SMART CITY AND REGION IN THE CZECH REPUBLIC WITH A FOCUS ON THE ZLÍN REGION

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Abstract

Concept of "Smart city and region" uses modern technology to pursue the streamlining of governance, innovation of approaches to the local sustainable development and many more. This paper deals with the area of Smart City and the Region and its current implementation in the Czech Republic with a focus on the Zlín Region. The paper is based findings of previous studies carried out in the Czech environment focusing on all levels of public administration. Consequently, the paper follows with empirical research in selected region of the Czech Republic. The main objective of the research is to analyse the potential of the application of the development concept of Smart city and Smart region in the Czech Republic and selected region in the Czech Republic with regard to the existing Smart development experience and existing professional literature dealing with the issue to highlight the opportunities for further development.

Keywords: *smart city, smart region, sustainable development, regional development innovation, Czech Republic, Zlín region*

1 INTRODUCTION

Nowadays, all territories strive to be modern, interesting, environmentally friendly, sustainable and competitive. How these goals can be achieved is a question that every interested agent in territorial development is trying to figure out. In recent years, there has been an increasing growth of focus upon quality of life connected with the concept of "Smart city", which is becoming the object of debates worldwide. Smart city as a modern concept is currently perceived by experts as a potential tool to achieve the above-mentioned objectives. Smart City is not only a question of the main management of cities and municipalities - all stakeholders from private, public and academic backgrounds can participate.

The first purpose of this paper is to characterize the basic elements of Smart city and region concept based on existing foreign literature and characterize the current state of implementation of the Smart city and region philosophy in the Czech Republic. The second purpose of this paper is to characterize and to highlight the possibilities for further development.

2 SMART CITY AND REGION PHILOSOPHY

Increasing activities related to the implementation of the concept have made it possible to identify cities that are actively committed to building an intelligent environment at different levels. Riva Sanseverino, Riva Sanseverino and Vaccaro (2017) mention in particular the areas of Amsterdam, Stockholm, Milan and Singapore, which are in society most commonly referred to as Smart cities .What Smart City is and since when can we call it Smart? Nowadays these questions cannot be simply answered. Smart city is a complex that is formulated and transformed every day. The idea of Intelligent city did not arise out of nothing but has been forming by social and economic factors, governance mechanism and many others - the Smart city concept is not a state but a long-term process.

In the context of increasing attention to the new Smart philosophy according to Caragliu, Del Bo and Nijkamp (2011), there is no general interpretation of concept. The formulation of basic characteristics is based mainly on historical development. The concept of smart cities finds Anthopoulos (2017) a relatively young idea and assigns its beginning (like many authors) towards the end of the 20th century. Beginning of the 1990s, the experts consider as an important period in terms of forming the basic attributes of Smart city - especially ICT technologies. Rafiq et al. (2013) point out the trend great of the ICT technologies and the role of innovation in the ICT sectors and Caragliu, Del Bo and Nijkamp (2011) its boom among wide audience in European countries early 1990s. Author mention as one of the main reasons of today's focus mainly on ICT technologies.

It is rather challenging to mention all areas related to Smart city. According to Bolívar and Meijer (2016) governance, technology, communication, transport, infrastructure, people, economy, environment, natural resources, healthcare, innovation and quality of life are just a fraction of the factors involved in the birth of smart cities. Neirotti et al. (2014) further define areas according to the necessity of developing ICT technologies for a specific area, such as energy grids, transport, mobility and logistics, waste management and public security. Neirotti et al. (2014) mention, for example, education, which they consider as an area that does not require a significant representation of ICT technologies.

