



AN ANALYSIS OF KEY FACTORS IN DEVELOPING A SMART CITY

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Abstract. The concept Smart City is used widely but it is perceived differently as well. Literature review reveals key elements of the Smart City – Information and Communication Technologies and Smart Citizens. Nevertheless, raising public awareness is not a priority of local municipalities which are trying to develop cities. Focus group discussion aims to analyse citizens' insights in regards to the Smart City and their contribution to creation of it. Case study of Vilnius examines a position of municipality in developing city as smart. Study contains suggestions for the improvement of communication in the city. Methods employed: comparative literature analysis, focus group investigation, case study.

Keywords: Smart City, information and communication technologies, smart citizens, intelligent city, urban space, human capital, sharing economy, open government data.

Introduction

Cities in our days and especially in the upcoming decades have a tendency to be developing and emerging in the extent humankind would have never thought about before. Over half of all human population currently lives in cities or close around them. According to Lierow (2014) it is anticipated that according to the urbanization trend, 70 percent of the world's population is expected to be living in cities by year 2050, which according to the United Nations would make about 2.5 billion people. The implication of Information and Communication Technologies (hereinafter referred to as "ICTs") merged so widely, that they are able to influence not only our close environment but also have an impact on the infrastructure and operation of the whole city. Together with a more frequent application of ICTs and their successful management, knowledge-based societies are gaining more experience every day. The significance of citizens in a Smart City is huge, although the local governmental bodies need to be responsible for education of the society and involvement in development of Smart Cities, therefore, the new ways of effective communication need to be set.

The main problem: The concept of Smart City is used widely and also understood differently, sometimes the idea sounds even utopic. The majority of scientists, representatives of corporations and governmental institutions, also inhabitants of the cities agree that the main elements of the Smart City are ICTs, their successful application and the

smart citizens. Nevertheless, the concentration on raising public awareness is forgotten by local municipalities which try to develop Smart Cities. Therefore, the demands and expectations of citizens need to be heard and also, clear action plan for communication of both sides needs to be set by local municipalities, in order to create a successfully operating Smart City.

Purpose: The study aims to examine the main elements of Smart City by conducting theoretical analysis and to measure the practical standpoints of citizens and municipality towards the Smart City, through qualitative research.

Methods employed: comparative literature analysis, focus group investigation, case study.

The grounds of Smart City

Smart City is a phenomenon which includes a wide range of sectors, such as transport, education, healthcare, administration, public security, infrastructure, logistics, ICTs, architecture, leisure, ecology, constructions, the effective consumption of resources, and many others. These sectors have an influence on the daily lives of inhabitants in a city. While analyzing the perception of Smart City, these sectors should be considered as a part of a puzzle. Meanwhile, a puzzle to be composed, certain players are needed. In order to understand the interconnection of elements in the Smart City, its grounds need to be analyzed.

The concept of Smart City has been developing for several decades, changing his content, involving or excluding different aspects. Even until these days, the idea of Smart City is evolving; therefore the definition itself is not concrete or specific enough. Hollands in his article argues that “In today’s modern urban context, we appear to be constantly bombarded with a wide range of new city discourses like smart, intelligent, innovative, wired, digital, creative, and cultural, which often link together technological informational transformations with economic, political and socio-cultural change” (Hollands 2008). In this variety of concepts it might become difficult to distinguish how the concept of Smart City differs in comparison with others. While seeking for the roots, it is noticeable that the concept of Smart City depends not only on historical development of cities themselves, but also on governmental policy, economic situation, social impact, technologies implemented, and many other different aspects.

