor, Zenica, Sisak), most of them are placed in remote areas amidst the mountains, canyons or natural amphitheatres. Here is the short visit to the most significant of them:

TJENTIŠTE (Bosnia and Hercegovina)



Fig. 2: **Tjentište Monument**
(Photo: authors)

Tjentište is a monument dedicated to battle of Sutjeska, the symbol of guerilla fight of Tito's partisans against wehrmacht and Italian fascists. In January 1943, the battle of Neretva began and in May 1943 the forces of Axis started the operation Black Box (127,000 German and Italian troops against 22,000 partisans). Partisans were overpowered and withdrew into small village of Tjentište. They lost in desperate defensive fights more than 7,000 manpower, but Tito was eventually able to withdraw to mountains of Bosnia and Montenegro (see more Niebyl, 2018). Ethos of defensive battle was a heroic effort to save the wounded and this event is considered as the turning point in Yugoslav war: it was the last Tito's big loss, after Sutjeska battle the streak of wins followed. The event was commemorated in Yugoslav epic movie Battle of Sutjeska (1973) with R.Burton. Monument was built in 1964-1971 (Miodrag Živković, Ranko Radović) and displays a monumental fractal abstract composition. Sculpture from reinforced concrete with sharp edges symbolises both the rocky canyon Sutjeska (which was the escape way to safety) as well as the „wings of freedom“. Slim silhouette full of edges and rims resembling the warfare events: the situation was fuzzy and changing every day and it was not easy (after the series of losses) to believe in final victory...Živković was very straightforward in its interpretation: „sculpture symbolises only the breakthrough and victory“ (Živković in Niebyl, 2018, p. 177). Inner sides of spomenik are filled with the figural motifs of partisans desperately struggling in enemy's entrapment. German historian Heike Karge (Niebyl, 2018) criticizes the fact that the monument is omitting the meaninglessness of war starvation as well as the pain of those who never got the

help as opposed to heroic and majestic depiction of the fighting men. Tjentište became one of the most popular school trips in heydays of former Yugoslavia (1970s). Sharp edges and ridges accelerating towards the sides and upside are telling us that the only way how to escape is to fight through...despite the losses. Leitmotif of reconciliation, typical for some other spomeniks, is essentially absent here. Unique landscape and white ridges of spomenik are visible from all spots in the surrounding valley. The sculpture was in 1970s and 1980s cleaned up every year and till now it is in good condition. Visual imagery of the place is breathtaking, especially in spring, in May - time, when the battle culminated. Views from the bottom of the valley: concrete blocks are hard, closed and almost unpenetrable.

They are asymmetric, indicating an uneven fight and generating some tension in composition. But if you step up into the small amphitheater, the silhouette of the sculpture plays out the motif of „wings of victory“ and you feel a little bit of a relief. Surrounding soft bucolic green landscape is somehow melting down the hard architectural language of the spomenik and delivers some contemplation character to the place. Fruit trees, green meadows and narrow path bent in two arches are betokening that the time of reconciliation is finally coming....

KADINJAČA (Serbia)

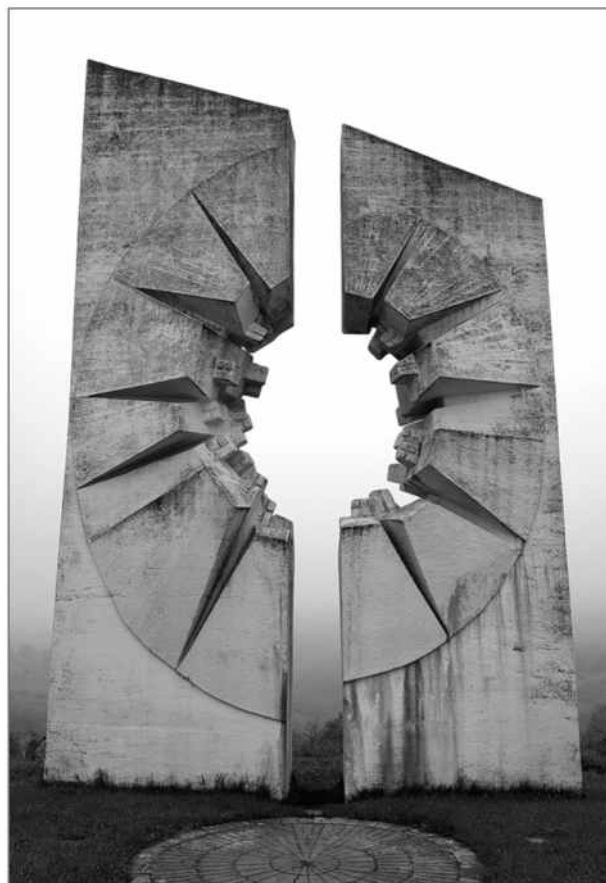


Fig. 3: **Kadinjača Monument**
(Photo: authors)



On the way to south-western Serbia, the landscape is slowly changing, the bucolic green pastures of the Belgrade region are replaced by wild Balkan mountains and you feel the oriental influence (towns of Čačak or Užice). City of Užice – in 1941 here the first partisan republic has been declared and city and its surrounding retained a certain portion of independence even after the crush of partisan movement (summer 1941). This was the place of birth of Yugoslav partisan tradition and nowhere else was the support of civilian population of Tito's partisans as massive as here ... (Titovo Užice).

In the suburb of Užice, the tiny dirty road is leading us towards Kadinjača, a place like from the movies of Emir Kusturica. On that place, on November 28th, 1941, the final defeat of Užice republic took place - last Užice workers battalion was crushed by Germans and the atrocities followed. Part of the partisans withdrew to the Sanjak mountains where they were fighting till the final victory in May 1945. Current shape of the place is the work of architects and sculptors Miodrag Živković and Aleksandar Dokič. Monument was opened on September 23rd, 1979 with the presence of 100,000 visitors and this was the last public appearance of Marshal Tito. Generous composition consisting of several concrete rebar and granit white blocks is tracking the path and leading us to the climax of this story: final sequence of white granit assymetric cinderblocks...each following cinderblock is little bit higher than previous one and their oblique horizontal ridges escalate the tension. The last one is perforated by huge stylised bulletshot. Rough concrete poetry does not need further explanation - Kadinjača is an aborted song. Monotonious tectonics and dull rhythm of the ascending alley is finished by rough brutalistic gesture - and its absolute silence is crying even today, 78 years after Kadinjača uprising. Despite strong, almost shattering gesture, the atmosphere on the place is calm and serene. Even the naturalistic shape of bulletshot associates neither the atmosphere of revenge nor the oversized celebration of victory.

Kadinjača is more like interrupted song, remembrance on those who were fighting against all the odds. 88 trees (each for one year of Tito's life) are the silent witnesses of the terrible events and conduct Kadinjača spomenik on its way into oblivion.

VUKOVAR (Croatia)

The border between Serbia and Croatia harbors completely different city than 30 years ago. On November 18th, 1991, after 3-month siege („Vukovar will never surrender“ – S.Glavašević), was the city destroyed by the JNA and Serbian paramilitaries. 3,000 civilians have died in the streets and Vukovar became „Croatian Stalingrad“. In 1998, the city was peacefully re-integrated into Croatian territorial and legal system. Mulberry trees on the riverside

of Danube, bucolic idyle of N. Tesla's birthplace from the fin de siecle, beautifully decadent chateau Eltz - this is the old Vukovar from postcards that does not exist anymore. On the other hand, current Vukovar is neither the war-torn rubble from the TV spots of the 1990s. Chateau Eltz was completely restored, as well as the birth place of Lavoslav Ružička, pedestrian zone, bank of Danube, parks....Danube is flowing and flowing and makes easier to forget...Symbol of today's Vukovar is bullet-pierced watertower, still standing despite more than 600 hits by shrapnels. Spomenik in mulberry park Dudik has been created by architect and sculptur Bogdan Bogdanović (1980) with such extension which could not have been anticipated even by such author like Bogdanović. Spomenik is dedicated to tortured and killed Serbs and Croats during so-called Independent Croatian State (NDH) in years 1941-42. 5 stoney wedges are deliberately ambiguous - Bogdanović indicated an inspiration by necropolis of Etruscan kings. Rumours said, that wedges symbolised the republics of Yugoslavia, but there were six of them. Spomenik suffered heavy damages during the war in 1991-92, the shell hits are countless and the whole area was refurbished by the EU funds in 2007. Even the decision of the renewal was controversial: Bogdanović was refusing it and he stated that the monuments should not be refurbished. The composition was deliberately designed to be continuously burried down into the moist soil, symbolising the methaphor that everything that was once connected will once break up (see Bogdanović 2008, Bogdanović 1993).



Fig. 4: Vukovar Monument
(Photo: authors)



KOSMAJ (Serbia)



Fig. 5: **Kosmaj Monument**
(Photo: authors)

Near Belgrade, the vast Pannonian lowlands are transformed into hilly green pastures, full of oak and maple trees, small vineyards and tiny forest paths. Architecture still bears a certain Central European modesty and scale plausibility. Through tiny forest roads we are approaching the Kosmaj mountain and after couple of footsteps uphill almost a sci-fi image enters the scene: between the tree branches we are observing huge sharp edges of giant star – Kosmaj spomenik. Kosmaj monument was created in 1970 (authors Vojin Stojić and Gradimir Medaković) as a tribute for Kosmaj partisan battalion and all its fallen heroes. July 2nd, 1941 the members of Kosmaj and Sava partisan brigade met and establish joint Kosmaj battalion, which later took part on the essential clashes with Germans as well as with chetniks of D.Mihajlović. Kosmaj battalion slowly increased from 60 to more than 1,000 fighters and took part in the final battle of Belgrade. When the unit was dissolved (March 1945), there was nobody from the founding members from 1941 alive... (Niebyl, 2018). Spomenik Kosmaj is made up from 5 pointy concrete monoliths, which together are creating shape of a star higher than 40 meters. Grey colour of raw reinforced concrete cannot tame the energy of birth even after almost 50 years.

Concrete blocks are initially concentric towards the focal point of composition, and after that are wildly dispersed in all directions like an explosion of supernova. Metaphor of war struggle where the new Yugoslavia in 1945 was born could be hardly expressed more punctually. The points of the star are only indicating the direction and are proving that idea of communism is borderless and does not show any empathy for the lives of others. The energy of the focal point of explosion is sensible even after 50 years.....and then comes the depression from deteriorating raw concrete, worn down and in state of decay, this materialised symbol of unavailing great red dream. In the centre of monument there is circular stoney platform with memorial texts and dedications. Surrounding trees are slowly becoming as high as the monument which gives the place kind of „otherworldness“ character. Visitors feel a mixture of surprise, awe, alienation, nostalgia and sadness...Correspondence with locality is more historical than compositional and sharp collision of the star with the sky and surrounding serene landscape is somehow confirming that the Kosmaj monument is more an emblematic expression of triumph than remembrance of the fallen soldiers. In the moment of its birth the monument served for confirmation of Tito s legitimacy which was slowly fading away and was even doubted in certain circles. 1970s were the times when first heroes of WWII started dying and the collective memory of Yugoslav nations started to be challenged be consumerism and materialistic „happy life“. Tito’s big dream started to melt down like an icecube in Coca-Cola and after some last peaceful years the resulting blend exploded like Kosmaj star.

PODGARIĆ (Croatia)

Endless macadam roads of Croatian region Moslavina led us to an unusual spomenik which is like coming from Star Wars series. Figural sculpture with assymetric wings looks more schizoid and surrealistic than the other spomeniks witch keep certain compositional discipline and monumentality. Podgarić is like from other world. Shabby texture is adding a kind of diabolic appearence and is fading its meaning away from the original semiotics. Podgarić comes from the series of spomeniks which partly abandoned purely geometric minimalistic language. In this period some semi-figural elements (wings, hands, forks) were added to puristic spomeniks architectural vocabulary. Spomenik is rather psychedelic than heroic and its correspondence with locality is rather historical than compositional, kind of devil solitaire born in deep Moslavina conifer forests and mountains. Balkan is here slowly stretching its hands towards Central Europe and grey, dark and gloomy brutalistic architectural language of the spomenik makes the alienation from the local context even more present.



Fig. 6: Podgarić Monument
(Photo: authors)

Concrete-aluminium sculpture of apocalyptic headless bird measures more than 20 meters (with extended wings) and is the work of Dušan Džamonja (1967). Main motif of „wings of victory“ is not new but never else it personalises such ambiguous and sinister character. Assymmetric wings, central alluminium „eye“ consisting of metallic oblique longerons is resembling everything else but communist victory. Officially is the spomenik dedicated to victims of national-liberating struggles in region Moslavina. Undercover of spomenik is the place of necropolis for partisans fallen in the battles and in the field hospitals. Podgarić never shone an atmosphere of victory, not even on the sunny photographs from the 1970s. Its soul remains dark and unpenetrable like surrounding Moslavina woods...

