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IN SEARCH OF THE PRINCIPLES OF RESILIENT URBAN DESIGN: IMPLEMENTABILITY OF THE PRINCIPLES IN THE CASE OF THE CITIES IN SERBIA

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ABSTRACT:

The concept of resilience is probably one of the best-known new international concepts, which have gained attention since the economic crisis in 2008. Since then, this global challenge has redirected general focus at all tiers from “faith” in unstoppable progress to more desirable stabilisation and preparedness.

Being the major places of globalism, cities across the World have suffered from the crisis. Therefore, they have profoundly embraced the postulates of resilience, transforming them with “urban” footprint – urban resilience. The creation of this significant concept has been in the agenda of many international organisations. However, the concept of urban resilience is still a novelty, with accompanying implementation problems. This is a very important issue in the field of urban design, a part of urbanism very much connected to concrete functioning *in situ*.

This “implementability” of the concept of resilience in urban design is an important issue for Serbia. As a post-socialist country, it has witnessed various problems and general inconsistency. With a strong motive to cope with them, local authorities and institutions often try to directly implement foreign-arisen concepts and knowledge, without any local adaptation. The results of these forceful acts are usually questionable.

Therefore, the aim of this paper is to understand how the principles of resilient urban design are tailored and how they are important for Serbian cities. Hence, general urban plans as the main development documents in Serbian cities are researched through the lenses of these principles, with expectations to check if they are ready to make urban design in relevant cities more resistant. The final contribution of the paper is foreseen in the form of guidelines to enforce urban resilience at local level.

KEYWORDS:

Resilient cities, urban design, principles, implementability, Serbia

1. INTRODUCTION

Many current papers in urban planning and design start by expressing the consideration that urban population has recently become prevalent at global level. According to the prospects of the United Nations (UN), it happened in 2007-2008. Furthermore, the figures that support this are increasing

rapidly; it is projected that the share of urban dwellers will reach 2/3 of World population till the middle of 21st century (UN, 2014). Moreover, the share is even more remarkable in the case of energy; 60-80 per cent of energy consumption and 75 per cent of carbon emission are related to cities (UN, 2015). Therefore, the future of the World is in cities, regardless of whether the fact is considered positive or negative.

The above presented facts are well-known to urban scholars. A good illustration of this stance can be seen in numerous theoretical concepts and models in contemporary urbanism, which have become famous across the globe. All of these concepts and models usually try to make a “full framework” for general urban development. However, some of them are more reputable, such as the concept of urban resilience. This concept has proved to be very influential in fields related to more problematic urban issues, such as customisation of cities to climate changes (Otto-Zimmermann, 2011; Davoudi, 2014; Johnson & Blackburn, 2014) or risk and disaster management in urban areas (Cutter et al, 2008; Brugman, 2012). However, the concept of urban resilience has been gaining a wider attention and acceptance since the economic crisis in 2008. The crisis-related hardships and shocks in urban economy made an immense impact on the global awareness of the urban resilience (Turcu et al, 2015; Saya, 2016). In the new circumstances, the significance of stabilisation and preparedness, as key elements in the concept of urban resilience, are certainly more desirable than the vanished “faith” in unstoppable progress – the concept of resilience tries to omit uncertainty as an especially challenging issue (Jabareen, 2013). Therefore, changing urban conditions in general are in the spotlight of urban resilience today (Sharifi and Yamagata, 2016). As a result, “(r)esilience seems to have become a new focus for thinking about both the short-term and long-term futures of city systems” (Batty, 2013, p. 571). Consequently, it has caught the attention of many scholars recently (Meerow et al, 2016).

Given that many elements of the concept of urban resilience are quite new and in the process of being defined, the possibility and scope of their implementation are still doubtful. Furthermore, cities are very complex systems for these concerns (OECD, 2016). Many international organisations and bodies have recently prepared guideline documents and handbooks to facilitate this process. They mostly tackle urban planning as a major field for intervention (OECD, 2015). Thus, it is even more questionable how the concept of resilience can be used in the second “pillar” of urbanism – urban design. Although urban design has been included in the overview of the concept, it is still a field that requires further upgrading and customisation. Being more connected to physical interventions *in situ*, urban design is hereby very visible to citizens. Well-shaped principles of resilient urban design are especially valuable to public locally. The reason is that they are both a connection to global knowledge and a good foundation to be customised to local conditions.