It all began in 1990 when the concept of Smart City was used in order to signify how urban development was turning towards technology, innovation and globalization (Gibson *et al.* 1992). This is a first noticeable reference to a Smart City, as such in the official publications. During years, the term became a little bit different. Now Smart Cities in most of the definitions are related to ICTs which are considered even fundamental for the existence of such concept. Famous independent American technology and market research company Forrester defines a role of ICTs in a Smart City “the use of ICT [makes] the critical infrastructure components and services of a city – which include city administration, education, healthcare, public safety, real estate, transportation, and utilities – more intelligent, interconnected, and efficient” (Washburn *et al.* 2010). Such description outlines the importance of ICT’s application in various spheres of citizen’s daily life as one of the main components of a city, allowing different sector of social life to be interconnected closely, to create common system called Smart City. In recent years, by publishing e-studies, European Parliament defines similar guidelines – “Smart City is a city seeking to address public issues via ICT-based solutions on the basis of multi-stakeholder, municipally based partnership” (Directorate General... 2014), therefore ICTs in city at European level are also considered to be playing an important role while, in cooperation between governmental and public section – solving issues of a city. Representative of Urban and Regional Innovation Research Unit represented by Margarita Angelidou, investigated the concept of Smart City and see technological capital as one of the input into development of Smart Cities. She highlights that “Smart Cities represent a conceptual ur-

ban development model based on the utilization of human, collective, and technological capital for the enhancement of development and prosperity in urban agglomerations” (Angelidou 2014). Although, besides technological role, author envisions the importance of utilizing the human and collective impacts. Apparently she is not the only one who agrees that these elements, together with ICTs also play relevant role in Smart Cities.

Being more precise, it is important to mention that some authors even prioritize the importance of human capital and collectivity against the others – technology related ones. European Parliament again, on the other side, acknowledges that “creation of Smart City is not, however, simply a technical challenge (...). Making a city smart is therefore a very multi-disciplinary challenge, bringing together city officials, innovative suppliers, national and EU policymakers, academics and civil society” (Energy Technology... 2012). There is a need of successful cooperation of various bodies of the city. A quite similar perception is set by Chourabi *et al.* (2012) who outline mostly one element of collectivity – it is strategies, which according to authors are necessary for the creation of a successful Smart City. Authors announce that “Smart Cities are about leveraging interoperability within and across policy domains of the city (e.g. transportation, public safety, energy, education, healthcare, and development). Smart City strategies require innovative ways of interacting with stakeholders, managing resources, and providing services” (Chourabi *et al.* 2012). In the other words, it is noticeable that a change in a management is needed, which is also outlined by Schaffers *et al.* (2011) in their published article about Smart Cities and future Internet where the authors speak about wise management. According to them, “a city may be called smart, when investments in human and social capital and traditional and modern communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance” (Schaffers *et al.* 2011). This concept also characterizes other challenge, which needs to be met – it is education of people, a will to change their attitude towards sustainable environment, ICTs’ implementation and the acceptance of new ways of its management.

Haque, Director at Haque Design & Research also agrees that “a key to successful smartness of the city is firstly smart citizens. Any adequate model for the Smart City must therefore also focus on the smartness of its citizens and communities and on their well-being, quality of life, as well as encourage the processes that make cities important to people” (2012). Many authors who discuss Smart Cities, actually agree that Smart City begins with

smart citizens. The real smartness of the city is the ability to meet the needs of its citizens. Technologies at first place should serve people in order for them to be able to transmit their needs and expectations. According to Saint (2014), to make cities truly smart for the future we need to make sure the technology is used to deliver things that people want and need, and that add real value to how life is lived in these cities. Lithuanian architect Šiupinskas (2014) is skeptical in regards to the concept of Smart City in general. Although he agrees that an intelligent city as the Smart City not only provides services in a cyberspace by itself, but its citizens actively contribute to its management, creation of services, and improvement.

While reviewing concepts of Smart City, it is obvious that there are 3 main elements without which term itself would probably not even exist – ICTs, smart citizens, and the interconnection of elements or collectivity. Even if such distribution of elements in a Smart City is not a constant, it represents the basis. To narrow such elements more, according to authors' view, there are basically 2 core elements in a Smart City – ICTs and smart citizens. The interconnection of elements, meanwhile, should be analyzed in relation with the efforts to involve citizens in making of decisions regarding to the development of the city and encouragement to apply ICTs.