KOZARA (Bosnia and Hercegovina)

Deep in the conifer forests of northern Bosnia is the region Kozara with its national park, the oldest one in Bosnia and Hercegovina. This region was closely connected with partisan tradition – deep forests, remote character of place predestined Kozara to guerilla activities. In the spring of 1942, partisans achieved some significant victories and temporarily deliberated some territory in northern Bosnia. The forces of Axis reacted quickly. 40 000 soldeirs of Wehrmach and ustashe faced 3 000 partisans and further 60 000 volunteers.



Fig. 7: Kozara Monument
(Photo: authors)



Military conflict lasted more than 2 months and delivered death to more than 25 000 people. 40 000 civilians were deported to Jasenovac. Woods of Kozara were the witnesses of many bloodsheds and atrocities. Young people were growing up with the hate in their hearts long after war was over. Till now there are voices interpreting the events in Kozara as a liberation fights of Serbs against Croats – which is not true, because among victims there were many antifascist Croats, Bosniaks, Slovenes...Spomenik was financed exclusively from the gifts of citizens and communities. Its author is renown Yugoslav modernist sculptor Dušan Džamonja (see e.g. Niebyl, 2018; Kulič et al 2012). Few of the spomeniks do have such complicated architectural language and structural configuration - 33m high cylinder is consisting from 20 rebar concrete blocks enforced by steel pylons. Its iconic shape became the symbol of Tito's Yugoslavia. Semiotics of spomenik has emphasized that the contribution of the dead and alive soldiers was equally important and the final victory had been born after the row of painfull losses...Strict and dull geometry of the cylindrical shape is somehow indicating the unforgiveness of Tito's magnificent victory – spomenik is not very inclusive and it seems that „brotherhood and unity“ is only for victors. Spomenik is in well kept state and in comparison with others, Kozara is a little bit missing the emotion of nostalgia, reconciliation or forgiveness – it is like mechanical piston monotonously dealing to everybody his/her fate: once a life, once a death, once a life, once a death...

ILIRSKA BISTRICA (Slovenia)

Few of the spomeniks are located on the territory of current Slovenia. Partisan guerilla fights have been fought also here, but picturesque and marvellous Slovenian

landscape is somewhat resistant to monumenal brutalistic gestures. Vineyards and red roofs are not the ideal theatre for rough and straightforward concrete utopia. But Slovenian history is full of tragic events as well (see Pušnik 2017). One of the most famous Slovenian monuments is „Hrib svobode“ („Mushroom of Freedom“) in Ilirska Bistrica: reinforced concrete cube with the 8 m long sides is the work of Slovenian architects Janez Lenassi and Živa Baraga (1965, see Niebyl 2018). Ilirska Bistrica was the place of intensive fights in 1942 and the bodies of 284 partisans are buried here. Architectural language of spomenik is a metaphor of surrounding carst landscape (Zeleni Karst), full of underearth cove labyrinths (Postojna jama, Škocjanska jama). Another interpretation is saying that spomenik symbolises the bones of dead partisans in an eternal cycle of life (see Niebyl 2018).

JASENOVAC (Croatia)

None of the spomeniks is conceptually heavier than the stone flower in Jasenovac...Place which will be probably haunted forever by its tragic history and which became a symbol for Auschwitz of Balkan... (Richter, 2016; Zanni, 2017). It is impossible to find out how many thousand of Serbs, Roma, Jews and antifascist Croats lost their lives in this extermination camp which was worse than Dachau or Buchenwald (see e.g. Hohenhaus, 2019), the modest estimations are about 100,000 victims (Hohenhaus, 2019). Forgotten place on Croatian-Bosnian border, which did not find its peace and tranquility even after 80 years after horrible events...Jasenovac was built in the wetlands of Sava river, far away from the public eyes. Remote and silent corner of Croatia was the witness of brutal physical extermination of thousands of innocent victims. Already in



Fig. 8: Jasenovac Monument
(Photo: authors)



1950s there was an intensive societal pressure to reflect the horrible war events in Jasenovac in artistic way...But even the experienced architects and sculptors failed to meet this challenge. Each competition divided society more and more and generated mistrust, misunderstandings and hate. Winning proposal of Bogdan Bogdanović in 1960 (spomenik was finished in 1966) was selected by Tito himself, without competition (see Niebyl, 2018). Nobody could be the better choice than Bogdanović, an outstanding sculptor and architect, directly participating in partisan battles. "Half of my classroom-mates were killed in the fights and the other half joined either the partisans or fascists..." remembers Bogdanović in one of the interviews (see Bogdanović 2008). There was nothing which would divide the seemingly cohesive society of Yugoslavia of 1960s more than Jasenovac. Jasenovac is today a mourning place built on complete flatland. The vacancy of surrounding landscape without trees is indicating how large the extermination camp once was. Today the landscape is somehow mellowed down with artificial lakes with sounds of frogs and cicadas. Narrow path leading to spomenik is undercovered by railway putlocks symbolising the cargo wagons transporting innocent victims.

Museum of Jasenovac was opened in 1970 and in the 1970s more than 250 000 visitors yearly arrived (Pejaković 2012). Bogdanović's highly conceptual design of stone flower/wing is extraordinary lyrical and is avoiding every personification of victims and perpetrators 24-meter-high concrete sculpture consisting from 6 arms is almost taking off. None of the spomeniks effulges such desperate desire for forgiveness and reconciliation...and despite of that here the Serbs, Croats and Jews are mourning their dead separately – each nation different day.

Spomenici today...

Spomenici are one of the deepest elaborated and symbolic artifacts of modern movement. They are encapsulating in themselves all the tragic contradictions and rifts of the Balkan history. We cannot separate the antifascist tradition of partisan fight and later Tito's communism. And we cannot completely separate artistic dimension of spomeniks and tragic historical contexts. If we concentrate on artistic aspects of the spomeniks, they are masterpieces from times when modern art reached its peak: it knew its limits and stunned us with its construction precision and artistic maturity.

The authors were the outstanding artists exceeding their zeitgeist in many layers...Nobody was able to bring an utopia closer to Earth than they were. Many of authors enjoyed not only the heydays of spomeniks, but also their decline, dusk and even destruction in 1990s. Dušan Džamonja, Bogdan Bogdanović, Vojin Bakić or Miodrag Živković remain in wild Balkan landscape present till nowadays and they are co-creating the collective memory

of this complicated region. Today, many of spomeniks are abandoned and they are airing the atmosphere of nostalgia, decay and wrack... They are like aliens, forgotten on Earth long ago..."the sad faces on merry wedding" (Robert, 2016). "They currently stand forlorn and forgotten, where they once would have been encircled by singing young pioneers and long-skirted oldsters with flowers and candles.

No people appear in the photographs. They have the air of the morning after a party: the smell of cigarette butts and stale beer, sodden streamers and guttered lanterns. It is the memory of the socialist party that is all over now. And yet, this is precisely what enriches the monuments meaning. In their dilapidated condition, they are no longer symbols of victory, but for the first time, true symbols of a newfound mourning. They seem to grieve for the horrors that took place where they stand, 60 years ago. Perhaps this makes them richer, more seasoned, beautiful and effective now. (Neutelings, 2008). They are witnesses of time, when the most important was to forget and not to forget. To forget in order to live normal lives and not to forget in order to hinder repeating of the atrocities. Unfortunately, they failed to complete this mission...

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GREEN PUBLIC SPACES AS A PLACE WHERE URBAN ISSUES CAN BE SOLVED – SYSTEMATIC LITERATURE REVIEW

Abstract:

With the increasing growth of the urban population, climate change, the development of the urban lifestyle, interest in green public spaces is increasing. People judge the cities according to the quality and condition of their public spaces, through the experience in public spaces they perceive and evaluate the city. Public spaces can change how you feel in a city or whether you prefer one city before another.

The studies in the public space value has received a noteworthy attention lately. Therefore, this paper aimed to contribute a Systematic Literature Review in this field to provide an overview of public space value and related topics, limitations, approaches, and available studies. This article aims to provide a structured overview of publications and to document the current state of literature, analyze and link trends and to provide a point of view why should we think of planning green human-centric public spaces. 83 articles are identified.

The review, based on extensive literature reviews, document analyzes, case study research, provides a better understanding of the role of proactive planning in improving the quality of life and the environment. The results suggest that it is inevitable to use the environmental approach as the basis and starting point of all processes in urban and spatial planning and in planning public spaces.

Key words:

Environment, Sustainability, Land Use Planning, Public Space Creation

"If you plan cities for cars and traffic, you get cars and traffic. If you plan for people and places, you get people and places." -

Fred Kent, Project for Public Spaces

Introduction

The quality of the urban environment is threatened by major global challenges such as population growth, demographic and social changes, climate change, pollution, urbanization but also losing regional and local identity and growing role of individual decisions in the combination with growing number of actors in decision-making processes, that cities are currently facing (Husár et al., 2018). Based on the UN the ratio of the world's urban population is expected to increase from 55% in 2018 (some 4.2 billion people) to 68% by 2050, which will mean that the world's urban population will nearly double (UN, 2018).

Environmental and urbanization challenges are also challenges for public space as the negative consequences of for instance excessive paved surfaces in cities are well known. Parks, gardens, waterfronts, particularly when well distributed in an urban area, are essential elements for solving this problem and open green spaces perform vital ecological functions, create ample benefits for the citizens and attract visitors.

Public space offers spaces for interventions that are relatively easy to implement on public property and has an immediate effect on these major global challenges. A well-planned city-wide system of public spaces can create green networks to regenerate ecological systems and restore environmental connectivity. The role that public spaces can play in the provision of ecological services is extremely important in the mitigation and adaptation strategies to climate change. In order to overcome the consequences of these challenges, it is important to start from public spaces and streets in cities. It is important to combine public spaces with natural elements.

Planning green infrastructure and green areas in public spaces, revitalizing and restoring public spaces, and their innovative use makes a major contribution to sustainability and resilience to climate change and provides large scale of environmental, social or economic benefits. People judge the cities according to the quality and condition of their public spaces, they perceive and evaluate the city and the life in them through experiences in public spaces. Public spaces should thus become a key attribute and focal point



in city planning. Despite their importance, public spaces are often still taken for granted and neglected (Toth, Espiau, 2008; Valkama et. al., 2013, ARUP, 2016; UN-Habitat, 2015).

Methodology

The main research question of the paper is what benefits provide green public spaces? The objectives of the article are to analyze the value and benefits of green public spaces and to point out what can be achieved by good public space planning and management. The paper provides potential answers to why should we more consider planning the public spaces, what the public spaces can provide for the city and what benefits they provide for their users.

Human-based public spaces

Public space is all around us, it is an important part of everyday life in cities and account for as much as a third of the land in a city. Public spaces should be a place where we stop for conversation, streets where we go to school or work, public areas where children play, parks where we do sports, walk dogs or just sit down to get out of busy everyday life. Unfortunately, under the planning policies and practices of the past 70 years, they were more the domain of cars than people.

The era of industrialization where the surge of industry during the mid- and late 19th century was accompanied by rapid population growth, unfettered business enterprise, sprawling cities and public failures in managing the unwanted physical consequences of development. Haussmann's efforts to modernize Paris so as broke down the barriers to commerce to enable the efficient transportation of goods as well as the rapid mobilization of military troops provided a template by which urban redevelopment programs operated in Europe and the United States until nearly the end of the 20th century, and they extended their influence in much of the developing world thereafter.

Haussmann's approach was especially influential on the European continent and in the designing the American civic centers. However, automobiles rapidly congested the streets in the older parts of cities so transportation networks became the focus of planning activities (Graham, Marvin, 2002). To accommodate the increased traffic, municipalities invested heavily in widening and extending roads. They chose to build cities that focused on cars at the expense of people (Fainstein, 2018).

Following Toth, Espiau (2008) in the 20th century, city planning was aimed at cities for cars. Transportation planning focused almost solely on accommodating the automobile and was done in isolation from community planning. Street design standards were developed that

classified streets only according to their functionality for the automobile. The effect that roads have on communities became a secondary consideration (Toth, Espiau, 2008). ARUP (2016) argue, that in view of the above-mentioned perspectives of urbanization, such planning is not sustainable, and it is necessary to change goals of planning and focus on planning that prefers walking and protecting the environment following the notion that cities adapted to pedestrians are better cities for all (ARUP, 2016).

Nowadays, with growing urban population growth and the development of urban life, there is a growing interest in public spaces worldwide. People judge individual cities according to the quality and condition of their public spaces, they perceive and evaluate the city and the life in it through experiences in public spaces. The requirements on cities are increasing as its citizens have a choice where they settle. Public spaces should become a key attribute in city planning and we should avoid the crisis facing people in other cities where cars were more dominant. Despite their importance, public spaces are often taken for granted and neglected (Toth, Espiau, 2008; Valkama et. al., 2013, ARUP, 2016).

The quality and aesthetics of the public spaces are important factors for a city's attractiveness. Well-functioning and attractive public spaces and a generally aesthetic environment can act as symbols of a city and of living together and may create a sense of ownership of the city by its population (Rettich, City of Växjö, 2011).