Barrionuevo, Berrone and Ricart (2012) characterize Smart city as use all available technology and resources in coordinated manner to develop urban centres that are at once integrated, habitable, and sustainable. Komninos (2011) perceives Smart city as territories with capacity for learning and innovation, which is built-in the creativity of their population, their institutions of knowledge creation, and their digital infrastructure for communication and knowledge management. Benevolo, Dameri and D'Auria (2016) mention the basic aspects of Smart City into three main topics: Digital city, Knowledge City, Green city. Benevolo, Dameri and D'Auria (2016) and Riva Sanseverino, Riva Sanseverino and Vaccaro (2017) complement the literature with the following aspects of Smart: Sustainable city, Talented and creative city, Ecological city and Connected city.

Zanella et al. (2014) specify the main barriers of Smart City development into three main dimensions. The smart city area is rich and extends to many developing areas. This fragmentation consequently requires the involvement of many stakeholders. According to the Zanella et al. (2014), the political dimension plays an important role in the decision-making power of all participating stakeholders, which can be eliminated by institutionalizing the idea of Smart City. In the technical dimension, Zanella et al. (2014) emphasize the diversity of technologies and the inability of systems to provide services and collaborate effectively. The last financial dimension related to current global trends affecting the economy and investment in public services. As the main problem, Zanella et al. (2014) find lacking a clear business model and believe that this absence hampers the development of the Smart City concept and is therefore needed to develop those services that support social services with a very clear return on investment. Vesco and Ferrero (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.

3 METHODOLOGY

The main objective of the research is to analyse the potential of the application of the development concept of Smart city and Smart region in the Czech Republic and selected region in the Czech Republic 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 20 respondents was selected for the initial survey: organizational units and organizations of the statutory city of Zlín and Zlín region, private sector representatives that are given its core competence for the implementation of the Smart City concept. Respondents were selected by the researcher to represent the most common development areas: transport, environment, ICT, energy, waste management, etc. 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 among 36 municipalities in the Zlín region was carried out among representatives of towns and municipalities. 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. The questions were chosen based on the results of interviews and empirical experience of the author. The choice of questions also took into account possible size groups of municipalities - the questions were adapted primarily to the conditions of smaller municipalities. Thus, specific research questions were identified regarding the main objective of the research.

Q1: How does the Zlín region perceive the Smart City development concept and what are the main attributes of this idea?

For Smart city, there is no uniform interpretation of the concept and gives extensive freedom for individual interpretation. The implementation of the concept depends largely on the leadership of regions and municipalities. The question seeks to approach the region's view of Smart City - the question also monitors whether the region follows the current trend where the main attention is paid to ICT technologies.

Q2: Is there a demand in Zlín region for anchoring and implementation of the SC philosophy?

Smart city is a current worldwide trend, which is the subject of professional debates. The question aims to find out whether there is a demand for the implementation of the Smart city concept in the Zlín Region.

Q3: What are the main potential benefits that can be expected?

Q4: What are the main constraints and unfavourable aspects that can be expected?

Questions Q3 and Q4 regarding anticipated benefits and limits are linked to question Q1. Due to the individual implementation of the concept, it is also possible to anticipate different benefits and limits for individual territories. The question tries to identify the basic possible future direction.

The additional aim of the paper is to elaborate a theoretical and practical basis for opportunities deepening on the existing knowledge of the concept in Czech Republic. Primary and secondary data were used for the research. Secondary data were based on available methodologies and currently prepared methodologies. The research also follows the author's research focused on the characteristics of the Smart environment in the Zlín and Trenčín regions. This work aims to better acquaint readers with the issue of Smart city in the Czech environment and characterize in more detail the current attitude of cities and municipalities in the Zlín region.

4 SMART CITY CONCEPT IN CZECH REPUBLIC

The concept of Smart Cities is addressed and also occupied by the Ministry of Regional Development as the main coordinator of the concept development for the Czech Republic,

which developed a general methodology called “Methodology of the Concept of Smart Cities”. The methodology is intended for both city management and local government employees who are involved in the preparation of SC concepts in the areas of transport, energy and information and communication technologies (ICT). Due to low use and public interest in the methodology of the Ministry for Regional Development, analyses and projects mapping the implementation and development of the Smart City idea are currently underway in the Czech Republic.

