

## SMART CITY AND SMART REGION CONCEPT IN ZLÍN AND TRENČÍN REGIONS

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### Abstract

*Each territory has characteristics that help to identify the positive and negative factors, from which we can identify possible opportunities and threats of development. Regions face enormous challenges of ensuring prosperity, sustainability, social inclusion, public health, and safety. It is in times of financial crisis especially, that traditional approaches fall short and innovative solutions for answering these challenges are needed. For this reason, the idea of transforming cities into "Smart cities or Smart regions" has gained much popularity among policymakers on both regional and urban development and professionals. The aim of this paper is also to present theoretical and practical aspects of Smart city and Smart region philosophy, in the selected regions in Czech Republic and Slovakia.*

### Key words

*Smart city, Smart region, sustainable development, regional development innovation.*

**JEL Classification:** O18

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### Introduction

In recent years there has been indicated growth of focus upon the quality of life connected with the concept of "Smart city", which is becoming the object of debates worldwide. The concept of "Smart city" uses modern technology to pursue the streamlining of governance, the innovation of approaches to the local sustainable development and many more. With attention to the environment, it offers extensive freedom of its individual implementation. It is a relatively new concept that has begun to be involved in the Czech Republic with a noticeable delay compared to neighbouring countries. How the intelligent concept will be grasped and implemented depends mainly on the main management of municipalities, cities and regions

The first aim of this paper is to characterize the basic elements of Smart city and region concept based on existing literature, characterize the current state of implementation of the Smart city and region concept with an emphasis on Zlín and Trenčín regions. Additionally, to highlight the possibilities for future development.

The second aim of this paper is to characterize objectives and methods of research that focuses on Zlín and Trenčín regions - acquaint the reader with the formation of future research intentions of the author. The work also

follows previous analysis of Smart elements in the Czech Republic, which the author dealt with.

### 1 Smart city and region philosophy

Angelidou (2015) believes that the idea of Intelligent city did not arise out of anything but has been forming by social and economic factors, governance mechanism and many others. As Haviernikova (2015) stated many changes in nowadays economy are affected by trends of globalization. According to Anthopoloulos (2017), the beginning of the 1990s was an important period for the formation of Smart city philosophy: experts intensively developed ideas on potential new solutions and alternatives to the use of modern technologies, especially for ICT, which would contribute to building entirely new and modern virtual cities that meet the daily needs of the population.

According to Meijer et al. (2015), the literature describing the Smart city area is rich but also characterized by its fragmentation. Given the conceptual comprehensiveness of a Smart city, a city is a complex system. Chourabi et al. (2012) consider that the philosophy of smart cities can be seen as an organic system connected by many components. Based on the analysis of contemporary literature: the most commonly areas mentioned in the characteristics of a smart city can be identified: Smart economy (a combination of successful elements of

business and innovation economics, promoting quality environment, security and social cohesion), Smart mobility (including not only the mode of transport but also the necessary infrastructure), Smart environment (all human activity designed to meet current needs without compromising the ability of future generations to meet the economic, environmental, and social challenges), Smart governance, Smart people and Smart living (the quality of life of the population is perceived due to our position and the influence of value systems). Albino et al. (2015) in his research states that many researchers argue that quality of life may not represent a separate dimension of a smart city - as all measures in other areas should improve the quality of life.

Sanseverino et al. (2017) claim that the first use of Smart city term was in 2007. In the context of increasing attention to the new Smart philosophy Lombardi et al. (2012) say that there is no uniform interpretation of Smart city and according to Dameri (2016) municipalities implementing smart strategies issue their own definition. For instance Neirotti et al. (2014) consider that there is wide agreement about the fact that Smart cities are characterized by the pervasive use of Information and Communication Technologies (ICT). However, Caragliu et al. (2011) emphasizes that the availability and quality of the ICT infrastructure is not the only definition of a smart city. The following table gives an overview of the most common components of Smart city used in articles.

*Tab. 1. Perception and definition of Smart city*

Smart city as	Focus	Number of papers
Smart technology in the city	Technology	12
Smart people in the city	Human resources	4
Smart collaboration in the city	Governance	6
Combinations of smart technology, smart people and smart collaboration in the city		12
No definition		17

Source: Renata Paola Dameri (2016)

Dameri (2016) believes that the conceptual idea of the smart city belonging to these main different key players: university, industry, and government. According to Bifulco et al. (2017), it is necessary to emphasize the area of Smart governance and the role of individual municipalities, because municipalities are an important coordinator of a smart city concept. Smart governance, also refers to eGovernment, as one of the attributes associated with smart city management, promoting the basic principles of transparency, transparency, and 3E helps to choose the right policy that is effective and efficient. Meijer et al. (2015) include the future of public services, community leadership and continuous improvement through innovation. It is the use of information and communication technologies to facilitate and support better planning and decision-making, improve

democratic processes and change the ways in which public services are delivered.