This paper aims at analysing the foundations of resilient urban design and their relation to general knowledge regarding urban resilience. In addition, it is further focussed on the above mentioned issue of “implementability” – how the main elements of the concept pertaining to resilient urban design can be applied to specific cases. Hence, the principles of resilient urban design are investigated and customised.

The contribution of the paper refers also to the local context of Serbia, because local adaptations to the implementation of the concept as a global one are inevitable (Otto-Zimmermann, 2011). Serbia has had a bad experience with weak adaptation of internationally valuable concepts, which have not made an impact locally. Therefore, the paper aims at understanding if Serbian cities are ready to acquire the global knowledge of urban resilient design. Their general urban plans, as the main development documents, are researched through the lenses of the mentioned principles, with expectations to check their resilience. The final contribution of the paper is foreseen to go in two directions – on one hand, the global knowledge is customised to local conditions to enhance the introduction and the application of the concept; on the other hand, this customisation also contributes to the international level by upgrade the “implementability” of the concept.

2. METHODOLOGY

This research is based on two methodological steps. The first step is the explanation of the concepts of urban resilience and resilient urban design as a less investigated issue within this theory. This part of the paper rounds up by giving the preliminary principles of resilient urban design through deduction from the previously detailed theoretical knowledge.

The acquired principles are additionally checked in the second step, tailored as a multi-case study. The main point is to check the inclusion of these principles into the general urban plans of Serbian cities as a research polygon. All 24 official Serbian cities, i.e. their plans, are included in this research in order to cross-cut the overall state in Serbian urbanism regarding urban resilience.

3. URBAN RESILIENCE

The word *Resilience* is turning into a panacea among urban scholars since it has been used more and more commonly when any urban topic is being discussed, be it a theoretical debate or an implementation into everyday urban practice and policy (Meerow et al, 2016). Nevertheless, the meanings of resilience in academic circles are numerous, depending on the aspects or disciplines which examine the concept (Chelleri, 2012):

- Organisational resilience: "ability of an organization to anticipate, prepare for, and respond and adapt to incremental change and sudden disruptions in order to survive and prosper" (BSI; 2014);
- Psychological resilience: ability of an individual to easily adapt to life tasks in the face of social disadvantage or highly adverse conditions (Peçitko, 2016);
- Energy resilience: the term close to energy independence;
- Constructional resilience: construction design which both enables the absorption or prevention of damage and protects from complete destruction (Jennings et al, 2013);
- Disaster resilience: the ability of countries, communities and households to manage change, by maintaining or transforming living standards in the face of shocks or stresses - such as earthquakes, drought or violent conflicts - without compromising their long-term prospects (DFID, 2011);
- Computer resilience: ability of a computer system to provide qualitative service level without the failures which trigger its normal functioning.

The above definitions make it obvious that all aspects of resilience highlight the importance of protection, response, adaptation, and preparedness of a given system. This is also evident in the case of urban resilience. However, similar to other global theoretical concepts, resilience faces many definitions and prompt explanations. For example, OECD defines resilient cities through measures organised in four sectors: economy, society, governance, and environment (OECD, 2016). They are presented in the following order of primacy:

One of the definitions of urban resilience clarifies that it is a "capability [of a given urban area] to prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to public safety and health, the economy, and security" (Klein et al, 2003). Furthermore, "100 Resilient Cities" movement, established by 100 Rockefeller Foundation, is oriented to cooperating with the stakeholders relevant to urban resilience. It links urban resilience with "the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience" (RF, n.d.). These short explanations depict the manifold character of the term (Meerow et al, 2016). In spite of that, its crucial elements can be recognised consistently.

