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AN ANALYSIS OF KEY FACTORS IN DEVELOPING A SMART CITY

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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 Dr. Lierow M. [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 United Nation would make about 2.5 billion people. The implication of Information and Communication Technologies (hereinafter referred to as "ICTs") have merged so widely, that these technologies are able to influence not only our close environment but also to have an impact on the infrastructure and operation of the whole city. ICTs are being adapted in order to optimize the efficient cooperation between different systems and services in the city and in this way- to create a sustainable urban environment. Although, in order for it to be called Smart City, the usage of ICTs have to be strongly measured at the first place**.**

Together with a more frequent application of ICTs and their successful management, knowledge- based societies are gaining more experience every day. A wider range of people are willing to use ICTs as a tool to simplify their daily lives which have also a huge influence in developing cities. The significance of citizens in a Smart city is huge, although the local governmental bodies need to be responsible for educating 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 awareness of society is forgotten by local municipalities, while trying to develop smart cities. Therefore, the demands and expectations of citizens need to be heard and also, clear action plan for both side communication needs to be set by local municipalities, in case reaching to create a successfully operating smart city.

Purpose

The study aims to examine the main elements of smart city and to identify the propositions for the municipality in order to more effectively develop a Smart City, within the involvement of citizens.

Objectives

1. To evaluate the holistic view on perception of smart city's concept and to identify its essential elements by conducting theoretical analysis of scientific literature sources;
2. According to set goals for research, to select the most reasonable method and to organize the empirical research;
3. Based on data analysis of empirical research, to measure the standpoints of citizens and municipality towards Vilnius, as Smart City and to present areas for improvements.

The procedure of writing thesis

In order to understand the concept Smart City, first of all, the review of scientific literature recourses is done. Besides, the grounds of Smart City are being analyzed through evolution of cities. Also, negative views towards the concept are presented. Analysis of conception leads to identifying the main elements and their significance in the smart city.

Accordingly, for further analysis, goals of research are set. In respect with these goals, focus group and case study are chosen as the most reasonable research methods. Collected data allows to reveal citizen's insights in regards to Vilnius, as Smart city and case study investigates the attitude of Vilnius' municipality' position in developing Smart Vilnius. Results of data analysis leads to the recommendations for Vilnius municipality.

I. THE PERCEPTION OF A SMART CITY

Smart city is phenomenon including 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 are the sectors, having influence to daily lives of inhabitant in a city. Although, while analyzing the perception of a smart city, these sectors should be considered as a part of a puzzle. Meanwhile, a puzzle to be composed, certain skills are needed. In a smart city, essential skills contains the management of ICTs and smart citizens, but in order to better understand the interconnection of elements in the smart city, its grounds also need to be analyzed.

I. 1. Grounds of a Smart City

In order to understand the grounds of a smart city, theoretical analysis is needed. Even if the a term itself is quite new and its significance is evaluated differently, there is some common accordance in between the comprehension of different scientists. On the other side, some differences are also being noticed, therefore it is important to analyze what causes such uneven understanding. City, not only as an extent of a territory, but also as an independently functioning unit of self-government is existing for a long time. In that period, many changes have occurred, including evolution of political forms, the improvement of technologies, sustainability of environment and the creation of common wealth. The progress of a city, as an environment which provides a greater concentration of public services and higher possibilities for improvement is becoming more attractive for the inhabitants, therefore the number of citizens is increasing largely from the middle of last century and the flows of people moving to cities is increasing, therefore to clarify the grounds of smart city, the concept is also investigated through the evolution of city. Despite the wealth and sustainability as the main ideas of a smart city, certain impacts could cause a negative position regarding to the concept. These points of views can also have an impact or even change a conception of a smart city, therefore need to be investigated further.

I. 1. 1. The concept of a Smart City

The concept of smart city has been developing in a several decades, changing his content from one aspect to another, involving or excluding different aspects. Although, even until these days, the idea of smart city is evolving, therefore the definition itself is not concrete or specific enough. Different scientists, who are investigating the idea of smart city and its components, as well as the ones who are using the term in the context between the other subjects, use this concept differently, without any agreement on common definition of it. There is no absolute concept of smart city in these days. Although, while seeking for the origin, it is noticeable that the concept or

in a broader sense- understanding of smart city depends not only on historical development of cities themselves, but also on governmental policy, economical 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, D.V., 1992]. This is a first noticeable reference to a smart city, as such in the official publications. At that time, when application of technologies in general was evolving, it was noticed that besides all, they could have an impact to the development of the cities. Although during the years, the term became a little bit different and therefore now smart cities in most of the definitions are related to Information and Communication Technologies as one of the key element used for a successful development of such cities and as a fundamental for even its existence. Without usage of ICTs in creating smart cities, the idea itself would lose the main significance. Famous independent American technology and market research company in their article "Helping Chief Information Officers to understand "Smart city" initiatives" defines a role of ICT 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 D., 2010, p.2]. Such description outlines the importance of application of ICT in various spheres of citizen's daily life as one of the main components of a city and also as a fundamental allowing different sector of social life to be interconnected more closely in order to create common system called smart city. In a few 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 for Internal Policies at European Parliament, 2014, p. 9], therefore ICT at European level is also considered to be playing an important role while, in cooperation between governmental and public section- solving issues of a city. One of the authors, who was investigating the concept of smart city, representative of Urban and Regional Innovation Research Unit- Margarita Angelidou also see technological capital as one of the input into development of smart cities. She highlights that "smart cities represent a conceptual urban development model based on the utilization of human, collective, and technological capital for the enhancement of development and prosperity in urban agglomerations" [Angelidou M., 2014, p.1]. Although, besides technological role, author envisions the importance of utilization of human and collective impacts. Apparently she is not the only one who agrees that these elements play relevant role in the 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" [European Parliament, Energy Technology Initiatives, 2012. p.3]. There is a need of successful cooperation of various bodies of the city, especially requiring the change of their current attitude towards the planning of implementation of technologies in cities in order to make them smart. A quite similar perception is set by Chourabi, H., Taewoo, N., Walker, S., Gil-Garcia, J. R., Mellouli, S., Nahon, K., Pardo, T. A and Scholl, H. J. who outlines mostly one element of collectivity- it is strategies, which according to authors are necessary in order to create a successful smart city. Authors announce "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." [2012, p.4].In the other words, it is noticeable that a change in a management is needed, which is also outlined by H. Schaffers, N. Komninos and others in their published article about smart cities and future internet where 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" [2011, p. 432]. 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, ICT implementation and the acceptance of new ways of management.

Director at Haque Design & Research and CEO of Connected Environments U. Haque 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 and which might well sustain very different – sometimes conflicting activities"* [2012, p.1]. Many authors, who talk about smart cities, actually agree that smart city begins with smart citizens. Smart city could not be called smart only because of the technologies used. There are many ways to implement the newest technologies, to create interactive city, including most innovative ICTs, encouraging governmental institutions and corporations to work together in order to manage the process of implementation of such technologies. But 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 A., "to make cities truly smart for the future we need to make sure the technology is used to deliver thing that people want and need, and that add real value to how life is lived in these cities" [2013, p.1]. Lithuanian architect and the author of an article named "Critical aspect of a smart city" is quite critical to the concept as smart

city in general. Although he agrees that intelligent city, as smart city not only provide services in a cyberspace by itself, his management, creation of services and improvement is actively contributed by its citizens [Siupsinskas M., 2014]

Except the fact of necessity for strong managerial solutions in cooperating the smart cities, there is also an existing idea that technologies should be connected together in such a way, that they would be able to control themselves and act independently. Even if it is kind of futuristic idea, where human impact in management of ICTs is getting less important and technologies are supposed to be able to operate independently in such a conception of a smart city, the realistic fulfillment of it seems to be closer than ever. One of the most wide, but also, mostly explanatory concept is concluded by Copenhagen Cleantech Cluster which is stating that in a Smart City, networks are linked together, supporting and positively feeding off each other, so that the technology and data gathering should: be able to constantly gather, analyze and distribute data about the city to optimize efficiency and effectiveness in the pursuit of competitiveness and sustainability; be able to communicate and share such data and information around the city using common definitions and standards so it can be easily re-used; be able to act multi-functionally, which means they should provide solutions to multiple problems from a holistic city perspective [2012]. After analyzing the concept of a smart city, it can be stated that smartness of a city is determined by applications of ICTs, at the same time- assuring collectiveness and creating the possibilities for citizens to be involved in the decision making. Nevertheless, in order to better understand, how cities developed during decades, it is important to comprehend a primal form of city and a development of it during decades.

I. 1. 2. Evolution of the city

Famous American- Canadian Journalist who was 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 J., 1961].Even if the idea was expressed in the middle of last century, today it sound simple as it is, although on the other side 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 and even in some cases, to take over the decision power from them. Looking back to the same middle of last century, it is important to notice that urban population wasn't as huge as it is now. Figure 1 illustrates the change of urban and rural population in the world between 1950 until now and the prediction for this further development until 2050. In year 1950 Urban population constituted only about 32% of all human population. Although, in almost 6 decades, in year 2007 first time urban population have exceeded the rural one. Today the urban population is about 10% higher than the rural. Afterwards, the line showing a number of

urban population keeps continuing to increase, while in the middle of this century it is predicting to reach the height of representing 70% form all human population. By forecasting the future it is important to note that the population itself in 2050 will reach a number of around 9500 millions. As Figure X shows, the increment of population overall is tend to be basing in the cities, while the number of people in rural territories is predicted to remain almost the same.

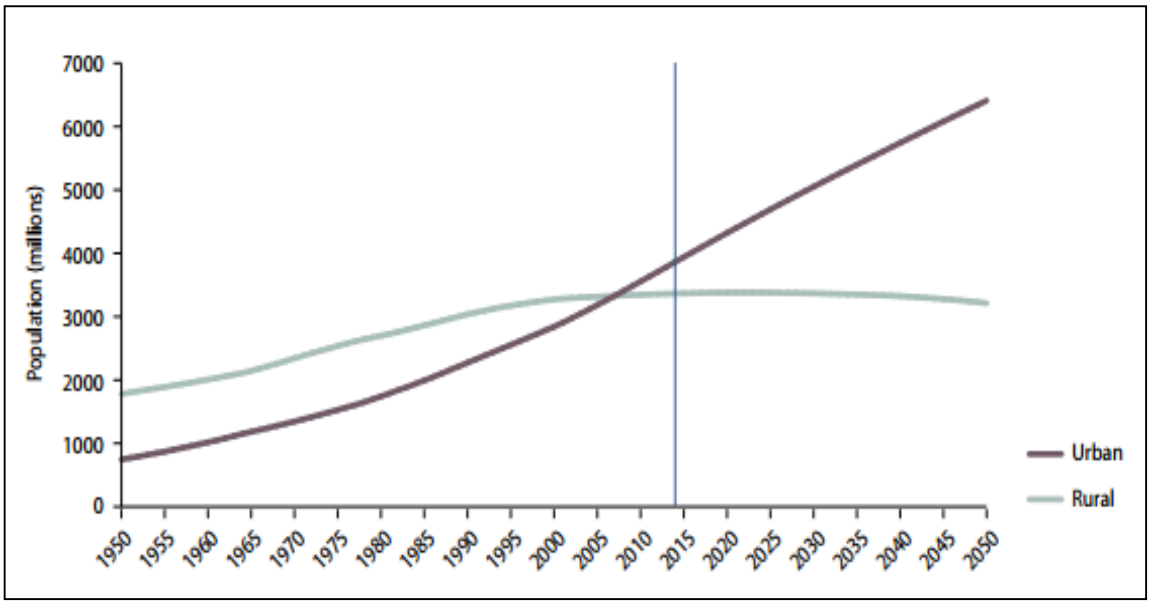


Figure 1 Development of urban and rural population in the world (1950-2050)

Source: Department of Economic and Social Affairs at United Nations (UN/DESA): World Urbanization Prospects: The 2014 Urban population Revision [2014]

During decades cities were changing and developing in many different ways in order to meet the needs of those for whom they were created- it's citizens. Today the concept of smart city basically contains not only the understanding of application of ICT, but also a successful management of collaboration between governmental institutions, stakeholders, universities and citizens, also, most importantly- involvement of citizens in creation of a smart city. The term smart city is not and have never been a contact yet. According to researcher Margarita Angelidou - "despite the extensive discussions, no agreed definition in "smart" or "intelligent" cities exists"[2014, p.1]. This could be explained because the evolution of city and the current existing conceptions of smart city is not separable from other city-related terms. Such terms in one or another way were evolving and developing differently, depending on pace of urbanization, culture, technological adaptability and at the end today have bigger or smaller influence to the understanding about smart city in general. Dr. Prof. Robert G. Hollands in his article called "Will the real smart city please stand up?"outlines 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."[2008, p.305].In this variety of concepts it might become difficult to distinguish why the concept of smart city is different in compariso0 with others, especially considering, that different researches, professors and specialist in the field, have different opinions. Although, some of them agree that "intelligent city" is the roots for what we now call smart city. According to Hollands R.G., The "intelligent city" has led to the emergence of a broader concept known as "smart cities" [2008, p. 306]. Despite the fact, author doesn't explain how exactly the concept smart city is broader. Wright, S. and Steventon A. in their work "Intelligent spaces – the vision, the opportunities, and the barriers", also refer to the same relation- "The concept of "smart city" has its roots on the notion of "intelligent cities". Intelligent cities are physical environments in which information and communication technology (ICT) and sensor systems become embedded into physical objects and urban settings" [Wright and Steventon, 2006].Nevertheless, the human factor, or in other words- the element of people's inclusion in decision making in the city is what makes smart city unique. "One of the difficulties is separating out the terms themselves, which often appear to borrow on one another's assumptions, or in some cases, get conflated together" [Hollands R. G., 2008, p. 305]. In order to better understand the concept of smart city and its margins in comparison to others, it is important to analyze similar concepts. Table 1 represents some of the main concepts and their explanations according to the first official mention in the literature.

