





Benefits and Obstacles of Smart Governance in Cities

Katarína Vitálišová^(✉) , Katarína Sýkorová , Samuel Koróny, and Darina Rojíková

Faculty of Economics, Matej Bel University, Tajovského 10, 975 90 Banská Bystrica, Slovakia
{katarina.vitalisova, katarina.sykorova, samuel.korony, darina.rojikova}@umb.sk

Abstract. The development of information and communication technologies influences all spheres of our lives and society including the concepts of public sector management and its tools. The aim of the paper is to point out the importance of smart governance and its toolkit in cities as an innovative component of local policy. The success of local development lies right at the heart of the relationships between local municipality and citizens and other stakeholders, including other public administration bodies what smart governance significantly strengthens.

The paper presents the findings of the primary research realized by Delphi method among experts in the fields of regional development, strategic planning, public administration from different countries from academia and from practice in second half of 2020. It compares their opinions on the main issues of smart governance in cities (its benefits, obstacles, and tools) with results based on the deep literature and research studies analysis. Subsequently, it identifies the main common features and obstacles of smart governance in local municipalities.

Keywords: Toolkit · Smart governance · Cities · Benefits · Obstacles

1 Introduction

The transformation of public administration at local level is in line with the technological progress, digitalization and “smartness” in decision making and thus has resulted in a new phenomenon smart governance within the smart city ecosystem. This trend is strongly associated with the participation and interactions of local government with all relevant stakeholders on regular and multi-channel communication including the virtual space.

The attribute “smart” in governance of cities enhances the local polycentric system in which a large number of different stakeholders are involved in local policy decision-making processes, based on the knowledge of behavioral economics, traditional tools of local policy in combination with the IT technologies. It is not just about adopting technology but more concerned with obtaining effective governance processes and achieving improved urban outcomes through the innovative use of technologies (Huaxiong 2021).

This approach in cities in Central and European Union had been implemented gradually, but usually not associated with some systematic approach. With ambition to learn

from the best, we research among the experts from all over the world, which is the most comprehensive definition of smart governance, what are the benefits and potential obstacles of its implementation, as well as the tools that it uses. However, the great impact of COVID-19 pandemic is evident also in this issue. In many cities it has speeded up the penetration of smart tools in solving the emerging situation, communication with citizens as well as the negotiations of crisis staffs.

The paper is organized as follows. Section 2 is theoretically oriented and defines the smart governance as a key dimension of smart city. Section 3 details the proposed methodology, including the realized Delhi method among experts in the fields of regional development, strategic planning, and public administration from academia and practice from different countries in second half of 2020. The third section is devoted to presentation of the research results on the main issues of smart governance in cities (its benefits, obstacles, and tools). In the concluding part of the paper, we summarize the main challenges of smart governance development in cities.

2 Smart Governance in Cities and Its Toolkit

Based on the deep literature and research studies analysis, we identified the gradual progress in definition of smart governance. The first group of definitions strongly link the smart governance with the new technology (Gil-Garcia et al. 2014; Scholl and Alawadhi 2016) and the role of e-government (Estevez and Janowski 2013; Janowski et al. 2012). As the theory and its implications in practice developed also more complex definitions were introduced. Firstly, aimed at the smart governance generally (Pereira et al. 2018) and later, specifically in case of cities (Ruhlandt 2018)¹. We incline to this definition because it combines all key elements of smart governance as stakeholders, their empowerment (roles and responsibilities), operational framework (structure, legislation, policies, agreements), tools and expected outputs.

Gil-Garcia and Zhang (2016) declare that the smartness in local governance is based on integration, innovation, evidence-based decisions, citizen orientation, sustainability, creativity, efficiency, effectiveness, equality, entrepreneurship, citizen engagement, openness, resilience and technological capabilities.

