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New urban governance as a way of building city resilience to pandemic-caused stress (COVID-19)

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Abstract. The COVID-19 pandemic and restrictions imposed by governing powers, aimed at limiting the spread of the Sars-CoV-2 virus, have resulted in high social and economic costs and lead to an elevated level of chronic stress, particularly in cities. The study aims to demonstrate an original new urban governance conception and to indicate the possible role of such governance in building city resilience to stress caused by the COVID-19 pandemic. The research proves that new urban governance should primarily include building stronger and more flexible forms of cooperation, engaging highly qualified, interdisciplinary experts to planning and city governing and applying smart technologies in communication and urban governance. What has been also emphasized is different mechanisms of new urban governance when the impact of the pandemic has to be suddenly mitigated and during a long-term reconstruction of the city system towards a stress-resilient city. The study is theoretical in nature and is based on a comprehensive review of the extensive literature on the subject.

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1. Introduction

Owing to dynamic and extremely turbulent changes occurring globally at present, cities as places of social interactions and human relationships face new challenges, problems and threats, which are the source of stress for both city organisms themselves and their residents (*Note* 1). Adverse phenomena and processes are increasingly common in cities, among which one should name inequalities and social exclusions, ethnic and religious conflicts, climate change, the spread of environmental pollution on a global scale, and also crime, terrorism, or infectious diseases (Chelleri, 2012; Jabareen, 2013; Meerow et al., 2016; Szomburg, 2020; Mierzejewska et al., 2021). The various stressors to which urban areas and their residents are exposed are discussed in greater detail in Mierzejewska et al. (2023).

One of the key challenges in the recent years have undoubtedly become the COVID-19 pandemic. It is particularly the residents of cities - geographical spaces recognized as the major pandemic outbreaks - that experienced most acutely not only the stress resulting from the fear of contracting the virus (Hagger et al., 2020; Hamel et al., 2020; Nelson et al., 2020), but mainly a long-term stress following top-down governmental remedial measures (restrictions, constraints, lockdowns), permeating almost all aspects of daily life often in all cities in a given country (Mierzejewska et al., 2023; Wdowicka et al., 2024). In practice, many of these restrictions turned out to be inadequate to the situation of specific cities and disproportionate to the scale of the threat. They did not allow for individual, markedly different development determinants of particular centers, their distinct spatio-functional structure, various needs and expectations of inhabitants, and also an individual course of the pandemic (Parysek & Mierzejewska, 2022). They brought about unfavorable socio-economic events, leading to numerous economic consequences for an urban economy (often irreversible) and affecting the residents' health, widely described in the literature. Chronic stress caused by the sense of insecurity about one's future and close family, job loss, loss of income, concerns about the availability of food and household items, and also the possibility of going out to the cinema, theatre, or restaurant, the limitation of mobility, movement, sports and recreation, contacts and gatherings of city dwellers, a decline in social ties, or insecurity about changes in the scope of restrictions led to a significant deterioration of social health and individual psycho-physical condition, especially among particularly vulnerable groups - children, young adults and seniors (Hagger et al., 2020; Hamel et al., 2020; Talarowska et al., 2020; Sønderskov et. al., 2020; Brooks et al., 2020; Garfin et al., 2020; Müller et al., 2021; Prohaska et al., 2021; O'Sullivan et al., 2021; Mierzejewska et al., 2021; Schou et al., 2021; Huang et al., 2021; WHO, 2022; Carvalho et al., 2022; Saladino et al., 2022). Therefore, as Garfin et al. (2020) point out, chronic stress resulting from direct and indirect effects of the pandemic, whose increased level is likely to persist also after the virus threat has subsided, is a parallel problem of public health during the COVID-19 pandemic (Hagger et al., 2020).

The inhabitants of cities were confronted with an unfavourable situation as a result of the inefficiencies of the crisis management system. This prompted a series of cumulative bottom-up actions (Sitrin & Sembrar, 2020; McGuirk et al., 2020). Concurrently, there was a need to seek new solutions in terms of building city resilience to emerging stressors. A response to growing threats seems to be the implementation of the resilient city conception which creates not only the possibility of surviving adverse conditions, but also enables a fast return to balance after an unexpected crisis and further dynamic socioeconomic growth (Godschalk, 2003; Grove, 2004; Desouza & Flanery, 2013; Picket et al., 2014; Meerow et al., 2016; Newman et al., 2017; Banai, 2020).

Thus, this study aims to present an original new urban governance conception and demonstrates the role such a new way of managing the city can play in building city resilience to a pandemic-caused stress using the example of COVID-19. The specific objectives of the study are directed towards answering the following research questions:

1. Why is a new model of urban governance needed?
2. How should the new urban governance model function in the case of stressors and mitigation?
3. Which social groups should participate in the new urban governance and what role should they play in it?
4. What role can experts play in the new urban governance model?
5. What is the role of new technologies in the new urban governance model?

The research objective is pursued in theoretical terms, with the study itself based on a comprehensive review of the extensive literature on the subject. . It should be highlighted that the authors' original research input is presentation of a governance model combining a participatory approach drawing on smart technologies with an active expert involvement. Therefore, this governance model sets apart models

used so far in democratic societies, which relied on local authorities, with often observed, relatively passive cooperation of city dwellers and limited bottom-up initiatives. The proposed model of new urban governance creates an opportunity to develop a strategy for building city resilience, adapted to local circumstances and to the needs of communities, which guarantees reduction of stress resulting from adopting top-down imposed socio-economic restrictions, often inadequate for specific conditions in particular urban centres. This will make it possible to create healthy cities, resilient to individual and social stress.

Due to the theoretical nature of the study, the main research method used in this study is narrative, sometimes referred to as literature review. This method involves a critical appraisal of the available research papers on a specific topic that the researcher is addressing (Sivilli & Pace, 2014). It involves the process of analysing published manuscripts in order to identify research gaps that exist in a particular area of knowledge and to acquire the knowledge necessary to make progress in a particular field (Webster & Watson, 2002; Boyd & Solarino, 2016; Pautasso, 2019; Snyder, 2019). The crux of the method of literature analysis and criticism is to refer to publicly available (which does not necessarily mean easily available) professional and scientific literature (Jesson, Lacey 2006). However, there is no conventional way of conducting a literature review, as the objectives, hypotheses or research questions formulated may influence the approach taken (Chigbu et al. 2023).