Table 1 City- related concepts

Concept	Year	Author/Inventor of the Concept	Primal explanation
Knowledge-based city	1990	Ryser Knight	"Elements of city development is changing, i.e. elements from the capital, labor, natural resources and other resources to talent, system, culture, innovation and the knowledge elements; due to increasingly dependent on knowledge, city economic development pattern is changed, knowledge production activities will dominate the development of city"
Global city = world city	1991	Sassen S.	"Linkages binding a city have a direct and tangible effect on global affairs through socio-economic means"
Ubiquitous city	1993	Mark Weiser	"Vision of a built environment which digital networks link individual residents not only to other

(synonym to a smart city)			people but also to goods and services whenever and wherever they need"
Intelligent city	2006	Komninos N.	"Intelligent cities are territories with high capability 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"
MESH city	2006	Ouellette R.	*"Whatever you might think about a computer-driven modernity, MESH Cities are not just smart cities. MESH Cities go beyond the management of infrastructure to the heart of what makes cities worthwhile—their livability. Metaphorically, MESH Cities are the offspring of an improbable marriage between Jane Jacobs and ubiquitous city computing. Their kids, in this context, are named MESH: M=Mobile, E=Efficient, S=Subtle, H=Heuristics"*

Source: Made by author

Table 1 represents various types of cities, excluded by several authors in different time periods. In 1990 city was first noticed to be dependent on the knowledge, even more, Ryser Knight who was the first formulating the term of Knowledge-based city have forecasted the further development of city on the basis of production, created by expanding knowledge. In the upcoming year, Susan Sassen [1991] invents a term of global city, as it was first time outlined to have a direct affect to the whole globe. This could be explained by the rapid expansion of urbanization. If we would take a look back to Figure 1, we can see that in year 1991 the urban population conducted around 43 percent of all population and was rapidly getting after the rural population. In year 1993 first time, the concept of ubiquitous city was mentioned, which is the most similar to the term of today- smart city. Even if Mark Weiser at that time talked about a vision of the system of elements which allows digital networks to link people one to each other and to allow good and services accessible to them much easier, today this vision actualizes, therefore such term and prediction appears to be very exact. Quite later, smart city-related terms which were originated already in this millennium are inseparable of the connectivity through technologies. Intelligent city, in year 2006 by Komminos N. was described as city which is capable to provide its inhabitant with a certain knowledge and understanding how to adopt innovations, increase creativity and apply digital infrastructure for communication and again- for the purpose of increasing knowledge. In the same

year, Qualletter R. invents the term which even surpasses the idea of smart city. MESH city, where M refers to mobile, E to efficient, S to Subtle, H to Heuristic is extraordinary creatively explained as a progeny of the idea about city of Jane Jacobs [1961] and ubiquitous computing. MESH city suggest citizen-focused and self-formulated solutions. Comparing all these concepts leads to the conclusion that the evolvement of technologies has a huge impact on the development of cities, but mostly, the biggest influence becomes not only on technologies, but on attitudes towards them, the willingness to accept and to apply them. The concept of smart city is called smart for the first time, because finally, today the society of a smart city is ready and smart enough not to only to accept the technologies, to use them for simplifying their daily lives and expanding further knowledge, but most importantly- for suggesting and creating solutions for the city and in the ideal situation, even taking over the power of decision making from other authorities.

Looking forward, there is no doubt that the power of the cities will be expanding further and the huge part of human population will be living in cities. The idea of smart city if not the utopian image, until it is accepted not only by researchers, businesses, governmental institutions, but also by people themselves, as being the most important player in city for it to be called smart. Although, not even all of researchers are so positive about the smart city. There are different, critical.

I. 1. 3. Critical approaches to the concept

Even if the concept of smart city is widely discussed in many various paperwork, also examined as an example of a successful urban development, the positive impact of globalization and the powerful tool allowing to increase the quality of citizen's daily life, there is also an opposing side. Together with the flows of information, application of new technologies and adoption of innovations in infrastructure of a smart city, city's dependency on technologies are also being brought in. When developing smart cities, it is impossible to avoid the reliance on technologies. Except the fact, that authorities are constantly paying attention to it and implementing some safeguarding tools, there is still a huge risk that in case some technological issues are faced, all the infrastructure and recourses distributions system in a city might be strongly affected. Even a small issue which is solved within few minutes, might require many victims, for example people being stuck in traffic jams, therefore- late to their works and businesses losing a lot of the expensive time as a result of it, or healthcare services facing difficulties to represent on time which can have an influence on someone's health or even life.

The dependency on ICTs is not the only concern. In some cases, a vision of a smart city might sound quite rhetoric, idealistic or even utopian. Haque U. who was investigating various aspect of smart cities and the concept of it as well as the origins of it, in his work also declares the insubstantiality of smart city. He outlines that the declared benefits of smart city reminds him of urban promises commonly heard in VI-th century, which referred to recreating cities with new

highways and skyscrapers in a densely furnished city center [2012]. Reading some declarations of cities, hearing the concept used not for its indented purpose only improves the frequent speculation of a term Smart City. Huge corporations, such as IBM, for example draws up a list named "The Smarter Cities Challenge". Although criteria for cities to be in the list varies, therefore a question of independency of such list arises. It is noticeable that some representatives of ICT companies are tend to speculate with the concept smart city, as their created products are presented to be the tools to create smart cities, despite the fact that the actual city is much more complex system, including not only application of ICTs but also many other elements, one and most important of which is involving the citizens to be the active participators in making decisions. Lithuanian architect and the author of an article named "Critical aspect of a smart city" [Siupinskas M., 2014]is tend to be a very doubtful about the true practical existence of smart city as Such. According to him, the concept of smart city is used as a marketing strategy which grants fresh, human face for high technology products, designed for management of cities. It is hard to disagree, when companies like Verizon Communications, IBM and other suggest smart city solutions which basically propose their own products. Besides, municipalities or representatives of tourism sector, also tend to use smart city as a loud name of technologically developed, attractive city- in order to attract investors, visitors and tourists.

Smart cities are being evaluated and recognized as bringing a positive input into the urbanization, the expansion and planning of huge territories as well as assuring a higher quality of citizen's lives. But on the other side, very few scientist speak about the risks which might come together with city becoming smart. It might be determined that most of such negative impacts are actually arising from the attitude of people. Researcher Grenfield A. thinks that "the smart city pretends to an objectivity, a unity and a perfect knowledge that are nowhere achievable, even in principle" [Grenfield A., 2013, p. 14]. The unwillingness to share the knowledge, fears based on lack of understanding and avoiding of changes are natural trigs arising from people. Although, they are important element of the such a huge system as smart city. It is important to be prepared for possible negative outcomes, in order to minimize the unfavorable impact and to consider the ways to avoid or at least reduce them, if possible. Below are several descriptions of such possible negative impacts:

- Security issues. As sharing economy plays a significant role in a smart city, it usually draws out the issue of security. When sharing a car, bike, any other transport or houses, parking spaces, household appliances or other things, there is always a risk taken by the owners of these things. This risks arise from lack of legal regulation, which would assure the security, in case of accident for example. Currently, there is a lack of legal regulations at this point, especially in Europe, comparing to the cities of United States of America. Although, as

sharing economy in spreading widely, situation is changing and authorities are trying to provide the instruments for assuring the security for both sides, therefore finding the solution which would benefit both sides, is only a matter of time. Looking to the potential security issues from the other perspective, the situations where technologies replace human work, for example healthcare services, including first aid, police, guard and similar positions might cause the feeling of insecurity, because of the lack of trust for technologies. In order to increase the trust, strong management if ICTs would need to be assured.

- Unemployment. It is a very probable issue for the same reason- technologies are replacing the human services, therefore some job places might be not even needed anymore, as soon as ICT's are developed in a way, they can manage themselves in a certain fields and therefore to be capable to replace the human interaction. Businesses are tend to use a trustful services performed by computers, avoiding the human errors in this way, simplifying and fastening the service process. Although, unemployment in this case shouldn't be considered as a huge threat. This is because only very few positions might be fully replaced. Even if they are replaced, new job positions arises, although in this case, people should consider the alternatives. Also, in a smart city, citizens have a wide opportunities to make their property earn the money, by adopting the principles of sharing economy- creating conditions for their things to be used by other people when they are not necessary for the original owner. Depending on the owned property such way of earning additional incomes might even become the primal recourse of the earnings.
- Privacy. A smart city is a city which have a totally different infrastructure comparing to the traditional one. In such city, there are sensors implemented on nearly every corner, there are cameras and Wi-Fi stations accessible to the wide society, smart city also propagate open data and the usage of mobile applications in the processes such as recourses saving or remuneration for services. Although the application of ICT's are also narrowing the private space of citizens. Technologies are emerging and affective their daily lives, reducing the possibilities to save the privacy which sometimes make people anxious and even in some cases increase negative attitude towards technologies. This is psychological factor, which might be stronger or weaker, depending on the culture, but in any case- can become a huge flag down in developing a smart city.

I. 1. 4. Key elements of a Smart City

Reviewing scientific recourses and comparing the definitions of smart city, used by different authors and organizations allows to reveal the prioritized fundamental elements for each of the concepts and also- to compare what elements and under which circumstances are more

important against the others. Table 2 contains all the aforementioned and analyzed definitions of smart city, indicates the most basic elements of each, also especially remarking Center of Gravities (hereinafter referred to as "COG")- as being a most important element in the concept of smart city in a certain definition.

Table 2 Fundamental elements of the concept Smart City

AUTHOR	YEAR	FUNDAMNETAL ELEMENT						
		Smart citizens	**ICT/IT**	**Intelligence**	**Interconnection of elements/ collectivity**	**Sustainability**	**Competitiveness**	**Management**
Gibson, D.V., Kozmetsky, G., & others	1990		COG		+			
Washburn, D. and Sindhu, U.	2010	+	COG	+	+			
Schaffers, H., Komninos, N., & others	2011	+	+	COG				+
Copenhagen Cleantech Cluster	2012		+	+	+	+	+	
Chourabi, H., Taewoo, N., & others	2012	+			+			COG
European Parliament, Energy Technology Initiatives	2012		+		+			+
Haque, U.	2012	COG		+		+	+	
Saint A.	2013	+	+					

Directorate General for Internal Policies at European Parliament	2014	+	COG		+			
Angelidou M.	2014	+	+	+	+			
Siupinskas M.	2014	COG						+
	Usage:	8/11	8/11	5/11	7/11	2/11	2/11	3/11

Source: made by author

While reviewing the concepts of smart city, it is obvious that there are 3 main elements without which, term itself would probably be not even existing. First of all- these are Information technologies or information communication technologies. Since 1990 they were considered as a key element of smart cities. If we take a look to the position of European Parliament towards perception of smart city, we can see that in 2012 different areas, such as ICT, management and interconnection of elements were considered to be more equally important. Although, in 2014 European Parliament concentrates on ICT, as a fundamental and most important item. Not only in 1990 but also 2 decades later, in 2010, the definition of smart city set by Washburn, D. and Sindhu, U. in their article named "Helping CIOs Understand “Smart City” Initiatives’" have also declared ICT as a most important factor, prioritized against others, such as intelligence and linkage of different elements.

Second meaningful component of a smart city is smart citizens. It is interesting to notice that at a very beginning of a set concept for smart city, there was no impact of a citizens foresaw besides the application of ICTS. Although, in the upcoming years, more attention was given to the human impact. Starting from the idea education and administration of people in 2010 and continuing with the raised need to invest in human capital in order for smart city to be operating, the significance of people have evolved. In the next year, it is Haque, who first states that key to successful smartness of the city is firstly smart citizens, outlining the impact of human capital and communicates to be worth most focusing. Ms. Angelidou in her works also agree that development of a smart city, besides all is also based on a human capital [2014]. Lithuanian researchers M. Siupinskas, surprisingly, even being critical to the concept of smart city in general, agrees that smart city begins from its smart citizens. Investigating the works in a field, it is noticeable that almost all of the new concepts include this element, which in the situation when application and managements of ICTs is becoming well-known and better-understood, begins to play more important role. This might be explained by understanding through experience, that in order to apply ICTs in a best way, it is

necessary to know what are the most actual issues which need to be solved, how technologies can simplify daily lives of citizens and etc. All this knowledge should come not from corporations, who usually might have self-seeking purposes, also not from governmental institutions, who can have an incorrect image of necessary changes, but directly from citizens.

Third, even a little bit less than the others but still significant influencer in the terminology of smart cities is interconnection of elements, or in other words- the cooperation in between different bodies, such as governmental, business, associations, organizations, universities, citizens and etc. Such characteristic of smart city defines a successful coo working, communication, understanding and linkage between these different elements. Such interconnection in a smart city is needed in order to create one basic cooperative system, where elements supplement each other and maintain bidirectional connection. Also, different bodies working together can create much more efficient system, comparing to the ones acting one by one. The importance of it was understood in the early stage of the development of smart cities and is still considered important till these days. Although, if we would take a look to Table 1, we would see that this interconnection or linkage was never a center of gravity of smart city. This might be explained simply by the fact that determination itself is quite unique, designating the connection between something more specific.