The following part deals with the characteristics of the current concept of Smart City in the Czech Republic. The project of the Ministry of Regional Development, which was elaborated by a team from Mendel University in Brno, was chosen as the information source. The title of the project is “Analysis of the current level of participation in the Czech Republic in the concept of smart city and smart region related to new trends, including draft measures” and its processing took place between 6 March 2018 and 25 September 2018.

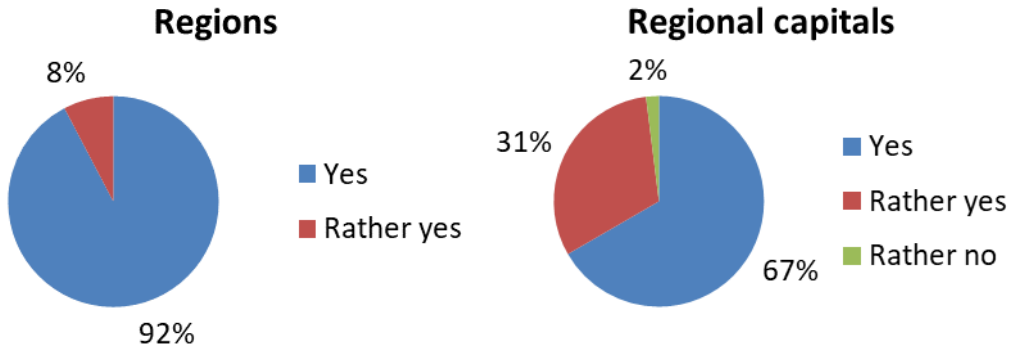

Fig. 1 – Interest in building a smart environment. Source: own research

Thirteen representatives of the Regional authorities, representatives of the City of Prague, 13 representatives of regional capitals and 51 municipalities were addressed. At present the implementation of the Smart city and region 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. Based on these graphs, it can be concluded that there is a demand for grasping the Smart city concept in the Czech Republic. The research thus focused mainly on higher territorial units and more dominant cities - thus the question of attitudes of smaller municipalities arises.

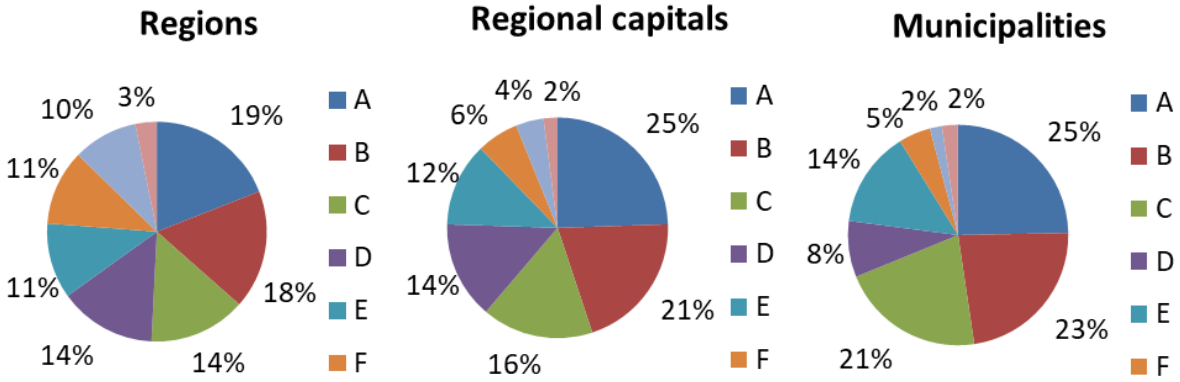

Fig. 2 – The main areas of Smart City and Smart region in relation to strategic planning. Source: own research

Legend:

A. Sustainable mobility

B. ICT and efficient management

C. Sustainable energy

D. Health, safety

E. Environment

F. Culture and tourism

G. Innovation and business development

H. Education and sport

Based on the research carried out and respondents' answers, it can be said that in the Czech Republic there is an even fragmentation of the main Smart Development areas. However, a slight preference for Smart Mobility can be seen.

