Communal Resilience Framework

Ondrej Mital'(✉), Silvia Ručinská, and Miroslav Fečko

Department of Public Policy and Theory of Public Administration, Faculty of Public Administration, Pavol Jozef Šafárik University in Košice, 04011 Košice, Slovak Republic
{ondrej.mital,silvia.rucinska,miroslav.fecko}@upjs.sk

Abstract. The study investigates communal resilience, the key evolving phenomenon of the last decade. Resilience helps cities and municipalities handle the growing rate of natural and man-made crises, risks, disasters, and emergencies. The study uses a literature review and multiple case study method to examine measures and activities implemented by selected regional cities that strengthen communal resilience. Regarding the conditions of the Slovak Republic and the increasing importance of communal resilience, altogether 8 cases between 2022 and 2023 were analyzed, focusing on the partial components of communal resilience. Based on the literature review and presented case studies, six complementary components of the communal resilience framework have been identified, strategic approach, networking, stakeholder involvement, resource management, output quality, and environment. The main benefit of the developed communal resilience framework is its wide applicability for any type of communal unit. Simultaneously study contributes to the growing discussion on the standardization of communal resilience framework.

Keywords: Resilience · resilient cities · resilience framework · Slovak Republic

1 Introduction

Modern society is perceived as a complex system of mutual relationships between entities interacting across various spheres of life. The social progress and growth of society result in a high level of interdependency. Governments worldwide increasingly understand that different systematic threats and challenges, such as climate change, cybersecurity, migration, energy transition, or poverty, can interfere expected and required development of modern society.

Looking at the past decade, governments' preparedness for contradictory impacts of expected and non-predictable crises has created a base for the effective achievement of public policy goals and perceived quality of life. In this regard, scholars and practitioners have started investigating whether governments, regions, cities, and communities, are resilient enough to overcome the growing frequency of disturbances. Resilience has evolved as a multidimensional concept dealing with how a complex system operates under stress, mainly underlining the ability to absorb, recover, and prepare for future shocks [24, 48]. Communal resilience must be seen as the resilience of local self-government units, mainly cities and municipalities. Authors argue that the communal

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resilience framework helps local self-government units resolve crises or emergencies caused by endogenous and exogenous factors.

The study has the ambition to realize preliminary research and investigate the communal resilience framework in the Slovak Republic. In this sense, the study examines measures and activities implemented by selected regional cities that strengthen communal resilience. Ahead of this analysis, the study examines, in a theoretical way, the multidimensionality of resilience, mainly focusing on communal resilience and its components. More precisely, the study examines, mainly with the use of the case study method, measures, and activities implemented by eight regional cities that strengthen the communal resilience framework, focusing on the partial components of communal resilience. Focusing on the conditions of the Slovak Republic and the increasing importance of communal resilience, altogether 8 cases between 2022 and 2023 were analysed. We presume that the communal resilience framework is a generic conceptual system composed of partial components, that help cities and municipalities to adapt and to recover from expected and unpredictable crises.

2 Resilience: Contemporary State of Knowledge

Public administration as a complex system should respond to trends of the last decades, such as globalization, interdependency, increased human population and mobility, and intensification and sophistication of modern information communication technologies. Resilience represents the concept of the capacity to proactively and reactively cope with shocks, surprises, adversity, and hard times [45]. Resilience is an important topic, if we consider the increased rate of challenges that governments have to face and deal with [72]. The growth of governmental reasoning of resilience is a logical response to a precarious and uncertain world [53].

Contemporary society is thanks to its dynamics challenging the abilities of different entities to conform with this changing social reality. Besides, the concept of resilience is a dynamic process, meaning that it is not static or trait-like [38, 59]. Resilience is a process that is influenced by numerous factors that can change over time [77].