The promotion of resilience-related strategies in the field of emergency and disaster management has been premised on re-evaluation of the security governance referents. It is believed that the government should not be directing the public in emergency situations; it should rather be supplementing and encouraging their natural tendencies for self-help. What have been instrumental

referents in the advent of such a notion are the process of busting the myth of panic in emergency situations, together with the process of supporting the notion of public possessing significant adaptive and self-organizational capacities in emergencies. “A well-prepared community, therefore, requires shared responsibility by local government and households in the community” (Basolo et al, 2009). The need for the public to take responsibility for their own security is also outlined by Alexander (2005), as follows: “in today’s complex world it is hard to see how the public can be protected adequately unless it takes some responsibility for its own security, as the task is simply too great for civil administrators to accomplish alone”.

Coaffee et al. (2008) outline the fact that security policy has seen the development of a “responsible citizen”, whereby responsibility for resilience is transferred from the state to individuals and institutions. Furthermore, the emergency literature highlights the fact that in recent years, the public are accepting more responsibility for their own preparedness (Terpstra & Gutteling, 2008). However, despite the public accepting more responsibility, levels of public preparedness still remain low (West & Orr, 2007; Ballantyne et al, 2000; Blendon et al, 2007).

In this way, the concept of urban resilience underlines the importance of the present-day cities being flexible, responsive, adaptive, and interconnected to cope with fast changing circumstances at global level. The cities should be devoted to upgrading their leadership, well-being, economy, infrastructure, and environment. These significant tasks ask for the thorough preparation of new experts and creation of special education and training programmes.

The broader definitions and related explanations of the concept of urban resilience are at the same time a reflection of its global dimension. Probably the most important fact regarding this is a strong support that resilience receives from major international organisations, such as UN, OECD, World Bank or ISOCARP. For example, UN has been carrying out “Making Cities Resilient” Campaign since 2010 (Johnson & Blackburn, 2014). Finally, resilient urban design has recently been embedded into one of the “backbones” of new urban agenda at “Habitat III” conference in Quito (UN, 2016).

4. RESILIENT URBAN DESIGN

Since the rise of the concept, urban resilience has targeted a “macro scale”, i.e. it has been connected mainly with urban planning and the related theoretical fields, such as:

- Financing urban management: Brugmann, 2012;
- Urban governance: Wagenaar and Wilkinson, 2015;
- Social issues in urban planning: Béné et al, 2014;
- Environmental issues in urban planning: Davoudi, 2014;
- Neighbourhood planning: Turner, 2009; Bouzarovski et al, 2011; Beilin et al, 2015;
- Place-making: Coaffee, 2013.

Consequently, “micro-level” approach to resilient urban design is still an underdeveloped field and that there is a lot of space to upgrade it in the future. Furthermore, it is a very important field in the overall spatial development. Being more focused on micro-scale interventions in urban development, such as larger groups of buildings, streets and public spaces (Boeing, 2014), urban design is inevitably more related to concrete projects and is therefore very close to citizens.

The essence of urban design is also very close to the goals and postulates of the concept of urban resilience. First, it aspires to achieve an integrative approach and balance in its concerns, to connect economy and society through qualitative urban space, to balance between nature and human development, to harmonise creativity and engineering. Second, it refers to both the building and the maintenance of urban space. Finally, it takes a proactive role, trying to facilitate the revitalisation and regeneration of entire urban fabric.

In many cases, resilient urban design is strongly connected to climate changes as well as hazard and risk management, which have had a significant impact in the last decades (Raven, 2010). Actually, they are usually seen as an initiative stage for the formation of the profound framework for resilient urban design.

Nowadays, resilient urban design is largely connected to the resilience of those urban spaces that are important for public concerns, such as squares, streets, parks, gardens or quays (Vargas et al, 2014). However, these were not a professional priority before the crisis in 2008. High-quality public spaces can produce a positive influence and play a major role in the resilience of wider urban areas. Additionally, resilient urban design is equally important for new urban quarters and neighbourhoods, as well as for the urban reconstruction and revitalisation of older ones (Wirsching Fuentes, 2015). All the elements highlighted above clarify that the establishment of resilient urban design as an organised theoretical framework is necessary and should be supported globally.

4.1. Principles of Resilient Urban Design

Urban resilience has recently been mentioned in one of the UN Social Development Goals, adopted in 2015. Namely, Goal No 11 goes as follows: “Make cities inclusive, safe, resilient and sustainable” (UN, 2015). It was further developed into ten targets which can be shaped to achieve resilient cities. For the purpose of this paper, they are customised to urban-design level.