Sanseverino et al. (2017) mention the basic aspects of Smart city:

- Knowledge city
- Sustainable city
- Connected city
- Talented and creative city
- Digital city
- Ecological city

Due to the fact many Smart city experts say that the concept of Smart cities is strongly interconnected with ICT, some authors, as well as Su, K et al. (2011), perceive Smart city as the product of the digital city. Vesco et al. (2015) state that the aim of implementing the Smart city concept in general is to achieve a level where the

city is digital, open, cooperative, prosperous, clean, safe and of general interest to citizens.

Governance, technology, communication, transport, infrastructure, people, the economy, the environment, natural resources, innovation and quality of life are just a fraction of the factors involved in the birth of smart cities.

## METHODOLOGY

The main objective of the research is to analyze the potential of the application of the development concept of Smart city and Smart region in Zlín and Trenčín regions with regard to the existing Smart development experience and existing professional literature dealing with the issue.

In the introductory phase of the research represented in this paper, the author focuses on the approaches of Zlín region of the Czech Republic to the topic of Smart city and region concept. The aim of this phase is to obtain qualitative data which subsequently served as a basis for quantitative research. A specific group of 19 respondents was selected for the initial survey: organizational units and organizations of the statutory city of Zlín and Zlín region, private sector representatives which are given its core competence for the implementation of the Smart City concept. The interviews were realizing for the research at the turn of February and October 2019.

Within the framework of the project "Information Bridge III: Smart City as a Source of Development of the Czech-Slovak Border Region" a questionnaire survey was carried out among representatives of towns and municipalities. The second step of this work includes quantitative research among 36

municipalities in the Zlín region and 53 municipalities in the Trenčín region by survey interviews. The purpose of this phase is to verify the findings from qualitative research. The survey interviews were realizing for the research at the turn of August and October 2019.

To achieve the main objective, the following research questions must be answered:

**Q1:** How do the Zlín and Trenčín regions perceive the Smart city development concept and what are the main application areas of this concept?

**Q2:** Is there any demand for anchoring and implementation of the SC approach in the Zlín and Trenčín regions?

**Q3:** What are the main expected benefits of the SC implementation?

**Q4:** What are the main expected constraints and unfavorable aspects of the SC implementation?

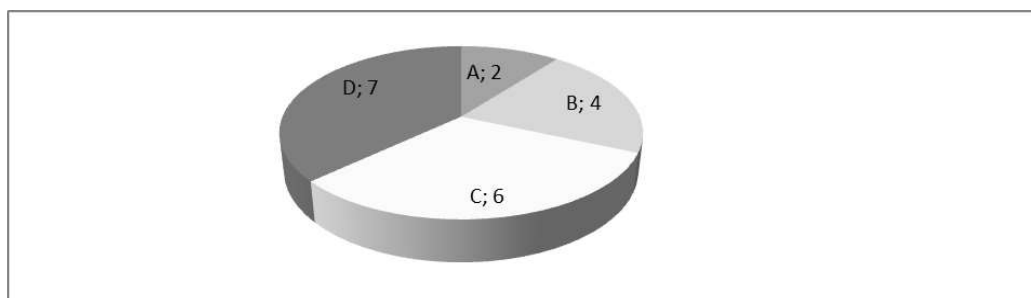
The secondary goal of the thesis is to elaborate a theoretical and practical basis for opportunities deepening on the existing knowledge of the concept in Czech Republic.

## City concept awareness status

Due to the fact that there is no uniform interpretation of Smart city, the first question concerned the characteristics of the basic aspects of Smart city

*City concept awareness status (knowledge of the concept and its characteristics) – qualitative research*

The aim of the question was to find out the current state of general awareness of individual actors about the concept of Smart city (in the statutory city of Zlín and Zlín region). The following chart shows the respondents' answers.

