

# THE PUZZLING CONCEPT OF SMART CITY IN CENTRAL AND EASTERN EUROPE: A LITERATURE REVIEW DESIGNED FOR POLICY DEVELOPMENT

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## Abstract

The modern concept of smart city rose from a relatively ambiguous term dealing with the future of urban areas to one of the most popular contemporary fields of research. Tackling a considerable range of topics from digitalization, citizen involvement, sustainability or governance, it managed to rapidly attract both academics and policy-makers. This study reviews the research papers published on the smart city concept with application to the European Union, and especially to the new member states from Central and Eastern Europe. The results indicate many common features of smart cities in the EU, but also some peculiarities of CEE in this regard, many deriving from their socialist inheritance. Meanwhile, it can be noticed the rather incipient status of smart cities approaches, the insufficient resources allocated by local authorities, which rely extensively on EU funding, the lack of awareness from citizens and the lack of a comprehensive and structured strategic approach. In order to tackle the abovementioned issues, our paper suggests a series of measures and directions for policy-makers, local administrations and business environment.

**Keywords:** smart city, CEE, digitalization, governance, sustainable development.

## 1. Introduction

During the last two decades, the concept of smart city became a buzzword which captured equally the attention of academics, mass-media, business environment and policy-makers. Its insertion in scientific papers, urban planning documents and popularizing communication has not ceased to increase to the point that different and sometimes confusing interpretations slipped into the general public perception. Nonetheless, besides growing into a popular 'megatrend', the smart city represents a fashionable (technological) concept which brought massive changes in the way policy makers are currently seeing the development of the urban areas.

Smart is just one of the multitude of concepts meant to designate the relation between the advancements of information and communication technologies (ICT) and economic, political and socio-cultural change, alongside 'intelligent', 'innovative', 'wired', 'digital', or 'creative' (Hollands, 2008; Thompson, 2016). In spite of the apparent diversity, the above-mentioned concepts represent variations of the same idea, the existent variety being a supplementary sign of the heterogeneous vision currently governing the field. Chronologically, 'digital city' was one of the first concepts largely used in literature and political discourse between 1997 and 2009, while since 2010 (and the adoption of Europe 2020 Strategy), 'smart city' became the predominant concept (Dameri and Cocchia, 2013). There are also geographical aspects regarding the use of these terms: 'intelligent city' was mainly used in Northern America and UK, 'digital city' is mostly present in USA, the Western parts of Europe (Ireland, UK), and Asia, while 'smart city', traditionally used in Europe and North America, became lately the most popular concept worldwide (Moir, Moonen and Clark, 2014).

From the technological-centric approach of Angelidou *et al.* (2018) to the more social-centric approach of Caragliu, Del Bo and Nijkamp (2011), or Taylor Buck and While (2017), the scientific literature proposes a generous offer of case-studies, researches, analyses, and interpretations. The variety of perspectives and the continuous interest of academia gradually induced a higher acceptance and a broader use of the concept within the political discourse as well. Introducing and supporting 'the use the information and communication technologies to develop their cities competitively in the increasingly complex and inter-connected world' (Paskaleva, 2009, p. 406) become a central topic for policy-makers who found in smart city an appealing framework, full of opportunities. Concisely, the notion of smart city incorporates the idea of an integrative framework making efficient and sustainable use of ICT, social capital, and environmental resources (Kourtit and Nijkamp, 2012). It addresses the long-term sustainability of urban areas, the improvement of quality of life, increased efficiency of urban operations and services, environmental protection, and urban competitiveness (Romão *et al.*, 2018).

Nonetheless, this academic interest for smart city-orientated strategies is not equally embodied across the globe. A review on papers written on digital and smart cities (Dameri and Rosenthal-Sabroux, 2014) ranked Asia as the continent with the most occurrences of the smart city concept (49% of papers), followed by Europe

(36%) and North America (only 9%). More recently, Joss *et al.* (2019) analyzed 27 sites worldwide, equally divided between Asia, Europe and America, and found that there is a certain homogeneity and communality in the vision regarding the smart city concept. However, significant differences can be observed in the integration of different dimensions of the concept (even between cities from the same continent (Joss *et al.*, 2019). These geographic differences are perceptible also in terms of approaches regarding the implementation of smart city initiatives. American and Asian smart city policies are financed mostly by national governments and private actors (Caragliu and Del Bo, 2020), while in Europe smart cities rely heavily on funding from European Commission's Frameworks Programs (Research & Innovation Schemes) that envision cities as key drivers of resilience and competitiveness (Caragliu, Del Bo and Nijkamp, 2011; European Parliament, 2014; Engelbert, van Zoonen and Hirzalla, 2019).

