Urban security

- as part of the 'Smart Cities' strategy

Zbigniew Władysław, PASZKOWSKI, Prof. PhD DSc. Arch., Poland

Sylwia KOŁOWIECKA, MSc. Arch. PhD, Poland

Aleksandra Agnieszka, KUŚMIEREK, MSc. Arch. PhD, Poland

Abstract

Security is one of the basic existential needs of man. In one negative definition, security is defined as a feeling of absence of danger. In a positive approach, we can define the feeling of security as certainty of existence, survival and development. Security is of a complex nature and, apart from providing physical protection against direct threats, also includes meeting many specific behavioral needs, including the emotional and social sphere, defined by the needs of belonging to a family, social group and psychological and physical sphere - attachment to the place and the environment, the need to have and identify the living space used.

In many cities, security experts develop strategies by analyzing urban planning and architecture and their resilience in terms of adaptability to changing climatic, social and economic conditions. The authors describe the need to include urban security in Smart Cities development strategies. The proper development and functioning of cities threatened by observed and forecasted climate changes, progressive anthropogenic environmental degradation, the effects of wars and terrorism, causes permanent updating of the city's development strategies and redefining of the architectural and urban environment.

Keywords

Urban security, Smart cities, Urban strategy,

1. Introduction

Architecture and urban planning play an important role in creating urban spaces. Proper shaping of the legible tissues of cities is conducive to building social bonds, deepens the feeling of belonging to the environment and prevents the creation of a sense of threat. One of the basic human needs is the sense of security. This need is largely realized in physical form by creating safe architectural spaces. Safety is a basic requirement when creating architectural objects as well as when building public spaces in urban areas, intended both for exclusive pedestrian traffic and for car and rail communication in cities.

In urban planning, we distinguish two types of security: a sense of security resulting from the lack of threats and a sense of certainty of existence, survival and development opportunities.

The urban tissue is a structure that requires - point by point - setting the boundaries of functionality, safety, and comfortable functioning. Elements of spatial planning have a huge impact on social behavior. Especially nowadays, the concept of urban planning is ambiguous and complex. Urban planning is by definition the science of building cities and the challenges of planning in the cultural, economic and even

technical fields. Nowadays, the basic tasks of urban planning concern references to existing structures that require improvement, modernization or revitalization. However, the necessity to provide residents with constant safety and security remains unchanged. This applies both to the context of planning emerging cities or urban districts from scratch, as well as urbanized areas subject to secondary urban analysis and revitalization. The security feature of urban space is the basis of the good functioning of cities and is a significant factor in creating smart city strategies. The challenges that arise from the progressive urbanization experienced by most countries have increased the social demand for more efficient and sustainable urban services, which in the environment of the digital revolution gave rise to and strengthened the concept of a smart and sustainable city. While discussions about smart cities have been going on for a long time, there is no consensus on what a smart city is.

WHAT MAKES A GREAT PLACE?

<https://images.app.goo.gl/iVEcFYDkfQ7TtqL8A>

Researchers and governments have assigned the term smart city different meanings. A "smart city" in general is a technologically advanced city, capable of combining "competitiveness" and "sustainable development" through the integration of several different dimensions of development (i.e. economic development, mobility, environment, people, life and management), becoming a self-sufficient work . The idea of "smart cities" serves to promote the factors defining this concept in the context of unlimited accessibility. The current situation in the world, resulting from the spreading dangers, shows that by improving the quality of the functioning of cities, the factor enabling their adaptation to atypical needs of crisis management is still at the initial stage, requiring new solutions in both IT and spatial-architectonic spheres.

The safety of urban residents can be considered on many levels. In the area of issues related to the architecture and urban planning of contemporary cities, security can be considered at the level of:

- spatial planning of urban structures and urban infrastructure,
- design and implementation of construction investments,
- use of building structures,
- use of public spaces and communication areas,
- security management,
- monitoring, prevention and protection against climatic threats,
- monitoring, prevention and protection against terrorist threats,
- monitoring, prevention and protection against the spread of the epidemic.