**Fig. 2. Smart city concept awareness status**

Source: own processing

**Legend:**

- A. No experience with the concept, impossibility to characterize the concept
- B. Only basic awareness without the ability to explain the essence of the concept
- C. Good awareness with emphasis on technological aspects
- D. High awareness with an emphasis on the conceptual perspective and the broader context of the concept

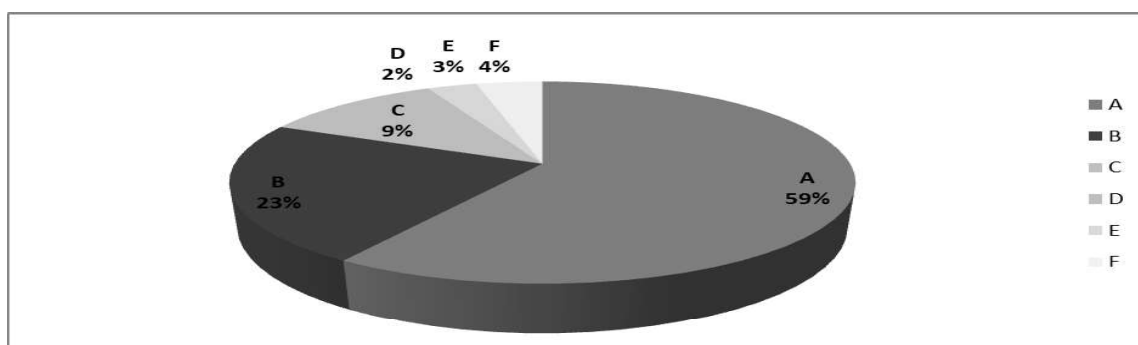
The majority of respondents understood the term Smart city a certain development concept that deals with data integration, smart technology implementation and new trends in city management.

The respondents cited sub-areas which in their opinion are part of the Smart city concept. The most commonly mentioned areas were: transport, security, ICT technology, energy, city management, strategic development and environment. It should be stressed out that all

respondents mentioned 2 areas: ICT technology and transport

*City concept awareness status (knowledge of the concept and its characteristics) and main investment projects in Smart city – quantitative research*

The aim of the question was to find out the current state of general awareness of individual actors about the concept of Smart city (in Zlín and Trenčín regions). The following chart shows the respondents' answers.

**Fig. 3. Smart city concept awareness status**

Source: own processing

**Legend:**

- A. Investment technology projects (sensors in transport or waste management, energy savings, information technology, data centers, etc.)
- B. Educated employees of the Office providing quality services
- C. Mobile and web applications (eg fault reporting, office or culture information, etc.)
- D. Transparency and open communication of the Office (open data, use of social networks, etc.)
- E. Involvement of citizens and other entities in the city (participative budget, commenting on strategies and projects, questionnaire surveys)
- F. Other

More than half of respondents perceive investment technology projects such as sensors in transport or waste management, energy savings, etc. under the idea of intelligent cities (53% of respondents in the Zlín region and 73.6% of respondents in the Trenčín region). Concerning the remaining possibilities, it is possible to mention the area of mobile applications, which was answered by 23% of respondents (in terms of the Zlín region it was 14% of respondents and Trenčín 32.1%). Other options have not been mentioned so much.

#### **smart city and region and Demand for implementation**

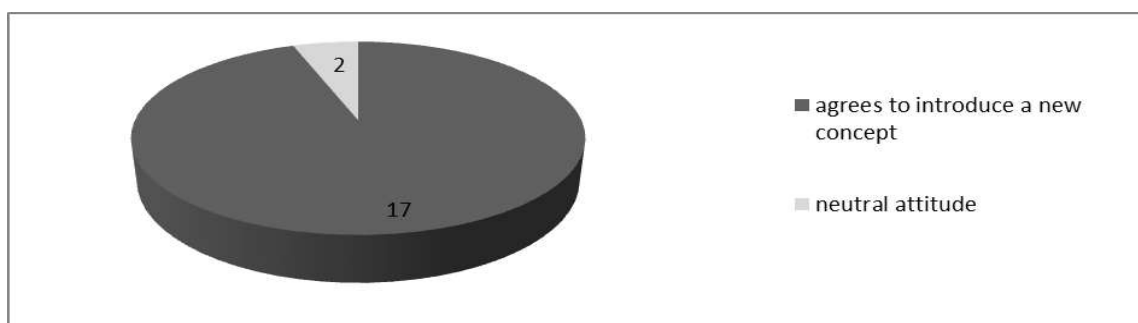
The respondents were also asked a question concerning the current level of support for Smart

city projects concerning territorial development and the fulfillment of basic strategic visions and objectives of individual towns and municipalities.