In this study, the analyses were conducted from the perspective of a broadly understood urban geography and urban planning. The focus was on the concept of urban resilience, which emphasises the importance of building resilience to different types of stressors. The literature on urban governance was critically analysed, focusing on the concept of the participatory governance model, which partly failed under the stressor of the COVID-19 pandemic. The article fills a research gap identified in the literature related to the search for new urban governance models for building urban resilience to pandemics.

The research procedure adopted herein has been divided into four stages. Stage 1 demonstrates, in particular, conceptions and views of researchers on building urban resilience to various types of stressors, presented in the literature on the resilient city. What has been indicated are strategies conducive to developing city resilience to stressors, which is a pandemic, and the importance of governance as one of the strategies for building such resilience. Stage 2 presents the rationale for the transition from the participatory urban governance model commonly accepted in democratic countries, which for the most part did not meet the challenges of the COVID-19 pandemic, to a new one-new urban governance. Then, the main elements of the new urban governance conception are described against a participatory model. The third stage of the research procedure outlines different mechanisms of new urban governance for short-term actions mitigating pandemic effects and long-term measures related to the need for the re-construction of the city system towards post-pandemic recovery and development of a stress-resilient city. The last (fourth) stage involves the discussion of the obtained results, formulation of some general practical recommendations, and points to advantages and limitations of the presented new urban governance model. The analyses were conducted from the perspective of widely understood urban geography and city planning.

2. Resilience as a way for cities to survive during the pandemic

The term resilience has been applied in many scientific disciplines and it is understood in terms of the ability to absorb changes, flexibility and adaptation to new circumstances (Holling, 1973; Masten & Coatsworth, 1998; Chelleri, 2012; Jabareen, 2013). Thus, resilience can be built and strengthened by developing and training its component features (Sivilli & Pace, 2014). The existence of a resilience continuum points to the need to create circumstances in which one may become more resilient (Chandler, 2012).

Resilience is formed as a response to stressors and is related to the risk of their occurrence, vulnerability (as a combination of susceptibility and exposure to stress), and the time of being exposed to it (Keyes, 2004; Feder et al., 2019). Risk factors, however, often coexist and cumulate in time, whereas higher, accumulated risk and the stress related make it difficult for a system to return to the state of balance (Masten, 2014; Burns et al., 2018; Feder et al., 2019). For this reason, responses to a stressful situation need to be relevant, but not excessive (Feder et al., 2019). Nevertheless, at the same time, it should be emphasized that stress may be positive. It may be helpful in learning new ways of coping with stressors, forcing to expand opportunities for action (Sivilli & Pace, 2014). Therefore, a difficult experience may become an opportunity for growth (Seyle, 1956). The development of adaptive, flexible skills to cope with a difficult experience may cause a similar challenge to be easier next time. This is, apparently, the essence of building resilience.

Cities, like other systems, are also exposed to stress and, thanks to developing adaptive mechanisms, may ensure their survival and growth. This is because adaptive principles apply to various systems equally, therefore also to urban ones (Kelly, 1970; Zautra et al., 2010).

City resilience may be understood as ability "to absorb, adapt, transform and prepare for past and future shocks and stresses in order to ensure sustainable development, well-being and inclusive growth" (OECD, 2016). This involves therefore the reduction of risk and the effects of a stressor at the moment of its occurrence, and also the corrective actions conducted in such a way as to minimize the impact of disturbances generated by this stressor (Bruneau & Reinhorn, 2004). At this point, a resilient entity (both at the individual and collective level) is never perceived as passive or without capacity, but as active, capable of self-transformation (Chandler, 2012; Feder et al., 2019).

The COVID-19 pandemic and the related stress of cities and their inhabitants have indicated an urgent need to reorganize and build resilience to unexpected situations, as well as to mitigate potential consequences of future threats, which should become the basis for the development of tomorrow's cities. City resilience is not a condition, but a state which cannot be maintained, if the system does not evolve, transform and adopt to present and future conditions and changes (UN-Habitat, 2021; UNCDF, 2021). There is no question that readiness to respond to future shocks and recovery depend on robust and flexible urban planning and governing systems (Desouza & Flanery, 2013; Mierzejewska et al., 2020). Thus, building resilience requires strategic plans and measures which can be adapted to the dynamic and living structure of the city.

Therefore, the development of strategies helping cities and their inhabitants to cope with stress during the pandemic and after its completion, which will result in strengthening their resilience, is becoming a priority (Hagger et al., 2020). In the context of the above-mentioned understanding of city resilience, such coping strategies include taking measures for the 1) mitigation of negative effects of the pandemic for cities, 2) re-construction of the urban system so that it would be less vulnerable to pandemic-caused stress by creating healthy and safe living conditions and services for inhabitants, 3) development of a new way to manage the city (new urban governance), serving to enhance the effectiveness of mitigation and re-construction that will result in city resilience to adverse effects of the present and future pandemic, but also other threats (Fig. 1).

However, the most important role in city resilience is attributable to people. This follows from the fact that it is them who decide about the creation, management and maintenance of all other elements of the city structure (the causative role of people), minimizing their unfavorable impacts and enabling them to return to normal functioning after the stressor has emerged (Desouza, Flanery 2013). What is more, the sustainability of social life requires fostering awareness and participation of all in the process of building city resilience (Zautra, Hall, Mufgoldrray 2010). Thus, in new pandemic, also post-pandemic circumstances, shaping city resilience requires new urban governance.

3. From governance to new urban governance

Approaches to urban governance change fast, since cities endeavor to adapt to a growing number of challenges (da Cruz et al., 2019). The shift 'from government to governance' (Harvey, 1989; Stone, 1989; Pierre, 2011; Koch, 2013) was a particularly marked change that was made many years ago. This new trend in city management consisted (and still does) in limiting (local) powers, officials and elected politicians for private actors, such as philanthropists, business associations, management consultants and NGOs (da Cruz et al., 2019).