As can be seen from this list, the problem of safety permeates many areas of activity, both in the field of architects and planners, as well as construction supervision, municipal authorities, police, medical and emergency services and many other professions and people involved in the process of ensuring the safety of life, work and residence. , social and economic development. Due to the emergence of new and significant threats in urban areas, this topic becomes extremely important. According to many opinions, new climatic and epidemiological threats mean that it will never be the same again.

2. Materials and Methods

The subject of the research are cities in Poland, and in particular, documents developed by municipalities regarding the implementation of safety rules in individual cities. The issues related to safety on the building scale were analyzed on the basis of the binding provisions of the construction law, in which the entire chapter of the regulations was devoted to the issues of construction and fire safety. An important contribution to the research in this area was the analysis of catastrophes, incidents and incidents posing a public threat to the health and life of residents.

Research methods such as statistical analysis, document analysis, comparative analysis, case study and descriptive methods with illustrative examples were used in this research.

2.1. Providing security in city spaces

The striving of individuals and entire communities to create urban structures is the result of satisfying, inter alia, security needs, i.e. the need of a higher order, defined by Maslow in the pyramid of needs of modern man, in 1943. The history of city building, starting with the historic city-polis, provides ample evidence that security belongs to the fundamental categories of urban planning. As he writes, "Polis was a settlement and performed various functions of a city-state, being the center of: (a) political institutions, (b) religious ceremonies, (c) defense, (d) production and trade, (e) activities related to education and entertainment ". However, attention is drawn to the fact that "the walls were not seen as a barrier between town and village, but rather as a monument of greatness and an object of civic pride". For the cities of the late Roman Empire, the fortification action intensified from the 3rd century AD, due to the barbarian invasions. Wall rings are one of the most characteristic determinants of the geometry of the layout of medieval, Renaissance and Baroque cities. The art of building effective modern fortifications in the Italian or Dutch style overshadows the art of building public buildings and temples. Also in the mid-nineteenth century, the political threat to security in Paris and the need to defend against the threat of revolution became the decisive stimulus for the restructuring of the urban fabric known as 'haussmannization'. Although the main sources of threats have changed today, the need to feel safe and truly protect against threats is still strong.

Model

Illustration 1. Model of the reconstruction of the Roman camp city of Timgad in Libya, surrounded by a wall of defensive fortifications. Fig. K. Bukowski

Georges-Eugène Haussmann (1809 - 1891), the prefect of the Seine, known as Baron Haussmann, was the main author and implementer of the nineteenth-century reconstruction of medieval Paris. Some consider him as the one who destroyed the medieval structure of Paris, others as the creator of New Paris.

Therefore, a thesis can be drawn that the assessments of ideally functioning, smart cities are largely conditioned by the degree of ensuring security needs and cannot function without it. Today, it is not city fortifications that can ensure security, but appropriate preventive measures of an architectural nature, taken in the sphere of spatial shaping of settlement systems, public spaces of cities, architectural facilities, as well as in the IT sphere, including the idea of 'smart cities'. Cities marked with the 'smart' label must be characterized by measures and appropriate features aimed at ensuring optimal conditions for both sustainable development and security. Such a way of presenting the definition of a smart city, ensuring the basis of security in each of the components of sustainable development, prompts us to treat security as an important category of urban planning.

Author - own study

As it can be seen from the diagram presented above, the elements of the 'smart city' are such issues as: safe economy, safe life of residents and visitors, management of intelligent information systems, sustainable development, safe policy and the potential of social values. These elements should be in balance with each other. The element that actively balances them is the social sense of security.

2.2. City-forming factors, strategy and tactics of threats in selected Polish cities.

Human striving for interaction and social contacts in the surrounding spaces is a basic behavioral feature, and the ability to control and freely shape spatial distances as well as setting boundaries and barriers are elements that build a sense of security. Creating barriers and barriers has a double effect: on the one hand, it increases the feeling of security, and on the other hand, it reduces mobility, social interactions and generates hostility. Minimizing barriers allows for unrestricted movement, but increases random social contacts and incidents. With the current threats, of unpredictable scale and scope, ensuring flexibility of solutions to increase security and the possibility of their quick modification seem to be a necessity. Therefore, an important element influencing the building of a safe city seems to be raising the awareness of residents about building spatial security, while using the available e-planning tools. These activities can significantly affect the comfort and safety of residents nowadays. In many cities, the implementation of practices of involving citizens in taking joint actions through online platforms becomes a priority in building city strategies.