However, the key element in building smart governance in cities is a considerable effort from politicians and city management to look for possibilities how to collaborate and empower the residents, entrepreneurs, as well as the various communities in the city and implement these possibilities via relevant tools and methods in local policy decision-making (Vaňová 2021; Lee and Lee 2014; Lombardi et al. 2011). For this process is necessary to create the suitable legislative and organizational framework, technological infrastructure as well as to support activities aimed at strengthening the digital skills of employees but also stakeholders (Nam and Pardo 2011; Mellouli et al. 2014; Maheshwari and Janssen 2014; Nam and Pardo 2014).

¹ Ruhlandt (Ruhlandt 2018, p. 10) defines smart governance in city as “a processual interplay among a diverse set of stakeholders, equipped with different roles and responsibilities, organized in various external and internal structures and organization, driven and facilitated by technology and data, involving certain types of legislation, policies and exchange arrangements, for the purpose of achieving either substantive outputs for cities or procedural changes”

Building smart governance is a long-term transformation process that requires financial and human investment, to which government must commit. That is why a common understanding of the smart governance concept, vision, strategy and sharing of responsibilities is an essential part of success.

The level of smart governance can be then assessed on the basis of transparency in urban management, the involvement of social partners, the level of public services and the implementation of development strategies (Kumar 2017; Zanella et al. 2014; Caragliu et al. 2011).

Smart governance can be seen as a basis for the development of smart administration through the application of new information and communication technologies (ICT) in management of local municipalities (inter alia Pérez-González, Díaz-Díaz, 2015; Pereira et al. 2017; Kleinhans et al. 2015; Castelnovo et al. 2015; Khan et al. 2015; Navarro-Galera et al. 2016). Smart governance with utilization of ICT improves decision-making process by better cooperation of different stakeholders and higher rate of their participation at solving public issues (Vitálišová et al., 2020). Because of the strong independence on the ICT, the great challenge for the cities is to educate and trainee the end-users of the smart governance tools. It assumes to develop tools which are friendly to all groups of stakeholders and moreover to combine the traditional and modern tools of governance to become an equal partner in relationship with local government.

All tools of smart governance can be associated with two main competences of local municipalities - participation in public policy processes (including informing) and involvement in improving services in the city (co-creation of smart city services). Participation of stakeholders increases openness, transparency, accountability of local authority and thus the quality of relations between stakeholders and local governments. Governments use and share data, information and knowledge to support evidence-based decision-making that enables governments to make more informed decisions and improve the effectiveness of public policies and programs. There can be used the traditional tools of participation as well as their innovative forms or new one (Castelnovo et al. 2015; Vitálišová et al. 2021). Co-creation of smart city services can help increase the city's competitiveness and citizens' quality of life, by ICT in city planning and management. Innovative services provide citizens with information, knowledge and actions related to various aspects of their city life (Lee and Lee 2014).

Guimarães et al. 2020 researches the impacts of smart cities on quality of life and clustered them into four areas—(1) transparency (dominant position), (2) cooperation, (3) participation and partnership, (4) communication and (5) responsibility. The smart governance toolkit supports the development of participation. By Smart cities and inclusive growth (2020) it includes several categories: (1) communication (information); (2) consultation; (3) participation; (4) representation in decision-making bodies; (5) partnership; (6) co-production and co-decision.

Based on the in-depth analysis of literature and research studies (inter alia Mackintosh, 2005; Castelnovo, et al. 2015; Estevez and Janowski 2013; Chourabi et al. 2012; Wijnhoven et al. 2015; Gil-Garcia et al. 2015; Johannessen and Berntzen 2018; Simonofski et al. 2019; Guimarães, et al. 2020; Vaňová 2021), we can identify 4 groups of smart governance tools. They overlap and complements each other. The first group includes the tools that strongly support the transparency (e. g. providing information, open data,

sharing databases, etc.). The second group includes the tools by which citizens become democratic participants in the city's decision-making process. It contains modern forms of e-participation and e-democracy belong electronic e-voting, e-petition, e-referendum, e-panel, discussion forums and chatting rooms, electronic community, electronic civil boards. Very efficient tools to support the decision-making process are electronic advisory elections, simulation of decision making, quick polls and surveys. These tools overlap partially with last two groups of tools—co-production tools (e. g. participative planning, participative budgeting, surveys, crowdsourcing, crowdfunding, living labs, etc.) and communication tools (websites, social media, PR, blogs, mobile application, etc.).