#### *Demand for conceptual anchoring and coordination of Smart city implementation - qualitative research*

17 of respondents agreed on the need to introduce a combined approach (conceptual and coordinated approach) to the implementation of the concept in terms of the statutory city of Zlín and Zlín region. Two respondents were neutral. On the contrary, none of the respondents would have preferred an uncoordinated - purely project approach.

**Fig. 4. Smart city concept and demand for implementation**



Source: own processing

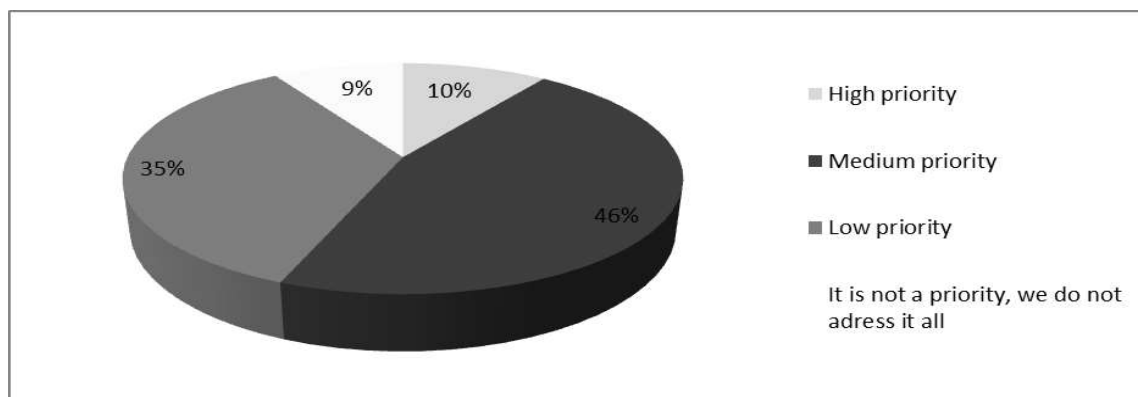
According to interviews respondents were positive for the introduction of the Smart city concept but stressed out that they do not perceive the concept as the primary tool for fulfilment of basic strategic goals and visions of the city but as a means of the level development of the city.

#### *Demand for conceptual anchoring and coordination of Smart city implementation - qualitative research*

As can be seen from Fig. 46% of the municipalities involved in the project put medium importance on the modernization of

municipalities and cities. Only 7% of the municipalities involved do not seek to modernize their municipality. In terms of regional comparison, the data are almost identical - the Trenčín region 45% and the Zlín region 47% place medium importance. When analyzing the remaining options, it can be said that the Trenčín region has a more positive relationship / emphasis, which shows higher values of high priority over the Zlín region.

Fig. 5. Smart city concept and demand for implementation



Source: own processing

### The main expected limits and benefits

#### *The main expected limits and benefits – qualitative research*

The following tables show the most frequently mentioned benefits and limits of the smart city concept (in the statutory city of Zlín and Zlín region).

Tab. 2: The main expected limits in implementing Smart thoughts in statutory city of Zlín

- Prioritizing solutions to current needs over a long-term conceptual perspective
- Excessive dependence on electronic systems
- Instability of electronic systems
- Too high demands on the protection of personal data
- Misuse of information from smart systems, including personal information
- Information overload
- Pitfalls of incomplete information
- Barriers to the involvement of seniors in participation processes
- Threat to the central heat supply system by separation tendencies

Source: own processing

Tab. 3: The main expected benefits in implementing Smart thoughts in statutory city of Zlín

- Improving the quality of life in the city
- Improving mobility and reducing traffic loads in the city
- Improving the quality of the environment, eco - friendliness
- Increase safety in the city
- Improving the availability of information
- More effective participation of the population
- Reducing administrative burdens (for citizens and officials)
- Digitization
- Save time and money

Source: own processing

Tab. 4: The main expected limits in implementing Smart Thoughts in Zlín region

- Less competence
- Increasing regional disparities
- Financial demands and returns
- The basis for building a smart environment - Smart people
- High technological progress and frequent technology exchanges

Source: own processing

Tab. 5: The main expected benefits in implementing Smart thoughts in Zlín region

- Increased competitiveness
- Satisfied residents
- Attractive territory and marketing
- Technological progress