5. ANALISYS

The analysis that follows is based on the above defined 10 principles of resilient urban design. All of the principles are used as the criteria to be checked in the general urban plans of all Serbian cities. The idea is to understand if and how the principles are embedded in the actions of the plans. Before this, the question of urban resilience is considered in the plans in general. This means that a thorough analysis has been conducted to decide if resilience and preparedness, as key markers in the concept, are included in the structure and the content of the plans.

5.1. Research units – Cities in Serbia and their general urban plans

Officially, there are 26 cities in Serbia (PS, 2007-2016), which are also the major urban and socio-economic centres. Majority of them have had administrative city rights for the last 10 years.

Being more administratively than physically shaped units, cities in Serbia include both urban and rural areas. For the purpose of this research, only urban areas of the cities will be analysed. In most cases, urban area covers the main urban settlement as an administrative seat together with a several nearby settlements, which are in fact suburbs despite their official status of rural settlements. In minority of the cases, urban area concurs with urban settlements (Antonić and Vaništa- Lazarević, 2016). However, it is important to underline that the urban areas considered in this analysis are physically and functionally united and inhabited by more than 30-35 thousand residents.

Furthermore, the described urban parts of Serbian cities perfectly match up to the general urban plans' limitations. In accordance to the corresponding Law on Planning and Construction, general urban plans must be designed for all administrative sites having more than 30,000 inhabitants (PS, 2009-2014).

This Law also prescribes that the plans are rather strategic by structure and content and should be further elaborated into lower-tier regulatory plans (PS, 2009-2014). Hence, such strategically oriented plans for major urban areas are the best starting point to introduce contemporary concepts, such as the concept of urban resilience (Jha et al, 2013).

5.2. Results

The first set of questions is related to the inclusion of the terms *resilient*, *prepared*, *adaptive* and *flexible* (serb. *отпоран*, *припремљен*, *прилагодљив* and *флексибилан*, respectively) in general urban plans. What has been particularly examined are the first parts of the plans, where planning objectives, vision, aims, and conceptual approaches are listed.

6. DISCUSSION

The two-step analysis of the general urban plans of Serbian cities supports the stance on the concept of urban resilience still being new for local conditions. The results of the first step of the analysis prove this stance to be apparent. Within this step of the analysis the term *resilient*, essential for the concept, was in the last place by the frequency of its usage in the planning policy – just 4/5 of all the plans included it. In other words, both the term and the concept have not yet become familiar within Serbian planning context.

The analysis showed that the most frequent terms were *adaptive* (100%) and *prepared* (96%), which can be easily utilised without the coverage of the concept of urban resilience. Hence, this finding preliminary leads to the conclusion that even though many constitutive elements of the concept are exposed in the plans, they are not systematically defined and organised to adequately reflect urban resilience as a comprehensive and complex concept.

The second step, dedicated to the analysis of the derived principles of resilient urban design, further confirms the above indicated gap. The examined planning aims and actions are mainly related to three principles: resilient disaster management, resilient environment and resilient urban greenery – 37, 36 and 35 points, respectively. The first two principles can be considered “older ones”, because they are based on “traditional environmental fields” of urban resilience, which deal with risk situations and climate changes. Furthermore, the improvement of these fields utilizing urban greenery is certainly a conventional one.

On the other hand, the last three principles in the plans (resilient urban-rural links, resilient urban transport and resilience and participation) are heterogeneous in their meaning. Even so, none of them belongs to the traditional fields. These principles are new within the concept and they emerged as a response to “the new, fast changing reality” after the crisis in 2008.

In addition to all the results of the analysis mentioned above, the second step of the analysis also underlines big differences among the analysed general urban plans. Some of them are frequently in line with urban resilience, such as the plans of Belgrade, Kruševac, Novi Sad, and Valjevo. These plans have recently been enacted or harmonised with newer legislation and trends. The plans of Pirot, Kikinda, and Vršac are in a sharp contrast to the first ones. It can easily be said that they do not comprise enough elements of urban resilience. In addition to this, it is evident that these plans are regulatory in their character with overall underdeveloped strategic elements. Thus, it is doubtful if these plans appropriately endorse the local strategic agenda proposed by the related legislation. Accordingly, it seems that these plans are more oriented to the current situation and short-term provisions.