As Sir Stuart Lipton, chairman CABI in the document 'The value of public space' mentioned "All too often, badly designed, badly managed public spaces are in the most deprived urban areas. Because of the lack of investment, they fail to improve the quality of life for the local people as they could and should. Indeed, shabby, badly maintained public spaces only worsen the sense of physical and social decline in an area. In those places where regeneration projects are being undertaken, it is important to ensure that the push for higher density housing is not at the expense of good-quality outdoor spaces. In fact, the higher the density of housing, the greater the need for well-designed, well managed public spaces to aid 'livability' in that community. It also makes economic sense as the research highlights the increase in property and land values surrounding good quality parks" (Woolley et. al., 2014 p. 3).

Consequently, typical barriers to innovation in public spaces include a lack of innovation incentives, poor management skills, lack of public budgets, reluctance to change or fear of failure (Valkama et.al., 2013; ARUP, 2016). Lack of financial resources or low regulatory power make it difficult for many European cities to develop in a harmonious and sustainable way, following the ideal model of attractiveness and growth (Rettich, City of Växjö, 2011). Following (Landry, 2008) a successful urban policy and management devote much more attention to cultural issues and approaches that are creative and human-based. Key players in emerging cities have certain qualities: openness and risk appetite, a clear focus on long-term



goals with an understanding of the importance of public spaces, the ability to work with local identity and the ability to find strength in obvious weakness, willingness to listen and learn (Landry, 2008).

Based on UN estimates, the ratio of the world's urban population is expected to increase from 55% in 2018 (some 4.2 billion people) to 68% by 2050, which will mean that the world's urban population will nearly double. By 2100, some 85% of the population will live in cities, with urban population increasing from under 1 billion in 1950 to 9 billion by 2100 (UN, 2018). The quality of life of this population determines our global future and the newcoming population's life prospects. The aim and goal of city planners should therefore be to create a better world by creating better places. Only in recent years has mobility been recognized as an essential factor in achieving sustainable urban development and increasingly guidelines for street design are emerging that acknowledge the role of transportation in shaping communities and dictate that streets should not serve only as conduits for vehicles. Hence there is a growing desire to lively streets in many countries in the world. People around the world are trying to gain the streets as a public space. Cities are beginning to realize that by gaining more pedestrians along with reducing cars they will have healthier, happier residents and thriving streets and public spaces (ARUP, 2016).

The value of green public spaces

The benefits of public spaces for cities and its users are listed by many researches and case studies around the world, achieved and demonstrated by quantitative and qualitative measurements. The following paragraphs synthesize the outputs of theoretical literature in the field of study the benefits of public spaces summarized in Table 1. For a better overview the benefits are divided into environmental, social and economic dimension. The aim is to highlight what can be achieved by planning public spaces and offering clear evidence of the benefits of investing and caring for public spaces.

The environmental dimension of the value of green public spaces

A significant increase in built-up areas and a decrease in the number of green areas leads to higher temperatures in cities than in the surrounding country - known as the heat island's effect. Vegetation, whether in public or private gardens, helps to reduce this imbalance and brings many important benefits for urban areas. The beneficial impact of greenery is confirmed by an increasing number of researches from around the world, such as Deilmann et. al. (2015), Armour et. al. (2014) or Kuttler (2012). These researches have shown that green zones have not only decorative functions but also play an important role in

creating human comfort (Ulrich, 1984), improving climatic conditions, cooling and regulating microclimate, providing oxygen exchange (Deilmann et. al., 2015). Greener as a key factor is an economic way of tackling climate change problems in cities, providing significant social, aesthetic, and economic benefits. Green public spaces play an important role in cities and must be considered as one of the most important aspects to be taken into account in the analysis of sustainable urban development (Deilmann et. al., 2015; Armour et. al., 2014).

In London, Deilmann and colleagues measured a 4-11 °C temperature drop in the buildings with green wall. Copenhagen plans to neutralize the climate by 2025 in order to install a green roof on every building with a roof slope of less than 30 degrees (Deilmann, et. al., 2015; Armour, et. al., 2014).

Natural and artificial water element also reduce the temperature in inhabited areas, as the water surface is generally cooler than ambient air. Measurements carried out in Oberhausen by Kuttler et. al. (2012) showed that water and forest areas help to mitigate not only the heat stress but also the periods of extreme cold.

The social dimension of the value of green public spaces

Tilt et. al. (2006) confirm that trees, parks, and greenery in cities increase the citizen's sense of community and affection for the neighborhood. This research also shows that people will walk more often to shops, cafes and the like if trees and greenery are in their neighborhood. In less green cities, people consider distances longer than they really are, which then leads them to make a decision not to walk. Green public spaces in any form create an opportunity for social interaction and thus represent the largest investment to increase social capital (Tilt et. al., 2006).

Armour et. al. (2014) believe that trees in cities can also serve as measures to slow down traffic. High trees and narrow gaps between the trees visually narrow the streets, prompting drivers to slow down speed and increase alertness. On the contrary, wider streets without trees give the driver a sense of "no danger" and encourage a faster and more dangerous ride (Armour et. al., 2014). The Human Benefits of Green Spaces study compared major Texas roads and pre - and post - planting paths over 3-5 years and found a significant decline in tree - planting incidents (Barton, Pineo, 2009).

Green public space has also impact on physical and mental health. Ulrich (1984) argues that life near greenery has a significant contribution not only to the physical but also to the psychological well-being of the population. Even a passive interaction with nature, seeing a tree through the window, just enough to reduce stress and blood pressure (Wolf, 1998; Ulrich, 1984). Parks, gardens, trees and water provide more than just a nice panorama.



They create a sense of peace, reduce stress, aggression and violence. In other words, our public spaces are a powerful weapon in the fight against bad health.

Greenery in public spaces by its shape, structure, color, size and their changes during the seasons is an important dynamizing factor of relatively static building objects and also fulfills an aesthetic function in the composition of urban spaces. The aesthetic function may be the dominant, concomitant function of green. Greenery in public spaces can carry semantic information. Green elements can have a symbolic content such as accents and dominants, rhythms, and can guide and facilitate orientation. This symbolic and communication function of green in public spaces balances and harmonises the predominant man-made elements in the city (Finka, 2008).

The economic dimension of the value of green public spaces

Lawlor’s case study (2013, later updated by Tasker, 2018) has shown that well-planned interventions and quality public spaces can increase people’s interest, attract people to the site, and then increase sales. Investing in streets and public spaces for pedestrians can increase retail sales by 30% or more (Lawlor 2013, updated by Tasker, 2018).

Kathleen Wolf of the University of Washington, Washington College of Forest Resources, found in her studies that the maintained streets of the city influence the views of visitors on the quality of the goods and services they offer. In shopping districts with greenery, consumers

were willing to spend about 9-12% more time than in an untrained neighborhood (Barton, Pineo, 2009).

Several studies show the impact of public space on property prices, land and rental income. Good city design and high-quality public spaces increase real estate prices as well as rents for commercial properties in these locations.

Regeneration or green planning in urban structures can provide psychological, social or aesthetic benefits while also bringing real resources to urban environments. Quality public spaces can have a significant impact on the city’s economic life and should therefore be an integral part of any successful regeneration strategy. As cities compete with each other for the acquisition of investments, the presence of good parks, squares, seaports and other public spaces becomes an important commercial and marketing tool. People migrate to cities for several reasons: due to employment, but also to urban life culture, due to experience or connections. A good public space also offers a very clear contribution to the city’s economy as people are willing to pay for living near the green.

Conclusion

Public space is one part of the development of a city, yet public space play an important role in the public life and enhance the quality of life. The importance of public space has been widely recognized, mainly from the perspective of improving quality of life through comfortable environment and abundant public life, enhancing urban image through urban vitality. Therefore, the changing nature of public

	<i>Environmental</i>	<i>Social</i>	<i>Economic</i>
benefits of public space	reduce heat island's effect	increase the citizen's sense of community, increase affection for the neighborhood	increase people's interest
	help to mitigate the periods of extreme cold	provides aesthetic, symbolic, communication, psychosocial and sport-recreational functions	attract people to the site
	decorative functions	people walk more often if trees and greenery are in their neighborhood	increase sales (increase retail sales by 30% or more)
	improving climatic conditions	create an opportunity for social interaction	maintained streets of the city influence the views of visitors on the quality of the goods and services they offer
	cooling	represent the largest investment to increase social capital	in shopping districts with greenery, consumers were willing to spend about 9-12% more time
	regulating microclimate	serve as measures to slow down traffic	impact of public space on property prices, land and rental income
	providing oxygen exchange	impact on physical and mental health, reduce stress, aggression and violence, create a sense of peace	contribution to the city's economy as people are willing to pay for living near the green

Tab. 1: The value of public spaces

Source: (Author based on Deilmann et. al., 2015; Armour et. al., 2014; Kuttler et. al., 2012; Wolf, 1998; Ulrich, 1984; Barton, Pineo, 2009; Tilt et. al., 2006; Barton, Pineo., 2009; Lawlor 2013, updated by Tasker 2018)



space and the emergence of new public space can beautify the urban environment and pleasant for the human being to work, dwell, and relax.

Public spaces are benefit for the city. That is why planners should always cooperate with local citizens and engage them in discussions about its revitalization, respectively to planning from the start to finish. The public has a more comprehensive vision of its public space as external experts and can provide valuable information. Good public spaces are flexible and responsive to the development of the urban environment, so public engagement ensures that space is adapted to their changing needs.

There are also new requirements for city planning that planners should take into account. There is no doubt about the benefits of well-designed public spaces for visitors and the cities themselves, based on reviewed studies. Increasing green areas in cities, revitalization and public space interventions should therefore be one of the key components of urban policies. As the studies shown, its necessary to use the environmental approach as the basis and starting point of all processes in urban and spatial planning and in planning public spaces.

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ECOSYSTEM SERVICES AND CLIMATE CHANGE

Abstract:

The man has crossed the threshold of the third millennium only recently. Applied science, technology and the way of accessibility and distribution of information a normal person is not able to capture. Everything is moving, rapidly changing, evolving, production is growing as well as the population and all of these inputs have negative impacts. But what is, and remains forever, unchanged, determined, limited and defined is the size of our planet Earth and the content of available resources that have been entrusted to our administration. The evolution of our system, conditioned by the existence of living organisms and human activity, undoubtedly interferes with and modifies the space we live in, changing its biodiversity, where the human being is at the top.

The outgoing millennium, where the center of the interest was focusing on humanity and the satisfaction of its needs, left us with a feeling of sustainable growth, unlimited possibilities of technology and exponentially growing consumption of ecosystem resources, securing the very essence of life itself.

What we need to pay attention to in today's world is the fragile environment in which we will strive for its sustainable state and development. Examined processes must always be assessed in at least three basic categories: scientific- technical, cultural-aesthetic or socio-ethical. We can quantify what society stands for if these impacts are not in balance.

The attempt to express the value of individual commodities / ecosystems in monetary terms aims to influence their appreciation by the company, owners or company-appointed managers or politicians, investors etc. With noxiousness and degradation of commodity values, we are creating debt to the next generation if we behave irresponsibly to manage these commodities.

Climate change is one of the most difficult problems facing today's world. Carbon dioxide, the greenhouse gas-absorbing heat that is the driving force of global warming, remain in the atmosphere for hundreds of years, and it takes a while for the planet (especially the ocean) to respond to warming.

The worst are cities threatened by floods, droughts, torrential rain, landslides and extremely long-term heat.

Cities need the ecological stability of the area using the microclimatic function of the green infrastructure. It can be in the form of green islands with a high proportion of scattered greenery in the streets, courtyards, indoors or on the playgrounds. Greens can absorb precipitation water and maintain the temperature in the long run, especially under trees where people are concentrated.

Key words:

ecosystem services, climate change, urban environment, PES, adaptation, regulation, weather extremes

Introduction

*"Urbanism creates space for man. Man creates space for the soul. The soul creates space for the universe."
(Skala, 2015)*

Urbanism is considered as the most difficult and most complex activity of a man. Its implementation leads to permanent changes in the most valuable commodity - the environment. During the groundbreaking and rapid development of technology, one was convinced that he would automatically solve a non-conflicting and comfortable habitat for him by gaining progressive materials and technology. A reputable urban institution includes a multidisciplinary team equipped with state-of-the-art knowledge and tools for computer simulation of major impacts and changes in ecosystems.

Obviously, this activity is extremely costly, but it is not possible for urban habitat creation to remain without a reputable, fully respected and paid institution, tied to its knowledge and results, gradually hierarchically to the highest possible community of the population, today the UN. In the EU, about 70% of the population is in urbanized areas and worldwide it is around 50% (Euractiv, 2016).

The process of urbanization rapidly increased in the 20th Century.