The attractiveness of the urban governance concept results, among other things, from the fact that local governments do not exist in a vacuum, but must coordinate their actions with higher powers (vertically) and neighboring communes (horizontally) while being pressured by lobbies and democratic concerns (Stone, 1989; Stone, 1993; Mossberger

Fig. 1. Stress resilient city model
Source: own compilation

& Stoker, 2001). Although this concept saw many different practical models, described, e.g., by Pierre (1999), focus in the literature on urban governance is still on participatory governance (Koch, 2013; da Cruz et al., 2019). The term is understood as participatory forms of taking political decisions used to improve the democratic quality (Geißel, 2009; Heinelt, 2018). However, scientific research in this respect has been dominated by case studies (da Cruz et al., 2019) while lacking more generalized approaches.

Nevertheless, participatory urban governance before the COVID-19 pandemic still faced a number of practical challenges, including insufficient public budget, inflexible administration (bureaucracy), too rigid rules, problems with coordination (observed especially when functional links of the city went considerably beyond its administrative borders), and also low involvement of citizens in urban governance (da Cruz et al., 2019). Thus, there appeared the need to seek new solutions for governing that would meet the 21st century challenges and which would engage inhabitants more in the city affairs and allow for bottom-up initiatives.

Undoubtedly, the COVID-19 pandemic turned out to be an additional challenge, which led to the revival of state intervention and the state government in terms of infection control, public health and diversified social and economic support (McGuirk et al., 2020). The pandemic revealed insufficiency of conventional methods of public governance for dealing with pandemic implications (Cave et al., 2020; Alqutob et al., 2020; Śleszyński et al., 2023), thus exposing the weaknesses of the existing models of governance and urban policy (Clark, 2020).

At the same time, the pandemic accelerated trends in using urban innovations, making it possible to expand a repertoire of governance mechanisms, including the application of digital tools (McGuirk et al., 2020). It also effected the revival of civic activities in the form of mutual help and 'pandemic solidarity' (Sitrin & Sembrar, 2020). Bottom-up initiatives of the kind were meant to remedy the imperfections of the government and the market, demonstrating readiness and capability of civil society for co-governance (McGuirk et al., 2020).

As a result, in the context of the pandemic challenge, attention is paid in the literature to the need for: (1) development of strategies for urban resilience to pandemics, including short- and long-term schemes (Afrin et al., 2021), (2) redefinition of the role of public authorities in the urban governance process (Śleszynski et al., 2022), (3) development of a new approach to planning collective spaces and social control in the condition of a pandemic (Śleszyński et al., 2020), (4) better coordination of measures, making it possible to respond faster to emerging epidemic threats and to manage the epidemic more effectively (Śleszyński et al., 2023), and also (5) wider inclusion of civic actors in the processes of urban governance and the post-COVID-19 recovery city transformation (McGuirk et al., 2020; Śleszyński et al., 2020).

The COVID-19 pandemic emphasized the importance of urban governance which should be more inclusive and meet changing needs of their residents. It turned out that policy aiming at the improvement on urban planning is essential and 'urban planners and leaders must rethink how people move through and in cities' (UNCDF, 2021). Owing to the pandemic, the political discourse has been refocused on urban planning, governance and health (Martínez-Córdoba et al., 2021; Ansell et al., 2021; Connolly et al., 2021). What is important, the pandemic has raised the question of the adaptability of currently accepted planning and governing paradigms to a new reality. This fact points to the need for continuous openness and readiness to change, as well as looking for the best solutions for governing city development (Stone, 2017).

Therefore, counteracting the effects of the COVID-19 pandemic will require a stronger and more effective, multilateral governance system for building resilience in various dimensions - economic (urban economy), social (social policy), environmental (urban environment) and in terms of legislation and organization (legislation and urban governance) (Pierre, 1999; Stone, 2017).

The COVID-19 pandemic, the major outbreaks (and restrictions) of which embraced cities, has shown in particular the need to establish new tools and goals in urban governance (Plümper & Neumayer, 2022) - more centralized and not limited to the city boundaries. It also revealed the weaknesses of the existing urban planning and governance systems when it comes to solving crisis situations (Brodeur et al., 2020).

Planning needs to be more active, constantly adjusted to a new reality, which imposes both mitigation and long-term measures, leading to the re-construction of a city structure. In this respect, planning may play an important role in adapting to pandemic-imposed changes and in efforts to improve resilience, making it possible for cities to respond appropriately to threats, including public health threats (Forster & Heinzel, 2021). This requires a strategic, long-term approach, based on development scenarios which may be adapted according to changing conditions and needs. The flexibility of such measures may be expressed if they have many different variants as well as by their obligatoriness and

willingness to offer - measures needed for execution and action, which will be taken depending on the situation.

In order to be able to respond to a dynamically changing future, urban planning and governance should be perceived as the function of public good and not as an instrument of short-term electoral benefits. Moreover, planning and governing the city make sense only when it is effective, that is when it is being implemented. The effectiveness depends primarily on intentional continuity of plans and strategies, and also the accuracy of forecasts (Gawlikowski, 1988; Manual, 2012; Ferro et al., 2013; Almirall, Wareham, Ratti et al. 2016; Meijer, Bolívar, 2016; Arendt & Kukulak-Dolata, 2016; Leleux & Webster, 2018; Hale et al., 2021; Mierzejewska & Wdowicka, 2022). This requires research and data that show what challenges and aspirations a city and its residents have. The present crisis should become a reason to consider changing local urban policy (Hale et al., 2021).

