Theoretical and Empirical Researches in Urban Management
Volume 15 Issue 2 / May 2020

SMART CITY STRATEGY AND ITS IMPLEMENTATION BARRIERS: CZECH EXPERIENCE

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Abstract
The aim of the paper is to identify, analyze and evaluate the barriers that public administration representatives have to face during the preparation and implementation of the Smart City strategy in the Czech Republic as one of the principles of modern sustainable urban development. The goal will be achieved through theoretical assumptions, analysis of sustainable and smart urban environment and especially through qualitative research, specifically by structured interviews with stakeholders who are responsible for the Smart City strategy implementations. The interviews will take place in three Czech cities, namely Prague – the capital, Brno – the winner of the ITAPA 2018 AWARD in category V4 region, and Zlín – an example of the city "on the way" that has no Smart City Strategy implemented at the moment but is running many smart projects within the city ecosystem. Barriers will be classified and divided into two categories – external and internal. Based on examples of good practices from abroad, measures will be proposed that should prevent the emergence of these obstacles right at the very beginning or, at least, mitigate them at their origin. The main identified problems were shortage of experts in the Smart City area, political unrest, poor interconnection with existing legislation and excessive bureaucracy. The proposed measures then focus mainly on the exchange of the best practices among municipalities, the legislative changes and a greater public awareness.
Keywords: sustainable urban development, smart city strategy, implementation barriers, Czech Republic

1. INTRODUCTION

In 2018, the United Nations Population Fund stated that the world is undergoing the largest wave of urban growth in history. More than half of the population today lives in cities and it is expected that the

total of urban inhabitants will exceed 5 billion by 2030 (United Nations Population Fund, 2018). This situation is not only unsustainable in the long run but brings about a great deal of problems that the urban agglomerations need to address already today – from the lack of accommodation and air pollution to inability to deal with an excessive waste production (Alkandari, Alnasheet, & Alshekhli 2017).

Precisely, the improvement of the living conditions and, in general, the quality of life in cities has been a big political topic in the last two decades. The representatives of public administration attempt to resolve these problems by implementing the tools of sustainable development. The concept of smart cities is currently regarded as a very effective tool (Dameri 2013). Its objective is to improve the quality of life in cities in view of accommodation, transport, environment, competitiveness and particularly public administration. New and innovative public administration is key to a balanced and sustainable development of the city, or rather – the urban area (Yigitcanlar et al. 2019).

Establishing the concept of a Smart City within the urban ecosystem happens by means of strategic plans or visions, often referred to as “smart strategies”. Even though naming of these strategies is considered as a new, also referred as a “new approach” or “futuristic visions”, Smart City strategies are basically enlarged concept of the Sustainable city strategies (Oberg, Graham & Hennelly 2015).

Implementation of these strategies then depends on the initiative of the respective authority (Fekete 2018). However, it is necessary that the whole ecosystem of the region participates in the process of fulfilling the visions and objectives of the strategy, including the science and research community, the private sector and, most importantly, the citizens. The implementation of the strategies itself seems to go rarely smoothly. On the contrary, a variety of problems can occur.

In recent years, the issue of the concept of smart cities and its implementation in public administration and governance has become a widely discussed multidisciplinary topic in both developed and developing countries (Webster, Leleux, 2018; Yigitcanlar, Kamruzzaman, 2018; Grimaldi, Fernandez, 2019; Dameri et al., 2019; Macke, et al., 2019 and many others). Without being aware of this, we are confronted every day with a 'smart solution' or 'smart project' and it can be argued that, especially during the last decade, the approach of public administration and public officials in planning the future of cities, regions or entire states has changed.

Post-socialist Central and Eastern Europe is not aside from these activities; on the contrary, smart strategies are increasingly being implemented in the development strategies of cities or sub-projects (Bednarska-Olejniczak & Olejniczak 2016; Jaňurová & Chaloupková 2018; Fekete 2018; Bednarska-Olejniczak, Svobodová & Olejniczak 2019). Public administration is the main factor responsible for the implementation of smart solutions in the everyday life of citizens. It is, therefore, necessary to ensure

Theoretical and Empirical Researches in Urban Management
Volume 15 Issue 2 / May 2020

that the public administration itself is smart enough, that is to say, smart, transparent and efficient enough.

The aim of the paper is to identify, analyze and evaluate the barriers that public administration representatives have to face during the preparation and implementation of the Smart City strategy in the Czech Republic as one of the principles of modern sustainable urban development. The examples of three Czech cities below show the barriers that the representatives of public administration had to face when implementing the smart strategies.