Many authors, who introduce their concepts of smart cities, also mentions intelligence as a part of smart city. Such intelligence is usually related to the need to increase the awareness of different bodies in regards to the need of ICT implementation in development of cities, of more efficient management, environmental sustainability, etc. On the other side, intelligence is very meaningful that we are talking about smart citizens, their education towards the long term perspective of smart city, involvement of them into daily life decisions making considering their smart environment or creating it.

The other interesting thing to exclude is the aroused element of sustainability, or being more precise- sustainable environment, which, yet, in 2012 was acknowledged by Copenhagen Cleantech Cluster, but considering their activity, it might be a little inequitable, meaning that organization itself is interested to maintain environment sustainable, or at least to shape such image in society. But also, Haque, U. in 2012 agrees that sustainability is quite important element. Although, it is quite surprising that sustainability in smart cities, according to Copenhagen Cleantech Cluster and Haque, U. is inherent from competitiveness. This might be explained as environmental sustainability is usually initiated by huge corporations who actually pollute the environment mostly, therefore they social attitude and position have to be sustainable environment. And not only this, also- investments need to be inputted in order to achieve some result in a long term. Therefore it is a place their the element of competitiveness' arises.

Some authors, regardless the exclusion of importance for interconnection of elements, also pays attention the need of a clear administration and/or management or a smart city as a system, conducted from many different elements. Usually this element is taken for granted, although, there is always a huge need of true professionals, who firstly understand the importance of smart cities, the volume of urbanization and most importantly- have a good skills to a manage all this complex system.

The smart city is considered not only as a theoretical concept including intelligence and fortunate management, creating competitiveness, sustainability and interconnection of elements. Smart city wouldn't exist as such without input of society. Different parts of community could play more or less significant role in creating a successfully operating smart city, therefore such city is also usually understood as an expression and a conjointly reached result of successful coo working by different sides of society. Although at this point, there is no common agreement, what exactly are these components without successful cooperation of which- the smart city wouldn't operate. The different points of views towards the components which constitutes a smart city doesn't lead to one consensus. Despite that, according to author's view, 3 main poles excluded as key players or influencers in creating a smart city by Manville C. and others in their study "Mapping smart cities in the EU" are most accurate to the concept. These poles are best described in Figure 2 below and are :technological factors, including physical infrastructure, mobile, virtual, smart technologies connected with digital networks, human factors together with human infrastructure and social capital, and also- institutional factors.

Technology factors	Human factors	Institutional factors
Physical infrastructure	Human infrastructure	Governance
Smart technologies	Social capital	Policy
Mobile technologies		Regulations and directives
Virtual technologies		
Digital networks		

Figure 2 Three core factors of Smart City components

Directorate General for Internal Policies at European Parliament. Mapping Smart Cities in the EU, 2014, p 29

Even though, such distribution, as proposed by Manwille C. and others is not a constant, it represent the basis of a smart city. To narrow such elements more, according to author's view, there are basically 2 core elements in a smart city- ICT and smart citizens. Figure 3 represent those 2 elements visually. Arrows around represent the interconnection or in other words- coo working of

such elements, affected by regulations and governmental policies, or if we would refer to Figure 2- institutional factors.

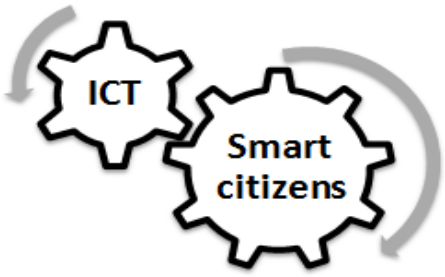


Figure 3 The interconnection of elements in a smart city

Source: Made by author

Further in this paperwork, exactly these 2 elements will be analyzed deeply in order to understand their importance and to signify their influence in the development of successfully operating smart city and to reveal the change of value in regards to these elements.

I. 2. ICTs in a Smart City

ICT usage in cities is becoming more and more important, even significant, which is noticeable while analyzing the concept of smart city. "Cities are systems of systems" [Mone G., 2015, p. 21] and therefore, technologies are applied in order to create a more efficient system, which improves communication and sharing of information in between different bodies in the city's system. Many scientists agree, that it is the application of ICT what makes a cities smart. "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 N., Mehmood, R. 2015, p. 264]. Integrating technologies into daily life of citizens providers an opportunity to share the feedback and gain new experiences, even create new products.

The essence of smart cities is to find smart solutions which would allow to smartly and effectively use modern ICTs in the daily lives of citizens, also, considering other aspect, such as environmental protection and social aspects. Talking about environmental solutions, this is the aspect government and corporations cannot allow themselves to ignore. Thus, "structure and governance of smart cities (or of smart communities, if related to wider areas) are based on the institutions of the so-called green economy, which is a key issue" [Ferrara R., 2015, p. 2]. Besides environmental issues, applying ICTs in city is ground to consider a social factors related to citizens.

Looking forward, it is very probable that ICT would not only play a significant role as technological tool, simplifying the daily services and activities, but also as an instrument for citizens to be the active participators in the creation of the city.*"Voluntarily or coercively, today nothing is out of the lens of sustainability including information and communication technology*

(ICT). Even though ICT is supposed to increase the productivity, profitability, empowerment, equity, paperless information transfers, etc. on the consumption end and, hence, support the triple bottom line (TBL), ICT's upstream cost has to be analyzed as well to put the downstream benefits in the perspective of sustainable development. Nonetheless, the reliance on ICT is ever-increasing and will reach one of its pinnacles when humans are going to reside in the smart cities." [Ahmad N., Mehmood, R. 2015, p. 264-265]. The trust of technologies also plays an important role in the process of citizens being involved in making decision for smart city, through ICTs. Different societies, cultures, even religion are the factors who influence such willingness of citizens to share experience and suggestion. It is important to analyze all these aspects, especially the ways, successful management of ICT can reduce the risks and increase the potential of smart cities.

I. 2. 1. Application of ICT's in a city

Table Nr.2represents the main purposes of creating smart cities and also, reveals how information and communication technologies are applied in order to implement such purposes. Basically, ICT is almost the only and truly the most applicable tool in order to implement key element of smart cities, to create urban but at the same time- sustainable environment. Without adoption if ICT, 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 and it is something to be considered a lot. Also, if we would take a look from the other side, the concept of smart cities was invented after Information and Communication technologies were known as such, meaning that ICT are the roots or fundamental which at the first place led to the concept of smart cities to emerge at all.

Table 3 Application of ICT in creation of smart city

	Purposes of smart cities	**ICT application**
1.	Establishing a closer relationship between different sectors, such as: private, governmental, non-profitable organizations, associations, other communities and single citizens.	Implementation of common framework or systems which allows different sectors to communicate more easily and effectively. Also- imposition of broadband infrastructure which combines cables, optical fiber and wireless networks.
2.	Keeping environment sustainable	"Reducing greenhouse gases emissions and improving the energy efficiency of urban infrastructure" [Schaffers H., 2011, p. 434].

3.	Managing urban flows/ controlling the urbanization of cities	Tracking such flows by using ICTs, creating applications for collecting data, analyzing it in order to make forecasts.
4.	Effective administration and management of city, healthcare, education, real estate, transportation, safety, etc	"Creation of applications that will run and improve every sector of activity, city cluster, and infrastructure" [Schaffers H., 2011, p. 435].

Source: made by author

There are also other ways, to distribute the elements of ICT in s smart city. For example, Escher Group, in their presented paperwork excludes five ICT elements which are essential for city to become "smart' [2014]. According to them, there are 5 basic units (see Figure 4), successful coo working of which would lead to the successful development of a city as "smart":

1. Broadband networks. They are necessary in order to create the network or to be more precise- infrastructure, which would be able to unite citizens with local businesses. Such infrastructure contains optical fiber, cables and wireless networks;

2. Use of smart devices and agents. This elements refers to enrichments of "physical space and infrastructures of the city are enriched with embedded systems, smart devices, sensors, and actuators, offering real-time data management, alerts, and information processing for the city administration" [Escher Group, 2014, p. 5];

3. Developing smart urban spaces. Smart urban spaces are created by using ICT in order to create a sustainable environment, to perform a higher quality services and to improve the efficiency of infrastructure in the city;

4. Developing Web-based Applications and e-Services. This element represent the empowerment of ICT to involve people, in this case- citizens, in generating ideas, testing them and even creating products.

5. Opening up government data (hereinafter referred to as "OGD"). Allowing data of government to be publically available creates an opportunity for the more effective use of information, closer coo working between business, governments, citizens and also increases a confidence of governmental bodies, as well as opens ways for open discussion about policies.

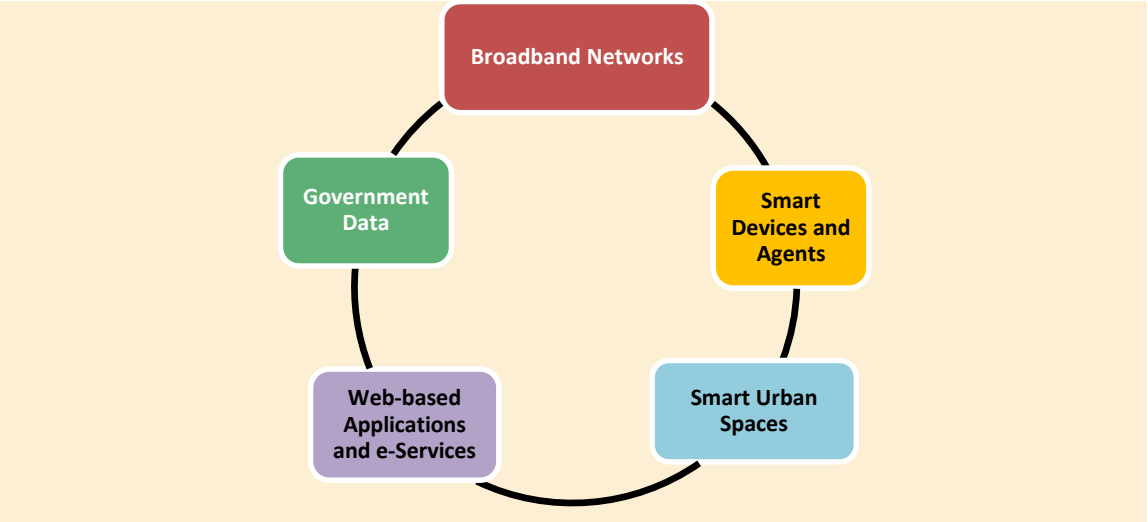


Figure 4 Five ICT essentials for Smart Cities

Source: made by author according to information from "Five ICT essential for Smart Cities" [Escher Group, 2014]

Even if such ICT essentials are quite a basic of ICT application in smart city, some aspects sound doubtful, especially considering that Escher Group is a company which provides software solutions and services for big communities, therefore taking a closer look to the report reveals doubts that the elements are rather representing the technologies themselves, than the actual image of ICT application in smart city, which includes not only technological but also economical, social, political, and other aspects. Although, the importance of OGD doesn't leave a considerations, as it truly makes a huge impact into daily citizen's lives and plays important role in the urban development. Opening a data makes the governmental bodies smart in a manner of smart city's system it could be called smart government. Such government is also tend to apply ICTS and therefore such actions makes smart government the core of the smart city's system. Nevertheless, opening data to public wouldn't necessary bring a positive results. Saunders T. and Baeck P. also notes it in their work, "Open up data to the public to help generate innovative solutions to urban challenges, but pay equal attention to finding productive uses for the data''[2015, p.14]. It is important that this information would receive enough attention and would be used actively. In an ideal case, when citizens are interested in the such data, the distribution of power might even redistributed. One of the ultimate view in regards to the ICT application in order to improve governance, even brings the application of ICT to situation, when governance is not needed, as people, citizens who are able to generate ideas and make decisions using ICTs can become new shape of governance in such smart cities where these technologies are implemented. As Mone G. referred in this article,- "You don't have to rely on the government. If the data is open, anyone could try to solve the city's problems through technology." [2015, p. 21]

Besides the above mentioned components of ICT in the smart city, Cosgrave E., Artbuthnot K., Tryfonas T., in their work excludes Living Labs and Innovation Districts as

measures to apply technologies in the development of city's environment or urbanization [2013]. Living labs in a smart city are the places were innovation have an opportunities to emerge, they are "real- world testing ground for new ideas and technologies" [Cosgrave E., Artbuthnot K., Tryfonas T., 2013]. Innovation districts, meanwhile, refer to the areas where mostly start-up companies initiate arise of newly developed districts with their own policies, innovations, creative solutions, etc. Saunders T. and Bleck P. also agree that the best way to examine the spread of ICT usage is to set up so called innovation labs. "To explore the potential of using digital technologies to collaborate with citizens, city governments should set up civic innovation labs. [2015, p.13].

Besides all, the view to technologies implemented in the smart city cannot be limited only by technical means. Smart cities need smart management in order to operate successfully, further chapter analyzes the means of management of ICT application in a smart city.

I. 2. 2. Management of ICTs

One of the main challenges for successful creation of smart cities is establishment of a close relationship between three sides: governmental, private sector and citizens. Governmental sector in this case might include state bodies, associations or other communities, figures in private sector also may vary from huge businesses till even very small, non- profit organization. Third and a principal element are citizens. Close communication and bidirectional understanding, as well as cooperation in between these three actors is a key to success not only in every state, but also in the city. In cities, even the big ones or urbanized places such communication still can be more effective comparing to the national level. Although, still- this purpose is quite an there are several reasons of that:

- First of all, citizens as a crowd always need a control and centralized decisions making but governmental bodies, in turn, sometimes tend to misapply their authority against decisions in regards to citizen's welfare, usually because of not paying close attention to citizen's needs or not having the ability to receive such needs.
- Representatives of private sector, especially the ones from huge corporations always tend to influence governmental decision even if such impact might be based on self- seeking intentions. In this case, information and communication technologies plays a new innovative role which allows to implement systems of frameworks as an instrument to share information and therefore- communicate more easily and effectively. Tools for such communication might be social networks, also- institution of broadband infrastructure which connects cables, optical fiber, wireless networks and etc.
- An ideal smart city is a city where the needs of citizen are listened and plays important role while making governmental decisions, also opinion of representatives of organizations and

associations are heard and at the end win-win-win situation is created, or in other words- sustainable relationships are created. But not only relationship need to be sustained, but also - the environment.