The implementation of the smart governance concept has been strongly influenced by the COVID-19 pandemic. The crisis has accelerated the need to communicate virtually and well as manage the crisis with the support of IT tools. The pandemic showed that it is never enough to possess the best apps and technologies; and a great need of inclusive policies, ground-up initiatives, and effective leadership (Baharudin 2020; Zhang and Savage 2020; Das and Zhang 2020). A crucial element to predict, detect, and mitigate a pandemic is 'data' retrieved from different sources and the increase of data sources should be pursued by the cities (Costa and G., Peixoto, J. P. J. 2020). The required actions to create smart cities can come from different areas, but governments should play the leading role in this process. Relevant for the future, the local and regional governments stakeholders should identify interventions to be executed in order to build back better after the Covid-19 pandemic and lead towards a more inclusive, safe, and sustainable urban future (Cities for all. Empowering Local Governments on Inclusive Pandemic Response 2020).

3 Material and Methodology

The paper is dedicated to the topic of smart governance, its tools, benefits, and obstacles of its implementation. The paper aims to point out the importance of smart governance in cities as an innovative component of local policy.

The paper presents the findings of the research realized by Delphi method among 33 experts during second half of 2020 mostly from the fields of regional development (39,39%), strategic planning (27,27%), and public administration (15,15%), politics (6,06%) and other (3,03%). They come from academia (85%) and from practice (15%). 49% of experts came from Slovakia, 18% from Poland, 9% from Italy as well as from Czech Republic. Other experts come from Hungary, Belgium, Finland, and Japan.

The experts involved into the research were identified by the authors' analysis of the academic papers and strategical documents of municipalities in Slovakia (the paper is an output of the research project oriented on the exploring smart governance in Slovak cities). In the first round, 278 experts were invited to participate, but we receive responds from 33 experts which were involved in the next steps of research (Fig. 1). That is why we assume that they are perfectly oriented in the topic and their knowledge covers complexly the research issue.

To process the primary data, we used a range of mathematical and statistical methods, especially the descriptive statistics and Kendall correlations.

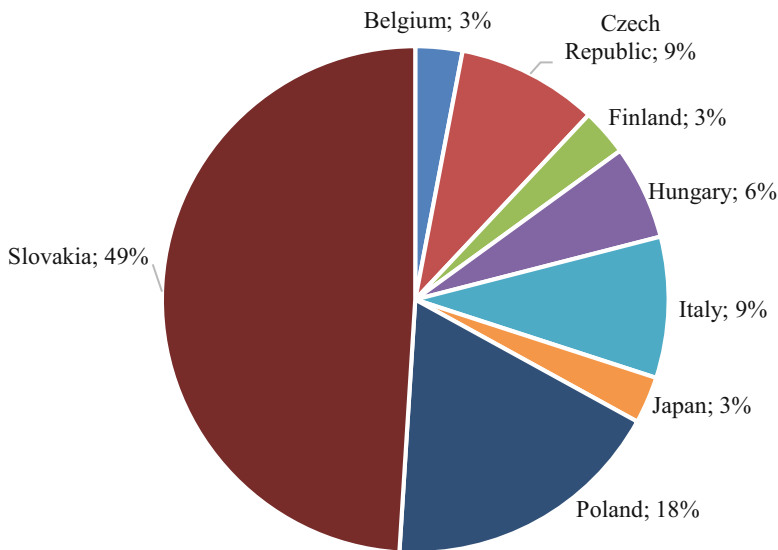


Fig. 1. The structure of research sample according to country

The last part of the paper discusses and summarizes the most important research findings and the main challenges of smart governance development in context of COVID-19 pandemic. All reports were made by Excel and by statistical software IBM SPSS 25.