CONCLUSION – IMPLEMENTABILITY OF RESILIENT URBAN DESIGN PRINCIPLES IN SERBIA

The findings presented above determine several recommendations to improve the implementability of the principles of resilient urban design in Serbia:

- Urban resilience is a new concept which is still developing. For the sake of its popularisation, it is important to create context-sensitive guidelines and handbooks. Regionally speaking, the field is in need of the special guidelines for post-socialist counties. These would be a “base layer” for the further customisation for Serbian cities.

- Best-practice examples are rarely presented. In addition, this issue is not adequately connected to the temporal dimension. It is still unclear which periods are acceptable for short- or long-term projects aiming at urban resilience. Thus, the promotion of best-practice examples should be undertaken side by side with the clarification of their targeting regional and temporal context.
- Those elements of the concept, adopted parallel with its cited widening after 2008, are still underrepresented in urban practice in Serbia. Some of them are less rounded up, such as the principle considering participation. It is more linked with the process than the outcomes and thereby more triggering for the local implementation and evaluation. Similarly, the principle which covers urban-rural link is “fuzzy” for Serbian urban planning. The main reason is that this principle refers to “transitive areas”. These areas are often close to the boundaries of urban plans or even cut by them, which prevents their overview as an entity. To sum up, the mentioned principles should be a focal point for the future scientific and institutional examination at both international and local levels.
- Given that the responsibility for resilience and security is being transferred to the public, majority of the countries request that the public take responsibility for their preparedness. There is a need to further understand urban resilience application to emergency/ disaster management contexts due to the limited research in this area. Most of the literature on emergency management focuses on influencing public preparedness as a part of community resilience. Whilst it is acknowledged that in emergency situations both emergency management agencies and the public should accept responsibility for public preparedness, the literature highlights a need to additionally define the concept of the responsibility for public preparedness, particularly from an institutional perspective.

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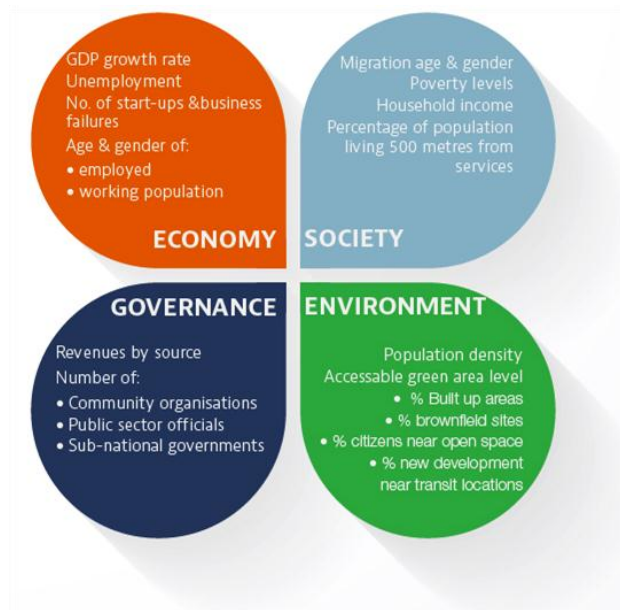


Fig- 1: Measuring city resilience (source: OSCE, retrieved from: <https://www.oecd.org/gov/regional-policy/resilient-cities.htm>)