2. CONCEPT OF SUSTAINABLE AND SMART CITY DEVELOPMENT

The sustainable urban development was originally associated only with the protection of environment as is seen in the development strategies of the UK in the 1980s (Healey 1995). Over time, new areas such as environmental sustainability (Satterhwaite 1997) and industrialization in developing countries (Stephens & Satterhwaite 2008) were gradually brought into play. A breakthrough in the perception of sustainable urban development from other points of view besides environmental was made by the introduction of four dimensions, which should be taken into account by any sustainable city, by the United Nations Commission on Sustainable Development. The four dimensions are following (Littig & Griessler 2005):

- Political-institutional,
- Environmental (ecological),
- Economical,
- Social.

Smart cities concept had emerged in literature at the beggining of 21st Century, however very first mentions can be seen at the end of year 2000. For instance Haughton & Hunter (1994) mentioned sustainability of cities and researched those factors, that can influence sustanability – pollution, size of the city, housing availability and sustainable city management itself. Sustainable city, usually percieved as a superior concept in relation to smart city, examined Satterhwaite (1997), who focused mainly to environment, respectively defined factors that influence city development, such as greenhouse gases, CO^2 reduction.

Roseland (1997) talks about the concept of the so-called eco-city and describes a summary of concepts related to the issue, namely sustainability, improving the quality of life, urban planning, transport, and economic development. Unlike previous authors, Roseland has extended the principle of urban sustainability to include new non-ecological factors - especially quality of life, transport and economic specifics. Simultaneously, a series of urban development expressions, such as digital city, knowledge

city, eco-city is used interchangeably with the smart city, significantly mystifying the reading of the concept (Praharaj & Han 2019).

In compliance with the above, many have been defined in the definition of smart or smart city, and there is still no general "agreement" (Cicea, Marinescu & Pintilie 2019). According to Alkandari Alnasheet & Alshekhli (2012) smart city can be defined by usage of smart systems, characterized by mutual interaction among infrastructure, capital and cultures. More complex overview brings study of the International Telecommunication Union (ITU 2014), that stated that smart sustainable city is an innovative city that uses information and communication technologies (ICTs) and other means to improve quality of life, efficiency of urban operation and services, and competitiveness, while ensuring that it meets the needs of present and future generations concerning economic, social and environmental aspects. Caragliu, Del Bo & Nijkamp (2011) say, in general, smart characteristic is result of investment to human and social capital as well as through traditional transport infrastructure and modern IT technologies, that support sustainable economic growth together with high level quality of life.

In attempts to define the concept of a Smart City, six basic dimensions have been defined by experts (e.g. Giffinger 2007; Deloitte 2016; Mutule, Teremranova & Antoskovs 2018). In contrast to the still different and inconsistent definitions, there is relatively good agreement in this respect. The Smart City concept is, therefore, part of urban development that meets citizens' needs sustainably and securely, taking into account the following dimensions:

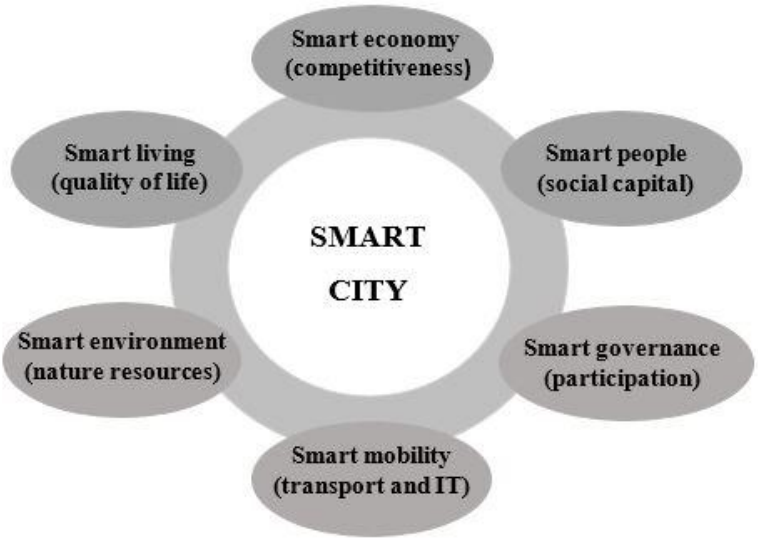

FIGURE 1 - DIMENSIONS OF SMART CITY CONCEPT
Source: Giffinger, 2007; Authors' own processing.

Theoretical and Empirical Researches in Urban Management
Volume 15 Issue 2 / May 2020

All the mention diemnsions have common denominator – energy, respectively are dependent on energy in different forms and regimes. Even though concept itself is not mentioned within 6 fundamental areas, it is concerned as a key to sustainable development of intelligent cities (Cicea, Marinescu & Pintilie 2019).