4 Research Findings and Discussion

Experts involved in our research by Delphi method had the possibility to choose at most two definitions of smart governance in city from definitions stated below:

- Investing in emerging technologies coupled with innovative strategies to achieve more agile and resilient government structures and governance infrastructure in city (Gil-Garcia et al. 2014; Scholl and Alawadhi 2016);
- The application of technology by governments in order to transform themselves, their interactions with customers and the relations with and citizens, businesses, other non-state actors and other arms of government, creating impact on the society in cities (Estevez and Janowski 2013; Janowski et al. 2012);
- Form of governance, allocating decision-making rights to stakeholders and enabling them to participate in effective and efficient decision-making processes to improve the quality of life in cities (Pereira et al. 2018);
- The processual interplay among a diverse set of stakeholders, equipped with different roles and responsibilities, organized in various external and internal structures and organizations, driven and facilitated by technology and data, involving certain types of legislation policies and exchange arrangements, for the purpose of achieving either substantive outputs for cities and procedural changes (Ruhland 2018)

– Other (space for own definition).

46% of respondents marked the definition of smart governance provided by (Ruhland 2018) as the best matching definition. 34% of respondents considered the definition by Pereira et al. (2018) as the most comprehensive and 12% of respondents regarded definition created by Estevez and Janowski (2013); Janowski et al. (2012) as the best matching definition. 6% of respondents chose definitions by Gil-Garcia et al. (2014); Scholl, Alawadhi (2014) and only 3% of respondents noticed own definition of smart governance. For detailed information see Table 1.

Table 1. Best matching definition of smart governance in city according to author(s).

Author(s)	Number of answers	Share (in %)
Ruhland (2018)	23	46%
Pereira et al. (2018)	17	34%
Estevez and Janowski (2013); Janowski et al. (2012)	6	12%
Gil-Garcia et al. (2014); Scholl and Alawadhi (2016)	3	6%
Other (own definition of respondent)	1	2%
Total	50	100%

The definition of Ruhland (2018) is preferred by the regionalists, the definition of Pereira et al. (2018) is preferred by experts in strategical planning. By the answers of respondents there is not clearly selected one best definition what confirms the difficulty to define the term of smart governance. Based on the research results, the definition should combine the approach of both experts. So, the smart governance in cities is a form of governance based on the processual interplay among a diverse set of stakeholders organized in various external and internal structures and organizations, driven and facilitated by technology and data with the appropriate legislation policies, focused on allocating decision-making rights to stakeholders and enabling them to participate in effective and efficient decision-making processes to achieve substantive outputs for cities and procedural changes embodied in the improving of the quality of life in cities.

Benefits of Smart Governance in City

Based on literature research (Savoldelli et al. 2014; Castelnovo et al. 2015; Osella et al. 2016; Navío-Marco and Anand 2018; Guenduez et al. 2018; Pereira et al. 2018; Tomor et al. 2019; Thon and Nhu 2020) and own previous research we set together group of 16 potential benefits of smart governance in the city, that were evaluated by experts involved in the research. Experts marked each potential benefit with grade from 1 (strongly disagree) to 5 (strongly agree). Results are presented in Fig. 2.

As benefits with highest mark (4,27) were selected increasing administrative efficiency and interoperability, promoting social justice together with improving the quality of life in cities. On the second place, but with little difference, there is enabling stakeholders to become more knowledgeable and more skilled (mark 4,21) followed by improving