ICTs in a Smart City

Technologies in a city are applied in order to create more efficient system, which enables communication and sharing of information between different bodies in the city's system. "In Smart Cities, information and communication technology (ICT) is seen as the basic enabling technology and sustainability and transport among the important criteria for the Smart Cities" (Ahmad, Mehmood 2015). Integrating technologies into daily life of citizens provides an opportunity to share the feedback and gain new experiences, create new products. The essence of Smart Cities is to find smart solutions, which would allow to effectively use modern ICTs in the daily lives of citizens. Without application of ICTs, the idea of Smart Cities would even most probably vanish, as new tools for implementation of purposes, such as establishing a closer relationship, keeping environment sustainable, managing urban flows, administration of city would need to be discovered.

Escher Group, in their presented paperwork excludes 5 ICT's elements, successful working of which would lead to the effective development of a city as "smart":

1. Broadband networks – necessary for creation of infrastructure, which would allow citizens to unite with

- local businesses. Such infrastructure contains optical fiber, cables and wireless networks;
2. Smart devices and agents – refers to "enrichments of urban environment with embedded systems, smart devices, sensors, and actuators, offering real-time data management, alerts, and information processing for the city administration";
3. Smart urban spaces – created in order to maintain a sustainable environment, to perform services with higher quality and to improve the efficiency of infrastructure in the city;
4. Development of Web-based Applications and e-Services – represent the empowerment of ICTs to involve citizens in generating ideas, testing them and even creating products;
5. Opening government data (hereinafter referred to as "OGD") – allows data of government to be available publically and creates opportunities for more effective use of it, closer working and communication between business, government and citizens (Escher Group 2014).

Even if these ICT essentials represent quite a basic of ICT's application in Smart City, some aspects should be considered doubtfully, considering that Escher Group is a company, which provides software solutions and services for big communities. Although, the importance of OGD doesn't leave considerations, as in case it receives enough attention from inhabitants and is used actively, it truly has a huge impact into daily citizen's lives and plays important role in the urban development. Figure 1 below represents the structure of OGD as a synergy of 3 core elements' interconnection: data, openness and government.

Solutions if ICT for Smart Cities allows to implement instruments such as sensors, mobile devices, actuators

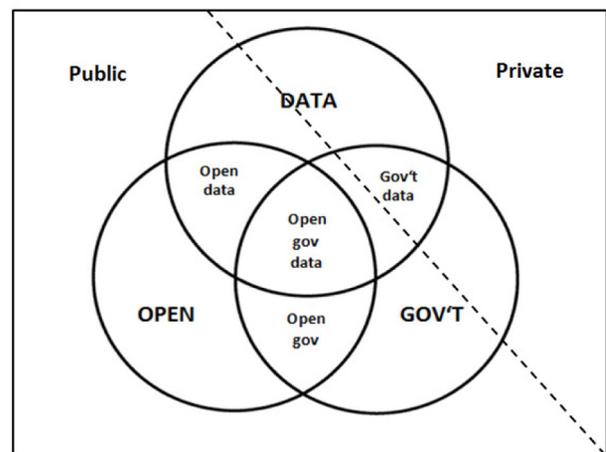


Fig. 1. Open Government data (source: Open Minesota Graphics)

and others – interconnection of which lets to collect and analyze data in regards to city's urbanization. City itself is contained not only from private, governmental sector and citizens. City is also a joint system of different fields, such as: healthcare, education, real estate, transportation, safety and others. And one of the biggest tasks is efficient serving to citizens, which can be reached and depends mostly on successful administration and management of all these spheres. In order to assure the quality of citizen's life, ICTs are applied for creation of applications, which runs and improves every sector of activity, city clusters and infrastructure.

In order for ICTs in the city to be managed effectively, it is also important for representatives of corporations, or stakeholders in the city to consider the effective planning of physical environment of the city and appropriate application of ICTs to make the environment, the economy, governance work efficiently and in a mobile way. Besides, valid use of recourses must be assured. Managers in a city should consider “certain factors when implementing ICT with regard to resource availability, capacity, institutional willingness and also with regards to inequality, digital divide and changing culture and habits” (Chourabi *et al.* 2012). Even if the management of ICTs in Smart Cities plays an important role and might create city as a stable system, the real smartness of the city arises from smart citizens.