The man by its activity influences climatic conditions in urban environment. However, the difference in climate quality is directly proportional to the quantity of urbanized space. While before 10 thousand years ago over 5 million people lived on Earth, currently it is over 7.2 billion. The UN forecast predicts a total of 8.1 billion euro in 2025. and in 2050 total 9.6 billion. residents. Under the influence of this



information, it is precisely in countries of rapid growth in the technosphere that a detailed survey of ecosystems should be carried out and globally agreed payments to be used for their resources. (United nation, 2008)

Man has always influenced the climate in his neighborhood, the only difference is that 10 thousand years ago, only a little more than 5 million people lived on Earth and now more than 6 200 million (6.2 billion). In addition, today's people have much greater energy and commodity consumption per capita and have more efficient technical means to influence the environment and the natural environment. Therefore, by its activities, the human community is very likely to change the climate conditions across the earth. Now it is primarily the emission of carbon dioxide (CO₂) from the combustion and exploitation of fossil carbon deposited beneath the earth's surface tens of millions of years ago. The climate modification of urban agglomerations has its specifics mainly due to the high density of impacts and also to the significantly changed energy balance of the Earth's surface. (Brown 2008)

In Slovakia, about 57% (Statistical Office of the Slovak Republic) live in cities, which are natural centers of providing a wide range of administrative, health, social, cultural and educational services, but also job opportunities for almost 30% of the population of catchment areas.

In the city environment is very different from the surrounding country, especially in indicators such as temperature, humidity, air quality and others. Climate change is expected to exacerbate these negative trends. (SHMU, 2010)

One of the most striking phenomena is the air temperature in the city, where increasing it causes considerable problems and property damage to cities. The main reason is the overlap of the original vegetation with roads and buildings. Building materials used in cities accelerate the urban heat islands. Asphalt, concrete, a lot of windows, black roofs and others building surfaces absorb energy very quickly and also very quickly losing it. Negative effect with increased building surfaces, the reflected and absorbed energy (from sun) is multiplied. For this reason, energy doesn't have the possibility to leave the city and heat island is create.

Greenery is able to consume accumulated energy for water transpiration and cool the city.

The heat released from industrial processes, internal combustion engines in transport and from heating of residential buildings also influences the temperature increase. All these factors and their interaction create the so-called a urban heat island, a higher temperature in the city than in the surrounding country. In various sources we find data documenting the temperature deviations of cities from the surrounding country at an average of 2.5 to 3°C. (Štecová, 2018)

Increased friction on the rugged surface of the city manifests itself in the difficult movement of air masses up to 1000 meters above the city, where the air layers are

warming and together with the presence of condensation cores (dust and aerosols) help increase the clouds above cities. On average, this difference is up to 5 to 10%. Increased cloud cover also increases rainfall, but impermeable surfaces in the city and sewage system quickly drain water from the area. (Hudeková et al, 2007)

We know the approach to assessing the importance of the natural environment to the quality of human life. The concept of ecosystem services to support climate in the urban environment is based on the notion that there are complex interrelationships between people and ecosystems but that society is not perceived and insufficiently appreciated. There is a lack of tools to change human behavior to mitigate the effects of climate change.

Many ecosystems in the world are currently under enormous pressure from:

- rapid population growth
- climate change
- biodiversity loss
- economic growth
- unbearable use of natural resources
- environmental pollution

Ecosystem services are a suitable tool for solving these problems as they influence and improve our life in a not insignificant way.

What can we do to do this in urban space? Increase the thermal reflectivity of surfaces and buildings, increase the proportion of vegetation cover (green roofs, parks, street greenery), reduce runoff (open water areas, reservoirs, less impermeable areas), reduce anthropogenic heat sources (air-conditioning, industrial buildings, transport). (Kanianska, 2013)

Development of ecosystem services

For thousands of years, Earth's ecosystems have provided us with various goods and services. In a way, everyone is dependent on renewable natural resources to meet their basic needs, such as food and water, maintaining healthy crops, and regulating the climate. Nature has also provided us with spiritual fulfillment and aesthetic pleasure for many years. Ecosystems that have been supporting human development for centuries are currently changing rapidly due to increasing population and increased population consumption (MINZP, 2020).

The beginnings of the modern history of ecosystem services can be found in the late 1970s in an extensive historical analysis (Coase, 1960). It includes a utilitarian definition of those ecosystem functions that are considered to be beneficial to society as economic services in order to increase public interest in biodiversity conservation. (Westman, 1977, Ehrlich and Ehrlich, 1981; Groot, 1987). Development continues in the 1980s to discuss sustainable development (WCED, 1987) until the 1990s with



mainstreaming of ecosystem services in the literature (Costanza and Daly, 1992, Daily, 1997) and an increased focus on methods of estimating their economic value (Costanza et al., 1997). The definitions have been developed through various publications with a different focus on ecological basis or economic use:

- Daily has defined ecosystem services as “the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfil human life” (Daily, 1997).
- Ecosystem services are the benefits that human populations derive directly or indirectly from ecosystem functions - (Costanza et al., 1997).
- Ecosystem services are the benefits that people derive from ecosystems – (WRI, 2005).
- Ecosystem services are natural assets used or used to achieve human well-being – (Boyd and Banzhaf, 2007).
- Ecosystem services are aspects (active or passive) of ecosystems used to produce human well-being – (Fisher et al., 2009).
- Ecosystem services are a direct and indirect contribution of ecosystems to human well-being – (TEEB, 2010).

The type, quality and quantity of EC are influenced by individual and community resource use decisions. While private markets can value selected ecosystem services, public markets are much more complicated. The difference in private and societal benefits or in unplanned costs (externalities) on the part of other actors leads to market failure: individuals will tend to provide too few ecosystem services. This basic logic can explain why the importance of ecosystem services is decreasing due to human pressures (Kemkes et al. 2010)

Climate

Climate is a characteristic long-term weather regime in the certain area (CDI, 2012,).

The climate condition is determined by the amount of energy stored in the climate system. The equilibrium between the energy of the Earth received from the Sun and the one that bounces back into space is called global energy equilibrium. How energy regulation is in balance depends on the energy flow within the global climate system. Many causes of climate change are caused by processes that cause changes in global climate balance and in the climate system. In addition to changing the orbits of the Earth around the Sun, this may be due to changes in ocean currents, changes in the energy incident on the Earth's surface, or changes in the composition of the atmosphere (Theodoropoulos, 2011)

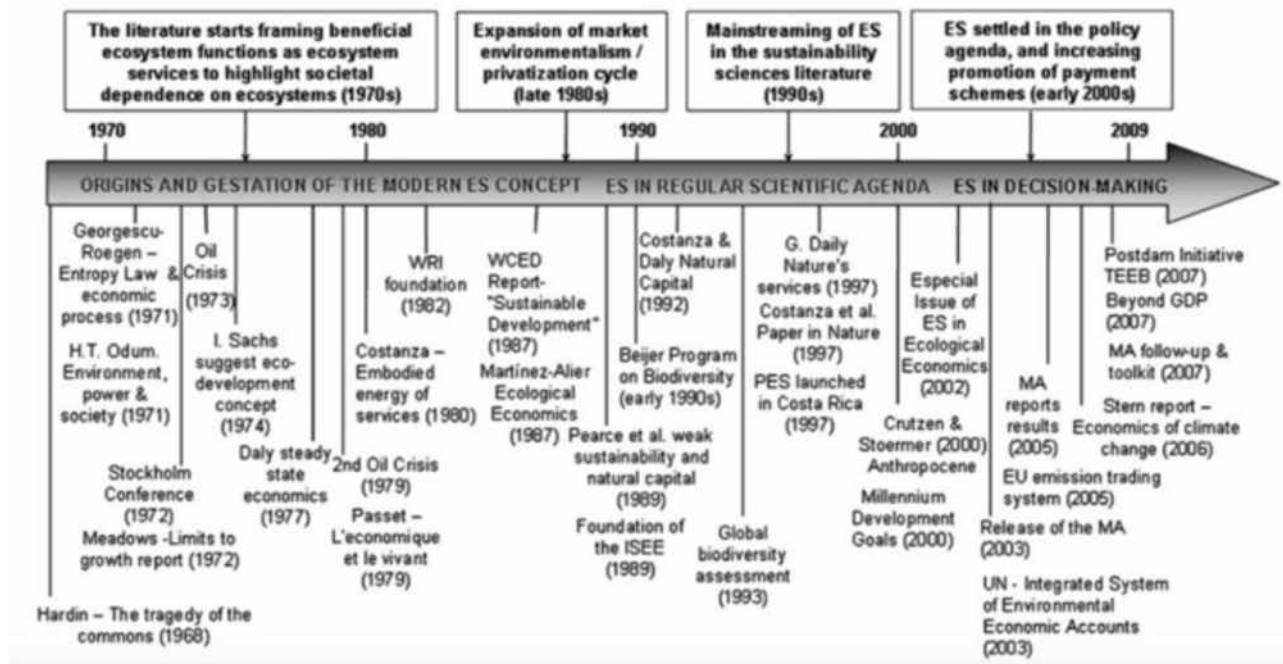


Fig. 1: Stages in the modern history of ecosystem services

.Source: Gómez-Baggethun et al., 2009. Ecosystem services (EC) represent the benefits that people derive from ecosystems "(MEA, 2005).



Over 100 years, the air temperature on the surface of the earth and in the lower atmosphere has increased by 0.6 °C to 0.8 °C. Over the last 25 years, it has represented a 0.2 °C rise in temperature over a decade. In Slovakia, the average temperature has risen by 1.6 °C since 1881 and the total rainfall has dropped by 24mm. During this period, the amount of greenhouse gases in the atmosphere has increased as a result of burning fossil fuels and changing land use (Carpathian Development Institute, 2012). The effects of urbanization and climate change also go hand in hand. Cities make a major contribution to climate change (although they cover less than 2 percent of the earth's surface), as they consume 78 % of the world's energy and produce more than 60% of all carbon dioxide and a significant amount of other greenhouse gases, mainly through energy production, vehicle use, industrial production and biomass use. This is one of the reasons why today's towns and villages are strongly threatened by climate change. Hundreds of millions of people in urban areas around the world will be affected by rising sea levels, increased rainfall, inland floods, more frequent and stronger cyclones and storms, and prolonged extreme bursts of heat and cold (UN Habitat, 2012).

Climate change is one of the most difficult problems facing the world today. This includes many dimensions such as science, economics, society, politics, moral and ethical issues, which are a global problem, noticeable at local level, which will last for decades and centuries. Carbon dioxide, the heat-reflecting greenhouse gas that drives global warming, remains in the atmosphere for hundreds of years, and the planet (especially the ocean) takes time to respond to warming.

So even if we stop all greenhouse gas emissions today, global warming and climate change will continue to affect future generations. Despite the growing awareness of climate change, our greenhouse gas emissions are still increasing. In 2013, daily concentrations of carbon dioxide in atmosphere exceeded 400 ppm for the first time in human history. Such high values were about three to five million years ago, during the Pliocene period (NASA, 2016). NASA, an institute that points to the fact that October 2016 in New York City was the second hottest October in 136 years (Cabbage and McCarthy, 2016), is also addressing the problem.

Regulations are one of the tools used to achieve environmental objectives and to comply with legal obligations. Regulations are legally enforceable instruments that can create different types of requirements for different types of activities, including limiting some activities and authorizing others to improve scientific research or business activities in an environmentally sustainable manner. They may require reporting, monitoring, research and information sharing (Boer, 1993).

Ecosystem Services and Climate Change

Ecosystem services play an important role in strategies for tackling climate change: mitigation and adaptation (Turner et al., 2009). Mitigation aims at reducing emissions sources or enhancing sinks of greenhouse gases, and

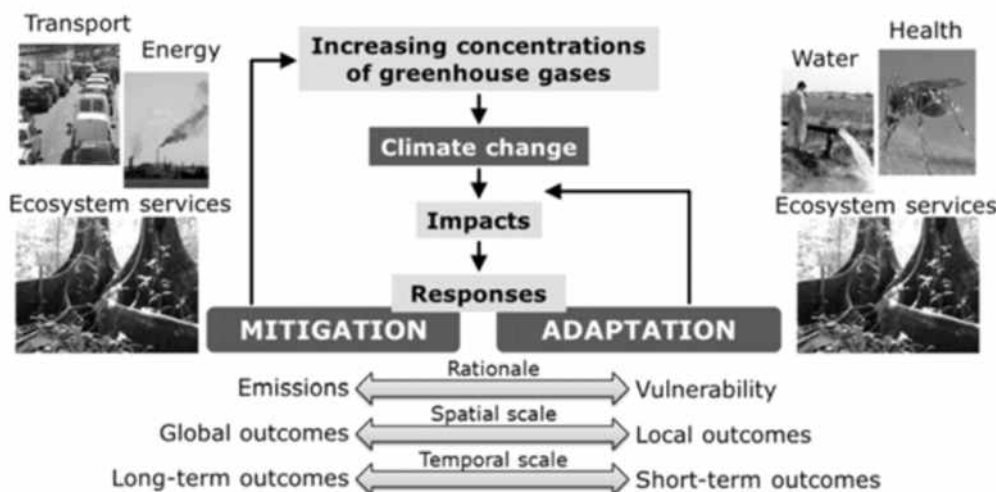


Fig. 2: Differences between climate change adaptation and mitigation
Source: (Locatelli, 2016)