Since problems such as climate change, population growth, increasing urbanization, demographic changes and related population ageing, rapid digital transformation and growing social differences have been deepening, they need to be approached in a more intense and creative way than before (Didsbury 2004). The fast progress of (not only) urban technologies is considered to be one of the important elements of the search for the needed solution of the current unsustainable situation of cities (Marsal-Llacuna et al., 2015) and it is these changes that, in fact, resulted in the establishment of a new way of technology-led management of urban sustainability. The concept of the "Smart City" emerged from the belief that a city must be smart in order to achieve sustainability (Caragliu, Del Bo & Nijkamp 2011; Yigitcanlar & Kamruzzaman 2018).

Giffinger (2017) unified the following interconnected areas through which the concept of the Smart City is shaped: competitiveness, social capital, participation, transport and ICT, natural resources and quality of life. The concept of the Smart City is seen as a visionary approach to urban sustainability. In other words, Smart City is a city that is effective, technologically advanced, green and socially inclusive (Vanolo 2014).

The representatives of public administration face a number of difficulties during the implementation of both strategies and individual projects. One of the principal issues could be the large number of players whose competencies do not always contribute to each other, but rather collide (Bachtler & McMaster, 2008). Poorly defined powers and multilevel governance are the result of insufficiently specified competencies on the level of regions and the fact that some public bodies are extensively centralized which causes delays in implementation and acquisition of expected results (European Commision 2017). More problems can be caused by poor communication among municipalities and higher administrative units, insufficient or absent infrastructure, which is an issue in East European countries in particular (including the Czech Republic), and further by the lack of high-quality educated personnel in municipalities competent enough to supervise the strategies from their initial design, through securing the funding (from e.g. European funding programmes), to the final evaluation (Kollar, Bubbico & Arsalides 2018).

In the Czech Republic, the problems are most frequently related to the lack of financial resources, legislative obstacles, insufficient communication with relevant ministries, lack of political will, overloading amount of exercise of delegated public powers and administrative burden (Úřad Vlády 2018).

3. METHODOLOGY

The first methodological step was to analyze the implementation of the Smart City concept in public administration in the Czech Republic. The subject of desk research was larger cities that were identified with regional cities for simplicity. It was ascertained whether the city had developed a development strategy and subsequently whether this strategy corresponded to the definition of Smart City according to Giffinger (2007), see Table no. 1. Each city received a score of 0-6 on the number of smart areas covered by the strategy. This analysis has become an auxiliary tool for the selection of model cities.

TABLE 1 - SMART CITY STRATEGIES IN COUNTY TOWNS OF THE CZECH REPUBLIC

City	Strategy name	Processed areas	Public administration	Points
Praha	Smart Prague	Competitiveness, social capital, transport and ICTs, natural resources, quality of life	untargeted	5/6
Brno	Strategy Brno 2050	Competitiveness, social capital, participation, transport and ICTs, natural resources, quality of life	6 topics	6/6
Ostrava	Smarter county	Competitiveness, participation, transport and ICTs, natural resources, quality of life	3 topics	5/6
Plzeň	Smart City Strategy	Competitiveness, participation, transport and ICTs, natural resources, quality of life	3 topics	5/6
Olomouc	Strategic Development Plan of the City of Olomouc until 2023	Competitiveness, transport and ICTs, natural resources, quality of life	untargeted	4/6
Liberec	No strategy	x	x	0/6
České Budějovice	City with good address	Transport and ICT, natural resources	untargeted	2/6
Hradec Králové	Programme SMART Hradec Králové	Competitiveness, social capital, participation, transport and ICTs, natural resources quality of life	2 topics	6/6
Ústí nad Labem	No strategy	x	x	0/6
Pardubice	Smart City strategy of Pardubice	Competitiveness, social capital, transport and ICTs, natural resources, quality of life	untargeted	5/6
Zlín	Zlín 2020	Competitiveness, social capital, participation, transport and ICTs, natural resources	5 topics	5/6
Jihlava	City with good address	Transport and ICTs	untargeted	1/6
Karlovy Vary	City with good address	Transport and ICTs	untargeted	1/6

Note: Cities are ordered by population size.
Source: Jaňurová & Chaloupková (2018); Strategic documents of individual cities; Authors' own compilation.

Theoretical and Empirical Researches in Urban Management
Volume 15 Issue 2 / May 2020

In the Czech Republic, smart governance has been processed by only 5 cities, namely Brno (open data, computerization, participation, good name of the city, functioning metropolitan area), Hradec Kralove (open data, smart services), Ostrava (bureaucracy reduction, corporate governance, open data), Pilsen (effective management, open data, computerization) and Zlín (smart image, open data, public-private partnership, international projects, cooperation with universities) (Jaňurová & Chaloupková 2018).