Smart citizens in urban development

Famous American – Canadian journalist, well known mostly because of her urban studies, in her greatest work named “The Death and Life of Great American Cities” writes about cities having the “capability of providing something for everybody, only because, and only when, they are created by everybody” (Jacobs 1961). Even if idea was expressed in the middle of the last century, today it sounds as simple as it is. Although, it is still usually forgotten that the real creators of the city are people and things changing by time are basically the tools for these people to be heard by governance. The idea of Smart City is not the utopian image, until it is accepted not only by researchers, businesses, governmental institutions, but also by people, as being the most important player in city for it to be called smart.

The smartness of citizens could be described as the ability of inhabitants in the city to accept technologies for application of them in a daily life, in order to simplify the usage of certain services, relevant to the same inhabitants. Saunders and Baeck (2015) in their work exclude an affect of cultural characteristics and changes of them as the influencing factor. According to them, “The Smart City vision

often fails to recognize the role that behavior and culture play in the way cities work. And yet, new technologies and data streams will only be beneficial if they are accompanied by changes in culture – a greater willingness to engage with data, incorporate new technologies into traditional workflows and to embrace the potential of ‘bottom-up’ solutions”. Difference of attitude towards technologies could be also recognized by comparing attitude of different generations towards technologies. Y generation tends more to apply technologies in their daily lives, to use them for benefit in general. The trust of technologies also plays an important role in the process in which the citizens are being involved in decision making for a Smart City through ICTs. Different societies, cultures, even religion are the factors, which influence such willingness of citizens to share experience and suggestions. One of the principles in Smart City concerns the environment, according to which the things are closely interconnected and applied to bring the value for people, not only being the subjects of storage. In a Smart City, sharing economy wins against the buying economy. The more people tend to share their things and also to use the things of others, instead of buying them, the less overcrowded city is, therefore, the more efficient system consisting of even more systems is created. Therefore, the opportunity of smartness to influence the habits of citizens is given, and first of all it is important to understand that in order to create the sustainable environment citizens need to start acting as technology-advanced people.

Also, smartness of people who live in the city should be considered as an empowerment for citizens to share the information with other citizens and with governmental bodies, to provide them with ideas and solutions, which would increase the smartness of the city. First of all, citizens should understand that the success of a city, which meets the needs of its inhabitant in a best possible way, lies down in the expression of the opinion of its citizens. People are used to the order where decisions are made by urban authorities, although in our days, technologies empowers people to be able to speak up. On the other hand, the ability of citizens to act smartly also strongly depends on the decision of governmental bodies, especially those of local municipalities. In order for citizens to be able to express their opinion, to suggest ideas and solutions, there should be certain platforms created for them and it is something to be considered by local municipalities. “Smart Cities are most successful and smartest when their focus is on people, and when they actively involve and engage their citizens in creating (...) the very smart services that are meant for them and improving their living environment and overall quality of life” (Saunders, Baeck 2015). But the other question is,

whether governmental authorities would want people to be actively involved in decisions' making. McLaren and Agyeman (2014) also notice that the problem is not just a failure of participation – as citizens remain excluded from decision-making – but of imagination, as politicians refuse to intervene in markets except at the behest of the corporate capital. The real example of such involvement could be the city of Santander in Spain, which is “a living experimental laboratory” (Evers 2013). The app “Pulse of the city” is used by citizens in Santander in order to receive the information to their mobile phones by simply directing their phones to certain objects, also app allows to report about the problems, simply by taking a picture of a hole in the street, when location is automatically detected by GPS and one more click reports issue to the municipality. This example reveals the existence of technical possibilities to be adopted in not only providing citizens with information, but also empowering them to be involved in development of a city.