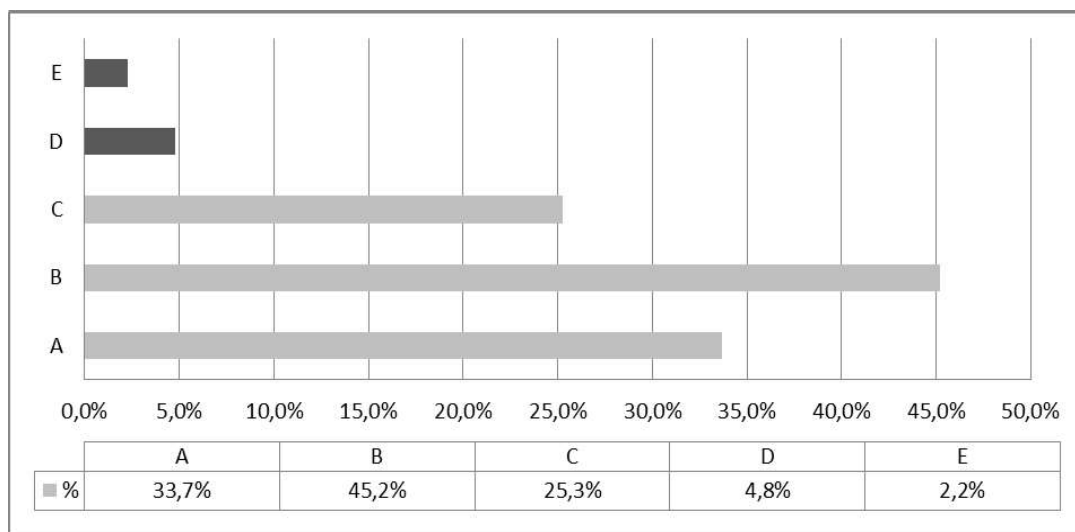
Source: own processing

The Respondents also pointed to the low readiness of the city and region for the implementation of the SC. Respondents assigned the concept to the preparatory phase and point to insufficient staffing and lack of partnership for successful implementation of the concept - Lack of institutional capacity of small municipalities to implement the Smart city concept.

***The main expected limits and benefits – quantitative research***

Each of the respondents was supposed to identify the three benefits and limits of the smart city project from pre-defined options (in Zlín and Trenčín regions).

**Fig. 6. The main expected limits of Smart city implementation**



Source: own processing

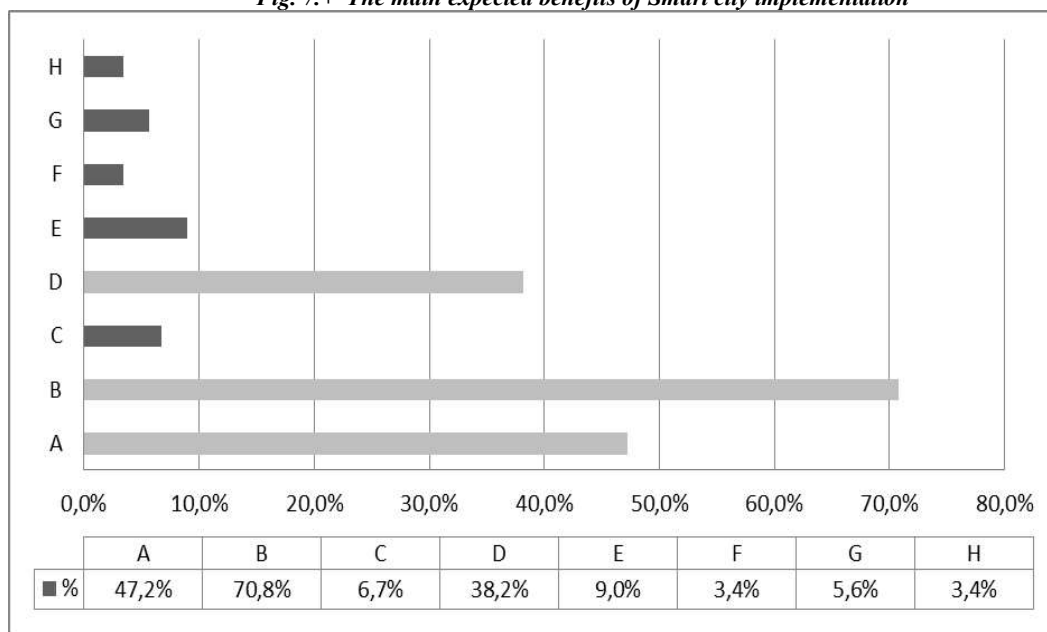
**Legend:**

- A. We don't have finance for similar types of projects
- B. We focus on other investment projects
- C. We don't have necessary knowledge / experts
- D. Citizens of our municipality are not interested in Smart city projects
- E. Others

It may be seen clearly that main limits respondents comparing to problematics of other projects investment – 46% (in Zlín region it is

47,9% and in Trenčín region it is 45%). Another important aspects respondents perceive are financing of Smart city and missing knowledge.