Despite the increasingly globalized world, the above-mentioned differences raise the question of spatial differences in the understanding, the implementation, and the interpretation of an overly technological concept. While a smart strategy is highly dependent on the local and regional context (Hollands, 2008), the existent literature identified a series of common actions generally considered as compulsory components of smart city strategies. This could turn out extremely helpful for public and private actors from CEE countries, where the emergence of smart city initiatives is more recent and responds to specific needs of the restructured, post-communist, systems. Local policy-makers from CEE urban areas are looking for smart solutions for their rejuvenating cities, however, the increased diversity of possible actions, doubled by an extreme overcomplication of the approaches, makes the task extremely difficult. Our study aims at providing a thoroughly, policy-orientated, literature review which could help local actors from the new member states of the EU build more solid and adequate smart city strategies.

## **2. Data and method**

As primary source for this literature review, we explored the journals, books, and proceedings from the most comprehensive and renowned scientific database, Web of Science Core Collection (<http://webofknowledge.com>). Our scientometric analysis covered a 20 years span between 2000 and 2019, which represents over 99% of all research published on this topic, and took into consideration the number of papers, the research areas of those papers, the countries of affiliation of the authors, and the average number of citations. As search strategy, the title, abstract, and keywords were scanned for smart city related terms. The selected articles and book chapters from Web of Science database were used to analyze the spread and impact of smart city related theme globally, in the European Union, and more specifically in CEE. This data provided the initial assessment of smart city research, its evolution, popularity and even trends. The preliminary assessment allowed us to clearly identify how research on smart city from CEE integrates into the European and even global framework.

Following this initial evaluation, a more in-depth inquiry was carried out in order to obtain a clearer image regarding the research undertaken in CEE on smart city. This inquiry exceeded the available papers through Web of Science Core Collection database and reached to official documents, reports, dissertations, case studies, business products, or strategies in order to build a more exhaustive image of smart city research in CEE.

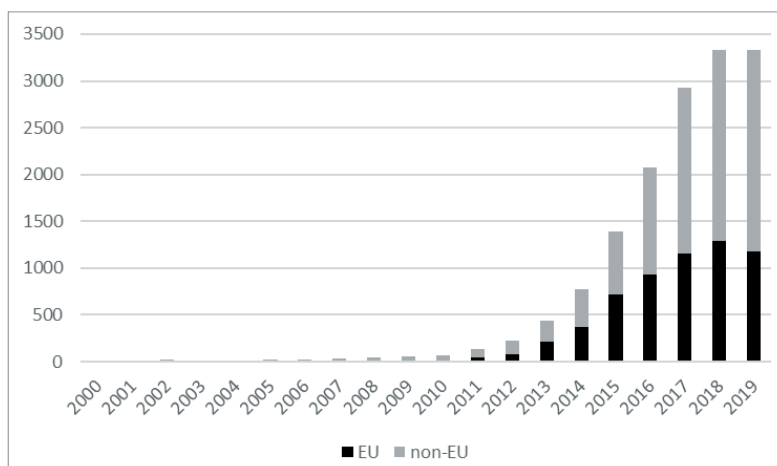
Finally, following a close lecture and grasp of the abovementioned scientific and non-scientific sources, we formulated a series of measures and actions aimed for policy makers, business environment, NGOs, and even citizens from CEE urban areas. Those measures represent either examples of good practices found in literature, either a series of urgent issues identified in various studies which must be addressed.