Empirical data analysis of citizens' and municipality's attitude towards the development of Smart City

While theoretical perception is drawing the image of nearly idealistic Smart City, the real situation might differ. Empirical research aims to analyze the practical perception of Smart City. *Problem of research* – according to the analysis of scientific literature, citizens are one of the main elements in developing a Smart City. Although, they are not always willing to involve contribute to the creation of such Smart City, therefore the reasons of that need to be analyzed. *Objects of research* are citizens of Vilnius and municipality of Vilnius. *Goal of research* – to investigate the perception of citizens towards Vilnius and its development as Smart City, as well as to analyze the efforts of Vilnius municipality to involve citizens in creation of Vilnius as Smart City. *Tasks of research*:

1. To analyze how differently citizens understand the term of Smart City in general;
2. To investigate various views of citizens towards Vilnius, as Smart City (present and potential);
3. To understand citizen's experiences in regards to Smart City's elements, such as: sharing economy and OGD;
4. To comprehend the diversity citizens' involvement in developing Vilnius, as a Smart City and barrier they are facing;
5. To ascertain actions taken by city government in order to encourage citizens to apply technologies more;
6. To identify the ways urban authorities empowers citizens to be involved in developing Vilnius, as Smart City.

Methods of research – in order to investigate the perceptions, views, knowledge, reasoning and attitudes of citizens, towards their city, as well as the real actions taken by city authorities, 2 qualitative research methods are chosen:

1. Focus group. The main interest of research is to understand certain society, people's beliefs and positions.
2. Case study aims to continuously analyze the situation of the inhabitants' involvement in developing Smart City from the standpoint of Vilnius municipality.

Selection of participants for focus group was based on following characteristics:

- Participants which live in the city for 3–5 years, therefore are familiar with it and are able to evaluate the development;
- Belong to Y generation (born between 1977–1994), as such generation is more technology advanced than X generation and represents the majority of inhabitants in Vilnius city;
- Are using public transport system in Vilnius at least several times per month;
- Are using smart phones, therefore have ability to use certain services of Smart City;
- Participants are tend to analyze situations more deeply, investigate the reasons and interactions.

Citizens' perception of Vilnius, as Smart City- data analysis of focus group

Participants agreed their thoughts to be analyzed and used freely. Although, names were hidden in order for confidentiality to be remained. Questions, which were raised in the questionnaire, are separated into 4 different blocks.

The first block of the questions is related to the concept of Smart City in general. Figure 2 represents elements, which were mentioned by participants as parts of Smart City. Technologies were the mostly repeated element, indicated by all, except one participant. Human capital took part in position of the second most mentioned element. Also,

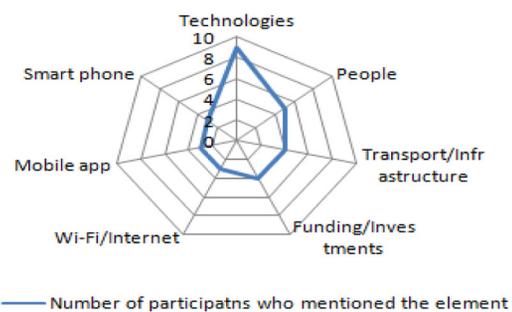


Fig. 2. Elements of Smart City mentioned by the participants

participants referred a lot to transport or infrastructure as well as to funding and investments. There were few participants who excluded mobile apps, smart phones, Wi-Fi or internet connection elements in general as the ones without which they do not imagine a Smart City.

The questions One and Two were formulated similarly in order to allow participants to think twice, to generate more ideas. For example, participant VR have equated Smart City to the “evolution of civilization”, although answering the question Two,, he specified “I would add maybe evolution of technologies, their expansion”. Besides the emphasis on technologies, many participants have talked about influence of the human capital, naming it as “synergy of citizens” (Participant JT), “attitude of smart citizens” (Participant MP), “implementation of self-awareness” (Participant RK), etc. Participant MB mentioned funding as the one and only necessary factor for existence of Smart City. Participant DB agreed that funding is needed for financing the ideas coming from people “bigger financing from government. I think that there are some ideas, but they are struggling somewhere, because of not receiving financing, and there are no ways to develop them, to try and to see what the influence would be”. Interesting fact is that this element is mentioned by participants, who all work in financial sector, therefore such answer could be considered a little bit biased. In general, by answering to the first block of question, participants were quite uncertain, had many doubts and the patchwork of minds. The perception about the city, technologies in the manners of adopting them in various spheres of life, as well as citizens in a manners of not only accepting technologies, but also gathering new ideas, being interconnected and becoming more self-aware, were signified as the main elements.