Talking about sustainable environment, it plays an important role in creation of smart cities, as sustainable environment is the result of implemented tools, which in the long term assures a smart usage of recourses. Sustainable environment can be understood in many ways, also different authors excludes and highlights various aspects, although, one of the most simple and precise definition describes environmental sustainability as "the ability to maintain things or qualities that are valued in the physical environment, where physical environment includes the natural and biological environments" [Sutton P., 2004, p.1]. Considering the fact that natural and biological environment is often used as energy recourse, as well as exploited while creating the infrastructure of city, it is important to firstly save these recourses, precisely forecasting the need of them, implementing measures to use recourses effectively. But also, at this place, ICT plays an important role in reducing the costs and gasses emissions for producing such recourses into energy or infrastructure, serving the needs of citizens. Efficient and intelligent installation of technologies is the way to reduce the impact of the city to environment recourses. Nevertheless, ICT could be also used in order to develop and maintain collective intelligence of the citizens. Besides the adoption of ICT in creating sustainable environment, city could be barely called smart, at least not in a long term. Even in a short term, city which does not plan its future development and sustainability, in any case could be called smart.

As aforementioned, it is crucial for governing bodies to take care of future development of smart cities. One of the relevant aspect is urbanization which in becoming exclusively important. International Electro technical Commission in their official report in 2014 announces that *"every day, urban areas grow by almost 150 000 people, either due to migration or births. Between 2011 and 2050, the world's urban population is projected to rise by 72 % (i.e. from 3.6 billion to 6.3 billion) and the population share in urban areas from 52 % in 2011 to 67 % in 2050"* [IEC, 2014, p.1]. Even if this phenomenon is not something to be avoided, although it still requires much control. Solutions if ICT for smart cities allows to implement instruments such as sensors, mobile devices, actuators 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, ICT is used for creation of application that runs and improves every sector of activity, city clusters and infrastructure.

One side of the analysis of the Smart City phenomenon has to be devoted to managerial aspects of ICT related companies because of the tremendous importance of ICT in Smart Cities and correlating investments in this area that spur other business opportunities and entrepreneurial activities [Sofronijevic A., Milicevic V., Ilic B., 2014, p. 6].

If an ICT company devotes its business objectives to developing technologies related to Smart Cities, that can be viewed in another dimension, not just the one that is foundational for other activities in a Smart City. This is a strategic business aspect of ICT in a Smart City and it is presented in Figure 5, along with its relation to the technology view, i.e., a concrete technology solution for a specific Smart City and stakeholders or systems view, i.e., city institutions along with officials and citizens. Therefore one has always to bear in mind the relationships between strategic aspects that ICT solutions development for the Smart City has for ICT companies and the other aspects of these technologies that are more vital for other stakeholders [Paroutis S., Bennett M., Heracleous L. , 2013, p.2].

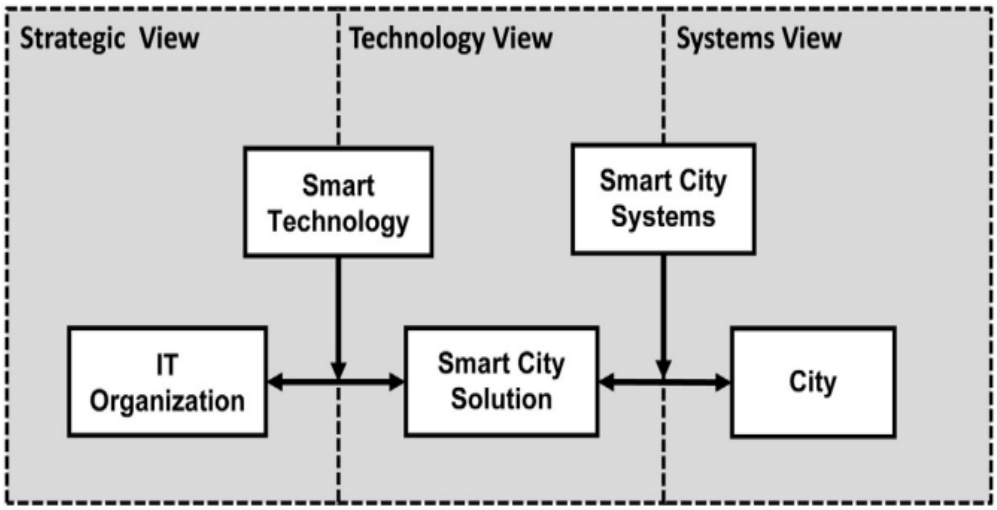


Figure 5 Perspectives on researching a Smart City solution

Paroutis S., Bennett M., Heracleous L. A strategic view on smart city technology [2013, p. 2]

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 effectively 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 H., Taewoo N., Walker S., Gil-Garcia J. R., Mellouli S., Nahon K., Pardo T. A and Scholl, H. J. 2012].

Even if the managements 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. They are the element which is the potential of being not only the active participators in urbanizations process, but also, a controlling mechanism, which, with an assistance of ICTs create the sustainable network of systems in the city.

I. 3. Smart citizens in a Smart City

Even if there is no common agreement on definition of a smart city, as investigated previously, many scientists and others who were making researches in regards to the concept of smart city and it's elements, playing less of more significant roles in creating, developing and maintaining the smart cities, agree, that the key element of smart city is smart citizens. As M. Siupinskas acknowledges in his article, smart city not only provide services in a cyberspace by itself, his management, creation of services and improvement is actively contributed by its citizens [2014]. While analyzing the concept of smart city it was summarized that smart citizens, together with ICT are equally important elements of smart city. 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. Also such smartness of people, living in the city should be considered as an empowerment for citizens to share an information with other citizens and also with governmental bodies, to provide them with ideas and solutions which would increase the smartness of the city. On the other side, 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, although usually in the cooperation with local stakeholders or even universities.

I. 3. 1. The admission of ICTs by smart citizens

The majority of scientists agree that smart city begins from a smart citizens, as well as smart city depends on the wide application of ICT's in the different areas in the city, such as infrastructure, education system, healthcare system, public and private transport, shopping, tourism, administration. Application of ICTs in the city is not only about the huge projects, implementation of technologies and speculation about names of big corporations. The application of ICTs at the first place is the acceptance and willingness to use technologies by its citizens. Although, behind the acceptance of technologies, several different aspects could lie. Saunders T. and Baeck P. in their

work excludes the affect of cultural characteristics and changes of it as the influencing factor *"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"* [Saunders T. and Baeck P., 2014, p.14]. Such difference of attitude towards technologies could be also recognized by comparing different generations attitude towards technologies. Y generation is more tend to apply technologies in their daily lives, to use them for benefit in general. Although, what is needed for citizens to use ICTs is the understanding that application of technologies would a simplify not only their lives in a short period of time, but also would change the wealth of all community in the long term. For example, one way of applying technologies is promoting the healthy lifestyle, via various challenges, implementing bike roads in the city, making them smart and interactive. Intelligent integration of according promotions could formulates healthy lifestyle as a constant. "The realization of such standards within communities means cities not only have to be "green and lean" about their planning and development, but also "get smart" as to the digital technologies and platform electronically enhanced services needed to meet their design and layout requirements" [Sidawi B., Deakin M., 2013, p. 319]. Author sees the opportunity for smartness to influence the habits of citizens. Besides, ICTs can also be applied in order to even connect people with flora. "*With the Smart City paradigm, however, comes different scenario, in which power plants need to interconnect with customers and with other distributed renewable energy sources. The challenge in coordinating this communication and fostering energy-saving and reuse calls for Information and Communications Technology (ICT) technologies to be applied*" [Girtelschmid S., Steinbauer M., Kumar V., Fensel A., Kotsis G., 2014, p. 170]. Even if now the ideas sounds a little like an utopia, the basic of moving towards them is the understanding the in order to create the sustainable environment around themselves, citizens need to start acting as technology- advanced people.

I. 3. 2. Sharing economy in a Smart City

While considering the sustainability of the city and the lifestyle, which should be propagated by smart citizens, it is important to note that smart city is not the city which is overcrowded with things, systems or vehicles. Idea of smart city is the environment, where things are closely interconnected and are working to bring the value for people, not only to be storage, whether we are talking about buildings, cars, bikes, or even cameras. In a smart city, sharing economy wins against the buying economy. As McLaren D. and Agyeman J, states in their article, "new opportunities for collaboration and sharing are arising at the intersection of urban space and cyberspace." [2014].The more people are tend to share their things and also to use the thing of others, instead of buying them, the less overcrowded city is, therefore- the more efficient system of systems is created. And

at this point, positive attitude towards a willingness to advocate such sharing economy is one of the exclusive characteristics of a smart citizen. Although, talking about willingness of people to share their things, probably the most driving power is the ability to earn additional money from their property. Sharing economy is predicted to have a huge impact in the development of cities and their economies, including many different sectors. It can also solve the problems, such as the lack of accommodation in the market, the traffic flows and jams, as well as problems of communities' cohesion. Currently, the understanding of sharing economy is usually incorrect, as citizens are used to evaluate it from the perspective of traditional, buying economy, which is usual for them. Sharing economy in many cases is seen as a way to earn incomes, not as a way to make things work for someone and to earn some additional money, or in other word- to pay back. Despite the incorrect image, such new trend to share things is increasing a smartness of city as whole. Sharing economy contains the main principles of smart city, which might be sometimes lost in the loud usage of concept by huge corporations- the interconnected, sharing people. McLaren D. and Agyeman J. in their article summarizes that "after researching leading cities around the world, we've concluded that truly smart cities will be those that deploy modern technology in building a new urban commons to support communal sharing" [2014]. Although in order for sharing economy to be successful, people themselves should be willing to use their property with others and in a certain way, to bring the wealth of community in front of their own feeling of security. "New opportunities for collaboration and sharing are arising at the intersection of urban space and cyberspace." [McLaren D. and Agyeman J., 2014]. The interconnection between urban places and cyber places can by successfully developed not only by citizens, but also, sometimes, the additional input or encourage should be brought in, in order to firstly increase trust and secondly- create and maintain tools for participation in activities of developing a smart city.

I. 3. 3. Empowerment of the citizens

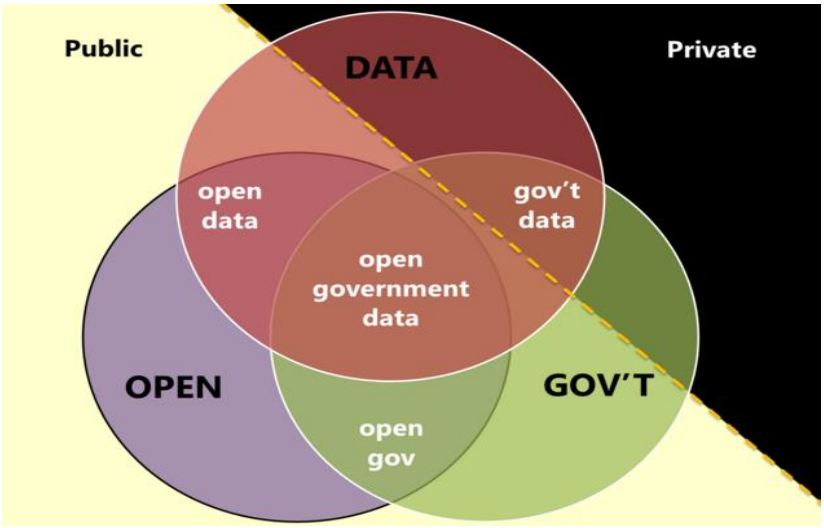
The intention of citizens to apply technologies in their daily lives, for simplifying solutions and services, also the determination to not only to be users of smart city, but also to suggest ideas and solution is very important and might be leading factor to the success of the city, or on the other side, if not applied- distributor, not allowing for a city to develop enough or fast enough. Although, in order for citizens to be able to generate solutions, suggestions to the city's authorities, 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. "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 T., Baeck P., 2015, p. 35]. People were used to the order where decisions are made by urban authorities, although in our days, technologies

empowers people to be able to speak up. But the other question is, whether governmental authorities would want people to be actively involved in decision making. "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 corporate capital." [McLaren D. and Agyeman J., 2014]. Some politicians are not ready for the few changes at this point, or even the beginning of revolution of power authorities in the city. The understanding of the value of it and win-win situation for both side: governmental bodies and inhabitants of the city is quite primal. Nevertheless, some cities are moving forwards quite fast. The real example of such involvement could be the city of Santander in Spain, which is "living experimental laboratory" [Ever M., 2013]. The author agrees that a real smart city is the one who provides possibilities for citizen to access the information as simpler as possible. The app for city, called "Pulse of the city" is used by majority of citizens in Santander. People can receive the information to their mobile phone by simply directing their phones to certain objects, for example- bus stop for routes, concert call for program of events, other building for their history, architecture, etc which also assist for tourists. Also, most importantly, this app also allows to report about the problem, simply buy taking a hole in the street by picture, location is automatically detected by GPS and one more click report the issue to the municipality. Therefore, seeing 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. It is the decision of governmental bodies - to organize some familiar initiatives or not. While on the huge issues, also declared loudly as the biggest distributor is finding funds such projects, the real and even more distributing aspect in this case might be the unwillingness of city authorities to provide such platforms to citizens. Because allowing them to express their opinion or report issues also bring together the responsibility to react to them and respond accordingly.