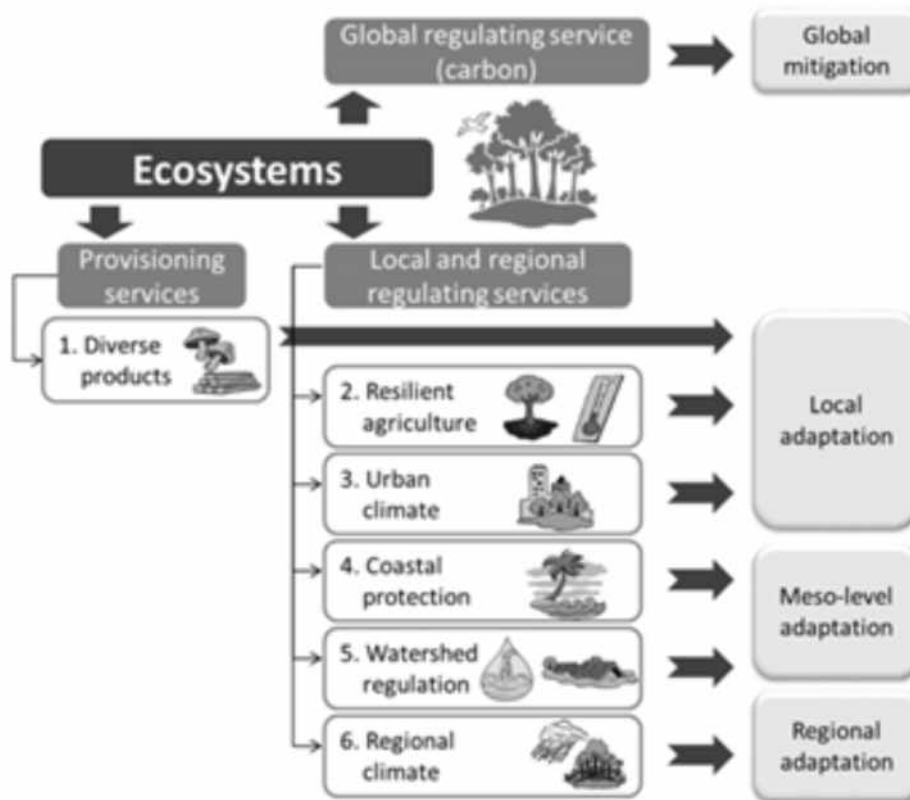


Fig. 3: Contribution of ecosystem services to climate change adaptation and mitigation
Source: (Locatelli, 2016)

adaptation aims at adjusting natural or human systems to moderate harm or exploit beneficial opportunities from climate variations (Picture 2). Because of their different rationales, these strategies have different priority sectors and locations: mitigation prioritizes larger emission sources or stronger potential sinks, whereas adaptation prioritizes vulnerable people, ecosystems and activities. While some sectors are mostly concerned by one of the two strategies (e. g., energy by mitigation or health by adaptation), ecosystems and their services are clearly relevant to both (Locatelli, 2016).

Ecosystems contribute to mitigation because of their capacity to remove carbon from the atmosphere and to store it. Ecosystems contribute also to adaptation because they provide services that can help people adapt to both current climate hazards and future climate change (Picture 3). While ecosystem services are part of the solution to climate change, they are also affected by changing climatic conditions. Ecosystem-based approaches to climate change should recognize the multiple links between ecosystem services and climate change: management can enhance the contribution of ecosystem services to adaptation and mitigation ('ecosystem-based adaptation and mitigation') and, as climate change will affect ecosystems and their services, adaptation measures are needed to reduce negative impacts and maintain ecosystem functions ('adaptation for ecosystem services') (Locatelli, 2016)

MITIGATION

Mitigation – reducing climate change – involves reducing the flow of heat-trapping greenhouse gases into the atmosphere, either by reducing sources of these gases (for example, the burning of fossil fuels for electricity, heat or transport) or enhancing the “sinks” that accumulate and store these gases (such as the oceans, forests and soil). The goal of mitigation is to avoid significant human interference with the climate system, and “stabilize greenhouse gas levels in a timeframe sufficient to allow ecosystems to adapt naturally to climate change, ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner” (IPCC, 2014).

Mitigation policies and practices in the sense of protecting nature from societal constraints are a modern phenomenon. In the case of climate, efforts of the kind that we now observe designed to protect nature from society did not enter political or scientific discourse until recently, because climate was widely perceived as a robust, even selfhealing process. (Locatelli et al., 2015).

Ecosystems contribute to mitigation because of their capacity to remove carbon from the atmosphere and to store it. Terrestrial ecosystems absorb around 3 billion tons of atmospheric carbon per year (Pg/yr) through net growth, which accounts for 30% of anthropogenic CO₂ emissions



(Canadell and Raupach, 2008). Forest ecosystems play a crucial role in carbon sequestration, particularly tropical forests, but tropical deforestation causes carbon emissions, estimated between 0.8 to 2.8 Pg/yr (Baccini et al., 2012; Harris et al., 2012), equivalent to 6–17% of global anthropogenic CO₂ emissions to the atmosphere (Werf et al., 2009). Thus, ecosystem management can contribute to climate change mitigation. Afforestation (converting long-time non-forested land to forest) and reforestation (converting recently non-forested land to forest), for example, increase carbon in the vegetation, whereas forest conservation contributes to reducing carbon emissions from deforestation. Agricultural management can also enhance carbon sequestration through soil conservation and the introduction of trees in agroforestry systems (Upreti et al., 2012).

ADAPTATION

Adaptation – adapting to life in a changing climate – involves adjusting to actual or expected future climate. The goal is to reduce our vulnerability to the harmful effects of climate change (like sea-level encroachment, more intense extreme weather events or food insecurity). It also encompasses making the most of any potential beneficial opportunities associated with climate change (for example, longer growing seasons or increased yields in some regions) (NASA, 2020)

Climate change is generally a global problem, but on the contrary, minimizing risks and implementing adaptation measures to adapt to climate change is a local issue. Climate change adaptation measures represent a set of possibilities for natural and socio-economic systems to adapt to ongoing or expected climate change, with a view to reducing the potential negative effects or exploiting the positive effects of climate change (Lim, 2004)

Examples of implementation of adaptation measures aimed at supporting and securing landscape features that improve microclimatic conditions, hydroclimatic conditions from the local level and contribute to the improvement of broader geoclimatic conditions (increasing the retention capacity of the landscape, optimal use of the landscape or its ecostabilization), are listed in the Catalog of selected adaptation measures (Andrejčinova, 2018) on the adverse consequences of climate change in relation to land use for self-governments.

Adaptation measures to the adverse effects of climate change in relation to land use listed in the catalog are (SAZP, 2020)

- ensure protection and stabilization of those parts of the country that have a climate-stabilizing effect;
- increase the share of green infrastructure elements;
- to support the retardation of the run-off water outflow;

- improve the water distribution and moisture regime of the landscape and contribute to favorable changes in climate processes;
- increase the balance of water in the country with support for elements of natural water storage.

Among the measures implemented outside the built-up area we can mention (SAZP, 2020)

- planting of non-forest tree species;
- drainage of forest and field roads;
- use of grass infiltration belts, infiltration ditches, breakthroughs;
- protective slope grassing;
- building terraces, terracing;
- revitalization of wetlands and peatlands.

Among the measures available on the watercourse we can mention (SAZP 2020)

- building longitudinal vegetation, non-vegetation and combined flow profile fortifications;
- adaptation of directional flows and inflows;
- building transverse objects on the watercourse
- planting and maintenance of accompanying vegetation of watercourses.

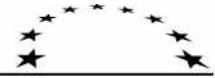
The following measures can be mentioned in the built-up area (SAZP 2020)

- construction of rain gardens;
- building vegetation roofs;
- building vertical gardens, green walls;
- use of grass paving;
- planting and maintaining residential greenery.

The above-mentioned adaptation measures to the adverse consequences of climate change for local governments are an example of inexpensive examples that any local government can undertake with a view to local adaptation to climate change. Each location, settlement or country is unique and therefore it is necessary to assess it comprehensively and especially professionally with regard to the functionality, operation, spatial and ecological conditions of the area, landscape and architectural value of the space. (SAZP 2020)

Conclusion

Throughout history, people and societies have adjusted to and coped with changes in climate and extremes with varying degrees of success. Earth's climate has been relatively stable for the past 12,000 years and this stability has been crucial for the development of our modern civilization and life as we know it. Modern life is tailored to the stable climate we have become accustomed to. As our climate changes, we will have to learn to adapt.



The faster the climate changes, the harder it could be (NASA, 2020). Adaptation to climate change aims to reduce the vulnerability of systems (both natural and socio-economic) in a timely manner and increase their resilience to its impacts, without compromising the quality of life environment and economic and social potential of society development. Adaptation represents a set of measures implemented continuously, gradually and in the long term, as well as the actual process of their implementation in time. Adaptation to the impacts of climate change includes preventive measures, measures to enhance the resilience of systems, preparatory actions, adverse response and recovery activities system functions. Adaptation measures need to be formulated and implemented in coordination with mitigation measures (actively reducing emissions and increasing their sinks) in order to achieve a synergistic effect and positive interactions of adaptation and mitigation. Adaptation strategy, the main part of which is focused on conservation the aquatic, soil and biological components of nature and landscape and the restoration of functioning climate-resilient ecosystems can also contribute to disaster prevention. The necessary strategic coordination is necessary both to eliminate the negative impacts of inappropriate combinations of individual adaptation measures and to increase or extend their effectiveness. From the long-term point of view, suitably designed and continuously implemented adaptation measures are economically beneficial. (Locatelli et al., 2015)

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The role of ecosystem services in support of landscape conservation under the global change.*

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Zuzana Ladzianska

ROLE OF DEMOGRAPHY IN SPATIAL PLANNING DOCUMENTS OF SLOVAKIA

Abstract:

The present state of population in Slovakia is the result of a long-term development under the effect of various factors. The most significant change was caused by the problems ensuing of economic transformation after the fall of the totalitarian regime and the transition to democracy, causing the shift in the personal values across the population. Current development of the demographic behaviour is manifested especially by ageing of population and ongoing problems characterised by the drop in reproduction behaviour.

The main aim of the proposed research is to explain, and to understand the problems; and to generate possible recommendations for planning on different administrative levels to handle the demographic change in Slovakia. In the next steps of the research semi-structured interviews with stakeholders were conducted. Finally, an overall synthesis of generated information towards the mutual understanding of the topic.

Key words:

demographic change, land-use planning, strategic planning, Slovakia, document analysis

Introduction

The main aim of the article is to give an overview of the first preliminary results of the dissertation thesis: "Reflection of the demographic change and the spatial planning of Slovakia". This paper aims to present partial results of the research with the focus on the reflection of the demographic changes in the planning documents available within the framework of the spatial planning system of Slovakia.

The research was conducted during the process of documents analysis. The aim was to analyse and evaluate available spatial planning documents possibly related with the issue on the demographic change. The idea was to follow the documents and processes starting at the national and finishing at the regional level. Due to the complexity of the spatial planning system of Slovakia, firstly, all documents related to the territorial planning were studied. After preliminary evaluation of these documents further research in the field was necessary. Secondly, wide range of documents related to the strategic planning was studied and evaluated with regard to the demographic changes. Mainly a search for direct (explicit references to the demographic change, see chapter 2) or indirect (references to the related issues or fields influenced or caused by the demographic change) evidence was made.

Demographic specifications of Slovakia

Demographic situation of Slovakia is the result of a complicated and long-term development under the effect of various factors. High natural increase is typical for the

whole after-war period as the result of not only high natality, but also low mortality. This period of high natural increase could manifest in a total increase of population. Population growth slowdown in 1980's that continued through the 1990's is related to the decrease of the natural increase, it means, by decrease of natality. It is estimated that the second demographic revolution reached Slovakia.

The decrease of population growth was accelerated by the problems ensuing of economic transition after the fall of the totalitarian regime in 1989 and the establishment of the independent Slovak Republic 1993. Aggravating social uncertainty, growth of unemployment, new life style of young population with stress on the economic self-reliance, new housing policy and other factors projected in nuptiality and natality decrease and eventually in the decrease of population gain. In 2001, for the first time after the First World War the natural decrease of population was recorded in Slovakia.

In the year 2002 the Slovak statistical office published the Population prognosis till the year 2025 for the Slovak Republic. Prognosis was published at the time of certain change in demographical trends and therefore an updated version was needed. The new version was created in the year 2007, as an updated prognosis version of the middle scenario. Bleha and Vaňo declare that the following 20 years will be characterized by continual ageing of Slovak population by maintaining relatively stable number of inhabitants.

After the year 2025, processes of ageing and population decline will significantly accelerate. It is for sure, that such future trend in number and structure of population will have far reaching impacts on the functionality of the whole society.



Spatial Planning in Slovakia

Spatial and territorial planning on the national level in Slovakia has a long tradition. First attempts to coordinate development of build-up areas on this level were visible in the 1960's when an Urbanisation Project of SSR has been created and later in the year 1976 ratified by the government. Immediately after 1989 there has been an overall change in spatial planning system in Slovakia. Evaluation of planning systems in the context of the market economy processes has started. The system of land-use planning, its legislation and instruments in Czechoslovakia and after 1993 in Slovakia was highly appreciated by the foreign experts, except for the institutional arrangement and low efficiency caused by the centralised management.