Before the inquiry about the opinion of Vilnius, as Smart City, in order for participants to give a better understanding about the concept of Smart City, generalization of Smart City, made after analyzing different scientific resources was provided to participants. After the question “In your opinion, could Vilnius be called a Smart City today?”, opinions have separated. Majority of participants were more positive about Vilnius, as Smart City than negative, although 2 persons were very doubtful whether Vilnius could be called smart. Also, 2 persons were totally negative about it, in their answers, word “No” was used. Interesting fact is that both “negative answerers” are the oldest respondents from the group, both aging 33 years and by their age being closest to belonging to X generation, therefore considering that they might have some characteristics of that generation, such negativity might be explained by not willingness to accept the technologies. While evaluating

Vilnius as Smart City, participants were also naming the aspects, according to which they decide, whether city could be called smart or no. Even the same element, by different participants was evaluated differently. For example, participant MG was critical to citizens “I think citizens are not very smart and they do not influence the development of a city much at the moment” while participant IB excluded certain group of people as being a positive indicator of or current society “youth, people born in 1985 or later are smart enough, they are not worse than other Europeans in this case”. Also, another several opinions distinguishes while talking about healthcare sector, as some of answers evaluate it as a bad system, while others consider it quite well developed. Participant MP also evaluates current situation of Vilnius quite realistically “maybe there are no common vision yet, no ideal purpose, but those first steps are done”. When participants were asked to look to the future considering the possibilities for Vilnius to become a Smart City, even if majority of participants have mentioned that first steps are done and Vilnius is moving to the right direction, the guidelines set for these movements are quite different. For example, Participant MG names communication as the missing tool, which would allow a closer relation with urban authorities and its citizens. Although, other 2 participants were rather tend to think that education of people is needed. For example, VR outlines: “I think education, healthcare system and many other spheres should be involved”. Although, other participants concentrate more on the people and their attitude towards the future of Vilnius as Smart City. Participant DB, for example, says that “The future is IT really and there will be more smart things, so we only need to catch the train and use them as more as possible” meaning that people need to be willing to adopt such ITs and smart things. Meanwhile, Participant VR signifies the governments’ or municipality’s influence “I think we should start from our government’s, municipality’s consciousness how it is necessary, how can it bring value and how many investments should be needed, when it would pay-off, etc.”. Participant IB raises another requirement “(...) more motivation for citizens to be involved in the usage of technologies. In order to investigate the motivational factor, further block of questions would serve.

Third block of questions was dedicated for investigating, how citizens perceive their influence towards the creation or development of smart Vilnius. It is interesting to note, that some citizens do not evaluate the usage of technologies as contribution to the creation of Smart City. They would signify that they are users, but not the creators, putting it as an oppose. Other participant meanwhile, as the input to the creation of Vilnius as Smart City mentions the usage

of technologies as well, although, different from others – they would be tend to think that the usage by itself is contribution. Basically, participants excluded 3 main reasons why they are not involved, or not involved enough into the creation of Vilnius, as Smart City. First of all, citizens have expressed the opinion that they are missing knowledge, understanding in general, what is Smart City and how could they contribute themselves. Participant RK named it as lack of education – “I do not know what is a Smart City and in order to contribute, first of all you should know about it and in what forms you can contribute. Therefore education is missing in the first place. Consciousness”. Other 2 participants have raised discussion about the lack of information, which according to them should be easily accessible in order for them to contribute. Second block connected their input to their personality, for example Participant IB even stated that “I am conservative (...) I like thing which are tested (...) I think it depends much on personality”. Third block of opinion is related to the need of seeing the result, encouragement, or in other words – motivation: Participant IB: “Maybe there is a need of encouragement, some remuneration for example” (Participant IB) and “In order to gain motivation, there should be some encouragements form the other side, suggesting for people to be involved somehow” (Participant MG).