<https://images.app.goo.gl/CYKH1qjBjBfCtSPV7>

The leader among Polish cities that focus on raising public awareness by involving residents in joint activities is the Gdynia City Hall, which was the first to introduce solutions enabling safer and more convenient contacts with the user, in the form of a Virtual Official. Virtual Official is an innovative technology, created thanks to funding from the National Center for Research and Development. The software facilitates access to information on services provided by the City Hall. Virtual Clerk works on the basis of artificial intelligence mechanisms, thanks to which he understands the question and immediately finds the answer or directs it to the place where it is located. Particular attention was paid to developing the application in a user-friendly manner, so that he could feel safe and comfortable; questions can be formulated in an individual way, using colloquial language, the most friendly forms of answers were developed. Virtual Clerk is an avatar - a nice, empathetic young woman. The prepared database contains answers related to about 200 topics from various areas of life, including economic policy, environmental protection and spatial planning.

pnghut_virtual-assistant-data-entry-clerk-business-administrative-service_Fg0tX0NxX0

Among the research on safe space, one should mention the research conducted in the last decade under the supervision of Prof. Andrzej Wyżykowski, research project at the Department of Renewal and Development of Urban Complexes of the Institute of Designing Cities and Regions of the Faculty of Architecture of the Krakow University of Technology in Krakow. The aim of this project was, as the authors write, "to define a strategy for solving problems related to the safety of individuals and social groups in the city space in a comprehensive approach".

<https://images.app.goo.gl/L1bzHBTn68QG2RKz6>

Particular attention was paid to defining a strategy of comprehensive solving problems related to the safety of individuals and social groups in the city space; changes in the law, identifying new threats, including, inter alia, terrorist attacks and the development of the Internet, cooperation with international experts in the field of security or creating a network of cities cooperating in the development of security development strategies.

Gdynia

Cracow

Poznań

Raising social awareness, and thus spatial safety, was also included in the Development Strategy for the City of Poznań. It is a program mainly focused on solving social problems, planned for 2019-2025. Security has been included as a separate thematic area of strategic planning alongside equivalent themes that are elements supporting the development of smart cities, such as social capital, support, health, housing and work. It was assumed that the general direction of the city's development will determine the opportunities, but also threats to the implementation of the objectives of the Social Problem Solving Strategy. Five priorities were distinguished: a strong metropolis, modern entrepreneurship, a green, mobile city, friendly housing estates and community / social dialogue. The city's mission was based on three fundamental values:

- openness - as freedom of thought and action, starting with self-knowledge and truth, and aiming at creating an honest community,
- shared responsibility as the essence of openness, shared commitment and compliance of aspirations, but also responsibility for the weak and excluded,
- co-creation, i.e. active participation in the joint creation of the City, based on mutual trust, dialogue, creativity and constant striving for improvement.

The current package of tasks to be completed by cities in order to pretend to be a SMART city is supplemented with new aspects concerning the safety of residents. Some of these tasks have already been the subject of previous considerations and implementations. The current intensification of various threats means that the issue of security, as the primary task of cities and communes, must be approached comprehensively. The development of these issues and the implementation of new rules for the construction and use of urban spaces becomes a key issue for maintaining the safety of residents and users of SMART Cities.

The following is a brief description of the safety issue that permeates the issues mentioned above.

Security in the field of spatial planning, planning and implementing urban infrastructure should generally be based on the principles of multilateralism, self-sufficiency, divisibility of systems and areas, communication alternatives and ensuring accessibility. These rules are presented in more detail in Tables 1,2,3,4 and 5 below.