One of the other hand, one of the smart city's principle is that governments are now willing to provide citizens with data, which traditionally was being applicable only for their internal use and was hidden under the shutter of confidentiality. Open government data (herein and after referred to as "OGD") is the concept meaning that information should be open for public use [Erik Borglund Tove Engvall , 2014, p. 164]. Such open data could includes statistical information about real estate, transport, infrastructure, planned projects, demographic changes, etc. Data could be provided in various formats and shapes in order to be better understood and more comfortable for analyzing and applying.

Figure 6 below represents the origin of OGD. We can see that gathering OGD is a result of interconnection of 3 core elements- data, openness and government. Government and data themselves have an aspect of privacy and when talking about government's data, traditionally it is

considered to partially be private. OGD eliminates the aspect of privacy, therefore availability to become public is the main strength of OGD.



Picture 6 Open Government data

Source: Open Minesota Graphics. Accessible through: http://openminnesota.org/graphics/

The main purpose of data is city's authorities openness towards its citizens, a willingness to gain more confidence and also to initiate both side communication. In order for such communication to be started, first of all citizens should be aware of open data and also, to be willing to use it, rethink it and gather new ideas accordingly. Although, situation in reality might differ a little.

II. METHODOLOGY OF EMPIRICAL RESEARCH

After analyzing various scientific literature resources, related to the definition of a smart city, its development, negative aspects and beyond indicating the main elements of it, it was concluded what 2 key factors, without which smart city wouldn't exist, are: implementation of ICTs and smart citizens. The willingness to accept ICTs and to adopt them for suggesting ideas and solutions related to the city development and management are considered to be the characteristics of smart citizen. In other words- such citizen could be described as the one who is interested in technologies, applied in the city, who cares about the decisions made in regards to the changes in the city, who rather proactively contributes to the development of its city than remain ignorant. On the other hand, in order for citizen to be able to involve himself into decision making, governmental institution have to provide them with such possibility in the first place. Cooperation in between inhabitants and urban authorities must be well developed.

While theoretical perception is possibly drawing the image of nearly idealistic smart city, the real situation might differ a lot. The authorities of the city might be giving many effort in receiving and maintaining the label of a smart city, although the true citizen's perception of such concept and understanding its aspects might be comprehended in other way. In this case, it is important to analyze, how citizens understand the smart city, how they evaluate their city as well as their input into developing it as smart.

On the other side, not only citizen's viewpoint on provided on possibilities, but the investigation of a real actions and project by urban authorities is needed. Empirical research aims to analyze the practical perception of smart city. For the empirical research, the situation in Vilnius was chosen as a model of a developing 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 citizens are not always willing to involve themselves into the creation of such smart city, therefore the reasons of that in practice, need to be analyzed.

Object of research

There are 2 main object of research:

- Citizens of Vilnius
- Municipality of Vilnius

Goal of research

To investigate the perception of citizens towards Vilnius and its development as smart city and 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 view of citizens towards Vilnius, as smart city (present and potential);
3. To understand citizen's experiences in regards to separate smart city's elements, such as: sharing economy and open data provided by city government;
4. To comprehend the diversity of how citizens are involved in developing Vilnius, as a smart city and what barrier they are facing;
5. To ascertain actions taken of city government for technologies to be more applied by citizens;
6. To identify the ways urban authorities empowers citizens to be involved in developing Vilnius, as smart city.

Method 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, the qualitative research method was chosen. Empirical research is contained from 2 different parts, both of which are qualitative. Qualitative research was chosen because of its allowance to dig deeper and understand the reasons of citizen's and government's behavior in Vilnius, instead of collecting statistics. Aiming to analyze the perception and activity or experience in regards to the city, both sides: citizens and governmental institution were investigated, therefore 2-parts empirical research was performed:

1. Focus group

Focus group as qualitative research method was chosen because it is allowing to be digging more deeply. Focus group allows to understand perception, beliefs, attitudes, various thoughts about investigated objects. Also such type of research helps to better understand the view points and their differences, reveals implementing factors. The focus group methodology is used to quickly gather ideas, views and attitudes from a group of people. It is a method noted for synergy in stimulating discussion and bouncing ideas off of many at once. [Butvilas T., 2014]. The main interest of research is to understand certain society, people's beliefs and positions.

Questions, which were raised in the questionnaire, are widely described in Table 4 below, also they are classified according to the tasks raised in this research.

Table 4 Distribution of questions to respondents, according to raised tasks

The task	The group of questions related to task	Questions
To analyze, how differently citizens	Concept of smart city	➢ Are you familiar with the concept "smart city" and how would you describe such

understand the term of smart city in general		city? ➢ What elements could you name, as significant for the successful development of a smart city?
To investigate various view of citizens towards Vilnius, as smart city (present and potential)	Perception of Vilnius, as smart city	➢ In your opinion, could Vilnius be called smart city, today? ➢ How would you describe the potential of Vilnius, as smart city?
To understand citizen's experiences in regards to separate smart city's elements, such as: sharing economy and open data provided by city government;	Knowledge and application of open data and sharing economy (as an elements of a smart city) in Vilnius	➢ Have you faced or used The open data, provided by Vilnius municipality and in case you did, what is your impression? ➢ Closed questions which examples of sharing economy in Vilnius.
To comprehend the diversity of how citizens are involved in developing Vilnius, as a smart city and what barrier they could face.	Citizen's involvement in developing a smart city and barrier faced	➢ Do you think you are contributing to the creation of Vilnius as smart city and if yes- in what way? ➢ What is missing in order for people to be (more) involved in creation of Vilnius as smart city? ➢ Do you think you are provided with enough possibilities to contribute to the development of Vilnius, as a smart city?

Source: made by author

2. Case study

For the case study, Vilnius was selected as a subject of research. Case study was chosen as a further, deeper analysis of data, gathered from citizens of Vilnius. Case study research method allows to investigate the backgrounds and the real situation of the case. The analyzing subjects of case study and questions raised will be excluded after the analyzing data gathered from focus group's discussion.

The process of the research contains 2 basic parts- it is organizing the focus group and analyzing the case study. First of all, participants, place ant time for focus groups were selected. 10 subject

under observation were participating in focus group which took part on November 30, 2015. 3 of these subjects were taking part in discussion from a distance, participating was with computer technologies - based assistance, including audio and video tools. Questions (Annex 1) were provided in Lithuanian language and the further discussion was also developed in Lithuanian language, in order to eliminate language barriers, and for participants to be able to freely express their thoughts. The group discussion have lasted 1 hour 49 minutes. In order to be able to script answers, recording equipment was used. The moderator of discussion was a researcher itself. Data analysis was performed afterwards which also let to distinguish main aspect to be analyzed in a case study in regards to Vilnius municipality's activity in developing Vilnius, as smart city.

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

- All of the participants live in a city not less than 3 year. This criteria is set in order to select participants who live in the city quite long, in order to be familiar with the city and different service areas in it, also to be able to notice changes, developments in the city;
- Has higher education- strengthens the ability to analyze situations deeper;
- Belongs to Y generation (born between 1977-1994 m.). People belonging to this generation are old enough, in comparison to Z generation, to be able to recognize and understand the processes in the city, also this generation is more technology- advanced comparing to X generation. Nevertheless, generation Y represents the majority of inhabitants of Vilnius city. According to data from Lithuanian statistics department "Population by age in municipalities", collected in 2013 there were 535 631 inhabitants in Vilnius city, 29,3% of which (157 287) belongs to Y generation, while Z generation contains 22,2% (118 783), X- 15,1% (80 916) of inhabitants [Statistics Department of Lithuania 2013];
- Are using public transport system in Vilnius at least several times per month, which is important as public transport is a significant part of infrastructure in city;
- 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.

After selection and analysis of data gathered from focus groups, certain aspects, requiring further investigation should be signified. Case study method is chosen for analysis of these aspects.

III. EMPIRICAL DATA ANALYSIS OF CITIZENS' AND MUNICIPALITY'S ATTITUDE TOWARDS THE DEVELOPMENT OF SMART VILNIUS

Empirical data analysis provision contains 2 part, singled out accordingly by the division of researches' types. First part of research data analysis is exploring data collected from focus group's discussion. Second part of data analysis contains findings from case study. At the end of analysis of both researches, results of them will are provided.

III. 1. Citizens' Perception of Vilnius, as Smart City- Data Analysis of Focus Group

Participants have agreed their thoughts to be shared, analyzed and used freely. Although, the real names and surnames were hidden in order for confidentiality to be remained. In the Table 5 below, basic statistical characteristics, according to which participants were selected, as well as their code names, which will be used in the further data analysis- are presented.

Table 5 The characteristics of participants

Code name	Living in Vilnius	Age	Born
Participant JT	3 year	22 m.	1993 m.
Participant VR	5 years	24 m.	1991 m.
Participant IB	6 years	25 m.	1990 m.
Participant MG	6 years	25 m.	1990 m.
Participant ED	6 years	25m.	1990 m.
Participant DB	7 years	27 m.	1988 m.
Participant RK	4 years	27m.	1988m.
Participant MP	8 years	28 m.	1987 m.
Participant DM	7 years	33 m.	1982 m.
Participant IJ	15 years	33 m.	1982m.

Source: made by author

III. 1. 1. Interpretation of the concept Smart City

The first block of the questions was related to concept of smart city in general. The purpose of these questions was to hear, how close are people familiar with concept and whom they relates it with, what elements come to their mind, while talking about smart city in general. First question was "Are you familiar with the concept "smart city" and how would you describe such city? ". 3 participants admitted that they have never heard this concept before. 4 people meanwhile said that smart city is something they heard before, are familiar a little bit but were not fully sure about the meaning. The rest 3 participants said they are familiar with the concept. Although, by analyzing data of their answers (see Figure 7) it turned out that even if participants consider to be understanding the concepts, it is not necessarily the true, and oppositely, other would name the

elements which were also excluded in the literature review. Below graphic represent the elements which different participants have excluded and named to be the parts of smart city. Technologies were the mostly repeated element, excluded by all, except one participants. Human capital took part in position of the second most mentioned elements. Also, participants referred a lot to transport or infrastructure as well as to funding and investments. There were few participant who excluded mobile apps, smart phones, Wi-Fi or internet connection elements in general as the ones without which they do not image a smart city.

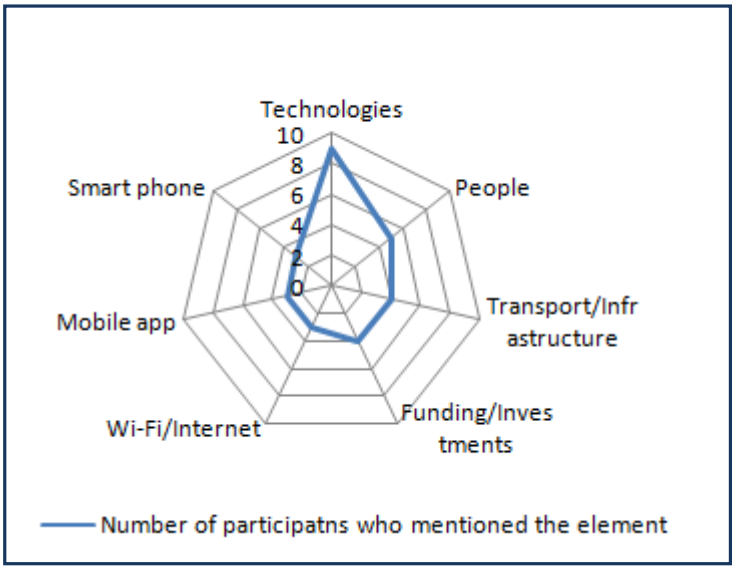


Figure 7 Elements of smart city excluded by participants

Source: made by author

Even the first one and second questions provided to focus group were different, they were actually very familiar. Question were formulated in this way on purpose, in order to allow participants to think twice, to generate more ideas than it comes to mind from the first question. When answering, participants were gathering ideas of elements in both questions and in some cases second question allowed them to specify or amend their thoughts. For example, participant VR have equated smart city to the "evolution of civilization", although answering second questions, it was specified " I would add maybe evolution of technologies, their expansion". Also, one of the participants, haven't excluded technologies "smart city for me associates with city which is built in a way that it is able to fully furnishes itself with energy recourses, it doesn't pollute the planet and buildings in such city have their functions, the same for infrastructure- road, etc.." [Participant IJ]. Although, after second question, Participant IJ have revealed other point of view "(...) the implementation of technologies, as everything is based on technologies" [Participant IJ]. Participants, who named Wi-Fi as the important factor for smart city to be existing, revealed it only after the second question:

Participant MR: "Good Wi-Fi which is available everywhere in the city"

Participant IB: "Accessibility of Wi-Fi"

Participant MB excluded 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".* Besides seeing the need of local authorities to invest into smart city's projects, 2 participants signified the need to attract foreign investors:

Participant IB: Besides, smart city should be attractive to investors, as for example in Vilnius: Barclays, SEB, Swedbank, IBM, Western Union, Microsoft, Nasdaq

Participant DM: the attraction of foreign capital in order to receive funds for implementation of technologies

Although, more than funding, participants in the group are tend the signify the influence of the human capital. Some of them call it "evolutions of civilizations" [Participant VR], others, rather as synergy of citizens, as Participant JT "..well the most important thing is for people to be interconnected in regards to the infrastructure of city". One more participant noted that the influence of people is very important, but these people also need a place where they would be able to express their ideas:

Participant ED: "as I imagine, for the development of smart city, the contribution of people is very important, namely some system, where people could express their opinion- what they need and what would simplify their daily lives".