### **3. The smart city concept in the European Union, a questionable transition from West to East**

In the European Union, smart cities represent a main pillar of the new administrative and political approach of urban areas (Russo, Rindone and Panuccio, 2014). In 2008, the Covenant of Mayors, an initiative of European Cities, started an extensive dissemination of the concept, leading, two years later, to the introduction of smart city in the targets of Europe 2020 Strategy. The increasing presence of ‘smartness’ in European cities is not meant just for restructuring and rethinking infrastructure, but also for making cities more innovative and more competitive (Paskaleva, 2009). Meanwhile, the original perspective on smart cities was slightly modified, in order to include in a more integrative approach the energy sector with a focus on economic development, sustainability and inclusion (Dameri and Cocchia, 2013).

The number of papers on smart city registered an unparalleled growth after 2010 (Figure 1). If in 2000 only 15 papers on this topic were recorded in Web of Science Core Collection, the number reached 73 in 2010 and 3,332 in 2019, a sign of its popularity, as well as importance for the urban decision makers. While its share varies from year to year, the European Union displays a constant interest for smart city and its significance, managing to gather more than a third of the total number of papers.

In a series of papers by Caragliu and del Bo (Caragliu, Del Bo and Nijkamp, 2011; Caragliu and Del Bo, 2016, 2019, 2020), which to date represents one of the most cited and examined series on smart cities, the authors make a good scanning of the fundamentals and characteristics of smart cities in Europe: the accent seems to be placed on both infrastructure (by integrating traditional and modern technologies) and people (both actors and beneficiaries). Moreover, one of the main ideas regarding smart city approaches in Europe is to go from intelligent/ digital/ smart cities *per se*, to associating these concepts to human capital, education, creative industries, accessibility, quality of urban transportation networks and, finally to urban wealth (Caragliu, Del Boro and Nijkamp, 2009).



**Figure 1:** Number of scientific articles on smart city between 2000 and 2019

**Source:** The authors

Overall, the scientific literature analyzing the smart city concept in Europe is focused on several key themes:

- conceptual debates including smart city and digital city concepts (Hollands, 2008; Dameri and Cocchia, 2013; Thompson, 2016; Ismagilova *et al.*, 2019), including critical assessment of the concept due to its both impreciseness and limited approaches (Hollands, 2008); there are also integrative conceptual frameworks taking as case study European cities such as Vienna (Fernandez-Anez, Fernández-Güell and Giffinger, 2018), Barcelona (Bakıcı, Almirall and Wareham, 2013) or multiple cities (Anthopoulos, 2017);
- general life quality oriented approaches of smart city policies, recognizing the concept not as a goal in itself but as a mean to increase resilience and quality of life (Boulos, Tsouros and Holopainen, 2015; Borsekova and Nijkamp, 2018; Kourtiti, 2019);
- analyses of specific smart city policies and their impact on general urban policies; these analyses focus on the decisive role in creating innovative cities at European level (Kourtiti and Nijkamp, 2012; Dameri, 2017; Caragliu and Del Bo, 2019, 2020) that is also an opportunity for competitive urbanism (Taylor Buck and While, 2017) and smart city planning (Kominos *et al.*, 2019); in close relation, the transformative effects of Internet of Things for cities are seen as a major innovation putting people and not technology itself in the center of smart cities approaches (Boulos, Tsouros and Holopainen, 2015; Ejaz and Anpalagan, 2019);
- smart city governance, a topic analyzed through a variety of approaches, such as coalitions and organizations (Anthopoulos, 2017), stakeholders' implication (Axelsson and Granath, 2018; Marrone and Hammerle, 2018), citizens (non)implication (Engelbert, van Zoonen and Hirzalla, 2019);