With regards to the current situation, the spatial development is understood as cross-cutting problem of spatial relevant management activities under which land-use planning, socio-economic development planning and landscape planning dominate. They create three main pillars of the system of complex spatial development management consisting of Spatial relevant planning activities; Spatial monitoring and information management system; and Spatial management - implementation control system. In accordance with the European charter on spatial planning, planning activities with the spatial relevance have to create a system, which is democratic, complex, functioning, oriented towards long-term goals.

According to the Act of the National Council of the SR No 221/1996 Coll. on Territorial and Administrative Breakdown of the SR with the effect from 24th July 1996, regions, divided into districts, have become the administrative units of the SR. Today, there is still in effect the former legislative base in the land-use planning – Act on Territorial Planning and Building Regulation No. 50/1976 and its last Amendment valid from the April 2020. The changes can be described as a movement from a centralised (state administration) to decentralised (self-administration) control system by implementing territorial units established on 1st January 2004. The main instruments of the territorial planning in the Slovak Republic are the land-use plans and the Slovak Spatial Development Perspective (KURS). It is important to stress that territorial planning in accordance with Slovak legislation is primarily an instrument of the local government. The so-called mandatory regulations of the functional and spatial organization of the territory are binding from the higher-level master plan to the lower levels.

The main instruments of the strategic planning are clearly listed in the Table 2. National Development Plan (NDP) is a tool on the national level and is used for application of the regional policy of the SR, and including all levels of strategic development. The aim of the strategic documents is to allow gaining financial resources from the European structural funds.

Reflection of the demographic change in territorial planning documents

Spatial planning documents of Slovakia, as already mentioned, can be divided into two big groups; the first is formed by territorial planning documents. Each document on the different administrative level consists of several parts, textual and graphical (land-use plans). The relevant part for the research is the textual part, specifically the legally binding part. The vertical hierarchy of the planning system is based on the top-down principle, starting at the national and finishing at the local/zonal level. In praxis it means that development regulations at the higher hierarchical level have to be implemented into the territorial planning document on the subordinate administrative level. This process assures continuity throughout the process of aims implementation.

Slovak Spatial Development Perspective (KURS), document of the national significance, is the only long-term document in this group. Documents on the lower administrative levels (regional, local) are characterized as middle-term documents. The only short-term document is the zonal plan. All of them must be evaluated and updated on the regular basis. During the evaluation process all relevant bodies (government, ministries, regional parliament, municipalities, etc.) involved in the planning system are asked to participate.

At the regional level (NUTS 3) eight territorial plans (Banská Bystrica self-governing region, Bratislava self-governing region, Košice self-governing region, Nitra self-governing region, Trenčín self-governing region, Trnava self-governing region, Prešov self-governing region, and Žilina self-governing region) are prepared. Every single document has incorporated and deeply detailed mandatory regulations of the national plan SSDP. In the analysis of the documents only textual parts have been considered. General guidelines of textual parts are very similar for as they have to follow recommended standardized forms. Each document possesses a chapter on the demographic situation of the region. Mentioned chapters describe past development and future trends in the demography of the NUTS 3 regions. The written form is very factual and descriptive. Demographic changes, especially ageing and the decrease of the natality are only partially mentioned in the text, but the trends are observable from the tables given as attachments. Legally binding parts of the regional documents, mandatory development regulations, are presented in several categories, following the structure of the general extension part.

Only a single document is explicitly mentioning ageing of the population within one of the social infrastructure regulations (e.g. to establish geriatric centers in each municipality of the district according to the development of the morbidity and population aging). Not explicitly but still directly, another four documents state the need for further improvement of existing infrastructure and development of elderly houses and care centers due to the expected change



in the population structure and increase of the people in the post-productive age. Further important fields where change of the population structure is mentioned are as follows: development of social infrastructure, social care services, education, regional development, and economy.

Reflection of the demographic change in strategic planning documents

The second group of the spatial planning documents of Slovakia consists of strategic documents. This set of documents as well as the already mentioned territorial plans are present at all administrative levels. Strategic documents, especially on the regional level, are even strongly interlinked from the national to the local level (top-down principle). In comparison with the territorial planning, strategic planning does not consist of any legally binding part. In the planning system several guidelines were published, but they are only based on the recommendation principle.

Thanks, better said unfortunately, to the existing guidelines the subsequent parts of the documents especially on the regional level are very similar for each of the analysed regions. The advantage of the strategic documents is their possibility to face specific problems in more focused way. This fact can be seen in the reflection of demographic changes in documents. Problems of aging and changing population structure, as well as with the regard to the marginal groups cause by the social disparities, are expressed more often explicitly, as it was in territorial planning documents. It can be followed mainly in the preparation stage of the documents making, in SWOT analysis. Due to the clear structure of the analysis and logical separation of the individual sectoral categories, problems of each region are expressed in more detailed way. The logical structure and clear addressing of the problems is disappearing in the formulation of concrete aims for further strategic development of the regions.

Some of the mostly described and discussed problems, depended on the demographic changes, are unemployment, education and problems of the ethnic minorities. All regions facing either some or combination of the above-mentioned problems (regions of the south-east part of Slovakia) are aware of the problems. The awareness can be followed in specific strategies that should help to deal with the problem. The weakness of all documents is in a vague formulation of the future goals and missing step-wise aims to approach the aimed goals.

Conclusion

This article gives a brief overview on the first research results. Analysis covered wide range of documents from all areas of Slovakia (horizontal dimension) as well as from different administrative levels (vertical dimension), starting

at the national and for the purpose of the study finishing at the regional level. To summarise, the overall reflection of the demographic change, based on the documents' analysis, is partial.

Strategic planning documents, especially on the regional level, can be seen as the representatives of the decentralised executive power, but without any legally binding base. On the other hand, territorial planning documents and land-use plans supported with the legally binding regulations which give the opportunity for well-structured further development of Slovakia, do not reflect the problems sufficiently. This discrepancy gives space for further improvement of the documents' completion.

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Michaela Kollárová

APPLICATION OF THE METHOD MULTI - CRITERIAL DECISION - MAKING SCIENTIFIC ARTICLE

Abstract:

The aim of the scientific paper was to examine in the field of digitization the criteria that have an impact on the development of an intelligent city by using the multi-criteria decision-making method. Within the multi-criteria decision-making method, I focused on using two methods: Modified decision matrix method (FDMM) and Analytical multilevel method (AHP). The Basic Decision Matrix Method (DMM) was not used in this article. I consider AHP to be a flexible model for decision-making, clarifying the problems that have several possible solutions.

The AHP method is implemented by means of an expert and subsequently a mathematical method, which divides the main problem into smaller and more detailed elements. I also processed the proposed analyzes in the MS Excel program and subsequently verified them through the freely available online 123AHP program for AHP analyzes.

Key words:

multi-criteria decision-making, modified decision matrix method – FDMM, analytical multilevel method – AHP

Introduction

In the scientific article from the subject System and Operational Analysis, I focused on the area that can be related to my academic work and at the same time, I will show an example of the use of the method of multi-criteria decision-making.

In recent years, cities have been under increasing pressure from digitization and the related process of implementing ICT in mainstream operations (education, health care, communication and services to citizens, safe city, intelligent transport, intelligent energy, etc.). The implementation of intelligent solutions in the city becomes part of urban strategies and concepts (for example in the form of economic and social development programs, etc.) or upcoming smart city concepts. Smart City is a complex of ecosystem consisting of several action elements such as the city residents, intelligent transport, intelligent energy, information and communication technologies, intelligent environment, local government, etc.

In recent years, we have seen a radical increase in the density of these elements in cities. According to the United Nations, nearly 70% of the population will live in cities, and therefore the strategic decisions of the city will be very important in the planning and implementation of smart solutions in order to build a secure smart city. A characteristic feature of the present time is the amount of quality and timely information that the city can acquire in order to be able to respond correctly and make a decision. With increasing of digitization, these data are becoming increasingly available.

The aim of the scientific article will be to examine the criteria for digitization that have an impact on the development of an intelligent city using the multi-criteria decision-making method. In this method, I focused on the

use of the modified decision matrix method (FDMM) and the method of analytical multilevel method (AHP). I did not use in this work the Basic Decision Matrix Method (DMM). I consider the AHP method to be a flexible model for decision-making, explaining the problems that have several possible solutions. The AHP method is carried out by an expert and then a mathematical method, which divides the main problem into smaller and more detailed elements.

I also processed the proposed analyzes in the MS Excel program and subsequently verified them with the freely available online 123AHP program (<http://123ahp.com/>) for AHP analyzes.

Multicriteria decision-making

In the following paper, we will compare the degree of digitization of three developed cities (Prague, Budapest and Bratislava) through multi-criteria decision-making.

Multi-criteria decision-making depends on the choice of the appropriate method, which affects the information we currently have and the impact on the selected method. Several different methods have essentially the same principle that is assessment of several variants or possibilities of solving the given problem according to preferential criteria and subsequent determination of the order of variants. The various methods differ according to how the so-called weight of individual criteria and how the degree to which the individual variants of the solution meet the selected criteria is numerically evaluated. (Leitner, 2015).

Multicriteria decision methods include simple methods such as the Decision Matrix Method (DMM) or the Modified Decision Matrix Method (FDMM), but more methods that are objective can be used. One of them is the multilevel



analytical method AHP (AHP - Analytic Hierarchy Process). The multi-level analytical method combines the advantages of DMM and FDMM and partially eliminates their shortcomings (Máca, 2002).

**EXAMINATION METHODOLOGY
- MODIFIED DECISION MATRIX METHOD (FDMM)**

In the Modified Decision Matrix Method, the weights of the individual criteria, and the evaluation of the variants as to how they meet the individual criteria, are determined by a paired comparison. This means that when comparing the two criteria, the more significant criterion is '1', the less significant criterion is '0'. This method has the advantage over the Decision Matrix Method (DMM) in that it sets the weight of the criteria more precisely (Kurpas, 2010).

I applied the method in MS Excel according to the following procedure:

- Determination of individual criteria.
- Verbal evaluation of individual variants.
- Paired comparison of individual criteria.
- Paired comparison of variants according to individual criteria.
- Creating a decision table according to the FDMM method.

Determination of criteria

By evaluating the degree of digitization, I chose the criteria that affect the degree of digitization. Coverage of the territory with high-speed 4G LTE mobile networks, connection speed, availability of WIFI connection, density of smart devices (penetration) among inhabitants, as well as cyber security.

I also chose the criteria according to the fact that the statistical data relevantly reflect the degree of digitization of cities. Details of the individual criteria are below:

- **4G LTE network coverage**
The criterion expresses the level of coverage of the territory by the 4G (LTE) network, which is a prerequisite for the implementation of smart solutions in places, where it is not wired or local wireless internet connection. It also reflects the technological base of the city in the area of internet connection.
- **Connection speed and connection response**
Connection speed points on average connection speed, which is achieved within the city. The higher speed and response of the connection, the smoother the operation and management of the intelligent solution.
- **Availability of WIFI connection**
An important criterion indicating the number of points in the city, which can be used to access the Internet.
- **Penetration of mobile devices (smartphone)**
It reflects the total number of people who own a smart device in the city, for example mobile.
- **Cyber security**
It reflects the overall capacity of the state to conceptually grasp the topic of cyber security in the areas of legislation, technical measures, organizational measures, capacity building and education, as well as cooperation.

Verbal evaluation of FDMM variants

I verbally characterized the individual variants based on individual criteria and I clearly captured this characteristic in Table 1.

Smart city	Verbal assessment criteria				
	4G LTE network coverage	Connection speed and connection response	Availability of WIFI connection	Mobile penetration (smartphone)	Cyber security
Bratislava	medium	above the EU average	slightly above the EU average	low	low
Budapest	high	high above the EU average	high above the EU average	low	low
Prague	medium	below the EU average	slightly above the EU average	medium	average

Tab. 1 Verbal characteristics of smart cities according to individual criteria



Paired comparison of criteria and paired comparison of variants according to individual criteria

In terms of the procedure for the application of the FDMM method, I am in table number 2 compared the individual criteria with each other, the value 1 always got the more important criterion, the less important got the value 0. Based on the sum of the point values of the individual criteria, I then determined the weight. The criterion of cyber security obtained the highest value (40%), followed by the 4G LTE coverage criterion (30%). The values obtained for each criterion will be taken into account in the final sum of the points of each country.

The next step was to compare the individual smart cities with each other in terms of individual criteria. For each criterion, I created a separate table in MS Excel. I assigned values according to the position of individual intelligent cities against each other and compared their criteria. If city X met the criterion better than city Y, it was rated 1. Subsequently, the city Y received a value of 0. If two cities met the criterion in the same way, then I would assign a value of 0.5 to both cities. In my comparison, there were such two cases. For the criterion Penetration of mobile devices (smartphones), within which the city of Bratislava and Budapest is at a comparable level as the criterion Availability of WIFI connection between the city of Prague and Budapest.

The comparison of cities is in the following tables.

Decision table for the FDMM method

In the resulting table number 8 shows the values of the individual smart points obtained by comparing them within the criteria and the weights of these criteria. I processed the analysis in MS Excel. The weighted average of the individual criteria values for specific cities determined the resulting ranking of cities in the area of the degree of digitization – Budapest, Prague and Bratislava. The resulting evaluation of the variants is standardized, so the sum of all evaluations within the criterion gives a result equal to 1.