In order to understand citizen’s experience in regards to separate elements of a Smart City, 2 main subjects were chosen-open data, provided by government and sharing economy examples in Vilnius. Citizens were asked, whether they are familiar with open data, provided by Vilnius municipality, although all the 10 participants requested for the explanation of term “open data”. It reveals the situation where none of these people are familiar with the term itself. Although, after given explanation, some ideas arose. Citizens raise the doubts, whether such information is handled good enough, if it is dedicated for citizens, but doesn’t reach them “I think it is not provided properly, not handled. I do not know much but it would be interesting to see” (Participant IB). Participant DB also showed the interest “Actually, I haven’t heard about them. Actually it would be interesting to see what’s going one. But no, I didn’t see it”. Other subject of analysis is sharing economy. In Lithuania, currently there are 6 known services of sharing economy, including person 2 person (Dalinosi.lt, Uber, AirBnB), business to person (CityBee, Dropbike) and government to person (Oranžiniai dviračiai). In the focus group, sharing platform “Dropbike” was known only by one person, even if it is international bike rental company and their founders represent it as “Uber for bikes”, although beginning of their services in Lithuania in September, 2015

haven’t received much attention from press, this might be the reason of lack of popularity of this service. Meanwhile, “Uber” have launched their services in November, 2015 and the attention received much higher, that is why 9 of 10 participants have heard about these services. Although, the recognition of the name could be mixed from services provided in Lithuania versus the ones provided abroad. For example, company “AirBnB” was known for more than a half of participants, although it is possible they have heard the name earlier than they knew about such services’ existence in Lithuania. “Dalinosi.lt” is the only unique platform in Lithuania, where people can share things between themselves online. Company is established at the end of 2012, although only 2 participants from the group were familiar with this name. Meanwhile, G2P services “Oranžiniai dviračiai” were known by everyone from the group and B2P services – “CityBee” were also known for the majority of the group – 90%. Such wide knowledge could be explained by such service providers’ stronger intention to sell their services.

The role of Vilnius municipality in developing a Smart City – data analysis of case study

Focus group’s discussion revealed that citizens understand the concept of Smart City in various different ways, which leads to the assumption that there is lack of knowledge in the society in regards to the conception, leading to different interpretations, therefore it is important to analyze the role of Vilnius municipality in this case – their actions taken in order to represent the concept to the society, provide them with common understanding as a basic to the further actions. Also, as citizens confessed that in order to contribute to the development of Smart Vilnius, they need more encouragement, second aspect to be analyzed is the municipality’s actions towards the promotion. Third area to be analyzed in open data, provided by municipality to its citizens.

First time the definition of Smart Vilnius was presented in 2012 and was mostly related with transport. Although today, citizens are aware that Smart City also contains other spheres, such as education, healthcare, etc. Still, education and better communication is needed in this place in order to develop of common unite understanding. Some examples of communication contain the reporting of city’s mayor of all the related news in his Facebook account, where thousands of people see his information on daily basis. Even if such kind of report of performed tasks is not accessible for the majority of citizens, the audience expands every day. Another way of communicating message is the participation in the conference “Switch”, giving a speech, explaining

the idea of Smart City in general and his vision of Smart Vilnius. Although, these initiatives seem to be only the roots of what is really needed – the access to a wider authority, the introductions on the ways people can contribute themselves into the creation of Smart City. Currently, it seems that there are small audiences being reached, but they are a minority compared to the rest.

Already mentioned conference “Switch” also invited to actively participate in the hackathon, purpose of which was to generate ideas under the topic “Smart City”. Since 2013 there were 3 such events organized by Vilnius municipality and it seems that the number would not stop at this point. Besides, recently, new initiative of Vilnius municipality is the project called “Code4Vilnius” – interested people are meeting up twice a month, generating ideas and developing projects. Such initiatives usually encourage with some awards for the implementation of ideas. The main purpose of previously described projects is to attract people who are motivated enough or with a very few encouragement could create platforms for the further involvements of the rest of society. One such initiative – app called “Tvarkau Vilnių” already exists. Anybody, who have downloaded the app and registered, can report the problem of the city, for example something related to transport, public order, security, or anything else. It seems that there is a wish to encourage people, to contribute to development of city as much as possible, although, such encouragement is not differentiated and current involvement attracts only the interested parties.