Therefore, new pandemic and post-pandemic circumstances seem to necessitate new urban governance that would require, except for the existing participatory models (Rhodes, 1996; Goldsmith, 1997; Peters & Pierre, 1998; Pierre, 1998), malfunctioning during a pandemic (Cave et al., 2020; Clark, 2020; Alqutob et al., 2020; Śleszyński et al., 2023), an independent third party – professional, highly qualified, interdisciplinary experts (Fig. 2) (Stewart & Sample 2020; Joyce, 2021). It should be their role to draw up and present development scenarios and the related multivariant action strategies, both short- (mitigation) and long-term (re-construction). Experts have many informal negotiation tools (soft-power) at their disposal, resulting from their authority and powerful arguments, and may fulfil the role of a kind of buffer between inhabitants and urban authorities (Wilson, 2008). It is them who, using their knowledge and experience and after analyzing the residents' and local authorities' expectations, should present objectives and the methods for their implementation for building city resilience. These objectives ought to be modified according to changing determinants and their implementation monitored on an ongoing basis.

The pandemic is borderless and thus cannot be contained in the city boundaries. In order to build a more resilient environment, new urban governance necessitates cooperation not only between urban authorities and inhabitants and experts, but also at territorial level, with authorities and residents of neighboring cities and communes, with full awareness of the influence of regional and state authorities on urban policy making. Such a cooperation requires strong, effective and integrating local governments

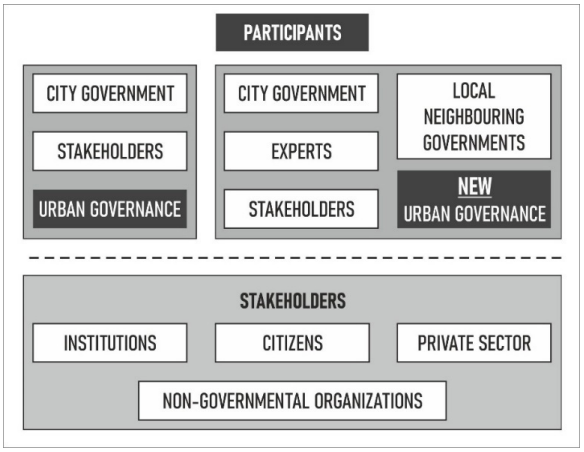

Fig. 2. Urban governance vs. New urban governance – comparison of participation
Source: own compilation

and authorities, and thus a more integrative approach. This allows creating the synergy effect, limits the overlapping competences and discrepancies between goals and action, promotes responsibility, and as a result, leads to a coherent local policy. The attainment of this coherence enhances the guarantee of effective planning and implementation of solutions creating the very multilateral governance system which is essential for building city resilience (Fig. 2, Fig. 3).

An innovative approach to governance also covers the use of new technology potential - smart technologies, including civil ones, developed from the bottom-up by city dwellers as is the case in smart governance (Fig. 3) (Ferro et al., 2013; Szymańska & Korolko, 2015; Almirall et al., 2016; Meijer & Bolívar, 2016; Leleux & Webster, 2018; Mierzejewska & Wdowicka, 2022; Szymańska, 2023). Smart technologies make it possible to gather, process and upload information in an electronic form (Arendt & Kukulak-Dolata, 2016) allowing residents to have better access to information on the city. Moreover, they foster social inclusion and service accessibility for people with special needs, and serve to increase social interaction, which makes the inhabitants more prepared and more interested in engaging in a shared, also bottom-up, urban governance. Thus, they expand the scope of traditional participation forms, which are part of technocratic urban planning, such as informing or public hearing, to include those more geared to using knowledge and inhabitants' creativity (e.g. crowdsourcing, co-production, co-creation of value) (Manual, 2012; Barns, 2018). Therefore, new technologies open up new opportunities for residents to participate in building the city's future.

Smart technologies and innovation have enormous potential in terms of planning and

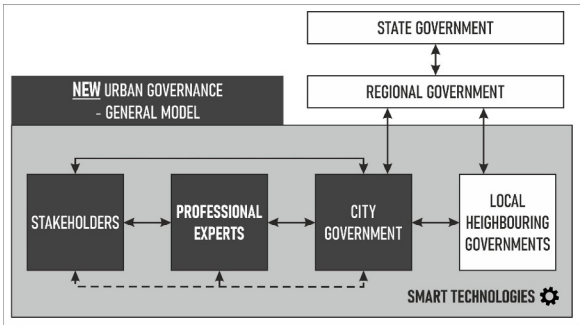

Fig. 3. New Urban Governance – general model
Source: own compilation

e-governance of cities and their main advantage is that they may be used for building city resilience and reducing pandemic-caused stress when direct contact and mobility are restricted. On the other hand, these technologies may also disturb urban governance. This is because they create problems related to technological polarization, the possibility of technological manipulation or digital surveillance (Antunes et al., 2021; Radzimski et al., 2022; Szymańska, 2023).

The interconnectedness of risks and opportunities resulting from the pandemic requires a systemic approach to governance and the implementation of changes for building city resilience (Vale, 2014).

New urban governance should therefore involve: 1) building stronger and more flexible cooperation forms - inclusive participation, 2) including highly qualified, interdisciplinary experts in urban planning and governance, 3) applying new technologies for communication and urban governance, 4) appropriate funding for local authorities and governments, and rationalization of costs, 5) effective leadership, 6) integrated planning resulting in a coherent local policy between cities and communes, and 7) development of civil society (Fig. 4).

Thus, resilient governance system promotes integrativeness and supports broad and meaningful participation of all, especially in urban planning and governance processes. However, this requires encouraging open communication and facilitating inclusive cooperation between a wide circle of interested parties represented by local authorities, experts and city dwellers with the help of new technologies and systems, and simultaneous horizontal cooperation with neighboring cities and communes - a new consistent urban governance. Such an approach may heighten a sense of responsibility and proactivity and thereby an effective implementation of plans and measures.

The decision-making process in the new urban governance model is different from the widely accepted, participatory model of urban governance. This is due to the involvement of a larger group of participants, the roles assigned to them, and the necessity for wider, multistage public consultations, which must be conducted with full awareness of the problems involved. These include time-consuming, resource-intensive, conflicting interests, false information, and panic.. Consultations take place already at the stage of initiating the processes of change that may be proposed by various entities (not only the city authorities, but also residents, among others), formulating the draft of the multi-variant resilience strategy, and discussing its final provisions (Fig. 5).