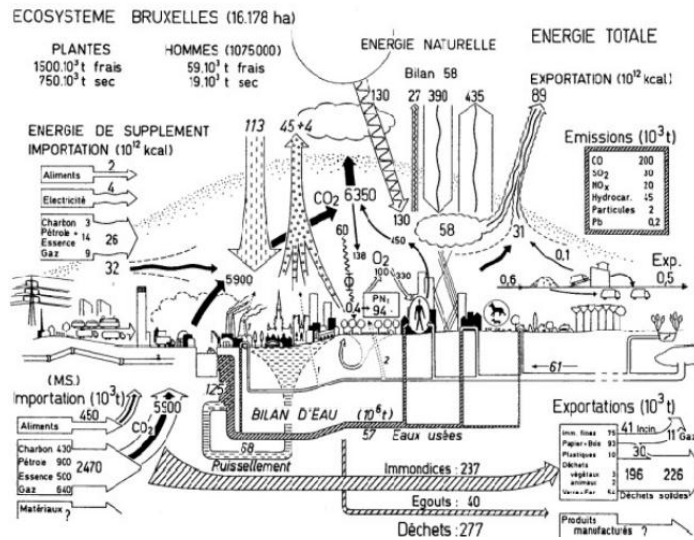


Fig. 2: Sketch of climate-driven resilient urban design (source: Duvigneaud, P. and Denayer-de Smet, S. (eds.) (1975) *L' Ecosystème Urbain*).

Table 1: Customisation of the principles of urban resilience to urban-design level

No	10 TARGETS TO ACHIEVE RESILIENT CITIES (UN, 2015)	PRINCIPLES OF URBAN DESIGN
1.	By 2030, ensure access to adequate, safe and affordable housing and basic services for all and upgrade slums	<u>RESILIENT HOUSING</u> : new and regenerated residential areas with viable focal points (squares and streets).
2.	By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and the older	<u>RESILIENT URBAN TRANSPORT</u> : support for public transport, design of the space where transport needs meet other urban functions and facilities, design for vulnerable people and groups
3.	By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries	<u>RESILIENCE AND PARTICIPATION</u> : inclusion of participation in urban-design process and management
4.	Strengthen efforts to protect and safeguard the world's cultural and natural heritage	<u>RESILIENT HERITAGE</u> : the qualitative inclusion of cultural and natural heritage into wider urban space, along with the protection of its uniqueness
5.	By 2030, significantly reduce the number of deaths and the number of people affected by disasters; substantially decrease direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with focus on protecting the poor and people in vulnerable situations	<u>RESILIENT DISASTER MANAGEMENT</u> : minimisation of risks, disasters and hazards, proper actions in design to prevent or easily overcome the mentioned challenges
6.	By 2030, reduce the adverse per capita environmental impact of cities by paying special attention to air quality and municipal and other waste management	<u>RESILIENT ENVIRONMENT</u> : incorporation of environmentally friendly measures in urban design through "smart" design and the use of resilient and healthy materials
7.	By 2030, provide universal access to safe, inclusive and accessible green and public spaces, for women and children, the older and persons with disabilities in particular	<u>RESILIENT URBAN GREENERY</u> : design of viable green urban spaces, formation of networks of greenery in urban areas, use of green materials and solution in urban design
8.	Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning	<u>RESILIENT URBAN-RURAL LINKS</u> : support mixed-use development and higher density in urban, peri-urban and rural areas to enable rational space usage and better connectivity
9.	By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement holistic disaster risk management at all levels in line with the Sendai Framework for Disaster Risk Reduction 2015-2030	<u>RESILIENT URBAN GOVERNANCE</u> : development of ITC-driven governance, flexibility and transparency in decision-making and all procedures in urban design
10.	Support the least developed countries, including financial and technical assistance in building sustainable and resilient buildings utilizing local materials	<u>RESILIENCE AND LOCAL AWARENESS</u> : the use of local tradition and materials in urban design, the link between urban design and urban context

Table 2: The settlements with administrative city rights in Serbia

NO	CITY	NO	CITY	NO	CITY
1.	Belgrade	10.	Novi Pazar	19.	Subotica
2.	Čačak	11.	Novi Sad	20.	Šabac
3.	Jagodina	12.	Niš	21.	Užice
4.	Kikinda	13.	Pančevo	22.	Valjevo
5.	Kraljevo	14.	Pirot	23.	Vranje
6.	Kragujevac	15.	Požarevac	24.	Vršac
7.	Kruševac	16.	Smederevo	25.	Zaječar
8.	Leskovac	17.	Sombor	26.	Zrenjanin
9.	Loznica	18.	Sremska Mitrovica		