Other speaker adds that much of success depends on the point of view of citizens, as well as on their acceptance of technologies. "Also, it strongly depends on the attitude of smart citizens towards all this idea of smart city and technologies, whether they accept it"[Participant MP]. One more opinion of elements in the smart city was quite concrete and interesting, because of involving various human inputs in the smart city:

Participant RK: maybe its implementation of technologies, the implementation of self-awareness of people, education of people, not struggling modern technologies.

Participant RK signifies the citizens not only need to accept technologies and implement them into their daily lives, but also be educated by others, about the smart city and how can they contribute themselves to implementation of it.

Some other interesting thoughts contained the opinion that even mayor of the city could be smart. "Simasius is even smart, he answers private messages on facebook, reacts to the complaints or suggestions" [Participant IB]. One of the most critical and ironic thoughts about the smart city was told by Participant IK "I heard there are some plans of missions to the moon, so they can built a smart city there".

In general, by answering to the first block of question, participants were quite uncertain, had many doubts and the patchwork of minds. To sum up the perception of group 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. Also, such key words as transport, infrastructure, internet or Wi-Fi, smart phones and mobile application were mentioned several times during the discussion. Differently from theoretical research, additional factors, such us funding, investments were also mentioned. 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. Sometimes, it was noticeable that people were starting to talk about Vilnius, as smart city, trying to describe it. This could be explained as a trying to remember live examples around, because in case no theory in regards to the smart city was faced by participants, analyzing the close environment is the automatic decision while trying to understand and gathering ideas. Further block of questions is analyzing exactly the case of Vilnius, as smart city.

III. 1. 2. Conception of Smart Vilnius

In order to for participants to give a better understanding about the concept of smart city, before asking the opinion about Vilnius, as smart city, the moderator of discussion have provided the following generalization of smart city, which was made after analyzing different scientific resources : "Smart city is the city in which information and communication technologies (referred to as "ICT") are applied in order to create a sustainable environment, including healthcare system, public safety, transport, real estate, administration of the city, education and other sectors. In the smart city, it is important that ICTs would provide a possibility for citizens to express their needs and on the other side, that those ICTs would be accepted and used in order to implement the quality of services and strengthen the development of a city. Therefore, one of the basic principles of smart city is smart citizens". By hearing this concept, participants where at first asked "In your opinion, could Vilnius be called smart city, today?", at this point, opinions have singled out a lot. Although everyone have agreed on one thing- Vilnius could not be called smart city today. Figure 8 below represents the separation of participant's opinion in regards to the raised questions. 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 form the group, both aging 33m. 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, not believing in their ability to control and change traditional systems from the basics.

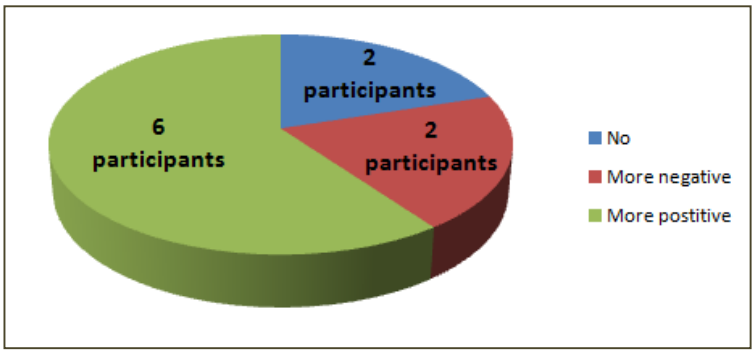


Figure 8 Separation of participant's opinion, whether Vilnius can be called a Smart City

Source: made by author

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. At this point even the same element, by different participants, according to their experience or understanding about the concept, 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". Participant RT meanwhile also signifies the difference of smartness in between the group of age "well let's say the older generation is not that smart as young generation". Another 3 opinions distinguishes while talking about healthcare sector, where participant IB is quite negative about it "in regards to healthcare sector, there is very unequal distribution between different institutions". Participant JT is tend to look to this sector with more positive attitude- "as far as I know, in a health sector, you can also register online. I couldn't name exact things, but there are some reasons, why Vilnius look quite smart city". The Participant VR criticizes this sector and also education "in regards to the education and healthcare systems- the evaluation is much slower than in between individuals". Even if many participant in one or the other answer mentioned transport, the only participant IB have provided a critical view to the transport system of Vilnius in general: "Public transport in Vilnius is quite a drawback in this case, because it takes much time to get from one point in the city till the other". The same participant acknowledges that "In regards to the internet, its accessibility and speed, it is terrific". 2 more factors, supplementing each other from both points of views are that, on the one side, financing is considered as the biggest problem [Participant DB], but Participant MP corrects, that actually Lithuania is now attracting many foreign investments. Although, this might not be enough, despite local government's financial input. Same 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".

Looking to the future and considering the possibilities for Vilnius to become a smart city, participants were asked the question "How do they evaluate the potential of Vilnius, as smart city". The opinion of answerers was also quite different. 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 "First of all, I would mention the education" [Participant RK]. Participant VR also talk not only the importance about education "I think education, healthcare system and many other spheres should be involved..". The other participant clearly highlights that " First of all, healthcare centers should be adjusted" [Participant IJ]. Participant IB agrees with such opinion but also adds the system of transport as the one requiring implementation. In opinion of Participant DM, "the main thing what we need is the attraction of more investments which would allow the implementations of new innovations". Although other participants concentrates 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. People, in the future will be using them more and more" meaning that people need to be willing to adopt such ITs and smart things. Participant ED also believes on the cruet of citizens -"there is a place for improvements and I think that society of our days is smart enough, if it could be called like that and with the input of people, something could be really done". Nevertheless, participant JT shares the insights that not only people, but also representatives of governmental bodies are the ones who influence the future most. I think everything should be possible, but it depends on people- on politics and people themselves. If they would have concrete ideas, how something could be done p [Participant JT]. Meanwhile, Participant VR signifies the government's 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.". One of the participants excludes not only many certain elements which are missing in Vilnius, but also reveals one more aspect- motivation for citizens to apply technologies, to use them in their daily lives:

More electric cars more stops for charging, more innovative events, educational events, more motivation for citizens to be involved in the usage of technologies. Also, power plant of Vilnius should be changed to other, renewable recourses [Participant IB].

A very interesting though raised that people need more motivation, therefore in order to investigate whether this is true, further block of questions would serve.

III. 1. 3 Contribution to development of Smart Vilnius

Third block of questions was dedicated for investigating, how citizens perceive their influence towards the creation or development of smart Vilnius, also, what would allow them to contribute themselves more and if they feel having enough possibilities provided in order to do that.

Answering to the question, how people think they contribute to creation of city as smart, 9 of 10 answerers noted that the main contribution is usage of technologies:

Participant JT: I do not think i contribute to the creation (of Vilnius as smart city). I mean to the creation itself- no. Maybe in the way that using the infrastructure which is created, the programs..they are not forgotten and I use them;

Participant RK: maybe by usage of smart technologies, nothing else comes to my mind

Participant VR: I also would say, maybe with usage of some new things, created in Vilnius

Participant RK: maybe that adaptation to smart technologies, but nothing else, I don't think so

Participant VR: we contribute here as uses, we buy those things, can leave some feedback, comment it. But in regards to the creation of them, involvement of society, no..

It is interesting to note, that these 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. Participants IB and DM excludes active/ passive contribution or usage, therefore they feel that they are involved, although- only partially, not actively.

Participant DM: Yes. I am not very active citizen;

Participant IB: I use smart technologies in city, I use them as a user, but I am not involved in the creation or not promoting ideas. I am passive user. I would like to contribute more.

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:

Participant MG: So as you mentioned the concept of smart citizens, I am trying to use technologies as much as possible- mobile apps,(..). I use technologies, as much as I need;

Participant MP: By Using technologies;

Participant IJ: I would agree as Margarita is saying, we contribute ourselves by using. Somebody creates and we are using.

Participant DB: Yes. We are using smart technologies.

There is a difference between participants in regards to the evaluation of their input, although everybody agrees that using technologies is the way of involvement in creation of Vilnius as smart city.

Answers to the following questions- "What is missing in order for people to be (more) involved in creation of Vilnius as smart city?" and "Do you think you are provided with enough

possibilities to contribute to the development of Vilnius, as a smart city?" were quire related, therefore further analysis will contain both of these questions. 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" and Participant VR also agreed on this. Meanwhile Participant ED articulated it as communication, also this opinion was accepted by Participant DB. MP stated that information is what is missing for her to contribute herself.

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:

Participant DB: In case you want to be involved, you have to search for information by yourself, for quite a long time, to know, how you could do that. That information should be accessible quite easily and shouldn't cause many problems for you in case you want to do something. I would repeat myself, there is no limit for improvements in this case.

Participant ED: it is very important that it would be user friendly, that it wouldn't cause some problems to evaluate and to help to improve for your city

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". Participant JT was also tend to agree of personality's input in decision making at this point " Contribution for the creation of smart city depends more on the person (...) I am not the person who is tend to participate in such projects and usually it depends on the choice of people". MP confessed that the lack of motivation for her is a distributing factor "I am not motivated enough, therefore probably I do not feel enough opportunities".

Third block of opinion in regards to the reasons, which affect citizen's decision about the involvement in creating smart Vilnius, is related to the need of seeing the result, encouragement or remuneration. All these factors, as confessed by participants- would increase their interest.

Participant DB: (...) that you would see that you have suggested, and there is a result- it would encourage the engagement, if it would be shown, if we would see, how it works, where it works, what could be done;

Participant IB: maybe there is a need of encouragement, some remuneration for example;

Participant MG: In order to gain motivation, there should be some encouragements form the other side, suggesting for people to be involved somehow.

None of the group members have mention anything in the relation to the involvement because of their own wealth, as being inhabitants of the city, although Participant ED have raised the idea that the long term result should be shown, resented to people, as in this case they could possibly understand that motivation of their input at the first place should be the better life conditions for themselves "I think if there would be expressed, how people could become involved, if we would see this information that my, as citizen's opinion could help, I don't know...in a year or something for me, to live better, I think it would help."

Talking about possibilities provided, allowing to contribute, interesting discussion arose, reminding the one in regards to chicken and egg- who came first.

Participant IJ: I am not involved and i do not even know how to do it

Participant MP: I do not even feel the lack because I don't have a wish to be involved

Participant IJ: but there are no possibilities if you would want..

Participant MP: but even if there would be, I don't even want, I wouldn't look for them

Participant IJ: but do you have possibilities?

Participant MP: I think if i would want, i would go and look for them, because if I would be interested, possibilities would come to me themselves and also I would be looking for them.

Discussion reveals the point of view, that provision of information, doesn't necessarily encourage and raise motivation. It could affect in case it comes straight to our hand/e-mails, etc, in case this information reached us directly. Otherwise, only motivation can be decisive factor. It was also signified by other participants. Participant JT agrees that " if you want to do something, you can really find how to contribute yourself" and IB meanwhile notes that if you have idea, you can find how to express it "I think with a current mayor, it would be easy, if you have idea and a wish to implement, there are possibilities".

III. 1. 4. Experience of citizens in regards to Smart Vilnius

In order to understand citizen's experience in regards to separate elements of a smart city, 2 main subject were chosen- open data, provided by government and sharing economy examples in Vilnius. After citizens were asked, whether they are familiar with open data, provided by Vilnius municipality, all the 10 participants asked for the explanation of term "open data". It reveal the situation where none of these people are familiar with the term itself. Although, after given explanation, some ideas arose. Particicpant IJ think that such information could reach people in other form or shape, not even being called as "open data", therefore, can not be recognized as such "if this data is released to the press, then yess, but i never go on purpose to the website of Vilnius municipality to check it. Maybe that information reaches us in other ways". Other citizen raises 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

intresting to see" [Participant IB]. IB also raised blurts that it would be intresting to see such information, Particiapant DB also showed the intrest "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, to be precise- its knowledge between citizens and their experience in regards to examples of it. In Lithuania, currently there are 6 main, known services of sharing economy. Traditionally, services of sharing economy have a model of sharing from person 2 person, or so called P2P, although the analysis also included examples of business to person (B2P) and government to person (G2P) in order for results to be compared in between. The Figure 9 below represent, the knowledge of sharing economy's examples in the group. Sharing platform, such as "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 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.