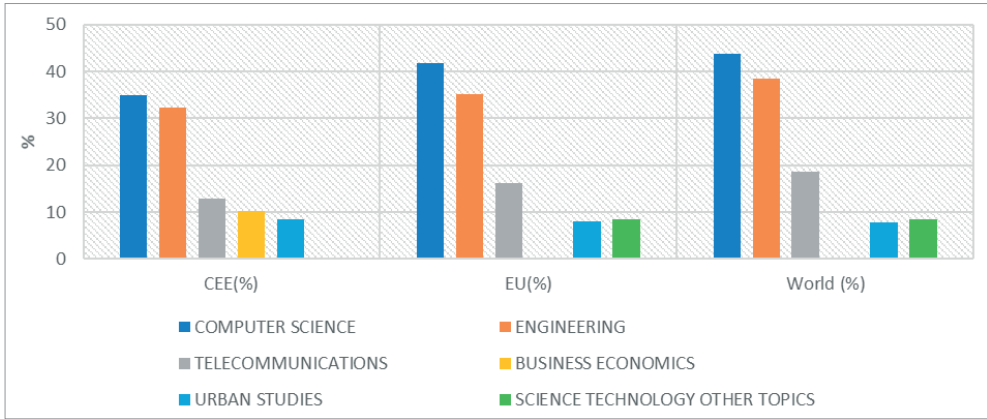
- smart city indicators for modeling performance (Lombardi *et al.*, 2012), using indicators in order to prioritize funding by the European Commission (Lazaroiu and Roscia, 2012), or ranking European smart cities (Giffinger *et al.*, 2007);
- smart city in relation to green cities, sustainability and resilience approaches (Antrobus, 2011; Baron, 2012; Papa *et al.*, 2015; Ahvenniemi *et al.*, 2017; Bănică, Eva and Iașu, 2019; Bănică *et al.*, 2020), including smart cities' contribution to sustainable public transport (Tomaszewska and Florea, 2018), decarbonizing transport (Zawieska and Pieriegud, 2018) and even a proposition of a European smart and resilient city model (Arafah, Winarso and Suroso, 2018).

Currently, there could be identified six main areas of smart city actions included in most of the approaches found in literature: governance, economy, mobility, environment, people, and living each comprising a multitude of potential actions (Lombardi *et al.*, 2012; Albino, Berardi and Dangelico, 2015). As an overall picture, based on these six dimensions, Arafah *et al.* (2018) suggest an European Smart City model that includes, besides technology, resources, processes, activities, population and institutions.

Geographically, the distribution of the smart cities in the European Union presents an unsurprisingly hiatus between the Western and the Eastern part. A comprehensive study accomplished by the European Parliament (2014) identified 240 urban areas in EU-28 that had a noticeable profile as smart cities. In relative terms, big cities had more smart initiatives and were, in a larger extent, part of smart city networks. At country level the highest absolute number of smart cities were recorded in UK, Spain and Italy, whereas in relative numbers Italy, Austria, the Northern countries (Denmark, Norway, Sweden) and some small Eastern countries such as Estonia and Slovenia were the best performers (European Parliament, 2014). Moreover, some of the most used examples in literature as smart city performers come from Western countries, e.g. Amsterdam, seen as the first digital city and taken usually as a case study for a successful smart city (Dameri and Cocchia, 2013; Capra, 2016), Genoa, which emerged as a leader in winning EU funding for smart initiatives proposals (Dameri, 2017), Barcelona (Bakıcı, Almirall and Wareham, 2013), Helsinki (Hämäläinen, 2020), Manchester (Antrobus, 2011), Vienna (Fernandez-Anez, Fernández-Güell and Giffinger, 2018) or Thessaloniki (Komninos *et al.*, 2019). All these urban areas have smart city initiatives that are included in an overall strategic framework of urban development and none of these cases comes from the Eastern countries with former communist heritage.

There is a striking delay between Western and Eastern EU countries, moreover, smart city solutions are still viewed as a novelty in the countries of the post-communist block (Sikora-Fernandez and Stawasz, 2016). As such, the European Digital Index displays a general underperformance of Eastern countries. All CEE cities present in the study (capitals, with the exception of Krakow) are positioned in the second part of the ranking: Tallin, as the best performer, in the 18<sup>th</sup> position, is followed at a

long distance by Budapest (33), Prague (37), Warsaw (38), Bratislava (41), Lublijana (47), Vilnius (49), Sofia (50), Krakow (51), Bucharest (52), Zagreb (57) and Riga (58). Besides European Digital City Index, there are many other papers or official reports that rank, map and compare the distribution and the performance of European cities, reaching a similar main conclusion: CEE cities are far from being leaders ‘in terms of number, scale and scope of ongoing smart initiatives’ (Kola-Bezka, Czupich and Ignasiak-Szulc, 2016).