Table 3: The inclusion of the terms *resilient*, *prepared*, *adaptive* and *flexible* and their related thematic fields in general urban plans of the cities in Serbia

NO	GENERAL URBAN PLAN OF CITY	RESILIENT / ОТПОРАН	PREPARED / ПРИПРЕМЉЕН	ADAPTIVE / ПРИЛАГОДЉИВ, АДАПТИВАН	FLEXIBLE / ФЛЕКСИБИЛАН, ЕЛАСТИЧАН	SUM
1.	Belgrade / Beograd	-	+ (priorities)	+ (centres, housing, local users, greenery, water management, public services, greenery)	+ (infrastructure, land use)	3
2.	Čačak	+ (greenery)	+ (waste, local finances)	+ (waste, environment)	+ (electro-system)	4
3.	Jagodina	+ (buildings)	+ (waste)	+ (greenery, transport, open urban spaces)	+ (telecommunications)	4
4.	Kikinda	+ (greenery, risk management)	-	+ (environment, greenery)	+ (entrepreneurship)	3
5.	Kraljevo	+ (greenery)	+ (gasification, water management, energy efficiency)	+ (public services, greenery, buildings, energy, canalization, natural heritage)	+ (land use)	4
6.	Kragujevac	-	+ (renewable energy, environment, telecommunications, risk management)	+ (greenery, cultural heritage, design, housing)	+ (economy, cultural heritage)	3
7.	Kruševac	+ (greenery, risk management, environment)	+ (telecommunications, water management, environment, waste)	+ (the main aims, greenery, design, public services, canalization, environment)	+ (land use)	4
8.	Leskovac	+ (accessibility,	+ (water and risk management, environment)	+ (greenery, public services, cultural heritage, transport, infrastructure, risk management, institutions, telecommunications)	+ (land use, environment, peri-urban)	4
9.	Loznica	+ (risk management)	+ (natural heritage, risk management, environment)	+ (urban-rural links, tourism, local centres, public services, greenery, transport)	-	3
10.	Novi Pazar	-	+ (energy efficiency, land use)	+ (economy, technology, telecommunications, local awareness, tourism, greenery, housing, design)	+ (public facilities)	3
11.	Novi Sad	+ (risk management)	+ (land use, local awareness, governance)	+ (design, transport, centres, housing, land use, public services)	+ (water management, environment)	4
12.	Niš	+ (greenery, risk management)	+ (public services, water management, gasification, environment)	+ (economy, public services, housing, water management, greenery)	+ (design, education)	4
13.	Pančevo	+ (greenery)	+ (land use, risk management)	+ (centres, leisure, energy, entrepreneurship, risk management, environment,	+ (the main aims, public services)	4
14.	Pirot	+ (building)	+ (water management)	+ (land use, building)	-	3
15.	Požarevac	+ (greenery)	+ (entrepreneurship, environment)	+ (the main aims, leisure, land use, public services, transport, greenery, risk management, cultural heritage, housing)	+ (the main aims, accessibility, greenery)	4
16.	Smederevo	-	+ (cultural heritage, risk management, energy efficiency,)	+ (leisure, transport, greenery, building, cultural heritage)	-	2