The following table shows the basic Smart City areas of the Czech Republic regions mapped by the Ministry for Regional Development. The table shows the basic direction of selected regions without the capital city of Prague. We can see that there is some difference in the direction and support of Smart areas. However, strong support can be seen in the areas of transport, energy and ICT.

Tab. 1 – Smart city areas in regions of the Czech Republic. Source: own research

Královéhradecký	Partner network building, Knowledge support, Support deployment of smart technologies
Moravskoslezský	Health protection, life protection, finance, energy saving, ICT; smart transport card, public Wi-Fi
Vysočina	Energy, transport, environment, IT, education, tourism
Liberecký	Transport, economic development and tourism, health service, environment, education public administration, social area
Zlínský	Partnership, networking and environment creation, Human resources, education and employment, support of SMART solutions and their integration into a functioning whole
Olomoucký	Smart municipalities, ICT, transport, energy, environment, smart office
Jihočeský	Mobility, ICT, Energy, Environment, Health and Social Services, Effective Territorial Management, Innovation
Jihomoravský	-
Středočeský	Smart accelerators
Ústecký	Health protection, life protection, finance, energy saving
Karlovarský	-
Plzeňský	Smart accelerators
Pardubický	Energy, transport

The following part deals with the characteristics of the current concept of Smart City in the Czech Republic. The project of the Technology Agency of the Czech Republic, which was elaborated by a team from Tomas Bata University in Zlín, was chosen as the main information source. The title of the project is “Methodology of application of smart governance approaches governance into organizational and management structures of municipalities in the Czech Republic” and is still in progress. 325 municipalities were chosen as a research sample.

Under the conditions of the Czech Republic, we can discuss the support for building an intelligent environment. Based on the research carried out between regions and cities, a positive approach for the implementation of the concept of Smart city and region prevails. In general, it can be stated that in the Czech Republic there are three dominant Smart City areas: Sustainable Transport, ICT and Energy. In terms of strategic planning, the priority is given to the area of sustainable transport, in terms of investment priorities it is ICT technologies. From the point of view of the implementation of the concept of Smart City and Smart Region, it is an important finding that almost no territory uses the Smart City methodology issued by the Ministry for Regional Development. It can be assumed that the individual approach will prevail.