**Figure 2:** The share of the top 5 research areas of scientific articles including ‘smart cities’ as a topic

**Source:** The authors

Moreover, when ranking the top research areas of scientific articles by geographical origin (Figure 2), there is a noticeable difference between CEE countries compared to the other EU countries and to the rest of the world. If computer science, engineering and telecommunication are more or less similarly represented as dominant for all three spatial levels, for the CEE countries the fourth place is taken by business economics which is much less represented at EU level (the eighth place) and, especially at world level (outside top 10 research areas). This drives to the assumption that in CEE, economic/business environment introduced and promoted smart cities as a form of mimicry, following the patterns and using the experience of Western countries while being to a lesser extent the result of an endogenous focus on technological research and innovation.

The challenges of smart cities from former communist countries are extremely high. Kola-Bezka, Czupich and Ignasiak-Szulc (2016) made a comprehensive review on the state of implementing the concept of smart city in CEE, identifying the main approaches, while two years later, Kollar *et al.* (2018) analyzed smart policies development in CEE, but also in South Eastern Europe, emphasizing the productivity and innovation gaps. Their conclusion is that smart cities in CEE are part of an ongoing process of planning and development, but the concept is not yet fully integrated in

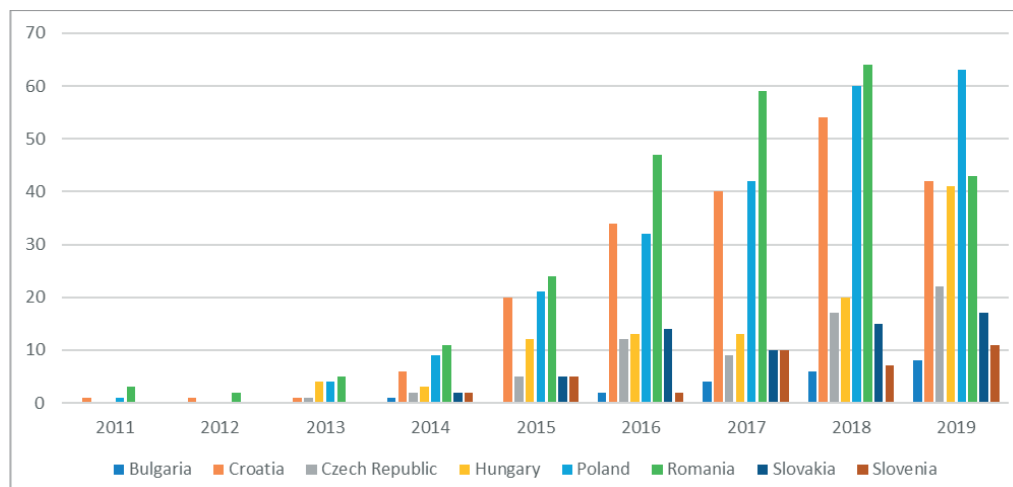


the management of cities. The scarcity of financial resources of municipalities make them focus on individual initiatives financed by EU programs. The main drawbacks derive from the fact that most of the cities that are part of the European smart cities network are simply implementing punctually ‘smart’ initiatives and do not have a clear strategic plan to become smart in all areas of urban life (Dameri and Cocchia, 2013). Notwithstanding, it is worth analyzing more in depth the status and the drivers of the issues faced by smart cities that emerged in the former communist countries.

#### 4. Smart city in Central and Eastern European countries

##### 4.1. The smart city concept in CEE: a (very) late start, but promising dynamics

The scientometric analysis reveals a late start for the smart city concept in CEE countries. Besides a few isolated papers between 2007 and 2012, the concept began to properly capture the attention of researchers starting with 2013, speeding up in the following years with varied intensity, according to each country (Figure 3). Poland, Romania, Croatia, and, lately, Hungary, seem to be by far the most active countries in terms of published papers, while in Bulgaria and Slovenia the concept is still in its incipient phase.