2.1 Resilience as a Popular and Trending Multidimensional Concept

Resilience studies have increased over the past 10 years. However, some aspects of contemporary meanings of resilience were analyzed at the turn of the millennium. The term resilience comes from the Latin word “resiliens” which means “to bounce back” or “to rebound”. The contemporary meaning of the term resilience was introduced by Wildavsky’s publication Searching for Safety in 1988 [21, 82].

Resilience is mostly defined as the capacity of a system or entity to continue to function in situations when crises or shocks have occurred. The primary content or resilience was mainly identified with the ability to respond to crisis [9, 67]. Over time resilience’s meaning was widened to include various societal difficulties and disorders, such as poverty, homelessness, traumatic events, natural disasters, violence, war, and physical illness [32]. Resilience is much richer than trying to resist change and control it to maintain stability because resilience also deals with complex adaptive system

dynamics, true uncertainty, and the ability to learn to live with change and make use of it [28].

Contemporary society faces many sophisticated challenges, such as natural disasters and environmental issues (fires, floods, storms, or droughts), man-made situations (terrorist attacks or cyber-attacks), economic instability (financial or debt crisis, inflation, and unemployment), pandemics (COVID-19), social changes (migration, changing demographics, cultural challenges). In this regard, resilience has become a complex phenomenon with different multidimensional aspects. Theoreticians and practitioners from different spheres of life are continuously examining and improving resilience in sociology, economy, ecology, public administration, psychology, and other disciplines. Research is mostly focused on preconditions and the impact of resilient frameworks at the individual, organizational, local, regional, or national levels.

Multidimensionality of resilience has been proven by different studies from various scientific disciplines, such as medicine, health, and psychology [20, 32, 77], environment and ecology [2, 3, 78], management [6, 17, 18, 57], society and governance [28, 34, 44, 69], as well as engineering, industry, and technology [54, 81]. Cooperation and cross-field collaboration are very rare, but it could help to utilize positive impact on research and practice implications in different fields of our society [29].

Environmental and ecological aspects of resilience are mostly focused on predictable and nonpredictable natural disasters, as well as the ability of entities to be prepared and recover from these situations. Managing resilience focuses on system-level characteristics and processes, and the endurance of system properties in the face of social or ecological surprise [2]. Resilience means building the ability of a community to bounce back after hazardous events, rather than simply reacting to impacts, while the ability to rebound more quickly can reduce negative human health, environmental, and economic impacts [46, 55]. In this regard, environmental and ecological aspects of resilience can also be discussed in its connection to other spheres of life.

In medicine and psychology, resilience represents a phenomenon that secures good outcomes despite risks, sustained competence under threat, and the ability to recover from trauma [20]. Scholars from medical scientific disciplines concentrate their research on health traits, characteristics, and requirements of resilient systems that prepare mainly individuals for potential anomalies. Resilience refers to positive adaptation, or the ability to maintain or regain mental health, despite experiencing adversity [32]. Resilience can also be seen as a trait that enables an individual to recover from stressful situations and to face the next stressful situations with optimism [76].

The managerial dimension of resilience is focused on the functioning and preparedness of managed and governed systems. Resilience is mostly explained as the capacity of the system to function properly despite anomalies [17]. The nature of resilience is based on the thinking of entities, that reality must be faced with loyalty, hard work, and innovative improvised solutions, while this positive view on social reality helps people and companies to be more resilient than those with negative moods [18]. Organizational resilience, based on no duplicity of practices, tailor ability, plurality of assessment techniques, measurability, and relative ease of use, is a part of the overall management framework [57]. Building resilience must be based on strategies engaging internal and external actors in the learning process and micro-processes [8, 64].

Regarding the engineering and technological dimension of resilience, this term broadly refers to the capacity of a system to handle disruptions, failures, and surprises in ways that avoid total system collapse, while this process also leads to adaptation and improvement [43]. However, the ability of the system to recover its performance after disruption is still dominant in this field of study [11, 12].

Resilience as a multidimensional phenomenon can also be composed of different responses to crises, shocks, or threats. The practical impacts of resilience can be reflected differently in three basic types of resilience [21, 27, 63].