The implementation of Smart City strategies usually takes place within the level of city administration via the city's development strategy or vision and, for that reason, the objective of this contribution is to point out the problems that it poses for the cities. The responsible persons of three cities that participate in the proposal and implementation of such strategies were approached. The three respondents are expert members of the cities' municipal authorities. Their identities remain anonymous herein.

The research itself consists of three steps. Second step was to select areas on the basis of selected criteria. The aim of the authors is to cover three different types of cities wich were chosen on the grounds of a stratified selection with the following characteristic:

- a capital;
- a city which is, within the Czech Republic, an expert in the field;
- a city which is "on the way" – it is only at the beginning of its journey towards a Smart City Strategy

The selected cities, then, are: Prague – the capital, Brno which can be considered the leading city in the field of smart city for several reasons – Brno is the winner of ITAPA 2018 AWARD in the category of V4 states, held the second year of URBIS (Smart city fair) and last but not least is known for practical application of Quadruple helix model. The third observed city is Zlín which does not have a Smart City Strategy at the moment but has already implemented a scale of smart projects into the city's ecosystem and is developing a Smart City Strategy as well.

The third step consists of structured interviews with representatives of public administration, who are in direct interaction with Smart city strategies or projects implementation at both national and municipal level. These representatives were approached on the basis of recommendations or personal acquaintance.

The interview took the form of structured interview lasting about 60 minutes each. Questions were asked gradually and than elaborated in detail, based on the respondents' answers. The authors chose a form of structured interview because of the possibility of a more detailed context and personal interaction with respondents compared to, for example, conventional questionnaires (Latham et al.,

1980). The questions were adapted to the nature of the self-governing unit, but only to the extent that the answers could be categorized.

The representatives of public administration were asked the following questions:

- Can you introduce a strategy that your city currently follows and the circumstances of its origin?
- What is the attitude of the political representation to the smart project, or the smart concept in general?
- What difficulties did you encounter during the implementation of the strategy and the individual projects? Can you give specific examples?
- Did you try to solve these difficulties? And how?
- Is the city limited by the political representation or the government – does it face problems concerning the legislation?

4. ANALYSIS OF ACQUIRED DATA

The text below introduces the obtained information. Firstly, each city and its strategy are briefly introduced followed by the transcripts of interviews made for the purpose of the research.

4.1. Prague City

Prague is the capital of the Czech Republic. It has 1.3 million inhabitants and, according to the Czech Statistical Office, its GDP per capita is approximately EUR 40,000 (Czech Statistical Office, 2018). The city has prepared a strategy, whose name itself – "Smart Prague 2030" – refers to the concept of smart cities. The strategy is based on the trends in the area – mobile technology, digital platform, big data, open data, internet of things, sustainable energy, robotic automation, zero waste, artificial intelligence and autonomous vehicles. The vision of the strategy is formulated as follows: "In 2030, Prague uses time-proven innovative technologies for transforming the capital to a sustainable city and a better living space" (IPR Praha 2017). The strategy defines the following 4 steps required for a successful progress towards its goals (Smart Prague 2017):

- Mapping and Prioritizing – review of all innovation options and processing a plan that will be used for their implementation – completed;

Theoretical and Empirical Researches in Urban Management
Volume 15 Issue 2 / May 2020

- Draft Measures – particular proposals that will help to set milestones for the implementation of individual projects – 50% fulfilled;
- Pilot Projects – individual projects are launched and start to appear in the public space – 10% fulfilled;
- Routine Operations – existing modern technologies help citizens and have become a part of their everyday lives; they can fully utilize their potential – expected to be fulfilled by 2025.

Interview Outcomes – Prague

First question was connected to the overall perception of the strategy and its origin. Interviewed representative sees Strategy Smart Prague 2030 as:

"*an exceptional for several reasons. Prague deals with smart topics and projects in a "majestic and ambitious" way, it is also considered to be best at Data Integrating Platform and would like to offer its know-how to other, not only Czech, cities*."

Must be mentioned that Prague is the only city in the Czech Republic where the city's development strategy is not directed by the municipal authority. It is the Prague Institute of Planning and Development (IPR Praha) – a subsidized organization, that manages and coordinates the area of strategic and urban planning. This kind of distribution is very welcomed, as mentioned below:

"*This distribution allows Smart Prague to work on more complex projects as it is not bound by the political representation which is a subject to frequent change in time*."

However, an advantage can turn into a disadvantage and restriction. In its powers, IPR Praha has a certain degree of freedom, but due to its separation from Prague's authorities, it is susceptible to a bureaucratically simple dissolution.