Table 1. Security in the field of spatial planning of urban structures and infrastructure

	task	threat
1	Location of new urban layouts in safe areas	Flood areas, landslides, seismic areas, areas at risk of drought, etc.
2	Providing access to water and the possibility of collecting and utilizing sewage.	The threats of drought and environmental pollution
3	Transport accessibility of the areas	Lack of access in case of breakdown, fire hazards, health and life hazard
4	Provision of dispersed sources of obtaining water, electricity, sewage collection,	The threat of a large-scale accident, the possibility of a terrorist attack on infrastructure
5	Organized collection and segregation of municipal waste	Environmental pollution risk
6	Providing the possibility of emergency commuting, crossings: <ul style="list-style-type: none"> - ensuring the access of fire brigades and other special vehicles to each building - liquidation of high-end streets),

	- network system of public transport	
7	Taking into account the compaction standards for high and high-rise objects with free access of rescue services	
8	Ensuring the possibility of excluding (separating) the threatened areas from other urban areas, without harming the city's communication system	In the event of terrorist threats and the need for area isolation of epidemic
9	Buffering the separated development areas with green areas and water	Creating natural green belts between building complexes and districts, enabling their isolation in the event of local threats
10	Provision of distributed renewable heat sources for heating facilities	Threat of air pollution, terrorist attack, mega-failures
11	Providing shelters and hiding for people in areas particularly threatened by climatic anomalies or armed conflicts and terrorism	Construction of shelters, hiding places, shafts of tall objects resistant to attacks

Table 2. Safety in the design and implementation of construction investments

	task	threat
1	Ensuring the stability and stability of building structures	Shocks, landslides, hurricanes, eruptions
2	The use of durable and certified materials and technologies	Durability of fasteners, materials
3	Compliance with fire regulations.	Fire hazard, smoke, possibility of quick intervention of emergency services
4	Emergency services' access to buildings and rooms preserved.	Access blocked, inaccessible facility
5	Building entrance control and CCV monitoring of entrances and common parts of facilities	Control over people who may constitute a threat

6	Creating the possibility of using underground car parks and basement floors for the purposes of civil defense in areas at risk	The threat of armed conflicts, air raids
7	Departure from designing underground garages under residential buildings and for people to stay in favor of building independent parking facilities	The threat of terrorism, explosion
8	Provision of alternative entrances, staircases and emergency exits outside buildings	Risk of explosion and building collapse
9	"Universal" design of residential and public utility buildings.	Counteracting the exclusion of disabled people

Table 3. Safety in the use of building structures

	task	threat
1	Application of building regulations regarding the dimensioning of building elements with protection against accidents (stairs, barriers, balustrades, shafts)	Fall from a height
2	Safety of technical installations (electrical, pressure, steam, central heating, water, etc.), the way of finishing the architectural detail (slip, sharp edges, glass, etc.)	Electric shock, burns, injury

Table 4. Safety in the design of public spaces and communication areas

	task	threat
1	Designing safe spaces (avoiding oppressive spaces, not visually controlled)	Personal threat to users of public spaces
2	Designing traffic segregation and safe places of collision of various forms of traffic in cities (pedestrian,	Collisions, terrorist attacks on areas of increased pedestrian traffic

	bicycle, car, scooters, trams)	
3	Designing safe underground and surface multi-parking car parks	Oppressive space, carbon monoxide concentration, collision, explosion hazard, smoke
4	Designing urban spaces protected against the negative effects of climate change.	Climate change

Table 5. Safety in the use of public spaces and communication areas

	task	threat
1	Forcing the use of public spaces in accordance with applicable law.	Collisions in communication, vandalism, oppression
2	Raising awareness of safe sharing of public spaces	Lack of awareness of legal regulations, no self-limitations in reprehensible behavior in social life

Table 6. Safety in the field of safety management

	task	threat
1	Integrated management of the security system in the city for a quick response of emergency and rescue services	Uncontrolled acts of violence, terrorism, perpetrator's escapes from the scene of an accident, burglary

Table 7. Monitoring, prevention and protection

	task	threat
1	Introduction of integrated monitoring systems, early warning systems, protection systems against local climate threats	climatic
2	Introduction of integrated monitoring and early warning systems as well as systems of protection	terrorist

	against the threats of terrorist terrorism	
3	Introduction of integrated monitoring systems, early warning systems, and systems of protection against epidemic threats	epidemic

Increasing the emphasis on social security - sensitivity to the needs of others, the ability to make joint decisions, commitment and the ability to join the 'team' at every stage - becomes an important element in planning modern cities. On the other hand, the already common processes of digitization, networks of sensors, monitoring cameras, the Internet of Things (Internet of Things), e-offices, automatic vehicles or mobility as a service on demand (Mobility as a Service-MaaS) significantly facilitate participation in the processes of building and development of cities from the level of the resident - he is no longer anonymous and becomes a co-owner of common spaces. Additionally, attention should be paid to the fact that the individualisation of consumer services, the optimal use of urban equipment and infrastructure, and the implemented solutions significantly contribute to the reduction of road traffic and the development of new tele-IT services, such as telemedicine.