Precursory resilience reflects the ability of the entity to handle and manage current ongoing crises or extraordinary situations. This type includes activities focused on mitigating and preventing negative impacts, which can be achieved through risk management, crisis management, and a systematic approach. This type of resilience reflects the ability to react immediately. Recovery resilience describes the ability of the entity to recover from a crisis or extraordinary situation that has occurred. The recovery process may start during the crisis but may also be initiated after the crisis or situation. Recovery can be achieved mainly thanks to coordinated efforts and cooperation of involved stakeholders. The capacity of stakeholders and relevant entities within the networks is important. Adaptive resilience includes the ability of the entity to learn from past crises that occurred in the past. Adaptive resilience gives entities the opportunity and time to learn from mistakes and failures. Learning and capacity-building aspects of resilience must be also perceived as very important for similar crises and shocks in the future.

The topic of resilience has evolved into one of the key cross-cutting issues of contemporary society. Resilience includes dimensions and aspects connected to governmental actions and the implementation of public policies.

2.2 Resilience in Public Administration and Local Governance

The multidimensionality of resilience offers scientists a wide range of issues that are examined by different scientific disciplines. In this regard, resilience can also be examined both from the public administration and local governance perspectives.

Resilience term in the sphere of public administration is highly ambiguous, it is used for different purposes in different contexts [21, 56]. Following general explanations of resilience, the resilience of public administration is the capacity to proactively adapt to and recover from disturbances that are perceived outside the range of normal and expected disturbances [15]. In this regard, research on public administration resilience concerns different topics and issues, such as national resilience as a determinant of national security in Ukraine [7], community resilience during global pandemics [23], economic reforms in 117 countries over 11 years [12], reform of public administration in Canada [45], adaptation to the challenges of crises in Great Britain [68], Australian regional natural resource management organizations [64].

Resilience in public administration is often connected to other terms such as vulnerability, adaptation or adaptive capacity, transformability, and robustness of social entities, such as individuals, households, groups, cities and municipalities, regions, nations, or the entire global world [44]. Uncertainty, ambiguity, and complexity represent complementary perspectives that characterize resilience as a new form of neoliberal governance [34]. The growth of governmental reasoning and the defense of resilience is a logical

response to a precarious and uncertain world [53]. Resilience in public administration must be seen as a complex phenomenon and as the quality influencing different levels of government, individuals, and professions.

Communal resilience concerns processes and know-how of preparedness and planning that disperse uncertainty and responsibility for being prepared and responsible throughout the system, which acts autonomously to respond to exogenous and endogenous shocks [4, 79]. In this regard, strengthening partial aspects of communal resilience, mainly participation and inclusion, has to be seen as a key part of modern cities and municipalities and robust local democracy. Building and strengthening communal resilience is a long-term process, which implies different stakeholders in municipalities and cities [36, 52, 61].

Studies on communal resilience cover different aspects of the execution of local-self-government competencies, for example, inter-municipal collaboration in England [22], community resilience in Italian municipalities [60], urban green spaces planning for flood protection in Indonesia [1], public service delivery in South Korea metropolitan areas [36], challenges of urban resilience implications [65], resilience and management capacity during disasters at local government level [41], impact of trust in government on building community resilience in China and South Korea [37], local disaster resilience from administrative and political perspective [58], strategic implications of local resilience in England [66].

The resilience framework identifies and describes factors or components that assist them when they face crises and help them maintain their success over time [19, 71]. Theoreticians and practitioners aim to identify a resilience framework as an inspirational guide for cities, and municipalities (Table 1).