"*For the future, the whole existence of IPR is, thus, theoretically threatened, particularly in case Smart Prague fails to meet the set objectives and requirements. Another disadvantage of this strategy is limited funding. Owing to its higher GDP, Prague belongs among the richer regions of the EU and its options to receive funding from the European funds are, therefore, limited*."

At present, the only funding available is through the Operational Programme Prague – Growth Pole of the Czech Republic, and in the next budget period, i.e. after 2021, the available funding may become even more restricted.

Smart Prague has to face not only problems with limited amount of funds, there are as well logictically connected issues, for example conditions realated to public tenders.

"*Another disadvantage of the strategy is the lengthy tenders for the smart solutions that have to be organized pursuant to the Act on Public Procurement."*

Besides, the emphasis on fast absorption of funding which can affect the added value of individual projects, is seen as a threat to the future.

4.2. Brno City

Brno is the second largest city in the Czech Republic with almost 380,000 inhabitants. The methodology of the Czech Statistical Office and Eurostat only allow to measure the GDP on the level of the whole region. In the South Moravia Region, with Brno as its capital, the GDP per capita amounted for EUR 20,500 (Czech Statistical Office 2018) and it can be assumed that in Brno itself, as a dynamic economic growth pole, it is strongly higher. The name of Brno's current vision #brno2050 refers to Brno as it will be in 2050. The aim of this vision is to overarch short-term strategies and projects, where drafting and implementation of these projects follows the same methodology. Brno's objective is to be an attractive, improving, lively, harmonious, sustainable and well-managed city by 2050. The vision focuses on the following three points of reference (Vize a Strategie #brno2050 2017):

- Quality of life – healthy people, coherent city and city of respect, cosmopolitan city, cultural city, city of sports, healthy living environment, nature in the city, compact and balanced city, architectural face of the city, city with affordable housing, prosperous city, Central European RDI centre, educated university city.
- Resources – globally accessible city, city with efficient and sustainable mobility, city with effective water management, energy-saving, independent and resilient city, self-sufficient, circular, clean and safe city.
- Governance –shared vision and good names of the city, functioning Brno metropolitan area, efficiently functioning electronic administration, city open in the area of data.

Interview Outcomes – Brno

Strategy designed for the Brno city was designed in 2017. Interviewed person was part of the team that created strategy as it is. When asking for the creation process, answer was:

Theoretical and Empirical Researches in Urban Management
Volume 15 Issue 2 / May 2020

"*A substantial problem was encountered already during the drafting of the vision. There was no political committee that could formally supervise its implementation. All political clubs were consulted, and their observations incorporated in the vision, however, it later turned out that the parties' perception of this approach was rather negative."*

The change of political spectrum brought about the change in opinions and attitudes to the strategy, which then affected the creation of subsequent strategic projects. Question concerning unwillingness of political representation was reflected as a key source of information, see below:

"*Political representation is reluctant to undertake long-run projects as they may not be able to influence the outcomes due to the change in representation every four years."*

Unwillingness and carelessness to participate in the design of the vision was an unexpected and troublesome problem that emerged from certain departments of the Brno City Municipality whose employees in charge do not attend the regular meetings with the working groups and generally neglect their participation in the management of the strategy.

In the long term, the strategy struggles with the Brno City Municipality's (lack of) respect, even though it attempts to instruct the departments methodologically so that the individual projects have the same structure, but often face disapproval. According to the interviewed representative this negative approach of other departments is not a unique problem. Most of the Czech cities have problems with messy structure and are facing unwillingness of its officials.

"*As to the strategy planning in general, the bitterness toward long-term planning remains from the period of communist regime associated with its central planning, the so-called five-year plans. There is a stronger tendency to pursue rather short-term projects*".

Legislation seems to be also a persistent problem. Let us take as an example the legal obligation to have a certain number of parking spaces for a given number of houses and flats.

"*If the capacity is not fulfilled, the building cannot be approved by the final inspection, although the number of parking spaces required by law may not be necessary, for example due to the location and availability of public transport*."

Another issue is the city's limited authority in certain areas. For example, the Brno's intention is to build a city ring to facilitate traffic in the city, but such construction is under the responsibility of Road and Motorway Directorate. The city can only influence this indirectly through communication with the relevant ministry or the Union of Towns and Municipalities. This way does not seem, however, to be the perfect one.

"*That, however, may not always be an effective solution and requires a lot of time.*"

Lastly, the city states that it should have cooperated more closely with the municipalities of the Brno Metropolitan Area that are also affected by the strategy. Currently, the players (mainly mayors of the surrounding municipalities) are not too involved in further planning. Question to ponder is whether these municipalities value such a coordination.