17.	Sombor	+ (material in urban design, greenery, risk management)	+ (water and waste management)	+ (public services, greenery, cultural heritage, housing, peri-urban, urban-rural, tourism)	+(entrepreneurship, land use)	4
18.	Sremska Mitrovica	+ (housing, greenery)	+ (building)	+ (land use, building design, cultural heritage, housing, greenery, telecommunications, gasification, open public spaces, rural)	+(entrepreneurship, land use, tradition)	4
19.	Subotica	+ (greenery, risk management, urban design)	+ (leisure, transport, energy efficiency)	+ (housing, economy, risk management, greenery, building design, public services, cultural heritage)	+(entrepreneurship, risk management, land use)	4
20.	Šabac	+ (greenery)	+ (water management, risk management)	+ (greenery, land use, open urban spaces, public services, cultural heritage, telecommunications)	+ (economy)	4
21.	Užice	-	+ (energy efficiency)	+ (greenery, leisure, public services, environment, waste management, cultural heritage)	+ (the main aims)	3
22.	Valjevo	+ (greenery, risk management)	+ (waste and water management, greenery)	+ (land use, tourism, public services, communal services, greenery, peri-urban)	+ (the main aims)	4
23.	Vranje	+ (greenery, risk management)	+ (transport)	+ (transport, housing, accessibility, greenery, entrepreneurship, land use, gasification, public and communal services)	-	3
24.	Vršac	+ (greenery, risk management,)	+ (land use)	+ (building design, risk management, housing, greenery, transport)	+ (centres)	4
25.	Zaječar	+ (local awareness)	+ (waste and water management, urban-rural, tourism)	+ (entrepreneurship, infrastructure, transport)	+ (economy)	4
26.	Zrenjanin	+ (greenery, risk management, leisure)	+ (telecommunications, land use, greenery, water management)	+ (the main aims, transport, energy, public services, housing)	+(entrepreneurship, risk management)	4
PRESENCE (%)		81%	96%	100%	88%	

The second set of questions refers to the acquired principles of resilient urban design. A two-step double-check has been conducted in the research. First, it was examined if there was a direct link between the elements of a plan and a principle. Second, the same procedure was carried out to find indirect links between the mentioned entities. This “double path” is marked differently in Table 4.

Table 4: The inclusion of 10 principles of resilient urban design in general urban plans of the cities in Serbia

NO	GENERAL PLAN OF CITY	1. RESILIENT HOUSING	2. RESILIENT URBAN TRANSPORT	3. RESILIENCE AND PARTICIPATION	4. RESILIENT HERITAGE	5. RESILIENT DISASTER MANAGEMENT	6. RESILIENT ENVIRONMENT	7. RESILIENT URBAN GREENERY	8. RESILIENT URBAN-RURAL LINKS	9. RESILIENT URBAN GOVERNANCE	10. RESILIENCE AND LOCAL-AWARENESS	SUM
1.	Belgrade/Beograd	2	0	1	2	2	1	2	0	1	2	13
2.	Čačak	0	1	0	0	2	2	1	0	1	0	7
3.	Jagodina	1	2	1	0	0	1	2	0	0	1	8
4.	Kikinda	0	0	0	0	2	1	2	0	1	0	6
5.	Kraljevo	1	0	1	1	2	2	1	1	1	0	10
6.	Kragujevac	2	0	0	2	1	2	1	0	1	0	9
7.	Kruševac	1	0	2	0	2	2	2	1	1	2	13
8.	Leskovac	0	1	1	1	2	1	1	0	2	1	10
9.	Loznica	0	1	0	2	1	2	0	1	0	1	8
10.	Novi Pazar	1	0	1	1	2	1	1	1	0	2	10
11.	Novi Sad	2	1	1	0	2	2	0	0	2	2	12
12.	Niš	2	0	1	0	1	2	1	0	2	1	10
13.	Pančevo	0	0	0	0	2	2	2	0	2	1	9
14.	Pirot	1	0	0	0	1	1	0	0	0	0	3
15.	Požarevac	2	1	0	1	1	2	2	0	2	1	12
16.	Smederevo	1	1	0	2	1	0	1	0	1	0	7
17.	Sombor	1	0	0	1	2	2	2	2	0	1	11
18.	Sremska Mitrovica	2	0	1	1	0	1	2	1	1	1	10
19.	Subotica	1	1	1	1	1	1	2	0	2	1	11
20.	Šabac	0	0	1	1	2	0	2	0	1	1	8
21.	Užice	0	0	1	2	0	2	1	0	1	1	8
22.	Valjevo	0	0	1	1	2	2	2	1	1	2	12
23.	Vranje	1	2	0	0	1	1	2	0	1	1	9
24.	Vršac	2	1	0	0	2	0	1	0	0	1	7
25.	Zaječar	0	1	0	1	1	2	0	1	2	1	9
26.	Zrenjanin	1	1	1	0	2	1	2	0	2	1	11
	SUM	24	14	15	20	37	36	35	9	28	25	
	COMMENTS	Direct link between a plan and a principle > 2 Indirect link between a plan and a principle > 1										