Fig. 7.+ The main expected benefits of Smart city implementation



Source: own processing

Legend:

- A. Reduce operating costs
- B. Improving the quality of life
- C. Positive image of the village
- D. Modernization of technological infrastructure
- E. A better collaborating community
- F. More educated and happier city workers
- G. Business support (development of new sectors)
- H. Other

The greatest benefit is clearly identified in the potential increase in the quality of life of the population by 70% of the representatives of cities and municipalities. Furthermore, almost 50% of respondents believe that involvement in a smart city project could reduce operating costs in the municipality. 38.2% of the representatives of towns and municipalities see the smart city project as beneficial in the modernization of technological infrastructure.

### THE FUTURE OF RESEARCH

The analysis is a part of 1 short-term and 1 long-term research activities:

**1) The methodology of the application of Smart city concept** into organizational and management structures of municipalities in Zlín and Trenčín regions (short-term research) with municipal authorities.

**2) Innovation processes, strategies and policies in the context of Smart City** (long-term research)

The main goal of the research project is to analyze and describe the role of municipalities in the creation of innovative solutions applicable within the Smart city concept. It will be examined as a municipality enter into innovation processes in interaction with research organizations and the business sector, what are the motivations and decision-making



mechanisms in municipalities in this respect and what are the barriers in this respect limit. The main objectives of the long-term research include identification of the applicability of the Smart region concept in the field of transport for Czech regions on the basis of a model based on key dimensions identified in existing literature and the creation of a theoretical core for the practical opportunities of the Czech regions which will lead to economical, efficient and effective building of Smart transport.

Emphasis will be placed on the following aspects:

- the municipality's demand for innovative solutions (initiation of innovation creation),
- city and municipality as a living laboratory for developing and testing innovative solutions,
- other supportive tools of municipalities for creating innovations (eg financial support, operation hard and soft support infrastructure).

The object of the research will be municipalities in three states of the European macro-region of Central Europe:

- Czech Republic
- Slovakia
- Austria

The prerequisite for the contribution of the work is mainly in the reduction of the limits, structural disproportions and imbalances in the Czech Republic / regions. Formulation of positive facts, favorable factors and assumptions for the possible future development of the regional innovation sector. Addition of the missing information knowledge Smart region and Smart transport for regions of the Czech Republic

#### **Basic scientific questions of long-term research:**

Q1: How about measuring long-term financial benefits on municipalities after the implementation of the SC concept?

Q2: Which other indicators would be reasonable for measuring effectiveness of the Smart city concept implementation regarding to the quality of life?

Future researches will also be based on a comparison of current studies on Smart city in the Czech Republic and Slovakia. For instance:

A) The project of the Technology Agency of the Czech Republic (the researcher: Tomas Bata University, Mostní 1, 613 00 Brno).

**Project title:** Methodology of application of smart governance approaches governance into organizational and management structures of municipalities in the Czech Republic

**Research sample:** Czech municipalities (325)

B) Comparison with research results by Mendel University

**Project title:** Analysis of the current level of involvement of the Czech Republic in the concept smart city and smart region related to new trends, including draft measures

**Research sample:** Czech regions (13), Czech regional capitals (12), Czech municipalities (51)

#### **CONCLUSIONS**

At present the implementation of the Smart city concept prevails at the level of individual municipalities in the Czech Republic – increases in numbers of strategic Smart documents, projects and conferences and many other activities related to building smart cities can be seen.

At the regional level it is so far not possible to talk about such strong implementation of the Smart city philosophy - signs of support for the idea of Smart region in the form of memoranda of cooperation in the spirit of Smart cities and the introduction of modern Smart technologies across the areas for balanced territorial development can be seen. However, these are only intuitive procedures that point out the lack of institutional framing of the concept into organizational structures and incorporation into the strategic planning of the regions.

The majority of respondents understood the term Smart city a certain development concept that deals with data integration, smart technology implementation and new trends in city management - Overall, respondents' awareness of the Smart city concept can be viewed positively, but it should be emphasized that only a minority of respondents understood the full substance of the concept; the technological aspect prevails over the broader concept of smart cities.

However, it should be noted that the research carried out repeated opinions. Some respondents do not perceive the concept of Smart city as a

priority area of solution in their territory. According to questionnaires 47% of respondents stated that they focus on other investment projects.

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