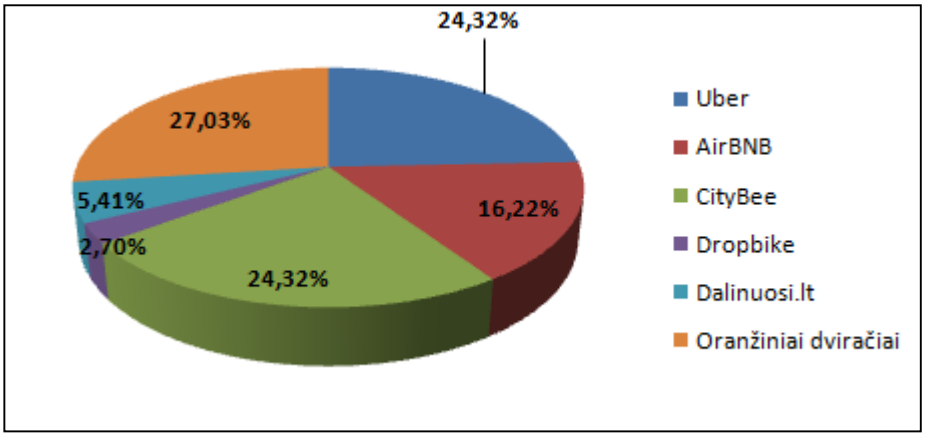


Figure 9 Distribution of knowledge about sharing economy's examples in Lithuania

Source: made by author

"Dalinuosi.Lt" is the only unique platform in Lithuania, where people can share things between themselves online. Company is established at the ends of 2012, although only 2 participant from the group were familiar with this name. Meanwhile, G2P services "Oranziniai dviraciai" were known everyone from the group and B2P services- "CityBee" were also known for the majority of the group- 90% (see Diagram X) Such wide knowledge could be explained by possible bigger trust in companies and even government or on the other side, such service providers have a stronger

intention to sell their services and also have more experience in the fields. Although, to investigate it further, deeper analysis would be needed.

Further answers, about the usage of the described services are represented in Table 6. Results confirm previous remark that company "Uber" is known because of the successful marketing, not because of the actually usage, as 0% of people who were familiar with the services, have actually tried to use them. Other services, which were quite well known, such as "CityBee", "Oranziniai dviraciai" and "AirBnB" were tried by 20-35 % of people who were familiar with them.

Table 6 Usage of sharing economy services

Service	Percentage of people who used service
Uber	0%
AirBNB	33%
CityBee	22%
Dropbike	0%
Dalinuosi.lt	50%
Oranžiniai dviračiai	30%

Source: made by author

All the participants who were using on or the other services, confessed that they have positive impression and that they have recommended or would recommend them to others. Also, the majority of group- 70% is planning to use "Uber", "CityBee" and "Oranziniai dviraciai" services in the future. Also, services of "AirBnB" in Lithuania are planned to be used by 30% of people and services of "Dalinuosi.lt"- by 2 people.

III. 1. 5. Results on data analysis of focus group

To sum up the results which were gained by analyzing data from focus group, there are several observations to be excluded in regards to participant's expressed opinion:

- Participants are familiar or partially familiar with the concept of smart city, although, definitions differs a lot in between the group;
- 2 persons were seeing smart city from their point of view, as elements of smart city were closely related to their profession;
- Most of the participant exclude applications of technologies and human capital as one of the main elements of smart city, although the human input is seen differently;
- 2 participants in the group were extremely negative about current status of Vilnius as smart city and this was related to their age which is highest from the group- 33 years old;
- Big part of participants revealed to have noticed the different regarding to the acceptance of technologies in comparison between separate ago groups;

- In the group, there was mostly the expression of opinion in regards to the healthcare and transport sectors in the city and the need of developments in these sectors;
- Members of the group perceive their contribution to the development of smart city through technologies in different ways;
- Participants feel to be missing a very basic- knowledge and understanding about the concept of smart city;
- Part of participants' outlines that personality is influencing the willingness to be involved in the creation of smart city;
- Participants of the group reveals a need of seeing the result of their brought efforts into the developing city as smart, they also need encouragement and motivation which would increase their motivation
- None of the participants of the focus group were familiar with the term "open government data";

Based on the revealed conclusion from the discussion of focus group, following targets were set for the case study:

1. Education and provision of information for the society in regards to the smart Vilnius;
2. Motivation of citizens, their involvement into decision makings in a smart city;
3. Open data, provided by Vilnius municipality

III. 2. The Role of Vilnius Municipality in Developing Smart Vilnius- Data Analysis of Case Study

Previous research of focus group revealed that citizens might not be very familiar with the concept "smart city", although in order to analyze the attitude of the majority, further quantitative research would be needed. In this case, focus group's discussion revealed that citizens are understanding 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, because only lack of knowledge could lead 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. Although, as none

of participants in the focus groups were familiar with the concepts, deeper analysis is needed of the methods such information is provided.

III. 2. 1. Representing the idea of Smart Vilnius to the society

When in 2012 famous visionary of smart cities- R. Beinat, after being asked what city today could be considered smart, stated that first of all there is a need of common definition, on agreement what do we call a smart city. In order to come to the common agreement, at least in the certain society, the idea of such concept should be presented and explained to the citizens, which most probably have different perception of the concept from something they have heard before. Municipalities or governmental institutions shouldn't be willing to involve citizens in the usage of technologies, their application in transport, healthcare and other sectors, also generating ideas and contributing themselves in any other ways, until the basic understanding for these citizens are formulated. And it is not only about the basic, it is also about the agreement which is common and allows to look to the same direction.

A very first time the definition of smart city was presented in 2012. At the time, smart Vilnius was mostly related with transport, therefore the visual image of Vilnius as smart city looked as in a Figure 10 below. The idea of smart city was presented as to be closely related to the transport sector.

Figure 10 The image of smart Vilnius in 2012

Source: http://m-transportas.lt/

Although today, citizens are aware that smart city is not only about transport, it also contains other spheres, such as education, healthcare, etc. Still, people are not aware of the exact information, therefore education and better communication is needed in this place. Vilnius mayor Remigijus Simasius believes in Vilnius as a potential to become smart city. He is reporting all the related news in his facebook account, where thousands of people see his information on daily basis. Even if the daily communication, kind of report of performed tasks is not quite usual for the majority of citizens, the auditorium expands every day, therefore, the audience also. This is a great example of how quickly big auditorium could be reached, therefore the sharing of information by mayor is a successful example, maybe that is why , other workers in Vilnius municipality have also followed his example.

Another way of communicating message to the wide audience is conferences, especially the ones, where many youth participates. Mayor at this point also took initiative into his hands and was participating in the conference "Switch", giving a speech, explaining the idea of smart city in general and his vision of Smart Vilnius.

Although, these initiatives seems to be only the roots of what is really needed- the access to a wider authority, the introductions about the ways people can contribute themselves into the creation of smart city. Currently, its seems that there are audiences which are wanted to be reach, although it is only a minority of the rest. In fact, these people are even more tend to be aware of a term already.

III. 2. 2. Motivation and involvement of smart citizens

Previously mentioned conference "Switch" was organized to not only invite people, providing information to its visitors, sharing knowledge and ideas about the future, the creation of it and contribution of us, governmental bodies and business representatives. Conference also invited to actively participate in the hackathon, purpose of which was to generate, polish and present ideas under the topic "Smart city". Out of 70 people, several ideas were rewarded by various corporations and are possibly to be developed soon.

This is not the only hackathon which is organized, encouraging people to involve themselves into generating the ideas about a possible development of Vilnius, as 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. Mayor of Vilnius after the last hackathon said that "We suppose that hackathon will create useful apps, which we could all use on daily basis. I think citizens of Vilnius will evaluate that in the upcoming 4 years, starting from today". Such opinion reveals some visions, seen by Remigijus Simasius, or even a vision, set by the whole municipality. In any case its seems that there is a wish to encourage people, to involve them into development of city as much as possible. 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 initiates are welcome as involves many interested participants who are usually also encouraged by some awards for the implementation of their ideas. The website http://codeforvilnius.lt/ lists ongoing and planned projects which are shared openly with a society. Certain users here can also express their opinion, contribute to the projects or suggest their own ideas. The assistant of mayor P. Poderskis, who is the biggest initiator of smart city's initiatives in Vilnius, especially in regards to the open data, in his facebook account have provided the link (https://docs.google.com/spreadsheets/d/1e__ODHSWTnAz5QZ3iGn0EBYZfsGQNCGU1H0Zxu5KJQ/edit#gid=0) where all his work tasks and projects are listed. Visitors can also comment on this activity, express a wish to contribute to some tasks or to give advises.

All the previously described projects are mostly oriented to the interested parties. The main purpose is to attract people who are motivated enough or with a very few encouragements could create the platform, mostly talking about mobile apps, who would be the platform for the further involvements of the rest of society.

One such initiative, when people, with a help of mobile application, can report the problems in the city, already exists. This app is called "Tvarkau Vilniu". Even if the app is not very functional and beneficial, its main function is quite well developed. 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. The problem is tracked and the progress of its solving could be followed in the same app. Also, anybody can see other people's reports about the problems. Despite the fact that mobile application is something what is really evolving citizens into the developing, helping the city, there are only around 2000 downloads are tracked, therefore the usage of app is even quite surprising of not being popular at all.

III. 2. 3 Open Vilnius municipality's data

Various governmental institution in the whole country are opening their data more and more. This time, the open data of Vilnius municipality will be analyzed. In the July, 2015 the mayor of Vilnius, Remigijus Simasius, in his official "Facebook" account have announced that Vilnius municipality have prepared the rules for usage of open data, provided in the official webpage of Vilnius municipality- http://www.vilnius.lt/ and is representing the open data to the society. R. Simasius added that it is not only a fashion, a wish or a present for IYT people. It is effective way, which will assure the real smart and will make it in the fastest, most innovative and economic way". Also, mayor 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. During the hackathon, 60 people were participating and 7 main ideas were raised. Winner's team created the information system- interactive map of Vilnius, representing the kinder gardens, their occupation, fee spaces and even prognosis for the future. In the Figure 11 below the realization of idea is presented. This interactive map with integrated data is provided.

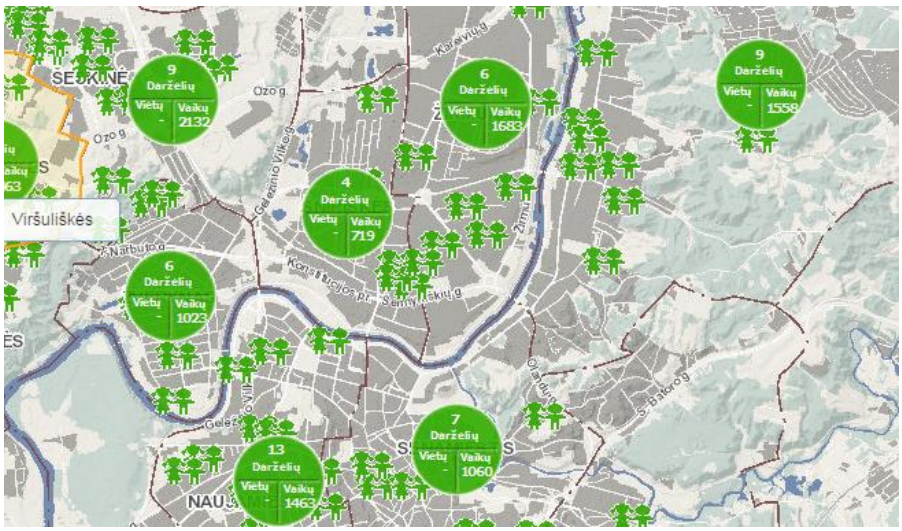


Figure 11 The interactive map of kinder garden's occupation in Vilnius

Source: made by author

Although, except the organized hackathon, there are not many information in the press or internet in regards to the release of such data, which leads to the assumptions that actually very few people and mostly the ones who have an interest in certain field, have received this message. Meanwhile, in order for information to reach other people, wider society, not much actions were taken. The open data of Vilnius municipality was presented in "Lietuvos Esri vartotojų konferencija", although the audience was almost contained with the professionals in the field, not a wide society, therefore information again remain in a closed circle of callers. In the beginning of October, 2015 one of the biggest ICT and entrepreneurship event "Switch" was organized in Vilnius. Various speakers were talking about digital future, discussing the influence of government, including the openness of data as well. Although in between 5 speakers, there was no representative form Vilnius municipality. Hundreds of young, not experienced but curious people, having load of ideas were participating in the event, although they haven't received information about the open data, provided by Vilnius municipality. On December 3rd, 2015 the forum for students and lecturers took place at "Science communication and information center". Povilas Poderskis, assistant of mayor have presented the open data of Vilnius, the current stage of it and also the plans, how to make this data more attractive. He 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, not regular citizens. In his speech, Povilas Poderskis also disclosed that the main goal at the moment is to make data more attractive- to put the statistical information into shape of maps, graphics, diagrams, therefore- to allow citizens to better understand it. Although, there were no plans exposed in regards to distribution of this information through other channels, increasing its knowledge and accessibility.

Vilnius municipality have presented 2 different pages of their open data:

1. http://gis.opendata.lt/ - this website includes geographic information systems or so called GIS data, which includes data in regards to: education, transport, environmental protection, constructions and territories, leisure. Although, website doesn't look very attractive, informative of user-friendly, also there is only a limited amount of information provided, including 5 sectors, but for example, no information about education is included.
2. https://github.com/ - in this page, various open data is provided. The site doesn't seem to be very attractive or user-friendly as well, as information is not grouped, some names are not understandable, coded, some information is partially English, partially Lithuanian, therefore it is harder to understand, especially for those who do not speak at least one of these languages. Data itself is not for everyone to understand, it rather requires at least basic understanding of concepts, data types, how they should be used and etc.

The provision of open data doesn't seem to be well developed yet, although municipality of Vilnius, besides of attempts to provide the information, also opens the meetings of Vilnius municipality council- the video records of them are available online and currently pilot live streaming are being tested in order to make these meeting available in a real time.