Table 1. Components of Communal Resilience

Authors	Resilience factors/dimensions/components
Buikstra et al., 2010	social networks and support, positive outlook, learning, early experiences, environment and lifestyle, infrastructure and support services, sense of purpose, diverse and innovative economy, embracing differences, beliefs, leadership
Wimelius, et al., 2018	cooperation, social networks, community resources
Torres, Alsharif, 2017	social dimension, economic development, population and governance, built environment
Tariq et al., 2021	physical, human/health, economic, environmental, social, governance
Schneider et al., 2015	infrastructure systems, social competence, community competence, economic sufficiency
Faulkner et al., 2019	exposure, sensitivity, capacity of response, adaptive capacity

(*continued*)

Table 1. (*continued*)

Authors	Resilience factors/dimensions/components
Graziano, Rizzi, 2016	openness to the external environment, structural diversification, availability of resources, structural dependence/independence, functional redundancy, adaptability strategy
Olsson et al., 2003	believes the individual´s stress, non-punitive, provisions and resources to assist, belief in the values of a society
IOM, 2019	self-esteem, social network, being flexible, a positive approach, problem-solving skills, looking after yourself
OECD, 2023	economy, society, governance, environment
City Resilience Index, 2023	leadership and strategy, health and wellbeing, economy and society, infrastructure and ecosystems
Figueiredo et al., 2018	robustness, redundancy, flexibility, resourcefulness, reflection, inclusion, integration

Source: authors

Municipalities and cities should clearly understand what needs to be done to strengthen resilience. The resilience framework concerns processes and technologies of preparedness and planning that disperse uncertainty and responsibility for being prepared throughout the system, that acts autonomously to respond to exogenous and endogenous shocks; as well as expected and unexpected risks [40, 79].

3 Methods

The study has the ambition to realize preliminary research and investigate the communal resilience framework in the Slovak Republic. The study examines measures and activities implemented by selected regional cities that strengthen communal resilience. Ahead of this analysis, the study examines, in a theoretical way, multidimensionality of the resilience, mainly focusing on communal resilience and its components.

The study aims to answer the research question what the components of the communal resilience framework are, concentrating mainly on selected regional cities in the Slovak Republic. With the use of the case study method, this study examines measures and activities for strengthening communal resilience implemented by selected regional cities in the Slovak Republic. Eight case studies from eight cities in the Slovak Republic were analyzed covering the period 2022 – 2023.

The research sample was intentionally selected (Fig. 1), taking the spatial fragmentation of the Slovak Republic and the cities' importance into consideration.

Municipalities and cities are in the Slovak Republic's conditions often perceived as initiators of innovative solutions. There are altogether eight regions in the Slovak Republic, and thus eight regional cities naturally concentrate more inhabitants than any other local self-government unit. Regional cities represent altogether more than one-fifth of the total population of the Slovak Republic. The status of a regional city is not associated with any special or unique legal status or competencies. The main difference



Fig. 1. Regional cities overview. Source: authors

between cities and other units is determined by the fact that cities realize key activities focused on the production of public services both for their residents and residents from the nearest territory. Slovakian's regional cities have even more financial, material, and human resources than small municipalities.

The case studies represent the appropriate tool, which was used to demonstrate how measures and activities implemented by regional cities strengthen communal resilience in its components. The multiple case study method helps to analyze data within each situation and across different situations, as well as to understand the similarities and differences between the cases [31, 83]. Each case study includes a description of adopted measures or activities, identification of prioritized resilience dimension by selected cities, impact of the implemented solution on communal resilience, and components necessary for the successful implementation of the measures.

A literature review was used to integrate findings and perspectives from empirical findings. Previous research from different scientific disciplines was investigated to demonstrate the contemporary state of knowledge in the sphere of resilience, mainly communal resilience.

Theoretical analysis was used to analyze the contemporary state of research focusing on the concept of resilience, mainly communal resilience. Content analysis was used to get an in-depth view of relevant activities of the selected regional cities. Abstraction was used in the context of filtering those aspects of selected cases, which were relevant to our research and communal resilience framework. The method of synthesis was used to systematize new ideas based on our research, as well as to draw conclusions resulting from the analysis.