4.3. Zlín City

Last of the studied cities is Zlín – a city with nearly 80,000 inhabitants located in the Zlín Region whose GDP per capita is EUR 15,800; it is expected that the city's own GDP is slightly higher than the region's average (Czech Statistical Office 2018). The city's current strategy is called "The City Development Strategy Zlín 2020" and was created already in 2012. Although, the strategy does not include the concept of smart cities in its name, its global vision declares the following: "Zlín 2020 – entrepreneur, smart, creative and sustainable city". The strategy as such is not in line with smart strategies in general but carries partial elements of these strategies (e-governance, sustainable transport systems, use of rainwater, etc.). These elements are then a part of individual projects and make clear that the city of Zlín is already half-way "smart" (Zlín 2020 2012).

Interview Outcomes – Zlín

As written above, Zlín is presently preparing a new strategy which would put more emphasis on being "smart" and "effective" in many ways.

Based on the interview, several obstacles have been met in the implementation of the smart projects. The example of European funding for a telematics systems project was mentioned as the core of one of them.

"*The obstacle lies in the sustainability of projects, which is set by the European funds to be 10 years, but the development of these systems is on the move and their sustainability is objectively much shorter*".

If the city wanted to later exchange these systems for new, more efficient and modern ones, it would have to return the entire subsidized amount and finance the payment purely from its own resources. The result of this situation was that city has to use old-fashioned models in the way no to lose obtained subsidy.

Theoretical and Empirical Researches in Urban Management
Volume 15 Issue 2 / May 2020

Another problem, which is partly related to the lack of a smart strategy, is the absence of a working group that would focus on smart projects. Such a group should be part of the planning team, and hopefully will be established as the new strategy will be drafted.

"*This group should include city leaders, experts, and companies. The reason for this is, in particular, the political displeasure and disapproval of the Smart City concept. This is now changing with the new political representation that has been in office for about 7 months*."

Other problems encountered by the city in implementing smart projects concern land ownership, as buying land from the owners is not always uncomplicated, and conflicts of interest with local ecologists also arise. Legal proceedings that are supposed to resolve and eliminate these problems and shortcomings are very lengthy and costly and oftentimes unsuccessful.

5. SYNTHESIS OF FINDINGS

The analysis of the strategies revealed that of the model cities on the imaginary peak was Brno, whose strategy meets all six "smart" criteria, and Prague and Zlín then fulfilled five of the above-mentioned areas. Prague had a lack of social capital, Zlín miss quality of life. The area of smart governance has been elaborated in Brno (open data, computerization, participation, good name of the city, functioning metropolitan area) and Zlín (smart image, open data, public private partnership, international projects, cooperation with universities). in the Czech Republic is insufficiently addressed.

In identifying the barriers that cities must face in implementing either whole strategies or individual projects, two sorts of the problems' origin were recognized. The problems can be defined as either internal or external. The internal ones are those for which the authority or the city bear responsibility and can, at least partially, influence. The external ones lie outside of the authority's influence, their impact is often vast and seldom removable. The table below presents the most frequent obstacles categorized according to the above.

TABLE 2 - PROBLEMS THE CITIES FACE IN THE IMPLEMENTATION OF SMART CITY STRATEGIES

Problem	Type	City where the problem arose
Limiting legislation (by national government or the EU)	external	Brno, Zlín, Prague
Limited and limiting funding (by national government or the EU)	external	Zlín, Prague
Limited authority of the city	external	Brno
Reluctance of officials to involve in the planning process	internal	Brno, Zlín
Dependence on political representation	internal	Brno, Zlín, Praha (in Prague, since IPR Praha could be dissolved, the political representation as such is not limiting)

Source: Authors' own compilation.

Table 1 shows that most problems appear in more than one city regardless of whether the city is an expert in the field or implements individual smart projects without an overall strategy. What may be surprising is the fact that the problems in the implementation of project are never caused by citizens. All interviews confirm that the citizens either do not notice new projects, adapt to them automatically or welcome them. As for the prevention of the problems, the city of Zlín, for example, has decided to set up a working group for the purposes of the newly formed strategy, which will act as a unifying authority across relevant departments. Brno considers implementing a similar measure. The cities are unlikely to be able to influence the elements of limited and limiting funding by national government and the European Union. However, they may be able to put pressure on relevant ministries and competent authorities. Similarly, in the case of dependence on the political representation, which can change every 4 years, the only conceivable solution in this case seems to be to meet regularly with responsible politicians and emphasize the positive impact of smart strategies.

6. CONCLUSIONS

The aim of this paper was to identify, analyze and evaluate the most frequent challenges that the representatives of public administration face in the implementation of Smart City strategies in the Czech Republic. Three cities were chosen for the study on the grounds of stratified selection – the capital city of Prague and cities Brno and Zlín. Each city has its own specifics, they vary in population size, GDP per capita as well as their approaches to the strategy designs. The research is quite unique and has not been carried out yet in Central European countries.