FDMM Method							
Criterion	4G LTE network coverage	Connection speed and connection response	Availability of WIFI connection	Mobile penetration (smartphone)	Cyber security	Sum	Weight
4G LTE network coverage	-	1	1	1	0	3	0,3
Connection speed and connection response	0	-	1	1	0	2	0,2
Availability of WIFI connection	0	0	-	1	0	1	0,1
Mobile penetration (smartphone)	0	0	0	-	0	0	0,0
Cyber security	1	1	1	1	-	4	0,4

Tab. 2 Paired comparison of FDMM method criteria



4G LTE network coverage					
Smart city	Bratislava	Budapest	Prague	Sum	Evaluation
Bratislava	-	0	1	1	0,333
Budapest	1	-	1	2	0,667
Prague	0	0	-	0	0,000
				3	1,0

Tab. 3 Paired comparison of cities by criterion 4G LTE network coverage

Connection speed and connection response					
Smart city	Bratislava	Budapest	Prague	Sum	Evaluation
Bratislava	-	0	1	1	0,333
Budapest	1	-	1	2	0,667
Prague	0	0	-	0	0,000
				3	1,0

Tab. 4 Paired comparison of cities according to the criterion Connection speed and connection response

Availability of WIFI connection					
Smart city	Bratislava	Budapest	Prague	Sum	Evaluation
Bratislava	-	0	0	0	0,0000
Budapest	1	-	0,5	1,5	0,5000
Prague	1	0,5	-	1,5	0,5000
				3	1,0

Tab. 5 Paired comparison of cities according to the criterion Availability of WIFI connection



Mobile penetration (smartphone)					
Smart city	Bratislava	Budapest	Prague	Sum	Evaluation
Bratislava	-	0,5	0	0,5	0,167
Budapest	0,5	-	0	0,5	0,167
Prague	1	1	-	2	0,667
				3	1,0

Tab. 6 Paired comparison of cities according to the criterion Penetration of mobile devices

Cyber security					
Smart city	Bratislava	Budapest	Prague	Sum	Evaluation
Bratislava	-	0	0	0	0,000
Budapest	1	-	0	1	0,333
Prague	1	1	-	2	0,667
				3	1,0

Tab. 7 Paired comparison of cities according to the criterion Cyber security

RESEARCH METHODOLOGY (ANALYTICAL MULTILEVEL METHOD - AHP)

In this section, we will focus on the multi-level analytical method – AHP. According to the available literature, the AHP method represents a flexible model for decision-making, clarifying problems that have several possible solutions. An expert and subsequently a mathematical method, which divides the main problem into smaller and more detailed elements, perform the AHP method. The AHP method removes some shortcomings of the previous methods.

The essence of paired comparison of the significance of individual criteria remains the same, but the evaluation is based on expert estimation and the evaluation scale is more complex, what for example removes one of the shortcomings of the FDMM method, when the criterion or variant to which the "0" value was assigned had no effect on the resulting valuation. It is evaluated on a scale of 1-9, which corresponds to a verbal rating of the same - weak -

medium - strong - very strong. Values 2, 4, 6 and 8 used to evaluate intermediate levels. It is necessary to point out to the first (1) level of valuation, in cases where the compared criteria or variants also meet the selected criteria (Maca, 2007).

The application of the method consists of the following basic steps:

- Realization of paired comparison of criteria and comparison of variants according to individual criteria - obtaining matrices.
- Determine own value (own number) of each matrix.
- Obtaining values of own vector of matrix.
- Transformation of own vector of a matrix into a standardized own vector whose components determine the weights of the individual criteria and the weights of the variants as they meet the requirements of the individual criteria.
- Resulting evaluation and ranking using weighted sums. (Leitner, 2015).



Criterion	Weigh	Smart cities evaluation		
		Bratislava	Budapest	Prague
4G LTE network coverage	0,3	0,3333	0,6667	0,0000
Connection speed and connection response	0,2	0,3333	0,6667	0,0000
Availability of WIFI connection	0,1	0,0000	0,5000	0,5000
Mobile penetration (smartphone)	0,0	0,1667	0,1667	0,6667
Cyber security	0,4	0,0000	0,3333	0,6667
Weighted average		0,1667	0,5167	0,3167
Rank		3	1	2

Tab. 8 FDMM decision table

Application of Analytical Multilevel Method - AHP

In the next post, I will deal with the application of the analytical multilevel method – AHP. The concerned method is considered to be of the highest quality, because it removes to some extent the shortcomings of the previous methods. The method is also based on a paired comparison of the degree of significance of individual criteria and the extent to which the evaluated options meet these criteria.

In the application of the AHP method, I again used the MS Excel, first I made a paired comparison of criteria and determined the values of their weights, which are listed in table number 9, then I compared the selected cities based on individual criteria. I captured the results from the comparison in tables number 10 - number 14.

The next procedure for determining the weight of criteria and comparing the solution variants is more complex than the previous methods. For each pair comparison matrix, I determined a normalized own vector corresponding to the largest real own value of the matrix considered in absolute value. Its components then, as in the previous method of paired comparison, determine the

weights of the criteria and the evaluation of the variants of the solution according to individual criteria, while the final evaluation of variants is obtained as well as the weighted sum of the determined evaluations multiplied by the weights of the criteria (Maca et al., 2002).

The own vector of the Ri matrix and the standardized own vector of the Vi matrix I calculated using the appropriate MS Excel function "= GEOMEAN ()".

In conclusion, the final decision table of the AHP method, Table 15, where I calculated the weighted sum based on the pre-calculated weights of the criteria and variants and determined the ranking of the cities in the area of the degree of digitization – that is Prague, Budapest and Bratislava. In the case of the AHP method, the decision is different from the FDMM method on the first two partitions.



Criterion	4G LTE network coverage	Connection speed and connection response	Availability of WIFI connection	Mobile penetration (smartphone)	Cyber security	Ri	Vi
4G LTE network coverage	1	7	5	7	1/7	2,04	0,249
Connection speed and connection response	1/7	1	7	6	1/5	1,04	0,127
Availability of WIFI connection	1/5	1/7	1	5	1/6	0,47	0,058
Mobile penetration (smartphone)	1/7	1/6	1/5	1	1/8	0,23	0,028
Cyber security	7	5	6	8	1	4,42	0,539
						8,19	1,00

Tab. 9 Paired comparison of criteria according to the AHP

4G LTE network coverage						
Smart city	Bratislava	Budapest	Prague	Ri	Vi	
Bratislava	1	1/5	3	0,84		0,18839
Budapest	5	1	7	3,27		0,73064
Prague	1/3	1/7	1	0,36		0,08096
				4,48		1,0

Tab. 10 Paired comparison of cities by criterion 4G LTE network coverage



Connection speed and connection response					
Smart city	Bratislava	Budapest	Prague	Ri	Vi
Bratislava	1	1/3	5	1,19	0,24896
Budapest	5	1	7	3,27	0,68685
Prague	1/5	1/7	1	0,31	0,06419
				4,76	1,0

Tab. 11 Paired comparison of cities by criterion Connection speed and connection response

Availability of WiFi connection					
Smart city	Bratislava	Budapest	Prague	Ri	Vi
Bratislava	1	1/5	1,4	0,37	0,10050
Budapest	5	1	1	1,71	0,46647
Prague	4	1	1	1,59	0,43303
				3,67	1,0

Tab. 12 Paired comparison of cities by criterion Availability of WiFi connection

Mobile penetration (smartphone)					
Smart city	Bratislava	Budapest	Prague	Ri	Vi
Bratislava	1	1	1,5	0,58	0,14286
Budapest	1	1	1,5	0,58	0,14286
Prague	5	5	1	2,92	0,71429
				4,09	1,0

Tab. 13 Paired comparison of cities by criterion Penetration of mobile devices



Cyber security					
Smart city	Bratislava	Budapest	Prague	Ri	Vi
Bratislava	1	1/3	1/7	0,36	0,08096
Budapest	3	1	1,5	0,84	0,18839
Prague	7	5	1	3,27	0,73064
				4,48	1,0

Tab. 14 Paired comparison of cities by criterion Cyber security

Criterion	Weight	Evaluation of smart cities		
		Bratislava	Budapest	Prague
4G LTE network coverage	0,25	0,1884	0,7306	0,0810
Connection speed and connection response	0,13	0,2490	0,6869	0,0642
Availability of WIFI connection	0,06	0,1005	0,4665	0,4330
Mobile penetration (smartphone)	0,03	0,1429	0,1429	0,7143
Cyber security	0,54	0,0810	0,1884	0,7306
Weighted average		0,1318	0,4012	0,4671
Rank		3	2	1

Tab. 15 Resulting decision table AHP



Verification of results in the 123AHP software program

Finally, I verified the results in the free online program 123AHP. If more than four criteria are used, registration is required. The start page is shown in Figure 1 and an example of the comparison of the criteria in 123AHP is shown in Figure 2.

calculation

Enter the decision making title in the field. Enter all alternatives and criteria important for the decision you want to make.

You can add more alternatives and/or criteria by clicking on plus.

my title
Stupeň digitalizácie

my alternatives
Bratislava
Budapešť
Praha

my criteria
Pokrytie 4G LTE sieťou
Rýchlosť pripojenia a odozva pripojen
Dostupnosť WiFi pripojenia
Penetrácia mobilných zariadení
Kybernetická bezpečnosť

New calculation next

Fig. 1. 123AHP start page with specified variants and criteria

Intermediate steps

criteria preferences	Pokrytie 4G LTE sieťou	Rýchlosť pripojenia a odozva pripojenia	Dostupnosť WiFi pripojenia	Penetrácia mobilných zariadení	Kybernetická bezpečnosť
Pokrytie 4G LTE sieťou	1	7	5	7	1/7
Rýchlosť pripojenia a odozva pripojenia	1/7	1	7	6	1/5
Dostupnosť WiFi pripojenia	1/5	1/7	1	5	1/6
Penetrácia mobilných zariadení	1/7	1/6	1/5	1	1/8
Kybernetická bezpečnosť	7	5	6	8	1

CI: 0,3483 CR: 0,3138 λ: 6,3931

criteria preferences

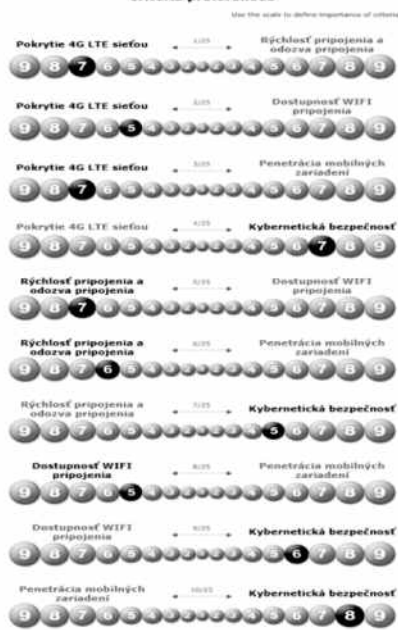


Fig. 2 Example of paired comparison of criteria in 123AHP program

Pokrytie 4G LTE sieťou	Bratislava	Budapešť	Praha
Bratislava	1	1/5	3
Budapešť	5	1	7
Praha	1/3	1/7	1

CI: 0,0326 CR: 0,0628 λ: 3,0653

Tab. 16 Paired comparison of cities by criterion 4G LTE network coverage (123AHP)

Rýchlosť pripojenia a odozva pripojenia	Bratislava	Budapešť	Praha
Bratislava	1	1/3	5
Budapešť	3	1	7
Praha	1/5	1/7	1

CI: 0,0323 CR: 0,0622 λ: 3,0647

Tab. 17 Paired comparison of cities by criterion Connection speed and connection response (123AHP)

Dostupnosť WiFi pripojenia	Bratislava	Budapešť	Praha
Bratislava	1	1/5	1/4
Budapešť	5	1	1
Praha	4	1	1

CI: 0,0028 CR: 0,0053 λ: 3,0056

Tab. 18 Paired comparison of cities by criterion WIFI connection availability (123AHP)

Penetrácia mobilných zariadení	Bratislava	Budapešť	Praha
Bratislava	1	1	1/5
Budapešť	1	1	1/5
Praha	5	5	1

CI: 0,0003 CR: 0,0006 λ: 3,0006

Tab. 19 Paired comparison of cities by criterion Mobile device penetration (123AHP)

Kybernetická bezpečnosť	Bratislava	Budapešť	Praha
Bratislava	1	1/3	1/7
Budapešť	3	1	1/5
Praha	7	5	1

CI: 0,0326 CR: 0,0628 λ: 3,0653

Tab. 20 Paired comparison of cities by criterion Cyber security (123AHP)

criteria importance

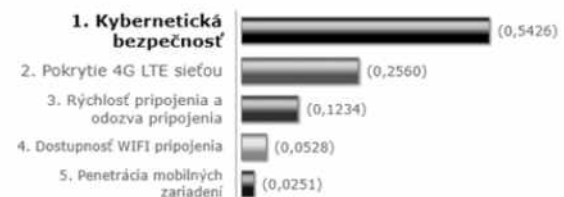


Fig. 3 Importance of criteria 123AHP program

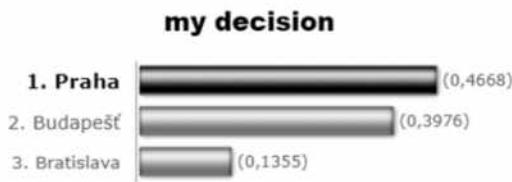


Fig. 4 Final ranking of cities compiled by 123AHP program

Figures 1-4 show the environment of 123AHP program, at the same time figures number Figures 3 and 4 show that the 123AHP online program gave comparable results to my processing of the AHP method in MS Excel program. Table number 16-20 shows individual paired comparisons by individual criteria.