In the new urban governance model, we assume that problems (e.g. caused by the pandemic) arising from changes in city development determinants generate new expectations, needs, demands, and even claims, which may come from both city authorities who can recognize the need to change the course of action and from stakeholders. All those initiatives should go to the group of experts who, based on their knowledge in various fields, experience and results of the public consultations during which the consequences of particular initiatives are discussed, draw up a multivariant resilience strategy. This strategy is based on various development scenarios (e.g. pandemic, but also other risks, such as drought, flood, climate change), depicting changes in internal and external determinants in the functioning of the city while allowing for the legal, financial and organizational framework of the city hall.

The variants determined in the resilience strategy correspond to a given development scenario - demonstrate the course of action if it occurs, aimed at

Fig. 4. New Urban Governance – main elements
Source: own compilation

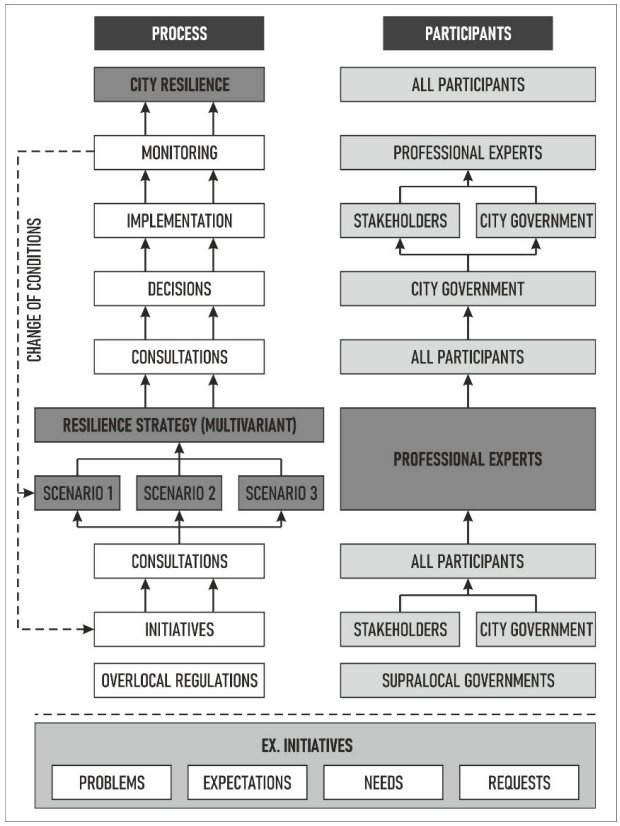

Fig. 5. New Urban Governance – decision-making process
Source: own compilation

maintaining a relative balance of the urban system in the crisis situation. The project of the strategy should be subject to further general consultations involving all participants of the urban governance process. The consultations are intended to obtain opinions of city authorities, stakeholders and neighboring communes on the city development variants proposed by experts in the resilience strategy. The consultations should conclude with the preparation of a common stance, a kind of consensus regarding, often competing, interests of various entities. The role of a moderator in the consultations should be performed by experts. They also ought to make possible modifications to the project of the strategy, referring to the results of the consultations. A formal adoption of the strategy takes place at the level of city authorities. However, all stakeholders, and first of all city authorities that are formally accountable for changes introduced to the urban system, should be responsible for its implementation. What is also important is continuous monitoring of the strategy implementation, which should lie in the hands of professional experts. Naturally, the appearance of new, important determinants in the city development may have an impact on the emergence of new initiatives or a change in development scenarios, which ought to entail the modification in the resilience strategy. This is so, because it should be a flexible document, following a changing world as well as needs and expectations of city dwellers.

4. The new urban governance during the pandemic

As was already mentioned, in the first phase the city response to a stressor such as the COVID-19 pandemic takes the form of an immediate action (mitigation), and then, in the long-term perspective, what is adopted are measures leading to transformation of the city structure (re-construction). In the proposed new urban governance model, individual participants perform different roles according to the phase of the response the city is in.

4.1. Mitigation phase

In the mitigation phase, particular role is performed by experts whose task is to develop optimal, under the given circumstances, ways of responding to threats (e.g. a virus). They need to consider the ratio of adverse effects of the virus to adverse effects of measures aimed at inhibiting its spread (restrictions), in line with the principle that "the cure cannot be more harmful than the disease". A group of experts should be composed of physicians of various specialties, economists, psychologists and sociologists (Table 1). In order to ensure the credibility of their opinions, experts should be independent of political influences. Furthermore, due to the limited scope of their expertise and the potential for error, their opinions should be subjected to verification by other experts and other stakeholders, including residents.

Experts draw up different variants of action and indicate the most favorable one on the basis of their knowledge and experience, allowing for the minimization of adverse effects.

In the mitigation phase, decisions about taking specific measures should be made by city authorities, who are guided by proposals developed by the team of experts, taking into account overriding regulations (Fig. 6). The functioning of urban systems is promptly reorganized with respect to the decisions taken (e.g. e-administration, changes in public transport, schools, etc.). The results of these decisions should be monitored (feedback from the stakeholders) to check if the measures taken are not excessive. The role of local authorities is to create a favorable environment to undertake bottom-up activities as

Table 1. An exemplary role of experts in building a stress resilient city in the mitigation phase

Experts	Role in building stress resilient city
Epidemiologists	determination of threat level, estimation of pandemic development scale, proposals for measures to limit virus transmission (restrictions)
Medical doctors in other specialties	assessment of health effects of restrictions with respect to specialties represented
Psychologists	assessment of psychological effects of restrictions for various social groups
Sociologists	assessment of impact of restrictions on social relationships
Economists	assessment of economic impact of restrictions

Source: Own compilation

well (e.g. by sharing data on the city, applications enabling two-way communication with residents), not forgetting to provide assistance to social groups most vulnerable to the virus (the elderly, the sick, the lonely, etc.) and those affected by the decisions taken (e.g. restrictions, lockdowns). In order to be more effective in combating the pandemic, what is also important is cooperation between city authorities and the neighboring communes. This results from high population mobility and the fact that various urban systems function beyond administrative boundaries of the city (education, health care, public transport, etc.).