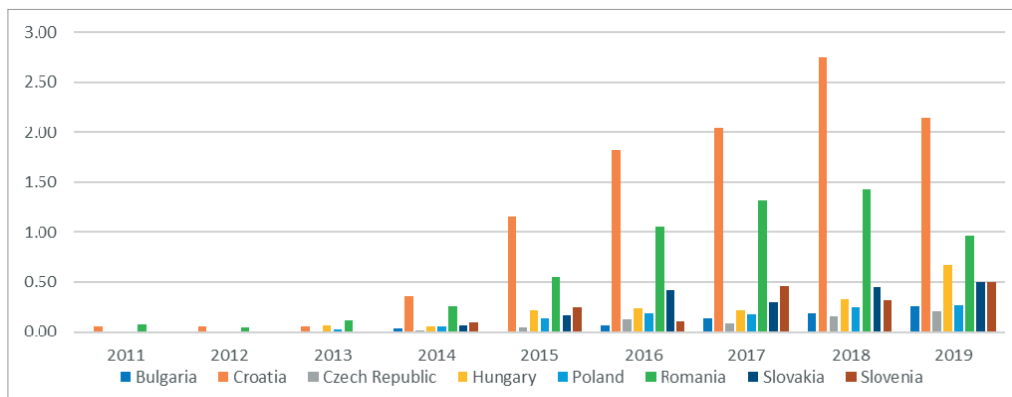
**Figure 3:** Number of articles on smart city for CEE countries

**Source:** The authors

However, since the countries presented in our study display unequal demographic and economic indicators, we considered that a clearer image of the popularity of the smart city concept in each country would be obtained by reporting the number of articles to the number of employees in R&D. This indicator (Figure 4) reveals an extremely high popularity in Croatia (over 2 papers on smart city/ 1,000 R&D employ-



ees) and Romania (over 1 paper/ 1,000 R&D employees), while for the other countries the values vary between 0.20 for Czech Republic and 0.67 for Hungary.



**Figure 4:** Number of articles on smart city per 1,000 R&D employees

**Source:** The authors

While comprehensive, this initial analysis provides only a limited understanding of the smart city concept in CEE. Besides the number of papers, it is equally important to scrutinize the themes, the level of detail, the issues that these papers report, as well as the good practices, the impact of smart city initiatives and the cooperation between the policy makers, business environment and citizens in harmonizing smart initiatives. Therefore, an in-depth exploration of the most representative papers and official documents was performed for the eight countries representing our research area.

#### **4.2. The case of V4 (Hungary, Poland, Slovakia, Czech Republic): an insufficient emphasis on quality of life and good governance**

According to the general accepted definition, smart cities should contribute to, *inter alia*, increased quality of life and better governance (Dameri, 2013; Capdevila and Zarlenga, 2015). However, recent evidence suggests that in Visegrad countries smart city approaches are not commonly associated with increased quality of life and good governance. Szczech (2014) found that cities from Eastern EU countries (Poland, Czech Republic, Bulgaria, Baltic countries) rank low in smart city index, due mostly to the ‘smart quality of life’ and ‘smart management’ dimensions that lower considerably their scores. A report of the European Investment Bank (Kollar, Bubbico and Arsalides, 2018) on the ‘smartness’ of the Central-Eastern and South-Eastern EU cities also found that they are mainly lagging behind in governance and quality of life (as well as in innovation and accessibility). For the particular case of Poland, Sikora-Fernandez (2018) noticed that ‘more and more cities are labeled ‘intelligent’ and ‘smart’ despite the fact that they are unable to meet people’s expectations for quality of life’ (p. 53).

Furthermore, one can argue on the fact that cities can deliver high quality of life without being smart: results reported by Bertalan (2015) revealed that inhabitants of Sopron (Hungary) identified 'livable' as being the main trait of their city (following 'historic' and 'border city'), while 'intelligent' was identified as the least pronounced trait of their city. In Slovakia, a recent study (Cagánová *et al.*, 2019) testing the degree of information and awareness of local population found that 63% of the population from regional cities is not aware of the 'smart city' meaning. Furthermore, a research conducted by Nick and Pongrácz (2016) on the Development Strategies of the Hungarian cities of Győr and Kecskemét found that Győr's strategy frequently refers to the smart city concept, but promotes smart (and IT) solutions mostly for the energy sector, while Kecskemét's strategy does not employ the term 'smart city', but envisages IT solutions for a broader array of domains. On a similar note, in Poland, Sikora-Fernandez (2018) found 'a lack of comprehensive approach to the smart development', and the fact that certain domains are by far more desired for smart solutions (e.g. smart urban transport) compared to others (e.g. smart urban management). Interestingly, these findings on planning priorities for Polish cities are in line with empirical evidences concerning the low level of 'smartness' for urban management found by Szczech (2014). This suggests that Polish (and most probably other V4 cities) have an ongoing issue regarding good governance and, yet, smart approaches in planning documents fail to approach the issue. Hence, we may argue the (intended) transition to 'smartness' depends considerably on the local initiatives and that there is place for national urban policies to intervene and promote smart city approaches if a more uniform distribution of initiatives is desired.