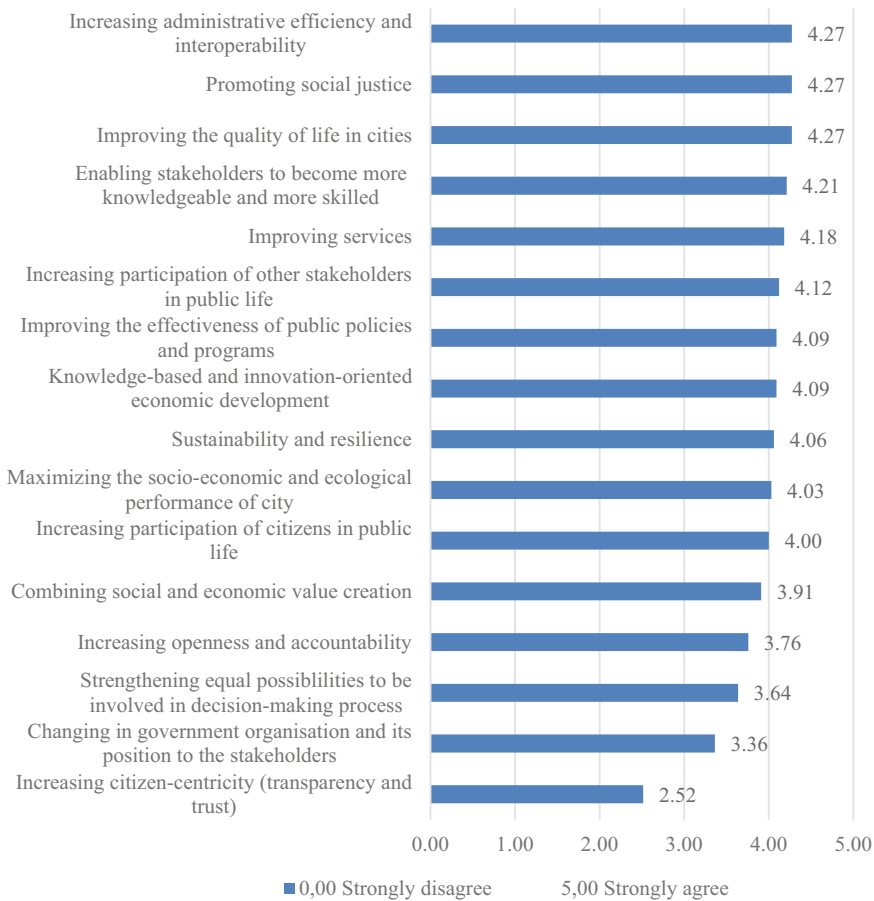


Fig. 2. Potential benefits of smart governance in the city

services (mark 4,18), increasing participation of other stakeholders in public life (mark 4,12), knowledge-based and innovation oriented economic development and improving the effectiveness of public policies and programs (both mark 4,09). According to experts, smart governance in the city increases participation of citizens in public life (mark 4,00), but at the same time increasing citizen-centricity (transparent and trust) is the benefit with the lowest mark (2,52). This is quite surprisingly contradictory.

Based on the research results, the identified benefits of smart governance in cities can be divided into three groups. The first group includes the impacts on the quality of life in the cities (better social and economic conditions, value creation, social justice, performance of the city, sustainability, resilience, etc.). The second group relates to the local municipality and its managing by the local authority (e. g. administrative efficiency, interoperability, effectiveness of public polices, etc.) and the last one is more oriented on stakeholders and its empowerment in local policy (e.g. increasing participation of

stakeholders, equality in their role in local policy. However, it is not possible to conclude which of them are dominant because of their overlapping.

Negative Effects of Smart Governance

Other part of our research deals with obstacles and negative effects of smart governance. We defined 7 potential obstacles or negative effects of smart governance (Tomor et al., 2018; Pereira et al. 2018) Experts were asked to evaluate each obstacle/negative effect with grade from 1 (strongly disagree) to 5 (strongly agree). Results are presented in the Fig. 3.

Insufficient learning capacity of local government was marked as the most important obstacle (mark 4). As second critical obstacle experts specified preference of technological innovations instead of the users' needs and expectations (mark 3,73) with little difference followed by exclusion of certain categories of the general population (mark 3,64). On the fourth place with mark 3,36 experts identified higher drop-out rates in participation, especially in e-participation as a potential obstacle of smart governance.