In July, 2015 it was announced that Vilnius municipality prepared the rules for usage of open data, 2 websites were opened. Also, mayor Šimašius have invited people to register in hackathon – event, where people can generate ideas, how open data could be used. This event named “Open data fest 2015 Vilnius” was organized by “Kurkim Lietuvą” and run 3 days at the end of August. Winner’s team created the information system – interactive map of Vilnius, representing the kinder gardens, their occupation, free spaces and even prognosis for the future. Although, there are not many information in the press about such events, therefore actually very few people were reached with this message. In order for information to reach other people, wider society, not many actions were taken. Repetitive of Vilnius municipality, Poderskis, in forum for student and lecturers “Vilnius – city open for ideas”, on December 3rd, 2015 recognized that currently, even if municipality is providing this open data, it is not provided in the format, understandable to everyone and is more oriented to specialists. He also disclosed that the main goal of Vilnius municipality at the moment is to make data more attracti-

ve – to put the statistical information into shape of maps, graphics, diagrams, therefore – to allow citizens to better understand it. The provision of open data doesn’t seem to be well developed yet, although municipality of Vilnius is beginning to put efforts in this.

Conclusions

Smart City doesn’t have one common definition neither theoretically, nor in practice. As urban development is forecasted to expand further, even if smart citizens and ICTs are recognized to be main elements of Smart City, in order for inhabitants to apply ICTs in cities, first of all, common vision and strategies need to be set by local municipalities. The acceptance of technologies could be unequally perceived in different age groups therefore they might need different information and motivation strategies. Interaction between smart citizens and ICTs in the city strongly depends on institutional factors: governance, policy and regulations. Urban authorities have to empower citizens to contribute themselves in the development of a Smart City, not only through applied ICTs. Interested people, having ideas are attracted to the various events, organized by municipality, in order to create platforms for integration of citizens into the development of their city, meanwhile others are missing information of how they can contribute to the development of their city. Also, some citizens are missing the motivation – encouragement or suggested remuneration for such contribution, sometimes – at least ability to see the result. Nevertheless, it much depends on personality; therefore involvement accordingly could require more or less effort, different motivational strategies. Municipality should also feel responsible for reducing risks of possible issues, such as privacy, unemployment and security. Characteristics of the Smart City, such as OGD and sharing economy are supposed to be applied by its citizens, although OGD should be not only published publically, but also adopted to be user-friendly. The trust of sharing economy’s services should be increased in order for inhabitants to apply them. In general, urban authorities should set a clear action plan, specifying how to improve the urban development through the involvement of citizens.

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AN ANALYSIS OF KEY FACTORS IN DEVELOPING A SMART CITY

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Santrauka

Išmanaus miesto sąvoka yra naudojama gana plačiai, tačiau suprantama skirtingai. Literatūros apžvalga atskleidžia, jog pagrindiniai išmanaus miesto elementai yra informacinės ir komunikacinės technologijos bei išmanūs miestiečiai. Nepaisant to, plėtojant miestus, visuomenės informuotumo gerinimas nėra savivaldybės prioritetas. Diskusija tikslinėje grupėje skirta išanalizuoti miestiečių įžvalgas apie išmanų miestą bei indėlį jį kuriant. Vilniaus atvejo analizė atskleidžia savivaldybės poziciją vystant išmanų miestą. Studija pateikia komunikacijos mieste gerinimo pasiūlymus. Naudoti metodai: literatūros palyginamoji analizė, diskusija tikslinėje grupėje, atvejo analizė.

Reikšminiai žodžiai: išmanus miestas, informacinės ir komunikacinės technologijos, išmanūs miestiečiai, sumanus miestas, miesto erdvė, žmogiškasis kapitalas, dalijimosi ekonomika, atviri valdžios duomenys.