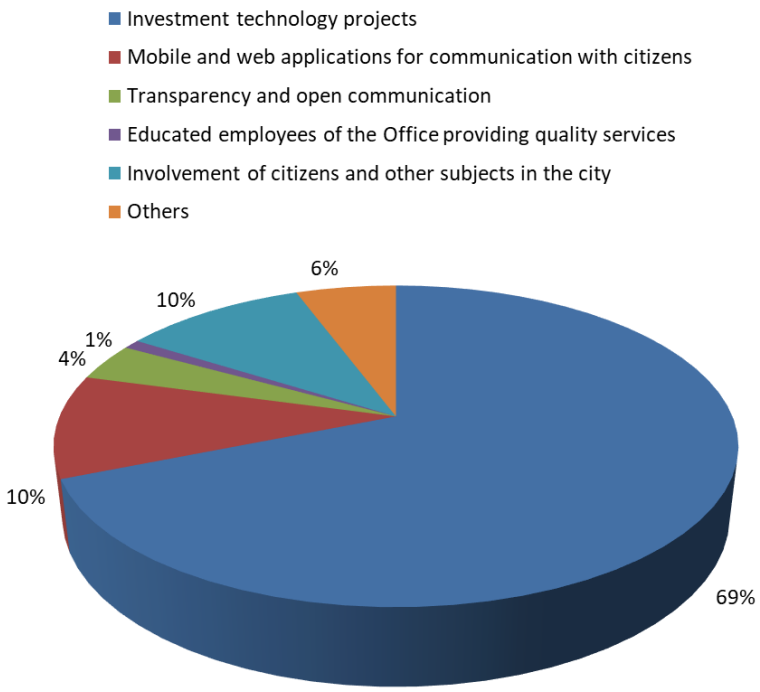

Fig. 3 – Investment priorities. Source: own research

5 SMART CITY CONCEPT IN ZLÍN REGION

By its development priorities, Zlín Region has been striving for a balanced development of its territory, increasing its territory competitiveness, attractiveness, and quality of life. The Zlín region is currently working on a conceptual document that is interconnected with the will comprehensively address the issue of Smart City and its partial thematic defines the role of the Zlín region and sets the framework and principles cooperation of the territory in this issue. So far, these are topics dealt with at an ad-hoc regional level.

5.1 Findings regarding city concept awareness status (knowledge of the concept and its characteristics)

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 role of ICT technologies was particularly emphasized. The central collection was considered as the basis for the development of the Smart city concept. The Invipo system, which is currently being developed in the city of Zlín, has been mentioned as an example.

The role of foreign experience was emphasized. According to respondents, the Zlín Region should draw on experience from abroad. The Respondents stressed that this is a relatively young global concept, which began to build in the Czech Republic with a significant delay compared to neighbouring countries. Respondents often mentioned (in the Czech Republic) the city of Brno as a more advanced city approaching the idea of Smart city - especially in the area of ICT technologies. Among the foreign cities mentioned were: Vienna, London, Amsterdam Barcelona

At the same time, they pointed out the negative trend of the concept implementation in the Czech Republic, where, according to the interviewees, a strong marketing approach of the concept for mere visibility of the territory prevails instead of real construction that would capture the full essence of Smart city philosophy. 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, waste management and environment. It should be stressed out that all respondents mentioned two areas: ICT technology and intelligent transport. 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. Thirty percent of respondents find the main investment priorities in reducing energy intensity. We can also mention ICT and mobile applications, which were marked by 22% of respondents.

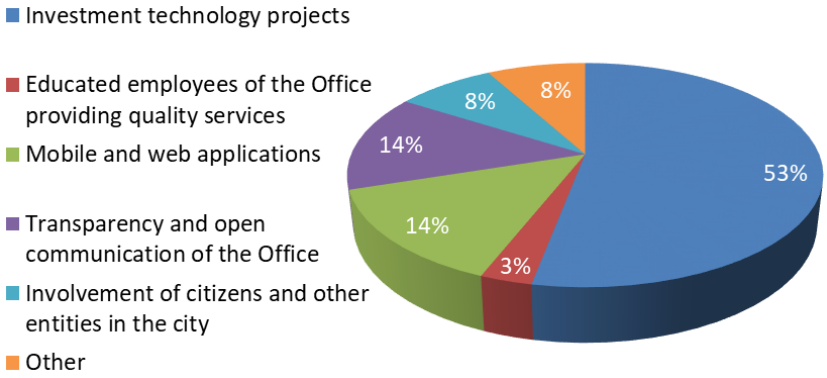

Fig. 4 – Knowledge of the Smart concept and its demand. Source: own research

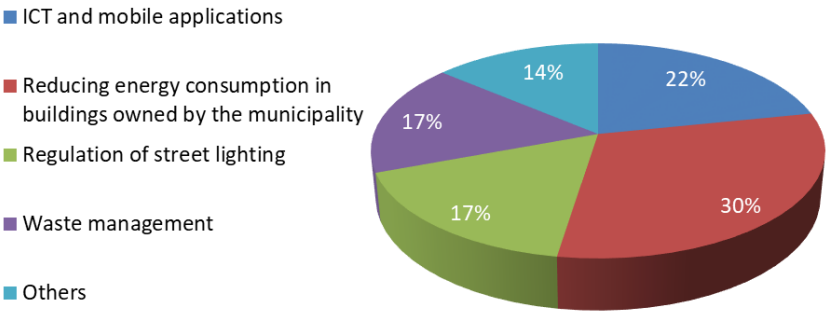

Fig. 5 – Main investment projects in Smart city implementation. Source: own research