With the use of ICT and collecting necessary data important for improving or development of municipality is closely connected other obstacle citizens transform into operative units for data-collection (mark 3,12). Other examined obstacles scored less than mark 3—negative effects of technology on ecology (e. g. energy consumption and pollution), (mark 2,73) and increasing consumption in the field of nutrition and consumer goods (by other words because of the relatively quick online distribution channels, the customers tent to shop or use more products and services) (mark 2,42).

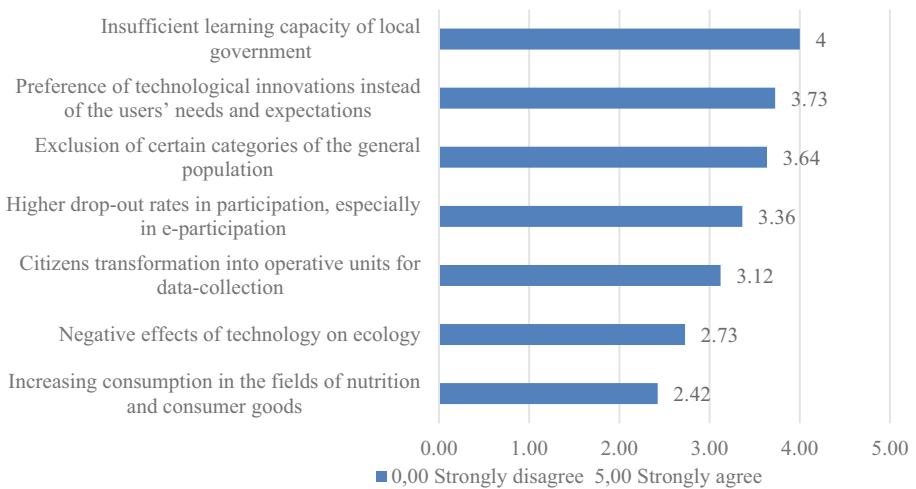


Fig. 3. Negative effects of smart governance

To eliminate these negative effects of smart governance it is necessary to implement smart governance strategically—it means to establish all necessary preconditions in legislative, organizational, procedural as well as technological framework (see more Pereira et al. 2018; Guenduez et al. 2018; Tomor et al. 2019; Thon and Nhu 2020). Moreover,

the further research how to prevent them could be helpful for the future development in cities.

Tools of Smart Governance

According to deep literature research and own experience we arranged a list of 28 smart governance tools. We divided tools into four groups—the tools that strongly support the transparency; tools by which citizens become democratic participants in the city's decision-making process; co-production tools and communication tools.

In the Fig. 4 we present the importance of smart governance tools according to expert opinion. Respondents were asked to indicate the importance of each of the 28 smart governance tools using mark from 1 (the least important) to 5 (the most important) for each tool.

We found out, there are very small differences between surveyed tools. According to experts, to the most important smart government tools belong the group of tools supporting transparency, i.e. open data portal on local government issues (mark 4,61), database for sharing information within the municipal office and smart city strategy (mark 4,55). It is followed by tools of co-creation of public services (mark 4,59) and co-production of public services (mark 4,47) and participatory planning (mark 4,47). As the third important group are the tools for active citizenships and the last group are the communication tools. It is important to mention that up to 19 tools scored the mark 4 or more, that means that according to experts the importance of almost all identified tools is relatively high. On the other hand, the successful implementation of most of them requires well developed IT infrastructure, integrated operational system and interoperability of the collected data.

To find the relationships between the smart governance toolkit and benefits we used the Kendall correlations coefficients. We testified the correlations of each evaluated tools with the each indicated benefit (see Fig. 2). The results of tests are presented in Fig. 5. We present just these one, where was the relationship evaluated as statistically important. The tools are again divided into 4 groups:

- red color - the tools that strongly support the transparency;
- yellow color - tools by which citizens become democratic participants in the city's decision-making process;
- blue color - co-production tools and
- green color - communication tools.