3. Summary

A significant increase in uncontrolled events, including terrorist attacks, political riots, an influx of emigration, the spreading COVID-19 pandemic and other forecast epidemics, make it necessary to pay attention to an even greater sense of social security in settlement units. The safety of society should become an important and basic element of educating architects and town planners in the planning and development of contemporary cities, as well as in other areas related to this issue.

Increasing social awareness and the willingness of residents to participate in shaping cities is a good direction in building safe enclaves for life and development. The Smart City strategy is evolving rapidly in line with the development of technology. The number of changes as well as predictable and unpredictable events affecting the spaces of modern cities requires a change in the way of thinking and functioning, in line with the slogan: "joint, deliberate action instead of unilateral decisions".

3.1. 4. References

1. Pinon P., (2002) Atlas du Paris Haussmannien, Paris. Parigramme,
2. Carmona M., Haussmann (2002) –his life and times, and the making of modern Paris, Chicago
3. Paszkowski Z., (2011) An ideal city and its connections with contemporary urban planning, Universitas,
4. Guedes, A.L.A.; Alvarenga, J.C.; Goulart, M.S.S.; Rodriguez, M.V.R.; Soares, C.A.P. (2018) Smart cities: The main drivers for increasing the intelligence of cities. Sustainability, 10, 3121. [CrossRef]
5. Giffinger, R.; Fertner, C.; Kramar, H.; Kalasek, R.; Pichler-Milanovic, N.; Meijers, E. (2007) Smart Cities: Ranking of European Medium-Sized Cities; Centre of Regional Science (SRF), Vienna University of Technology: Vienna, Austria; Available online: http://www.smartcities.eu/download/smart_cities_final_report.pdf (accessed on 14 August 2019).

6. Harrison, C.; Eckman, B.; Hamilton, R.; Hartswick, P.; Kalagnanam, J.; Paraszczak, J.; Williams, P. Foundations for smarter cities. *IBM J. Res. Dev.* 2010, 54, 1–16. [CrossRef]
7. Caragliu, A.; Del Bo, C.; Nijkamp, P. Smart cities in Europe. *J. Urban Technol.* 2011, 18, 65–82. [CrossRef] 32. European Innovation Partnership (EIP). Smart Cities and Communities: Strategic Implementation Plan. 2013. Available online: <https://smartcities.at/assets/Uploads/sip-final-en.pdf> (accessed on 14 January 2020).
8. Bouskela, M.; Casseb, M.; Bassi, S.; Facchina, M. (1981) The Road toward Smart Cities: Migrating from Traditional City Epstein, Yakov M. Crowding stress and human behavior. *Journal of Social Issues* 37 (1): 126–144.
9. Ewing, R., T. Schmid, R. Killingsworth, A. Zlot, and S. Raudenbush. 2003. Relationship between urban sprawl and physical activity, obesity, and morbidity. *American Journal of Health Promotion* 18 (1): 47–57.
10. Glaeser, E. 2012. *Triumph of the city: How our greatest invention makes us richer, smarter, greener, healthier, and happier.* New York: Penguin Books.
11. Gruebner, Oliver, Michael A. Rapp, Mazda Adli, Ulrike Kluge, Sandro Galea, and Andreas Heinz. 2017. Cities and mental health. *Deutsches Ärzteblatt International* 114 (8): 121.
12. Lederbogen, F., P. Kirsch, L. Haddad, F. Streit, H. Tost, P. Schuch, S. Wust, J.C. Pruessner, M. Rietschel, M. Deuschle, and A. Meyer-Lindenberg. 2011. City living and urban upbringing affect neural social stress processing in humans. *Nature* 474 (7352): 498–501.