In order to mitigate the effects of the risk, city residents need to organize themselves from the bottom-up as part of the neighborly assistance, especially in relation to social groups vulnerable to the virus/bacteria, for instance they should organize a voluntary service using modern technologies (applications).

4.2. Re-construction phase

In the next phase, the re-construction, the measures taken should be precautionary and conducive to regeneration after stress. In this long-term perspective, experts' task is to analyze initiatives announced by inhabitants and city authorities, pointing to their results, to moderate discussions on changes in the city structure, to develop the multivariant strategy project of a healthy, stress resilient city, allowing for various development scenarios and to monitor its implementation (Fig. 7).

Experts may perform the role of a 'buffer' mentioned earlier between residents and city authorities (Fig. 7 – Variant 1), or a body working directly with the city authorities (Fig. 8 – Variant 2). In the first case, initiatives of authorities and inhabitants go straight to experts. In the second one, residents address their ideas directly to city authorities cooperating with a group of experts. The choice of a specific variant of new urban governance in the re-construction phase depends on social, cultural and legal determinants in a given place, including the level of education and awareness of civil society and residents' trust in the authorities.

The group of experts should be composed of specialists in various fields (medical doctors, psychologists, sociologists, architects, town planners, spatial planners, economists, ecologists, etc.), but also urban activists and people familiar with the local context. Their exemplary role has been shown in Table 2.

City authorities during the re-construction phase perform the role of a co-initiator of changes,

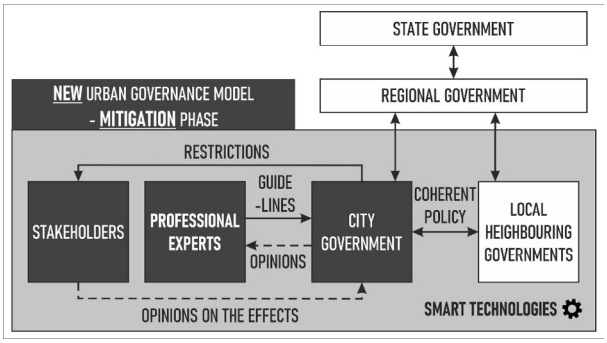

Fig. 6. New urban governance model – relations between participants in the mitigation phase
Source: own compilation

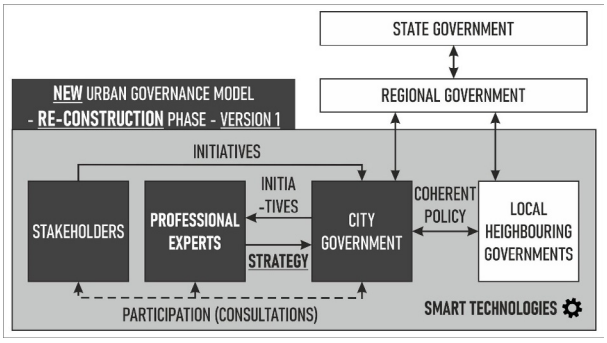

Fig. 7. New urban governance model – relations between participants in the re-construction phase – Variant 1
Source: own compilation

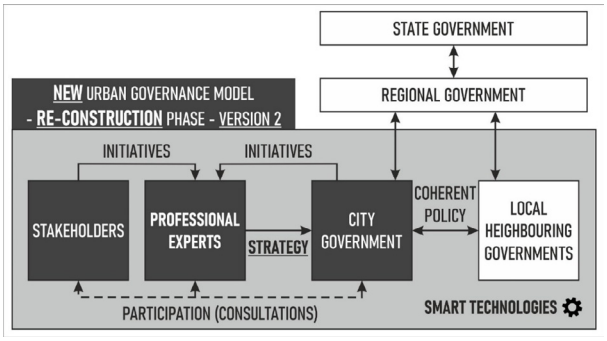

Fig. 8. New urban governance model – relations between participants in the re-construction phase - Variant 2
Source: own compilation

participate in discussions on positive transformations in the spatio-functional and economic structure of a city, adopt the strategy for building city resilience allowing for proposals developed by the team of experts as well as legal, financial and organizational determinants, and then implement it with the help of inhabitants. At the same time, city authorities are responsible for ICT infrastructure development, for improving skills in its use in the groups of citizens digitally excluded (training courses) and for e-administration development, because smart technologies (systems, applications) fulfil an important role as an information medium (without the need for a direct contact). These need to be, however, user-friendly technologies, simple to operate, safe and transparent.

On the other hand, city residents should participate in identifying problems with city functioning and report new needs changed by the

Table 2. An exemplary role of experts in building stress resilient city in the re-construction phase

Experts	Role in building stress resilient city
Medical doctors	show right directions for transformation of elements of city's spatio-functional structure and quality of urban environment so as to reduce stress of residents and enhance their resilience (preventive health care, creating healthy life style conditions).
Psychologists	show sources of stress for residents, solutions for stress reduction possible to be implemented in city (in place of residence, in its surroundings, in ways of getting around in city, etc.) and assessment of psychological effects of projects on structural changes
Sociologists	assess social effects of proposed changes in urban structures, show right directions for changes in these structures from social point of view
Town and spatial planners	determine directions for transformation of elements of city's spatio-functional structure (public transport system, public space, greenery in city, trade and service networks, health care, etc.) to ensure high level of services while limiting movement, and to ensure high accessibility of spatial development elements reducing residents' stress
Architects	design residential buildings and infrastructure so as to reduce stress of residents and to ensure healthy living conditions
Economists	assess economic effects of projects regarding structural changes in city, care for favorable conditions for functioning and development of business entities in city and proper economic structure (size, ownership and sector structure)
Ecologists	show need to transform urban environment from natural environment perspective, as well as need to adapt to climate change, to develop green and blue city infrastructure, etc., and assess effects of projects concerning changes in development for living environment