4 Results

The following case studies demonstrate activities strengthening resilience in selected cities. Each of the eight case studies includes a description of adopted measures or activities, identification of prioritized resilience dimension by selected cities, impact of the implemented solution on communal resilience, and components necessary for the successful implementation of the measures.

4.1 Strengthening of Energy Independence

The city of Trnava belongs to the leaders in energy independence among Slovak cities. Between 2022 and 2023, Trnava implemented innovative solutions based on the installation of photovoltaic devices on the roofs of elementary schools established by the city. The solution was realized mainly thanks to positive previous experience in the city, production of own electricity from photovoltaic devices on the roofs of elementary schools, and health and social facilities. The implementation of these solutions resulted in the reduction of carbon footprint by 252 tons of CO2, an average of 67% of cost saving of electricity costs for one school, and also supply of pre-flow electricity to the network that was used by the Ice Stadium of Trnava [75].

The identified solution implemented by the city of Trnava highlights mainly energy independence which is a key aspect of preparedness for future crises. However, financial effectiveness was achieved already at the time of project implementation. Simultaneously, the chosen solution is also environmentally friendly.

4.2 Digitalization and Circular Economy

The city of Nitra included the topic of resilience also to the vision of the city. This ambition is complemented by the support of the city to implement activities in the sphere of circular and shared local economy. The functioning of local circular and shared local economy is thanks to the interactive Circular map of Nitra smoother and healthier. An interactive map helps citizens to find different goods and services in the city. The circular map of Nitra provides information on different parts of the circular and shared economy in the city, for example, car and bike-sharing, services and repair shops, community gardens, compost sites, packaging-free stores, swap markets, collection yards, containers for small electrical waste and used clothing, as well as events focused on ecological activities and many others [47].

The case of resilient activity implemented by the management of the city of Nitra covers components of resilience. Firstly, the selected solution strengthens networking among communities in the city, which can be very useful not just in the time of unexpected crisis, but also in the time of any disturbance from normal life. The circular map also builds awareness of the circular economy and the need to reduce waste. The secondary impacts of the presented solution can be seen mainly in the environmental protection and reusing habits of citizens.

4.3 Unique Mobile Application for Increased Safety

The resilience of the city of Prešov was strengthened thanks to the unique mobile application. The solution adopted by the city was the first of its kind among municipalities in the Slovak Republic. The similar mobile app is currently used only by the Mountain Rescue Service and Air Rescue Service. Platform “Safety” allows the use of multimedia communication to be added to the standard emergency call. After the initialization of the emergency call, the individual will receive an SMS message with a specific link from the operator of the emergency center. When individuals open this link, they confirm sharing

their location and start a video call after allowing access to the phone´s camera. The platform also includes a chat with the possibility of translation to 30 languages [51].

The solution adopted by the city of Prešov reflects the ambition of the city to strengthen the safety of citizens in an emergency or crisis. The mobile application represents a user-friendly solution that helps citizens protect their properties and their lives in times of natural and man-made emergencies. Application is also inclusive, because the benefits of application can be perceived by different types of groups regardless of age, education, or social status, and without previous registration or authorization. However, previous coordination of emergency services departments is more than necessary, which needs a systematic approach by the city´s management.

4.4 Systematic Evaluation as a Tool for Strong Communities

Banská Bystrica realizes different types of activities funded by different projects, funded by European, national, and own financial resources. Measures focused on strengthening resilience have helped the city to react to climate change, support green and blue infrastructure, engage local communities in participatory budgeting, revitalize public spaces, as well as to develop sustainable mobility in the functional city region [5]. Systematic evaluation and complementary implementation of partial activities help the city not just to achieve the goals of the projects, but also to create a resilient environment with the involvement of relevant stakeholders.

The identified case represents the ambition of the city to strengthen resilience through the ecological dimension, with a secondary positive impact on the quality of life and health of citizens. The management of the city also fosters the involvement of relevant communities, supporting their accountability for the future of the environment. Implemented activities are evaluated and presented every year, which can be seen as a planned and systematic approach guaranteed by the city´s office.