Overall, the literature shows that urban planning documents from Visegrad countries lack a comprehensive approach in implementing the smart city concept. There is evidence that they promote smart solutions mostly for transportation and energy sectors, and do not sufficiently cover the aspects related to quality of life and good governance. Unsurprisingly, there is evidence on the existence of a great variability in the intensity of smart city approaches from city to city. Most probably, this is an outcome of the variegated local dynamics. However, national level planning could play a greater role, for at least two reasons: (1) all Visegrad countries dispose of national urban policies or are currently defining them, and (2) cities from Visegrad countries are still highly relying on European funds that are mostly regulated through national programs. Cities from Visegrad countries still have to overcome some of their inherited top-down approaches to urban planning, including in relation to smart city approaches. This suggests that, although technology could enhance a more open and transparent society and government, it still has to undergo implementation, and that implementation depends on the willingness of local stakeholders.

#### **4.3. Smart Cities in Southeastern EU (Romania, Bulgaria, Croatia, Slovenia): towards diversification of Smart City approaches**

South-Eastern EU countries, including Romania, Bulgaria, Croatia and Slovenia, appear to lack proper implementation of smart city initiatives and solutions when compared to Northern or Western counterparts (Klimovsky, Pinteric and Saparniene, 2016; Pašalić, Čukušić and Jadrić, 2020) and have been identified as lagging behind in terms of smart initiatives (Kola-Bezka, Czupich and Ignasiak-Szulc, 2016). Although the scientific literature on this topic could benefit from more research, one can appreciate that, at its current stage of development, it is already diverse. The existent approaches could be classified to: (1) the comprehensive analysis of single or multiple case studies (Alpopi and Silvestru, 2016; Nicula *et al.*, 2020); (2) inquiring the general perspectives and policies related to Smart City at a national level (Čukušić, Jadrić and Mijač, 2019; Ivan, Beu and van Hoof, 2020); (3) addressing a particular dimension or segment related to the Smart City concept, such as the environment (Lugaric and Krajcar, 2016; Cicea, Marinescu and Pintilie, 2019; Petrova-Antonova *et al.*, 2019), smart governance and smart people (Milenković, Rašić and Vojković, 2017; Soomro, Khan and Ludlow, 2017; Rašić, Milenković and Vojković, 2018), smart mobility (Bănică, Eva and Iașu, 2019; Šurdonja, Giuffrè and Deluka-Tibljaš, 2020), or ICT-related dimensions (McElroy, 2019; Briciu, Briciu and Kavoura, 2020).

The territorial context appears to play a central role in the predisposition of implementing smart city projects. As such, regional economic disparities are associated with the differences between regions in terms of smart city initiatives, the most developed regions in Romania registering more smart initiatives in the last decade than the less developed ones (Ivan, Beu and van Hoof, 2020). The least developed regions have also been indicated as lacking a long-term vision for the smart city idea. However, research shows that a long-term vision regarding the implementation of the smart city concept is a difficult goal to be reached, regardless of the level of development. For example, Cukusic *et al.* (2019) underline that ‘strategic challenges’ are perceived by stakeholders as the most difficult challenges to be tackled when a city or country aims at implementing smart city projects. More precisely, these challenges are referring to the necessity for clear evaluation of opportunities, setting objectives and establishing priorities of intervention, as well as the necessity of ensuring the citizens’ satisfaction. The second aspect appears to be rather common, as in Romania, the Smart City agenda is mainly focused on issues of infrastructure and sustainability, lacking a stated orientation towards vulnerable groups of people or communities (Ivan, Beu and van Hoof, 2020).