Source: Own compilation

Table 3. The role of particular participants in new urban governance

Participants	New urban governance	Phases	
		Mitigation	Re-construction
stakeholders (city dwellers, entrepreneurs, institutions, NGOs)	initiating changes in city; evaluating projects and options for city development strategies proposed in project strategy (participation in consultations), co-implementation of resilience strategy	taking bottom-up action as part of neighborly assistance; providing feedback on restrictions and constraints imposed	active participation in identifying problems, reporting new needs; initiating changes in city; co-implementation of resilience strategy
city authorities	initiating changes in city; evaluating development options proposed in project strategy (participation in consultations), formal adoption of resilience building strategy, responsibility for implementing resilience strategy	taking decisions on imposing certain restrictions and constraints; creating conditions conducive to taking bottom-up action by city dwellers; providing assistance to social groups especially those vulnerable to virus and adversely affected by restrictions and lockdowns; cooperation with neighboring communes	initiating changes in city structure for creating vision of healthy, friendly, stress-resilient city; adopting strategy for building city resilience; implementation of strategy with cooperation with stakeholders, including city dwellers
experts	developing and modifying city resilience strategy (options corresponding to given development scenario – procedure in event of stressor), performing role of moderator in project strategy consultations, monitoring strategy implementation	developing optimum ways of responding to emergence of risk (e.g. virus) in given circumstances; developing various action options indicating most favorable one; monitoring feedback from stakeholders	analyzing initiatives proposed by city dwellers and authorities, pointing to their effects; moderating discussions on changes in city structure, developing multivariant strategy project on healthy, stress-resilient city allowing for various development scenarios and monitoring its implementation; performing role of 'buffer' between city dwellers and city authorities or body cooperating directly with city authorities
representatives of neighboring communes	evaluating development options proposed in strategy project (participation in consultations), cooperation with city authorities	cooperation with city authorities in terms of introducing remedial measures	participation in consultations on resilience building strategy project, cooperation with city authorities
regional government	gathering information and analyzing data on crisis situation at regional level, cooperation with city and state authorities in organizing crisis response		
state government	gathering information and analyzing data on crisis situation at national level, cooperation with city and regional authorities in organizing crisis response		

Source: Own compilation

pandemic (civil society). Therefore, the initiatives concerning changes in the city structure for creating a vision of healthy, friendly, stress resilient city should come not only from authorities, but also from residents. They implement a resilience strategy as well, alongside city authorities. However, in order to be willing to engage in the city affairs and take responsibility for its development, they need to feel that they have a real impact on the decisions taken and are treated as partners in the decision-making process. The role of specific groups of participants in new urban governance, including also mitigation and re-construction phases, is shown in Table 3.

5. Discussion of the results

The COVID-19 pandemic, despite various consequences, meant also a historical revival of the state and authorities' intervention in terms of infection control, public health, and social and economic support (McGuirk et al., 2020). Those measures, however, were not always fully effective, because they did not fit in with local specificity and individual development features (also the development of the pandemic itself). Hence, there is a need to develop new ways of governance, which will prove useful both during the pandemic and in a new, post-pandemic reality, determined as 'new-normal' (Chen et al., 2021). This gap is addressed by the novel urban governance model proposed in this study. Such a new method of governing provides an opportunity to develop a city resilience strategy for the pandemic-caused stress and to build healthy cities, which will reduce their individual and social stress, with full awareness of the difficulties of operationalizing the concept of city resilience and other problems that its implementation may generate, as described more widely by Meerow and Newell (2016).

The very term new urban governance is not new. It was used by Bingham (2006), among others, to indicate new tools (tax incentives or privatization of some public functions) and processes enhancing communication (dialog, mediation, monitoring) between stakeholders and leaders for developing goals based on common values and interests. Da Cruz et al. (2019), however, in this context indicate disconnection between the actual needs of cities and a theory and scientific research. They also point to the fact that cities (and their governing bodies) should cope competently with global problems: social inequalities, climate change and the evolving digital context, and thus probably also with the pandemic. The new urban governance conception proposed in this study fits in with the above-mentioned views, and also with other notions, significantly integrating and developing them.

The city is an organic whole, a network of elements combined into a single coherent system (Kanter & Litow, 2009). Yet, it is first of all a community which should be governed well (Chourabi et al., 2012). What is indicated as a model here is urban governance, often limiting public participation, however, to ensuring mechanisms for commenting on, voting for or choosing the options proposed by urban authorities (one-way communication with no feedback). It gives residents no opportunity to contribute to services, values and opened innovations, which could be used while formulating and implementing urban policies (Semanjski et al., 2016; Khan et al., 2017). The proposals, suggestions and initiatives of city dwellers may be helpful when taking more conscious political decisions and ensure a higher quality of city services (Tomor et al., 2019). Therefore, in the presented model, we assume that the largest number of entities possible should be involved in urban governance, including those from the immediate neighborhood. This is so because pandemic problems cannot be resolved without uniform rules for urban agglomerations. We also assume, following Mierzejewska and Wdowicka (2022), that public participation should be treated as a series of interrelated activities, and not only a single action.

The pandemic crisis accelerated trends in urban innovations, making it possible to expand the repertoire of mechanisms for governing public spaces, mobility, planning and service rendering (McGuirk et al., 2020). It also imposed changes in institutional attitudes of actors and in forms of power (McGuirk, 2021). During the pandemic, access to ICT technologies turned out to be key when mobility was seriously impeded. Building stress resilient city requires the availability of smart technologies which will facilitate functioning, meeting various needs in the pandemic and post-pandemic periods, as well as active, bottom-up participation.

The COVID-19 responses were formulated first of all at national level by teams dominated by politicians, virologists and epidemiologists. Other experts were mostly excluded from decision-making bodies regarding the health, social and economic implications of the means used in the response to the disease. Owing to the fact that the pandemic crisis is not only a health problem, but also a social one - it affects every individual in the society one way or another and leads to economic consequences - we have to become more integrative and multidisciplinary (Rajan et al., 2020). This means

the need to incorporate the opinions of experts in different fields and the observations made by various social groups in the decisions taken.