5.2 Findings regarding demand for conceptual anchoring and coordination of Smart City implementation

The vast majority of respondents agreed on the need to introduce a combined approach (conceptual and coordinated approach) to the implementation of the concept in terms of statutory city of Zlín and Zlín region. Two respondents were neutral. On the contrary, none of the respondents would have preferred purely project approach. Respondents were positive for the introduction of the Smart City concept, but stressed out that they did 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. The concept of smart cities should not replace the basic (existing) development documents – according to respondents the smart city document must develop current development topics. The need for the establishment of a competent coordinating body; drawing inspiration from other cities and abroad, the need to reduce administrative burden, emphasis on trust and openness.

Forty-seven percent of the municipalities involved in the project put medium importance on the modernization of municipalities and cities. Eight percent of the municipalities involved do not seek to modernize their municipality. An important finding here is that 42% of municipalities regard the idea of Smart City as a low priority.

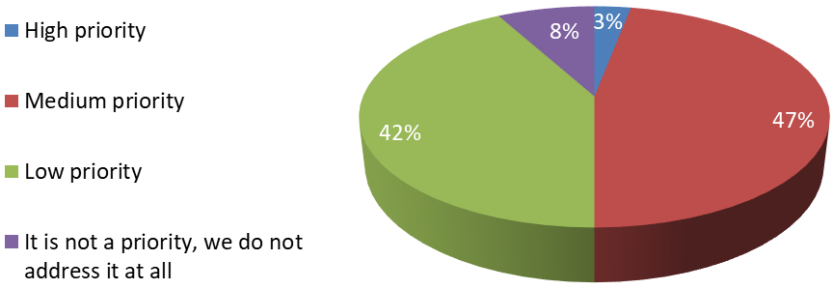

Fig. 6 – Attitude to Smart city projects. Source: own research

5.3 Findings regarding expected limits and benefits

The risk of uneven development of the territory, the unintentional purchase of new technologies and the "random" identification of areas and stakeholder to which the concept will be directed increases. The preference of the conceptual approach was found by the respondent to be wasteful investment in the creation of documents whose stated intentions will not be realized in the future. 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. In relation to the implementation of the Smart region, weaker competences in relation to territorial development are considered as the main pitfalls of the region.