4.5 Preparedness for Climate Change in Communal Life

Activities focused mainly on environmental aspects of resilience are being implemented in the city of Žilina. However, these activities have different cross-sectional impacts on citizens´ quality of life. In the summer of 2023, Žilina adopted a Strategy and action plan for adaptation to the adverse consequences of climate change in the territory of the city of Žilina, which helps the city effectively implement measures raising preparedness for climate change safely and timely, and thus ensure sustainable and resilient functioning of the city in the future [85]. The strategic approach of the city helps to systematize activities focused on environmental resilience in different spheres of communal life, such as planting linear and mobile greenery, revitalization of city parks, support of electromobility, as well as reduction of energy consumption and building of green roofs at city´s buildings [84].

Environmental aspects of resilience are strengthened by activities of the city of Žilina. Mentioned activities are defined also by the strategies of the city. Activities aim to improve and enhance the green and blue environment surrounding citizens, mainly to improve quality of life and decrease the financial costs of the city´s facilities.

4.6 Green and Living Housing Estates

Activities reflecting community and ecological aspects of resilience were realized in the Karlova Ves, city district of the city of Bratislava, the capital of Slovakia. These activities were a part of the DELIVER project implemented between 2018–2023. The main aim of the activities was to strengthen the resilience of the housing estates to the impact of climate change, mainly because of the balanced spectrum of measures. The project aimed to turn housing estates into climate-resilient living places through the project activities, such as building awareness on climate resilience and carbon footprint, using of integrated approach in adaptation and mitigation measures, increasing participation of the public, and suggesting changes in legislation [35]. The importance of resilience was also supported by subjects from private and non-governmental sectors.

The resilience of communities and the strong involvement of stakeholders were identified in the case of the Karlova Ves. Communities and strong networking have an important role in measures that aim to foster climate-resilient housing estates. Simultaneously, activities help to increase the quality of life and health protection processes.

4.7 Strategy with Clear Measures, Timeline, and Responsibility

The city of Košice has decided to manage partial aspects of resilience systematically. In this regard, the priorities connected with resilience are declared by a binding document The economic and social development plan of the city of Košice and its function area 2022–2027. The mentioned strategy includes 21 goals with significant importance for the current city management. Among other important spheres of communal life, Košice aims to increase the city's resilience to extraordinary events through effective risk management. Strategy precisely describes measures, specifically measures on prevention of extraordinary situations focusing on the protection of life, health, and property and mitigation of negative impacts of these situations, development, renewal, and strengthening of technical and logistic capacities including management, rescue units, and self-government units, improving the preparedness of public in the sphere of civil protection [39]. Strategy also defines timeline, financial resources, and responsibility for the realization of the identified measures.

The city of Košice has chosen to systematically coordinate measures that strengthen resilience. The main development strategy of the city precisely describes particular activities and implementation processes. This approach of the city leads to a higher quality of realized activities, creates an adequate informational base for citizens and other stakeholders, and rationally uses personal, material, and financial resources.

4.8 Long-Term Visions by European Values

Trenčín city management perceives resilience as a preparedness for extraordinary situations and climate change but with a focus on the environmental aspect of examined phenomena. The city also uses a systematic approach and includes resilience measures into a strategic document called the Program of Economic Development and Social Development of the City of Trenčín for the years 2023–2029 with a view to 2050. The mentioned strategy includes resilience measures in connection to selected spheres of

life, mainly environment and renewable resources, rural development, and green and blue infrastructure [74]. Measures are focused on the building of awareness, informational support, and free-time activities that reflect the development of a low-carbon economy, effective use of resources, adaptation to climate change, and preparedness for extraordinary situations.