The relationship between public and individual health and the organization of urban space is particularly complex and multifaceted. A perfectly reasonable demand for "designing cities for health" (Ding et al., 2020) still requires theoretical concretization and many efforts to be put into practice. What seems the key is the development of an urban policy allowing for a balance between health protection costs and economic ones. Such studies may partly contribute to defining the demand of 'healthy city planning' and redefining (both at the level of the city itself and at other tiers of power affecting the urban policy) competences of particular public authorities (Śleszyński et al., 2020).

6. Conclusion: Summing-up and recommendations

City dwellers belong to a growing majority of the planet's population, remaining under the considerable pressure of enforced lifestyle changes. They are also the group most exposed to stress and implications of top-down COVID restrictions, functioning in particularly complex social, economic and political systems of today's cities. The residents and users of urban spaces are at the same time the group which, because of its competences, e.g. ICT skills, should not only be governed. This group may, and should, react with agility to introduced restrictions during the pandemic, and in the long-run also to changes introduced in the city system. The urban space, as a spatio-temporal continuum and the medium of work for professional experts, spatial and city planners, may be, when effectively governed, an actively shaped field of regeneration and recovery after both the personal and social stresses.

As part of the model proposed in the paper for building stress-resilient cities after a pandemic, they can distinguish several coping strategies: mitigation (immediate responses, short-term measures, fast information exchange), re-construction (long-term reconstruction of the city structure), and finally – new governance, i.e. an ideological, technological and mental change in the 'style' and way of urban governance. The last strategy is based on the need for a new paradigm of organization: democratization, inclusiveness, responsiveness and transparency of planning procedures, including especially defining the prosocial and health-promoting goals of spatial and city planning at a local scale. In practical terms, its implementation will require:

- allowing for the conception of adaptivity of the future urban structure towards stress resiliency as well as individual and social stress reduction, possible thanks to the anticipation of crisis scenarios and the fact that the resilience strategy is multivariant;
- reintegration of (institutional changes in) local authorities, strengthening of cooperation between authorities in vertical hierarchies, and especially in horizontal ones—with stakeholders and experts—but also recognizing the role of neighboring local governments (and local budgets) in building an effective governance system (multilateral governance system, new consistent urban governance);
- strengthening of an expert, third (next to stakeholders and local, city and supralocal government) party in urban governance. It occurs in the conception role, as well as that of content-related (especially in the re-construction phase) and mediation (not to be confused with the professional role, in which investment processes are implemented). In the re-construction phase, a group of experts undertakes the initiatives announced by both city government and city residents and becomes the party drawing up various development scenarios and the multivariant strategy for a stress resilient city;
- in the mitigation phase, in the process of imposing restrictions on stakeholders by the governing party, professional experts are a substantial source of the projects proposed (restrictions), allowing for feedback from stakeholders. In this phase, it is city authorities that should take final decisions on the choice of applied solutions (restrictions) which should not be imposed top-down by government – that is so, because every city has other determinants. The rules developed at government level (also global – formulated by WHO (2022)) should be general and be a proposition, which will be elaborated and polished up by experts at local level depending on a specific situation;
- finally – support for open communication and inclusive public participation, a harmonious relationship between local governments in the decision-making process, and also shaping the conditions for the growth of civil society, which may be facilitated (or made more difficult due to digital inequalities) thanks to new, smart information technologies.

When a city model resilient to upcoming crises and stress is adopted in the face of the observed and

emerging new changes and threats, one should turn to the new urban governance conception, whereby governments (at city and local scales), stakeholders and professional experts actively co-create the regenerative nature of urban space. These parties are fully entitled entities (not objects) of planning measures. In the new urban governance model, decision-making relates to both the creative role of an expert party and the need for the coordination of (coherence between) local policies and supralocal government partners alongside a bottom-up involvement of stakeholders and a significant share of smart technology.

The author's model developed and presented in the paper is an innovative approach to managing a post-pandemic city. The model is based on partnership city co-management involving different social groups, including experts specialised in specific issues, city authorities and citizens, whose bottom-up, active participation in the co-management process is supported by smart technologies. In contrast to the urban management models presented in the literature and used in practice to date, this approach allows for a better identification of local needs and problems and the adaptation of implemented solutions to the specificities of the centre. As a result, it is conducive to building the resilience of a city and reducing the stress that cities and their inhabitants may be exposed to as a result of various emergencies (including pandemic outbreaks). The model thus reduces the risks arising from top-down decisions that are not adapted to local circumstances and that can have a number of negative socio-economic effects, as was the case with the COVID-19 pandemic.

The implementation of the new urban governance model proposed may bring numerous advantages to the city and its inhabitants. The most important include: - drawing on crowdsourcing when making decisions, and especially on the knowledge of experts in various fields, thus creating a more democratic way of governing the city (Pierre, 2009);

- fuller co-governance (including people with reduced mobility and disabled persons) and accelerated decision-making process while using smart technologies;
- greater efficiency in governing the city regarding both mitigation of the pandemic effects and re-construction of the city structure;
- more effective monitoring and assessment of the authorities' actions (e.g. because of greater involvement of stakeholders in the city's affairs, collecting feedback by experts, using smart technologies);
- possibility of its application to other threats as well, e.g., those related to climate change or heat waves (flexibility of the model).

The general character of the model presented means that it may be applied in cities of democratic countries where a participatory model has already been functioning. At the same time, cities in countries with different political systems should aspire to it in the future. In this case, however, its implementation may encounter various obstacles.

This model does not eliminate problems attributed to a participatory governance model, the subject discussed further by Pierre (2009) and Peters (2011), among other researchers. Nor does it protect against the above-mentioned risk arising from using smart technologies (Antunes et al., 2021; Radzimski et al., 2022), and its effectiveness will depend mostly on the possibility of involving high-level experts, also the city's inhabitants, in urban governance processes. It does, however, ascribe two functions to the city authorities, namely the role of the main executor of a city resilience strategy and at the same time an initiator of measures for greater involvement of inhabitants in the city governance process. Moreover, it requires practical verification as a theoretical model, thus opening new fields of research on urban governance.

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Note 1

The term "stress" is defined as the physical or psychological tension that arises in response to any stimulus (stressor) that is perceived as a potential threat to the physical, mental or social integrity of a living organism, including the city (Ellison & Maynard, 1992).

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