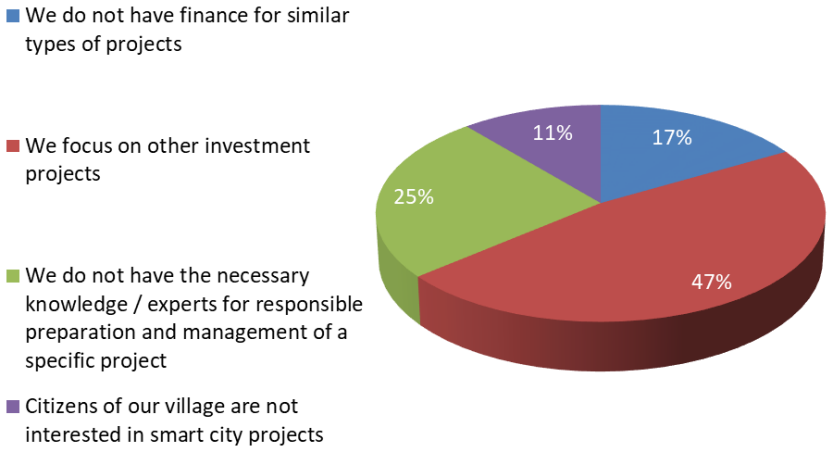

Fig. 7 – The main expected limits. Source: own research

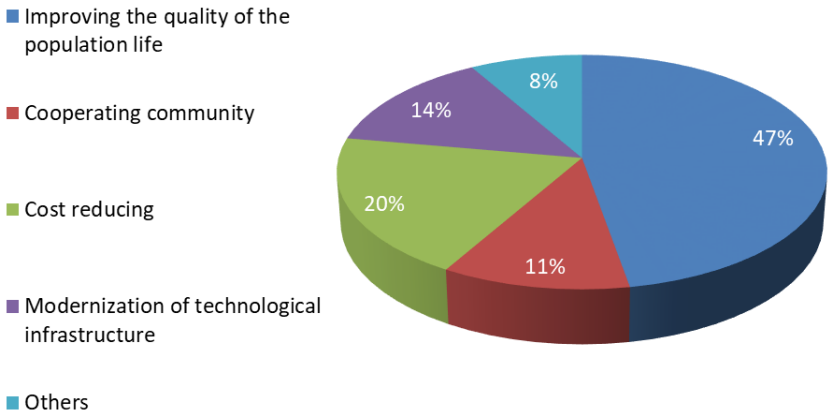

Fig. 8 – The main expected benefits. Source: own research

Respondents see the improvement of quality of life as the main benefit of Smart City implementation. Cost reduction also plays an important role.

6 CONCLUSIONS AND DISCUSSION

Based on the research we can say that Smart city resonates in Zlín Region. Support can be found at all levels examined: regional and municipalities. 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.

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. In relation to nationwide trends we can say that Zlín Region has a similar focus on sustainable transport and ICT technologies with regard to strategic planning. 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. According to questionnaires 47% of respondents stated that they focus on other investment projects - it can be assumed that this is mainly due to the concept phase - in the Czech Republic the concept is in the preparatory and initiation phase and the public is only getting acquainted with the idea of the SC. This information shows the current demand for the concept and at the same time it expresses the position of the main barrier of SC development (limit).Respondents see especially the improvement of quality of life as the main benefit of Smart City implementation - cost reduction also plays an important role.

The analysis is a part of a long-term research. Many experts claim that modern transport problems can no longer be solved solely by the physical construction of new roads, nor by the reconstructions of existing roads. In this respect, significant scientific and research efforts have been made for a long time, to address the problem of transport using new information and communication technology resources and novel knowledge on how to run such complex systems and processes. Current state of mobility of most territories seems to be often unsustainable. To remodel them into sustainable form, it would require a long-term transition with needed technical and non-technical changes. How to approach and formulate individual solutions is a crucial issue. The existence of factors such as technical requirements of the transport system, organizational models, regulatory framework and user habits strongly influence decision-making processes.

New efficient transport systems, research, innovation and development in the transport sector have a significant impact on the formation of the economic state of the territory, job opportunities, integration of society and the formation of basic conditions for the life of the population.

Smart mobility is one of the most difficult topic to face in large metropolitan areas. It involves both environmental and economic aspects, and needs both advanced technologies and virtuous behavior oddwellers. Smart Mobility is largely permeated by ICT, used in both backward and forward applications to support the optimization of traffic fluxes, and also to collect citizens' opinions about live ability in cities or quality of local public transport services.

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

Formulation of new knowledge of intelligent approaches and solution methods for the development of selected transport areas for individual regions of the Czech Republic, which can be expected to contribute to the development of an intelligent transport environment, which will lead in particular to:

1. Reduction of pollution
2. Reducing congestion
3. Increasing the safety of traffic participants
4. Reducing noise pollution
5. Improve bit rate
6. Increasing the comfort and awareness of the traffic participants

Basic scientific questions of long-term research:

Q1: What is the financial return from the implementation of the SC concept?

Q2: What role do the public sector, private sector and academic environment play in the SC environment?

Q3: How can be the Smart city concept measured?

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