III. 2. 4. Results on data analysis of case study

To sum up the results which were gained by analyzing data collected by case study method, there are several observations to be excluded in regards to government's policy towards smart city's policy:

- Municipality of Vilnius do not communicate, educate or provide information to the society in regards to the concept of smart city and creation of Vilnius as such. Therefore it explains why citizens feel the lack of knowledge at this point;
- Municipality is organizing various types of events in order to attract interested parties, who would be able to create platform for the further inclusion of the rest of the society in the development of Smart Vilnius;
- Open data of Vilnius municipality currently is not user friendly and could be hardly used for a regular citizen, although it is planned to be transformed in order to become more attractive and understandable to citizens.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions are provided separately, according to the raised objectives

Theoretical part:

- There is no consensus about the concept of Smart city in between the scientists;
- Evolution of cities is estimated to expand further;
- Smart citizens and ICTs are identified to be the main elements of a Smart City;
- The interaction of main elements in the city depends on institutional factors: governance, policy and regulations;
- Privacy, unemployment and security issues are excluded as threats of Smart Cities;
- Open government data is one of the significant application of ICTs in a Smart City;
- Sharing economy is identified to be one of the systems, supposed to be applied strongly in successfully operating Smart City;
- The application of ICTs by smart citizens is an important factor determining the development of a city;
- The empowerment citizens by governmental institutions is needed in order for inhabitants to contribute themselves to the development of a Smart City;

Methodological part:

- Qualitative research methods were chosen and successfully applied for the empirical research;
- Focus group discussion allowed to reveal the posture of citizens in regards to the Smart Vilnius, their contribution to it and areas for investigation with second research;
- Case study of Vilnius, as a Smart City served as a tool to analyze the activity of municipality of Vilnius regarding to a Smart Vilnius.

Empirical part:

- The concept of smart city does not have one common definition in Vilnius and even main principles of such city are not known for the whole society;
- The is no common vision of smart Vilnius, therefore interpretations of it can be very subjective;
- Citizen's understanding about their role and their input in a smart city is interpreted differently;

- The perception of smartness in the city could be not equally perceived in different age groups, therefore separate age groups might need different information and motivation strategies in;
- The acceptance of technologies could be not equally perceived in different age groups, therefore separate age groups might need different information and motivation strategies**;**
- Citizens are mostly interested in current situation and development of transport and healthcare sectors as elements of a smart city;
- There is no common understanding about the significance of technologies' application in a smart city;
- There is a lack of information or communication about smart city and how people can contribute to the development of it;
- Not all citizens are interested in the development of the environment they live in, therefore it might require accordingly more or less efforts, depending on the personality, when trying to involve the inhabitants in the development of its city;
- Citizens have a higher motivation to be an active participants of the smart city, in case they can see the result of involvement, receive some encouragement or are suggested some remuneration for contribution;
- Open data of Vilnius municipality is not accessible and user friendly for citizens at the moment;
- The distributing factor in the willingness to try services of sharing economy is the lack of trust of such services and people;
- Interested people, having ideas are attracted to the various events, organized by Vilnius municipality in order to create platforms for integration of citizens into the development of their city Vilnius.

Recommendations:

- Clear understanding and common vision of what city is, should be set at the first place;
- Citizens need to be provided with information, how they can contribute themselves into the development of a smart city;
- Information and communication provided for citizens by Vilnius municipality in regards to the smart city as well as motivation for contribution should be differentiated according to age groups;
- The education provided for citizens by Vilnius municipality in regards to the application of ICTs in smart city should be also differentiated according to age groups;

- Transport and healthcare sectors should be prioritized while developing a smart city, as being most relevant for citizens;
- Communication message, inviting citizens to contribute themselves by using ICTs as much as they can- in personally more acceptable way should be sent by municipality;
- Citizens should be encouraged and motivated to be involved in the development of a smart city. Result of successful projects should be presented and evaluated;
- Vilnius municipality should find the ways to make the open government data more attractive and easily understandable for regular citizen. Also, it should be distributed and provided through secondary channels in addition to official websites of Vilnius municipality;
- In order for people to accept the idea of sharing economy and be more interested in trying it, the image of trust for services need to be strengthened;
- The platforms, where people can actively participate in the development of their city, such as "Tvarkau Vilnius" should be more adjusted to be more user friendly, also they should be promoted more widely, presented and promoted to citizens;

Limitations of research and directions for further analysis

The empirical research have analyzed a situation of Vilnius as smart city. Conclusions of empirical research are designed according to example of Vilnius, as well as the recommendation which are dedicated to municipalities. Conclusions and recommendation of this paperwork could be used by various municipalities of Smart Cities, or potential Smart Cities. Although, it is important to consider that different cities distinguishes because of their historical development, national policy and regulations, priorities, scale of population, culture and many other aspects. Therefore, it is important to consider such characteristics for applying recommendations to other cities. Further analysis could contain the investigation of other cities' cases.

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SUMMARY

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. 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 Information and communication technologies (herein and after referred to as "ICTs"), their successful application and the smart citizens. Nevertheless, the concentration on raising awareness of society is forgotten by local municipalities, while trying to develop smart cities.

The study aims to examine the main elements of smart city and to identify the propositions for the municipality in order to more effectively develop a smart city, within the involvement of citizens. Accordingly, objectives for master thesis are designed:

1. To evaluate the holistic view on perception of smart city's concept and to identify its essential elements by conducting theoretical analysis of scientific literature sources;
2. According to set goals for research, to select the most reasonable method and to organize the empirical research;
3. Based on data analysis of empirical research, to measure the standpoints of citizens and municipality towards Vilnius, as Smart City and to present areas for improvements.

While producing paperwork, first of all, literature resource review is done, which allows to identify areas for further research. Qualitative research methods- focus group and case study are chosen as the most reasonable research methods in field of research. Collected data from focus group allows to reveal citizen's insights in regards to Vilnius, as Smart city. Case study investigates the position of Vilnius' municipality in developing Smart Vilnius. Results of data analysis leads to the provision of guidelines, how the communication between citizens and municipality could be improved in the development of Smart Vilnius. The main recommendation contains:

- Clear understanding and common vision of what city is, should be set at the first place;
- Citizens need to be provided with information, how they can contribute themselves into the development of a smart city;
- Citizens should be encouraged to be involved in the development of a smart city.
- Transport and healthcare sectors should be prioritized while developing a smart city, as being most relevant for citizens;
- Vilnius municipality should find the ways to make the open government data more attractive
- The platforms, where people can actively participate in the development of their city, should be more adjusted to be more user friendly.

SANTRAUKA

Miestai šiais laikais ir ypač ateinančiais dešimtmečiais turi tendenciją plėstis žmonijai anksčiau neįsivaizduotais mastais. Išmanaus miesto sąvoka yra plačiai naudojama ir taip pat skirtingai suprantama, kartais net skambanti utopiškai. Dauguma mokslininkų, korporacijų ir valstybinių institucijų atstovų bei miestiečių sutinka, kad pagrindiniai Išmanaus Miesto elementai yra Infomrmacinės ir Ryšių Technologijos (čia ir toliau- "IRTs"), jų sėkmingas pritaikymas, bei išmanūs miestiečiai. Nepaisant to, kuomet savivaldybės stengiasi plėtoti išmanius miestus, sustitelkimas siekinat sustiprinti miestiečių sąmoningumą yra pamirštamas.

Mokslo tiriamasis darbas siekia ištirti pagrindinius išmanaus miesto elementus ir miesto savivaldybei pateikti pasiūlymus, kurie leistų, kartu su miestiečių pagalba, efektyviau plėtoti išmanų miestą. Atininkamai, magistro baigiamojo darbo tikslai yra:

1. Įvertinti holistinį požiūrį apie Išmanaus Miesto sąvokos supratimą ir išskirti jo pagridinius elementus, vadovaujantis teorine mokslinių literatūros šaltinių analize;
2. Remiantis nustatytais tyrimo tikslais, parinkti labiausiai tinkantį metodą ir suorangizuoti empirinį tyrimą;
3. Remiantis empirinio tyrimo duomenų analize, įvertinti miestiečių ir savivaldybės požiūrį į Vilnių, kaip išmanų miestą ir pristatyti tobulinimo sritis.

Rengiant rašto darbą, visų pirma atlikta literatūros analizė, kuri leidžia identifikuoti tolimesnės paieškos sritis. Kokybiniai tyrimo metodai- fokus grupė ir atvejo analizė pasirinkti kaip labiausiai tiriamu atveju tinkantys tyrimo metodai. Fokus grupėje surinkti duomenys leidžia atskleisti miestiečių įžvalgas, susijusias su Vilniumi, kaip išmaniu miestu. Atvejo analizė tiria Vilniaus savivaldybės poziciją plėtojant Išmanųjį Vilnių. Duomenų analizės rezultatai leidžia teikti gaires, kaip plėtojant Išmanųjį Vilnių, komunikacija tarp miestiečių ir savivaldybės galėtų būti pagerinta:

- Visų pirma, turėtų būti nustatytas aiškus sąvokos supratimas ir miesto vizija;
- Miestiečiai turi būti informuoti, kaip jie gali prisidėti prie išmanaus miesto vystymo;
- Miestiečiai turi būti skatinami įsitraukti į išmanus miesto vystymą;
- Transporto ir sveikatos apsaugos sektoriai, kaip reikšmingiausi miestiečiams, turėtų būti prioritizuoti, vystant išmanų miestą;
- Vilniaus savivaldybė turėtų rasti būdų, paversti atvirus savivaldybės duomenis patrauklesniais;
- Platformos, kur žmonės gali aktyviai įsitraukti į išmanaus miesto vystymą, turėtų būti pakeistos tam, jog taptų draugiškesnės vartotojui.

ANNEX 1 - QUESTIONS OF EMPIRICAL RESEARCH

Sveiki, tai kadangi mane pažįstate, prisistatinėti nereikia. Pasikviečiau čia Jus tam, kad užduočiau keletą klausimų, susijusių su mano magistro baigiamojo rašto darbo tema, kuri angliškai skamba taip- "An analyis of key factors in developing a smart city".

Pagrindinis tikslas yra sužinoti Jūsų nuomonę bei apskirtai, turimą supratimą ir žinias šiais klausimais, taigi neteisingų atsakymų nėra ir nežinojimas taip pat yra visiškai suprantamas. Svarbiausia yra Jūsų mintys, nuomonės, įžvalgos, idėjos, samprotavimai ir t.t.

Šios apklausos metu moderatoriumi būsiu aš, laikysimės išanksto numatytos struktūros ir pasiruoštų klausimų, tačiau esate laisvi ir daugiau padiskutuoti šia tema bei norui esant kelti ir kitus, susijusius klausimus, o aš savo ruožtu jeigu jausiu, kad krypstame nuo temos, informuosiu Jus ir atitinkamai grįšime prie pirminės struktūtos. Užtrukti turėtume ne ilgiau kaip dvi valandas. Tai jei neturite klausimų, galime pradėti.

1. Ar Jums yra pažįstama sąvoka "išmanus miestas" ir kaip tokį miestą apibūdintumėte?
2. Suprantu kad ne visiems šis terminas yra pilnai pažįstamas, tačiau visgi, dar noriu paklausti, Jūsų įsivaizdavimu, kokius veiksnius įvardintumėte, kaip būtinus sėkmingam išmanaus miesto plėtojimuisi?
3. Ačiū už Jūsų atsakymus, įdomu išgirsti įvairias mintis. Pateiksiu išmanaus miesto apibendrinimą, kurį sudariau atlikus literatūros analizę šia tema bei išnagrinėjusi, kaip kiti mokslininkai apibrėžia šią savoką. Tai išmanus miestas yra miestas, kuriame informacinės ir komunikacinės technologijos (čia ir toliau "IRT") yra pasitelkiamos siekiant sukurti tvarią aplinką, t.y. įskaitant sveikatos apsaugos, viešojo saugumo, transporto, nekilnojamojo turto, miesto administravimo, švietimo ir kitus sektorius. Be kita ko, išmaniame mieste suinteresuotos šalys, miesto valdžia, aukštojo mokslo įstaigos, bei miestiečiai bendradarbiauja kartu siekdami efektyvios miesto plėtros. Išmaniame mieste yra svarbu, kad IRT suteiktų galimybę miestiečiams išreikšti savo poreikius ir kitavertus, kad IRT būtų priimtos ir naudojamos siekiant pagerinti paslaugų kokybę ir stiprinti miesto darną.

   Tai sekantis klausimas būtų- kaip manote, ar Vilnius šiuo metu gali būti vadinamas išmaniu miestu?
4. Kokį numatote Vilniaus, kaip išmanaus miesto potencialą?
5. Ar esate susidūrę ar naudoję Vilniaus savivaldybės teikiamus atvirus duomenis ir jei taip, kokie Jūsų įspūdžiai?

6. Kaip manote, ar prisidedate prie Vilniaus, kaip išmanaus miesto kūrimo ir jei taip, kokiu būdu?

7. Ko trūksta, kad įsitrauktumėte (labiau) į Vilniaus, kaip išmanau miesto kūrimą?

8. Ar manote, jog Jums yra suteikiama pakankamai galimybių įsitraukti į Vilniaus, kaip išmanaus miesto kūrimą?

9. Kiek laiko gyvenate Vilniuje?

10. Į lentelėje pateiktus klausimus, prašome atsakyti TAIP arba NE:

	Uber	AirBnB	CityBee	Dropbike	Dalinuosi.lt	Oranžiniai dviračiai
Ar Jums pažįstamos šios įmonės/pasalugos?						
Ar esate naudojęsi šiomis paslaugomis Lietuvoje?						
Ar planuojate ateityje pasinaudoti šiomis paslaugomis ateityje? (galioja paslaugoms, kurios Jums yra žinomos)						
Ar Jūsų įspūdžiai, (galioja paslaugoms, kuriomis naudojotės) yra teigiami?						
Ar rekomenduotumėte, arba esate rekomendavę šias paslaugas (galioja toms, kuriomis naudojotės) savo artimiesiems?						