Furthermore, although the smart city concept envisages ICT as a main tool for providing services that satisfy citizens’ needs (Kourtit and Nijkamp, 2012; Pašalić, Čukušić and Jadrić, 2020), citizens’ attitudes towards ICT, and by extension, towards the idea of smart city, vary considerably. Empirical evidence from two cities in CEE countries (Maribor, in Slovenia and Kosice, in Slovakia) revealed a lack of awareness among citizens regarding the potential of ICT, and, consequently, they do not take

full advantage of ICT in their areas (Klimovsky, Pinteric and Saparniene, 2016), similar findings being documented in Croatia, with a lack of citizens' awareness regarding public policies towards implementation of smart solutions (Rašić, Milenković and Vojković, 2018).

The smart city concept gradually becomes a reality in the Southeastern EU, with multiple directions of interest covering several dimensions of the concept (smart economy, smart environment, smart governance, smart living, smart mobility, smart people). However, a potential factor that influences these countries' low positions in smart cities rankings might be the rather shy role of citizens in the implementation and 'consumption' of smart city solutions.

ICT-based solutions, as central components of smart city, are constantly developed and implemented, nonetheless, more often than not, the citizens are either unaware of their utility and functionality, or rather uninterested, as these solutions fail to really meet their needs. This situation is mainly a consequence of the absence of the community's opinion in the decision-making process when smart initiatives are considered and, ultimately, implemented. Therefore, the smart city's stated goal of improving the quality of life should be approached through a more active and meaningful participation of the people that are expected to benefit from the implementation of such a concept.

## **5. Discussions, conclusions and recommendations for policy makers**

The cities from CEE countries do not seem to present issues entirely different from their European counterparts, nevertheless, certain features specific to this territory could be identified following the literature review. Smart city initiatives, especially in new EU Member States, tend to display a high degree of imitativeness, copying ideas and initiatives from leading cities from Western Europe, and often omitting the citizens' involvement. The mimicry is understandable, giving that smart city represents a rather new concept for these territories. However, copying solutions from other cities without adapting to local context presents a major downside: there is a limited relation between smart solutions and already existent plans of urban development which, in time, causes a lack of integration of smart initiatives into the organic nature of the city. The situation is even more challenging when taking into account that the urban areas from CEE are still supporting the heavy weight of their communist heritage. Most of these cities were redesigned and rebuilt in the second part of 20<sup>th</sup> century according to a planning doctrine completely different from the Western urban plans. Moreover, the smart solutions should take into consideration the issues created by several decades of communist planning and amplified by the post-1989 period of transition.

While the authors do not claim the issues to be representative only for cities from CEE countries, nor to be the most important, as a ranking of urban issues would be illusory and unlikely productive, they represent undoubtedly obstacles that should be tackled by local policy-makers. In this vein, we suggest a series of measures and

actions tailored for local administrations, stakeholders, private actors and, ultimately, citizens of cities willing to implement smart initiatives:

- a) better identification of citizen needs with higher emphasis on citizen-centric approaches and better operationalization through satisfaction surveys, both as evaluation tools for implemented policies and as input for future policies; furthermore, citizens' integration in smart initiatives will contribute to raising their awareness regarding the already existent smart solutions;
- b) reduction of the dependence on EU funding by encouraging public-private partnerships and granting more resources for local authorities at city and metropolitan area levels to use exclusively in smart city strategies;
- c) better correlation of smart city strategies with sustainable development strategies in order to create long-term positive effects and to address flaws embedded in smart cities approaches;
- d) tackling social justice issues: not all citizens have access to smart city technology, e.g. elder urban population, therefore smart initiatives should try to embody different approaches in order to address the largest possible share of population;
- e) addressing in a larger extent the environmental issues, especially the complex environmental impact of technology in an increasingly artificialized city; and
- f) new smart city initiatives should be built not only starting from good practices tested elsewhere, but also by constant learning from the challenges and failures previously experienced either by the same city or by similar cities.

From theoretical definitions to practical applications, this study aimed to provide a brief review of the smart city concept and its implementation in CEE. Based on this review, we suggested a series of measures aimed at increasing the success of smart initiatives in those countries and, therefore, contribute to the creation of more inclusive and greener urban habitats. Far from being exhaustive or exclusive, this list should be seen as a series of guidelines with the ultimate goal of easing the transition of cities from CEE countries towards a smarter future. At the same time, the paper launches the opportunity for future research on the smart city concept more targeted on issues related to smart governance and active involvement of citizens in smart initiatives.

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