A long-term vision on the topic of resilience was identified in the case of the city of Trenčín. The main strategy of the city defines priorities for the seven-year horizon but also declares the required development of partial spheres of life with a view to 2050. This long-term vision reflects the aims and goals of similar documents adopted at the national or European level. A similar long-term approach is unique in cities and municipalities but confirms the importance of a strategy approach.

5 Discussion

Resilience has become a frequently discussed issue in the sphere of public administration and local self-government. As demonstrated by the previous research, resilience can be improved and that is the main justification for studies that aim to investigate its components. The mentioned research and selected case studies demonstrated that communal resilience can be decomposed into partial components (Fig. 2).

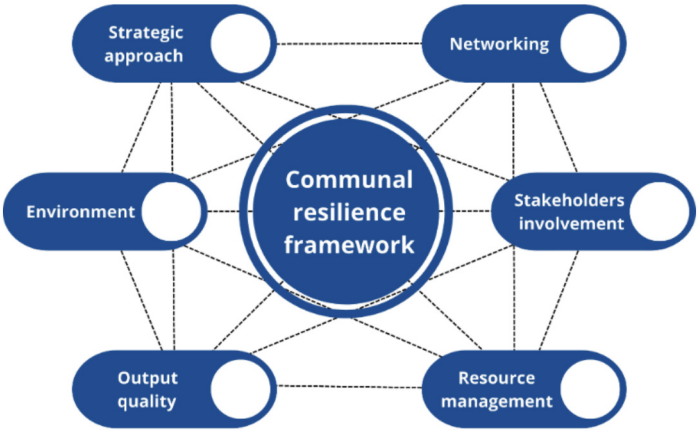

Fig. 2. Communal resilience framework. Source: authors.

A strategic approach must be seen as the first and most crucial component of the communal resilience framework. Cities and municipalities usually adopt different types of documents, strategies, and action plans. Some of them are required by the national legislation, but cities and municipalities also adopt documents at their own decision. Currently, there is no legal obligation to adopt a document focused on resilience. At the communal level, two types of approaches can be identified. Cities and municipalities often elaborate documents focused mainly on ecological and energetic dimensions of resilience. Simultaneously, the topic of resilience is very often incorporated in different

types of documents, while the same partial components of resilience can be found in two or more documents.

As was proven by the theory and case studies, networking and increasing the capacity of social networks is a very important component of communal resilience. Cities and municipalities should proactively strengthen mutual social connections between entities in their territory. Different communities can positively influence the ability of cities and municipalities to prepare, respond, adapt, and recover from crises and extraordinary situations. Communities that may be perceived as distant may be the source of success, for example, volunteers, youth, seniors, and people with disabilities. Vital social networks help local democracy to take advantage of adequate responses when it is needed. Strong communities may help cities to be more resilient and also may help cities to provide public goods and services on a complementary basis, not just in normal situations, but also in times of crisis or emergency.

Stakeholders' involvement is a key part of successful policymaking in each sphere of life. The involvement of relevant stakeholders in the planning and implementation of partial activities may increase the capacity of cities and municipalities to be more resilient. Transparency and openness of these processes help stakeholders not only to gather necessary information but also to communicate with cities and municipalities through official and approved channels. Awareness of stakeholders on their roles and accountability during the crisis is an important precondition for the successful management of disturbances in communal life. Involved communities can also help cities and municipalities to achieve outcomes of public policies with lower costs.

Resource management is in the context of resilience mostly perceived as economic effectiveness and cost saving. This view mainly results from the saving of public finances generated by green and digital technologies adopted by cities and municipalities. In this regard, economic effectiveness has the potential to strengthen resilience, and vice versa. However, measures focused on strengthening communal resilience also save other types of resources, mainly material and personal of cities and municipalities. Thus, it can be mutually beneficial to use the potential of communities to innovate and critically evaluate public services and communal life needs. Part of this component is also decreasing of energy consumption of facilities and energy independence and security.