Prague, the capital, founded a subsidized organization Prague Institute of Planning and Development, while in Brno and Zlín, the strategies were created under the authority of local municipalities. It should be noted that the city of Zlín has an older strategy and is currently preparing a strategy that will follow the Smart City concept. Table 3 presents the main keywords or more precisely the most problematic areas resulting from the interviews.

TABLE 3: SUMMARY OF KEY WORDS DEFINING EXAMINED CITIES AND THEIR BARRIERS

Prague	Brno	Zlín
Bureaucracy	Political disagreement	Projects unsustainability
Long tenders	Distrust of longterm projects	Loss of EU funds
Tight financing	Unwillingness and sluggishness of officials	Lack of qualified personal
Threat to intellectual property	Centralization tendencies of Brno	Clash with ecologists

Source: Authors' own compilation.

Theoretical and Empirical Researches in Urban Management
Volume 15 Issue 2 / May 2020

On the basis of structured interviews with the representatives of public authorities and authors of the strategies, two categories of the most common problems have been identified : internal and external, where internal problems can be, to some extent, influenced and possibly resolved by the cities, while external problems are very difficult for the cities to deal with on their own.

The external problems are limiting legislation created by the bodies of both the Czech Republic and the European Union, limiting and limited funding, also from the side of both Czech authorities and the EU, and the cities' limited authority. The internal problems that cities frequently face is dependence on political representation which changes each electoral term as well as the reluctance of the officials to cooperate on the creation and implementation of the concept of the Smart City.

AKNOWLEDGEMENT

This contribution was completed as a part of internal grant project of Faculty of Economics and Administration, Masaryk University: Creative and Smart Cities: Strategies and Tools of Sustainable Development (MUNI/A/1137/2018)

REFERENCES

Alkandari, A., Alnasheet, M., & Alshekhli, I. F. T. (2012). Smart cities: a survey. *Journal of Advanced Computer Science and Technology Research*, 2(2), 79-90.

Bachtler, J. & McMaster, I. (2008). EU Cohesion Policy and the Role of the Regions: Investigating the Influence of Structural Funds in the New Member States. *Environment and Planning C: Government and Policy*, 26(2), 398-427.

Bednarska-Olejniczak, D. & Olejniczak, J. (2016). Participatory Budget of Wroclaw as an Element of Smart City 3.0 Concept. In *XIX. International Colloquium on Regional Science. Proceedings* (pp. 760-766). Brno: Masaryk Univerzity.

Bednarska-Olejniczak, D., Svobodová, L. & Olejniczak, J. (2019). Towards a Smart and Sustainable City with the Involvement of Public Participation-The Case of Wroclaw. *Sustainability*, 11(2), 332 (in press).

Caragliu, A., Del Bo, C. & Nijkamp, P. (2011). Smart Cities in Europe. *Journal of Urban Technology*, 18(2), 65-82.

Cicea, C., Marinescu, C. & Pintilie, N. (2019). Smart cities using smart choices for energy: integrating modern bioenergy in consumption. *Theoretical and Empirical Researches in Urban Management*, 14(4), 22-34.

Czech Statistical Office (2018). Regional GDP. Retrieved December 18, 2019, from https://www.czso.cz/csu/xb/regionalni_hdp

Dameri, R. P. (2013). Searching for smart city definition: a comprehensive proposal. *International Journal of Computers & Technology*, 11(5), 2544-2551.

Dameri, R, P., Benevolo, C., Veglianti, E. & Li, Y. (2019). Understanding smart cities as a glocal strategy: A comparison between Italy and China. *Technological Forecasting and Social Change*, 142, 26-41.

Deloitte (2016). Recent smart city trends: empowered citizens on the rise. Tailored public services to increase resource efficiency. Retrieved January 10, 2020, from http://www2.deloitte.com/content/dam/Deloitte/lu/Documents/public-sector/lu_en_recent-smart-city-trends_122015.pdf.

Didsbury, H. F (2004). Thinking creatively in turbulent times. Bethesda: World future Society.

European Commission (2017). The making of a smart city: best practices across Europe. Retrieved Januar 5, 2020, from https://smartcities-infosystem.eu/sites/default/files/document/the_making_of_a_smart_city_best_practices_across_europe.pdf

Fekete, D. (2018). Economic Development and Economic Governance Through the Example of the City of Győr. *Deturope*. 10(1), 97-115.

Giffinger, R. (2007). *Smart Cities – Ranking of European medium-sized cities*. Vienna: Centre of Regional Science.