The red numbers in the figure presented that the relationships among the tool and benefit is statistically important, the positive number means a positive correlation—as the benefit is evaluated as “more agree”, also the tool is more important. The interpretation of the negative correlation has no informative value in this case.

By the tests results, to the increasing openness and accountability contribute public hearings as well as providing information via website (mind positive correlation). Strong positive correlation was indicated also among increasing citizen-centricity and shared architecture of data systems for multi-level governance and cross-city engagement for knowledge. Discussion forums with representatives of stakeholders's groups contribute

Transparency	
Open data portal on local government issues (online and off-line)	4,61
Database for sharing information within the municipal office	4,55
Smart governance strategy/smart city strategy	4,55
Shared architecture of data systems for multi-level go	4,30
Integrated security system	4,15
Electronic identity	3,97
3D map system	3,70
Cloud storage for sharing documents and information	3,48
Tools supporting democracy citizenship	
Electronic tools of e-democracy (electronic voting, petitions, etc.)	4,31
Participation of stakeholders in working group	4,24
Educational activities oriented to stakeholders	4,00
Co-production of public services	
Co-creation of public services	4,59
Co-production of public services	4,47
Participatory planning (online and offline)	4,44
Electronic public services/digital services	4,38
Cross-city engagement for knowledge/experience exchange	4,18
Participatory budgeting (online and offline)	3,90
Communication tools	
Online feed-back system from stakeholders	4,39
Discussion forum with representatives of stakeholders	4,33
Public discussions (hearings)	4,06
Online communication via web applications of the municipality	4,03
Online communication via mobile phone applications of the municipality	4,03
Online communication via social networks	4,00
Website of the city	3,91
Hackathons and competitions for stakeholders	3,73
Organising events	3,59
Questionnaire survey	3,48
Contacting stakeholders by post, e-mail, etc.	2,88

Fig. 4. The importance of smart governance tools

to the changes in government organization and its positions to stakeholders. The positive correlation is also between hackathons and competitions for stakeholders and increasing participation of citizens in public life; databases for sharing information with the municipal office and reducing social justice and improving the quality of life in cities.

The research results on the definition of the smart governance confirm the complexity of the Ruhlandt's definition (2018), as well as our approach to this issue. The smart

Tools / Benefits	Increasing administrative efficiency and interoperability	Increasing openness and accountability	Improving the effectiveness of public policies and programs	Changing in government organization and its position to the stakeholders	Increasing citizen-activity (transparency and trust)	Increasing participation of citizens in public life	Knowledge-based and innovation-oriented economic development	Combining social and economic value creation	Strengthening equal possibilities to be involved in decision-making process	Promoting social justice	Improving the quality of life in cities
Open data portal on local government issues (online and off-line)	0.086	0.007	-0.498**	-0.133	-0.116	-0.183	0.010	-0.076	0.184	0.018	-0.033
Databases for sharing information within the municipal office	0.069	0.076	-0.254	0.183	0.243	0.076	0.038	-0.030	0.318*	0.223	0.344*
Shared architecture of data systems for multi-level governance	0.020	0.173	-0.038	0.191	0.339*	0.241	-0.038	0.219	0.063	0.126	-0.066
Educational activities oriented to stakeholders	-0.111	0.044	-0.333*	0.043	0.072	-0.056	-0.003	-0.023	0.090	0.164	0.032
Participatory budgeting (online and offline)	0.137	0.124	0.049	0.013	0.105	0.005	0.072	-0.065	0.177	0.307*	0.134
Co-creation of public services	-0.363*	-0.027	-0.073	-0.055	-0.043	0.112	-0.159	-0.082	-0.210	0.098	-0.119
Cross-city engagement for knowledge experience exchange	-0.071	0.272	-0.263	0.244	0.428**	0.299	0.056	0.154	0.198	0.238	0.150
Public discussion hearings	0.140	0.444**	-0.089	-0.032	0.165	0.215	-0.052	0.089	0.108	0.046	0.113
Discussion forum with representatives of stakeholders' groups	-0.182	0.016	0.169	0.330*	0.228	0.249	0.020	0.116	0.172	0.182	0.165
Contacting stakeholders by post, e-mail, etc.	-0.254	-0.008	-0.196	0.005	-0.046	-0.046	-0.321*	-0.370*	-0.045	0.107	0.089
Website of the city	-0.128	0.323*	-0.058	0.011	0.107	0.141	0.008	0.014	0.229	0.185	0.039
Online communication via social networks	-0.335*	-0.026	0.075	-0.054	0.150	0.165	-0.185	-0.031	0.163	0.145	0.139
Online communication via web-applications of the municipality	-0.417**	0.093	0.028	0.079	0.194	0.231	-0.200	-0.090	0.195	-0.023	-0.027
Hackathons and competitions for stakeholders	0.060	0.101	0.067	0.035	0.140	0.369*	0.165	0.267	0.191	0.023	0.195