CONCLUSION FOR MULTICRITERIAL DECISION MAKING METHODS

It can be seen from the examples that the AHP method is currently considered to be the most complex and most widely used multi-criteria decision-making process. This method has a wide application, for example when choosing or buying technology in the field of smart cities. Based on predefined criteria (more complex) and their significance, we can select the best product. Unfortunately, the AHP method involves complex difficult calculations and requires hardware and software to calculate them. As part of normal decision-making are various basic programs available on the Internet.

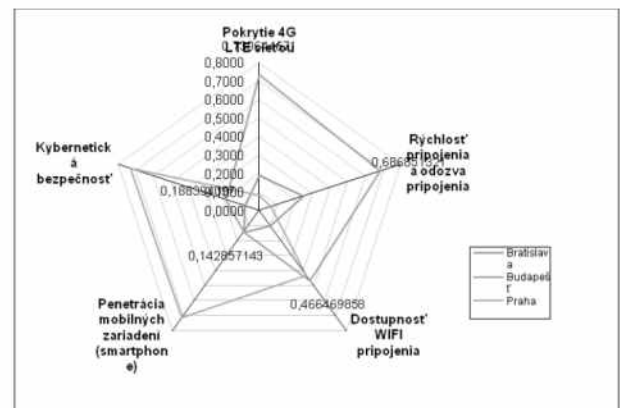
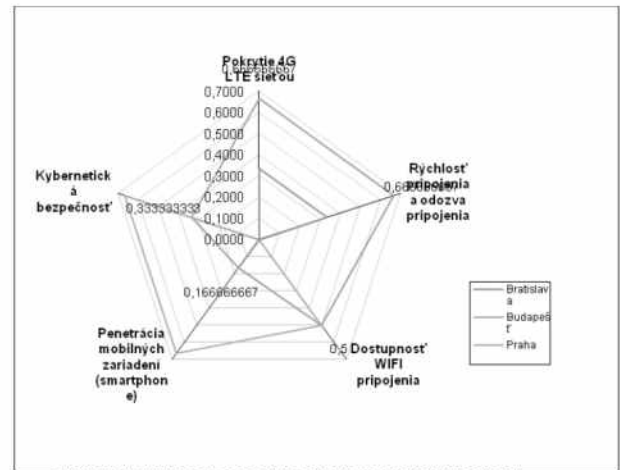
When comparing the degree of digitization of intelligent cities, I used two methods of multi-criteria decision making: FDMM and AHP. I achieved almost the same results in the Analytic Multilevel Method in Excel as well as in the 123AHP online program. In my example, I had evaluation matrices of individual criteria with dimension (3 x 3), which is, in the end, a very good compliance of the approximate values with the exact 123AHP program.

I used the GEOMEAN Excel function to determine my own vector, which is relatively simple. The components of the own vector of the valuation matrix H of dimensions (n x n) can be easily determined as the n-th root of the root of the products of the elements in each line.

$$a_i = \sqrt[n]{k_{i1}xk_{i2}x \dots xk_{in}}$$

It follows from the above that the used approximate method gives good evidence only for deciding problems with smaller dimensions of evaluation matrices (max.4 x 4). For larger problems, however, it is necessary to use an accurate method for an objective and qualified decision, despite its shortcomings and greater computational difficulty. Determining the own vector does not work correctly and the own vector of the matrix must be determined in another analytical way (Leitner). The overall result was different at the modified decision matrix method.

To compare the results of the FDMM and AHP methods in Excel, I transferred the results to graphs number 1 and number 2. A noticeable difference occurred in Budapest and Prague. In the AHP method, Prague achieved a better result (weight) in the Cyber Security criterion than in the FDMM method. At the same time, Budapest achieved worse results in the AHP method in Connection speed and connection response criteria, WIFI connection availability and Cyber security. The disadvantage of the FDMM method is when the criterion or variant to which the value "0" has been assigned has no effect on the final evaluation and this effect has been transferred to the final evaluation of the other criteria. At the same time, the difference in results may also be due to the quality of the estimate, which should be clearly quantifiable - evaluable in these methods.



Graph number 2 Results of AHP method in Excel
Summary of results

Overall, Budapest ranked first in the modified decision matrix method with a weighted average of 0.5167. In the MS Excel analytical multi-level method, the city of Prague



ranked first with a value of 0.4671 and in the Analytical Multilevel Method in the online 123AHP program reached the value of 0.4668. Cyber security is an important criterion in the degree of digitization. Of course, that doesn't mean it. that the remaining criteria are irrelevant or do not require sufficient attention.

More detailed results captures Figure 5. From the conclusion, I conclude that the AHP method is more accurate because the individual criteria are quantified in more detail, instead of the values 0 and 1. Figure 5 shows more pronounced variations in the FDMM method and comparable results in the application of the AHP method in the MS Excel program and in the 123AHP software program.

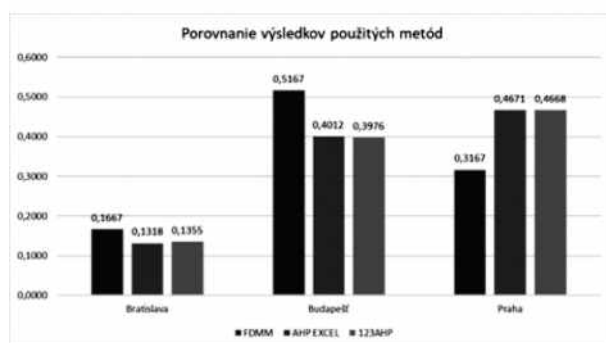


Fig. 5 Comparison of results by FDMM, AHP in Excel and online 123AHP

In conclusion, I would like to point out that the best method for decision-making is the analytical method of AHP and the implementation of its exact and approximate formulation, as it is considered to be the most elaborated multi-criteria decision-making methodology. This scientific work enabled me to understand the functioning of individual methods and thus enabled me to understand more deeply the functioning of system and operational analysis methods. At the same time, I also used the 123AHP online software program, which allows a more intuitive and comprehensive analysis, but also easier application of selected methods. The theoretical mastery of specific methods is the basis of their correct application in practice, for example in my scientific article.

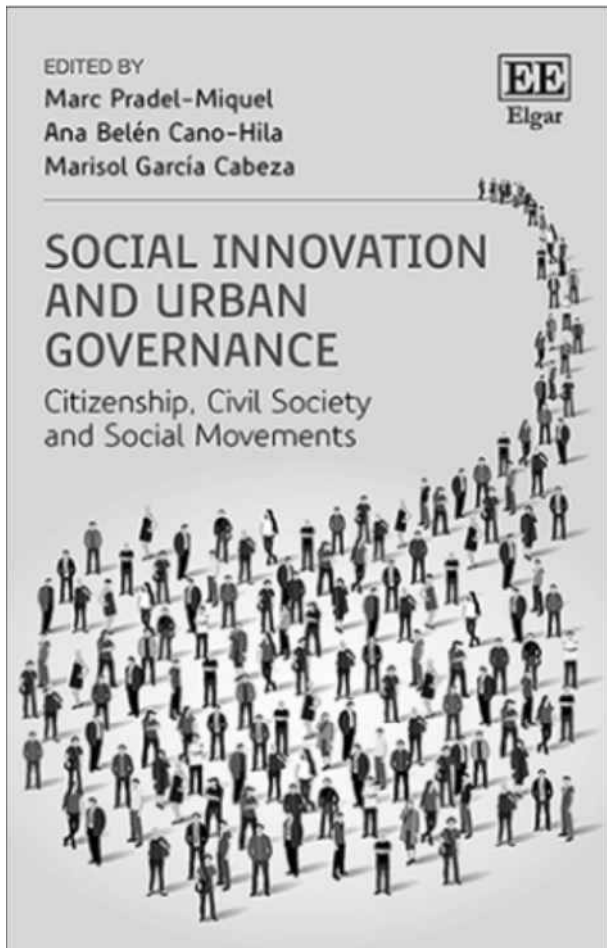
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Dagmar Petříková

SOCIAL INNOVATION AND URBAN GOVERNANCE
CITIZENSHIP, CIVIL SOCIETY AND SOCIAL MOVEMENTS



Social Innovation and Urban Governance

Citizenship, Civil Society and Social Movements

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The importance of social innovation is declared in a number of strategic documents and research activities of the European Union (EU) devoted to its promotion, such as the Renewed Social Agenda to Empower and Help People in the 21st Century Europe (European Commission, 2008), the Europe 2020 Flagship Initiative Innovation Union (European Commission, 2011), stressing the role of social innovation in shaping European response to new social challenges, producing new solutions, reconnecting with the people, facilitating reforms in public service capacities and improving quality of life.

Presenting social innovation initiatives that emerged from organized citizenry in Southern European cities, this book explores the response to austerity policies implemented at the 2008 economic crisis. Chapters look at the common aim of these initiatives in responding to social needs and challenging social exclusion.

The key question this book attempts to answer and is whether social innovation be a trigger for governance change and political transformation in cities. It is undoubtedly the most pressing issue in contemporary urban practice for those concerned with questions of urban democracy and social equality. And this book is a formidable achievement in charting the possibilities of social innovation to nurture urban transformation.

Using Spanish cities as an empirical example to understand how south European cities reacted to the 2008 crisis, this important book unveils how governance arrangements can change through the transformative potential of social movements and under which conditions civil society can be a driver of social innovation. The book provides evidence of bottom-linked governance experiments in prominent southern European cities, in which public servants, local politicians, movement leaders, concerned citizens and migrants, become engaged in a shared, learning process

This book is a valuable and timely contribution of comparative urban research. Although the chapters in this volume are focused primarily upon the meanings of citizenship, governmental authority, and social change in southern Europe, the research reported is relevant to the countless other places in the world that are experiencing rapid social change.



Milan Husár

**WHAT DOES THE E-FUTURE HOLD FOR CITIES?
THE E-FUTURE OF CITIES: BETWEEN TEMPTATIONS OF EXPONENTIAL TECHNOLOGY GROWTH AND
THE CONCEPT OF HUMAN CITY - BELGRADE, 24TH TILL 25TH OCTOBER 2019**



Spectra Centre of Excellence of the EU was a co-organizing institution for a large scientific conference taking place in Belgrade (Serbia) between October 24th and 25, 2019. The theme of the conference was revolving around three key topics – controlling the rapid growth of urban areas, exponential advancement of technological development and the relationship between people and technologies and its impact on cities. The main organizers - Academy of Engineering Sciences of Serbia and University of Belgrade, Faculty of Geography, prepared a splendid scientific event with rich attendance from the Serbian institutions as well as foreign researchers from fields of geography and spatial planning. The conference hosted 15 keynote speeches from renowned experts, including prof. Stojkov from Belgrade, prof. Mueller from Dresden or prof. Giffinger from Vienna. After the keynotes, within three sessions dedicated to (1) Exponential technology growth and city development in the future, (2) Smart city and

opportunity of sustainable city, and (3) Social aspects of new technologies in the cities of future, 20 scientific contributions were presented. The conference prepared also a book of proceedings which is ready to be downloaded online (see QR code).

From the research team of Spectra CE, 4 people attended the conference and were presenting their work. Prof. Maros Finka was invited to give a keynote speech titled 'The Cities as Innovation Hubs - Challenge for Planning' where he was discussing cities as innovation hubs and its reflection in the EU policies. He was also arguing for robustness and adaptability as the key attributes of cities contributing to their resilience and sustainability. Assoc. prof. Matej Jasso and Dr. Michal Hajduk gave a second keynote speech titled 'Role of Social Media Concerning Public Participation And Promotion Of City Identity'. This paper is a result of doctoral dissertation successfully defended last year at the Slovak University of



Technology, where the focus was to look at how the social media are contributing to the public participation in planning and their role in enhancing the city identity. The last contribution by Dr. Husar and MSc. Varis titled 'Practice Makes Smarter? A Focus on Turkish And Slovak Smart City Practices' was comparing the practice of smart city promotion in Slovakia and Turkey. The authors made a study examining the concept of smart city and how it is used in selected cities in these countries.



There were more than 50 participants actively contributing to the conference. Besides renowned professors and practitioners, the event was attractive also for young researchers who had a chance to present and discuss their work. The second day of the event the students from Faculty of Architecture and Faculty of Philosophy of the Belgrade University were presenting their poster presentations to the audience of conference participants.





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