Grimaldi, D. & Fernandez, V. (2019). Performance of an internet of things project in the public sector: The case of Nice smart city. *Journal of High Technology Management Research*, 30, 27-39.

Healey, P. (1995). The institutional challenges for sustainable urban regeneration, Cities, 12(4), 221-230.

IPR Praha (2017). Koncepce Smart Prague do roku 2030. Retrieved December 8, 2019, from https://www.smartprague.eu/files/koncepce_smartprague.pdf

ITU (2014). *Smart sustainable cities. An analysis of definitions*. ITU-T Focus Group for Smart Sustainable Cities. Geneva: International Telecommunication Union.

Jaňurová, M. &Chaloupková, M. (2018). Koncept smart cities ve veřejné správě v České a Slovenské republice. *Geographical Information*, 22(1), 180-190.

Kollar, M., Bubbico, R. & Arsalides, N. (2018). *Smart Cities, Smart Investment in Central, Eastern and South-Eastern Europe*. Brussels: European Investment Bank.

Latham, G. P., Saari, L. M., Pursell, E. D., & Campion, M. A. (1980). The situational interview. *Journal of Applied Psychology, 65*(4), 422–427.

Littig, B. & Griessler, E. (2005). Social sustainability: a catchword between political pragmatism and social theory. *International Journal of Sustainable Development*, 8(1-2), 65-79.

Macke, J., Sarate, J.A.R. & de Atayde Moschen, S. (2019). Smart sustainable cities evaluation and sense of community. *Journal of Cleaner production*, 239 (in press).

Maral-Llacuna, M. et al. (2015). Lessons in urban monitoring taken from sustainable and livable cities to better address the Smart Cities initiative. *Technological Forecasting and Social change*, 90, 611-622.

Mutule, A., Teremranova, J., & Antoskovs, N. (2018). Smart city Through a flexible approach to smart energy. *Latvian Journal of Physics and Technical Sciences*, 55(1), 3-14.

Oberg, C., Graham, G., & Hennelly, P. (2015). Smart cities -A literature review and business network approach discussion on the management of organisations. *IMP Journal*, 11(3), 468-484.

Theoretical and Empirical Researches in Urban Management
Volume 15 Issue 2 / May 2020

Praharaj, S. & Han, H. (2019). Cutting through the clutter of smart city definitions: A reading into the smart city perceptions in India. *City, Culture and Society*, 18 (in press).

Satterthwaite, D. (1997). Sustainable Cities or Cities that Contribute to Sustainable Development? *Urban Studies*, 34(10), 1667-1691.

Smart Prague (2017). O Smart Prague. Retrieved December 14, 2019, from

https://www.smartprague.eu/o-smart-prague

Stephens, C. & Satterthwaite, D. (2008). Urban Health in Developing Countries. In Quah, S. R., Heggenhougen, K. (eds.), *International Encyclopedia of Public Health* (pp. 452-463). Amsterdam/Boston: Elsevier/Academic Press.

United Nations Population Fund (2018). Urbanization. Retrieved Januar 12, 2020, from https://www.unfpa.org/urbanization

Úřad vlády (2018). Analýza aktuální úrovně zapojení ČR do konceptu Smart city a smart region v souvislosti s novými trendy, včetně návrhů opatření. Retrieved Januar 19, 2020, from

https://www.vlada.cz/assets/evropske-zalezitosti/aktualne/Zaverecna zprava_Smart_City_a_Smart_Region.pdf

Vanolo, A., (2014). Smartmentality, *Urban Studies*, 51(5), 883-898.

Vize a Strategie #brno2050 (2017). Vize a Strategie #brno2050. Retrieved December 15, 2019, from https://brno2050.cz/wp-content/uploads/2018/12/Strategie_BRNO_2050_strategicka_cast_FINAL_web_12_12_2017_publicita.pdf

Webster, C. W. R. & Leleux, Ch. (2018). Smart governance: Opportunities for technologically-mediated citizen co-production. *Information Polity*, 23(1), 95-110.

Yigitcanlar, T. & Kamruzzaman, M. (2018). Does smart city policy lead to sustainability of cities? *Land Use Policy,* 73, 49-58.

Yigitcanlar, T., Kamruzzaman, M., Foth, M., Sabatini-Marques, J., Eduardo da Costa, & Ioppolo, G. (2019). Can cities become smart without being sustainable? A systematic review of the literature. *Sustainable Cities and Society*, 45, 348-365.

Zlín 2020 (2012). Strategie rozvoje statutárního města Zlína do roku 2020 – Zlín 2020. Retrieved December 20, 2019, from https://www.zlin.eu/clanky/dokumenty/2800/05e7fb05-0-strategie-zlin-2020-navrhova-cast-1-0.pdf