Output quality represents mainly the quality of public goods and services provided by cities and municipalities. Besides, it can be also perceived as the quality of resilience that can be compared between local self-government units. In this regard, this component includes the quality of partial public services that strengthen resilience, but also the quality of communal resilience established by the city´s management and co-created by involved stakeholders. Finally, this component also influences the quality of life perceived by citizens.

Environment as another component of the communal resilience framework reflects the importance of resilience in the sphere of ecology. Practical implications represent mainly climate change management, expansion and maintenance of greenery, and biodiversity, as well as the development of green and blue infrastructure. The importance of this component is also underlined by the growing rate of natural disasters and the building of awareness on the protection of the environment. The environment surrounds each human activity, thus the quality of the environment affects a wide range of competencies

performed by cities and municipalities, as well as the everyday activities of citizens. It is easy to harm nature and the environment, but it takes much longer to repair that damage. In this regard, the environmental dimension must be perceived as an important part of strategies and visions in the conditions of cities and municipalities.

The results showed that analyzed regional cities in Slovakia have different approaches to the topic of resilience. Selected cities concentrate their attention on identified components. Table 2 includes a comprehensive summarization of analyzed cases focusing on the occurrence of partial components of the communal resilience framework.

Table 2. Comprehensive summarization of communal resilience components

	Strategic approach	Networking	Stakeholder involvement	Resource management	Output Quality	Environment
Case 1 Strengthening of Energy Independence	x			x	x	x
Case 2 Digitalization and Circular Economy		x	x	x		x
Case 3 Unique mobile application for increased safety	x				x	
Case 4 Systematic evaluation as a tool for strong communities	x	x	x		x	x
Case 5 Preparedness for climate change in communal life	x	x	x			x
Case 6 Green and living housing estates		x	x		x	x

(*continued*)

Table 2. (*continued*)

	Strategic approach	Networking	Stakeholder involvement	Resource management	Output Quality	Environment
Case 7 Strategy with clear measures, timeline, and responsibility	x	x	x	x		
Case 8 Long-term visions by European values	x		x			x

Source: authors

Cities, and especially bigger cities, have an important role in strengthening and improving communal resilience. With their infrastructure and resources, bigger cities can provide help and assistance to smaller municipalities in the nearest surroundings. The developed communal resilience framework applies not only to the city itself, but also to functional urban and metropolitan regions, or any other communal units. Especially bigger cities have the potential to serve as an entity that smaller cities and municipalities can rely on in times of crisis or emergency. Small municipalities may not always be able to be resilient in crises, therefore those municipalities may rely on bigger (region) cities that have enough financial, personnel, and human capacities.

6 Conclusion

The topic of resilience has evolved into a crucial phenomenon that is gaining more and more attention from theoreticians and practitioners. This tendency is even more visible in the local self-government, a part of public administration that directly affects the quality of life. Based on previous research, resilience, and communal resilience refer to the ability of local self-government units to react, adapt, and recover from expected and unexpected crises or emergencies. In this regard, the communal resilience framework defines components of preparedness and planning that help local self-government units resolve crises or emergencies caused by endogenous and exogenous factors.

Based on the literature review and presented case studies, six complementary components of the communal resilience framework have been identified, specifically strategic approach, networking, stakeholder involvement, resource management, output quality, and environment. The main benefit of the developed communal resilience framework is its applicability not just for cities, but the framework is also applicable by functional urban and metropolitan regions, or any other communal units. Simultaneously the study contributes to the growing discussion on the standardization of communal resilience framework. The importance of research is also underlined by the increasing rate of

crisis and emergencies, that constantly challenge cities and municipalities across the world. Despite the benefits of the study, there are still limitations to be addressed in further research. First, our findings were partially based on the intentional selection of case studies. Nevertheless, we consider their information value sufficient to demonstrate different aspects of communal resilience. Our research can be further extended from the following aspects, mainly broadening the empirical evidence, and further analysis of different approaches to resilience across municipalities, cities, regions, and governments.

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