* p < 0.05 or ** p < 0.01

Fig. 5. Kendall correlation coefficients between benefits and tools of smart governance in local municipalities

governance approach should be seen as a framework for the various types of interaction and cooperation with the stakeholders in the municipalities realized in the traditional way but also with the support of new IT technologies and collecting data what contribute to design more tailored public services and increase quality of life. These expected outputs were also confirmed as benefits of smart governance implementation.

Moreover, the smart governance can be a suitable way how to increase the administrative efficiency and interoperability, eliminate the paper issues and time wasting. However, it is possible only with the knowledgeable and skilled employees with the will to develop their digital and analytical skills, as a basis of learning capacity of local authority.

The key to successful implementation of smart governance is a tricky balance of implementation of technological and social innovations relevant to the stakeholder's needs and expectation with support of interactive communication tools. The looking for optimal balance in these issues can help eliminate the potential obstacles explored also by our research.

5 Conclusions

The paper reflects very actual topic of smart governance in cities strongly influenced by Covid-19 epidemic. The aim of the paper was to point out the importance of smart governance in cities as an innovative component of local policy with special attention paid to the utilization of smart governance tools in elimination of the effects of the COVID-19 pandemic in cities.

Our findings point out that pandemic situation speeded up the implementation of selected tools of smart governance in cities. Consecutive the utilization of smart governance tool and principles enable municipalities to provide services, created development policy and communicate more effectively with citizens, entrepreneurs, and other stakeholders even in time of pandemics. In this case, the COVID-19 showed that the utilization of the smart governance tools should be a regular part of municipal agenda.

In Slovak municipalities, as a totally new tool that has been used in the time of pandemics, are online–electronic meetings of municipal council/parliament and other municipal bodies According to law, municipal parliament should be in session at least each three months. To ensure meeting of local (municipal) parliaments and avoid infection of the new coronavirus some Slovak cites has started to use online meeting. The municipality has the obligation to create and release a video recording till 48 h after the online meeting and to create and release written record of the meeting till 5 days at the website of the city.

Other example of utilization online tools of smart governance in the city is elaboration of strategic development documents. City Žarnovica has started to prepare its strategic program of economic and social development using ICT and online communication. Working groups built up from representatives of city management, municipal parliament, citizens and representatives of university and other stakeholders had scheduled online meetings via MS Teams application and necessary data were collected from open data portals of Regional government and Statistic office of Slovak republic.

The city Banská Bystrica provides for citizens online reservation form for some public services. Register Office offers the possibility for citizens to register on exact date if they need a specific service for example birth certificate for newborn baby etc.

The pandemic situation has accelerated electronization of public services as well as their real practical utilization in Slovakia. Formally, it was possible to use many electronic services before pandemics, but very little things were really prepared and done.

Our research showed that all tools of smart governance are important and optimal way is to mix them with aim to achieve the multichannel communication with stakeholders which significantly influence the forms of interaction and cooperation in co-creating and co-producing of public services and local policy decision making.

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