HUMAN LIMITATIONS TO INTRODUCTION OF SMART CITIES: COMPARATIVE ANALYSIS FROM TWO CEE CITIES*

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Abstract

Smart cities are a modern administrative/developmental concept that tries to combine the development of urban areas with a higher level of citizens' participation. However, there is a lack of understanding of the concept's potential, due possibly to an unwillingness to accept a new form of relationship with the citizens. In this article, the willingness to introduce the elements of smart cities into two Central and Eastern European cities is tested. The results show that people are reluctant to use technology above the level of their needs and show little interest in participating in matters of governance, which prevents smart cities from developing in reality.

Keywords: Slovenia, Slovakia, smart cities, privacy issues, participation.

1. Introduction

Smart cities are one vision of the technological future of the information society that is emerging in different countries. The main features of smart cities are management and governance with real-time monitoring of different infrastructural parameters. An overview of existing literature shows a general technical and administrative excitement at the possibility of easier infrastructure management which reduces management costs while also providing the possibility for citizens to get involved in improving the wellbeing of their local community (e.g. Smith, 2012). Furthermore, smart cities aim at improving their competitiveness and their position in comparison with other cities (Begg, 1999). From this perspective, the smart city concept belongs to one of the newest socio-economic concepts. Most of the debate on smart cities focuses on technology and administration. There are, however, some authors who are trying to understand and clarify the relationship between the possibilities for introducing such ICT-driven changes and citizens' interest or willingness to accept such concepts in practice.

In this article, in the first part we define smart cities and analyze the concept, which is an important administrative innovation, but one that has so far demonstrated only a limited ability to improve citizens' lives in the real world of administration in Central and Eastern European (CEE) countries. In the second part, we explain our methodological approach and the sample we have used. The third part presents the empirical results of the survey we have conducted, which are then discussed in the context of our theoretical framework. Based on this, the last part concludes with some general observations and recommendations.

1.1. The development of the concept of the smart city

Although the term smart city has become a buzzword in the last decade (for multiple definitions see Mundula and Auci, 2013), its definition is still unclear. The concept is difficult to define (Odendaal, 2003) and the term is used inconsistently in the relevant literature (Tranos and Gertner, 2012). There are several other terms that are often used, such as digital cities, intelligent cities and knowledge-based cities, and therefore some authors – e.g. Schaffers *et al.* (2011) – speak about the existence of conceptual confusion in regard to the smart city concept. Usually, as stated by Alawadhi *et al.* (2012) or Shapiro (2006), smart cities are defined in terms of the outcomes of the smart city concept: smart cities are more efficient, sustainable and pleasanter to live in. For instance, Washburn *et al.* (2010) define the smart city as one that uses smart computing technologies to manage its critical infrastructure and services, which include city administration, education, healthcare, public safety, real estate, transportation and utilities, in a way that is more intelligent, interconnected and efficient.

The smart city concept understands ICTs in a very broad sense. This means that the utilization of smart technologies may vary very much, from intelligent energy technologies (see for example Yamagata and Seya, 2013), through intelligent traffic regulation to intelligent security systems. In other words, the use of ICTs is a core

feature of the smart city concept (Fusco, Lombardi and Nijkamp, 2009; Lee, Phaal and Lee, 2013; Walravens, 2012). The stress on the use of the ICTs takes us, however, to the concept of e-governance, which is defined, for instance by the World Bank, as the use by government agencies of information technologies that have the ability to transform relationships with citizens, businesses and other arms of government (Steins, 2002, p. 18). Intelligence linked to smart cities is considered to be the inner quality of any territory, place, city or region where innovation processes are facilitated by ICTs. What varies is the degree of intelligence, which depends on the personnel, the system of cooperation, and the digital infrastructure and tools that a community offers to its residents (Komninos, 2002). The smart city concept implies that a city has the ambition of improving its economic, social and environmental standards, and consequently also its competitiveness compared to other cities (Giffinger *et al.*, 2007; Giffinger, Haindlmaier and Kramar, 2010). This leads us to the definition of smart cities, as presented by Caragliu, Del Bo and Nijkamp (2009), where every city that has the ambition to be considered a smart city must invest in both human and social capital (see also O'Connell, 2008), and in both traditional and modern infrastructure, as these are the driving forces of sustainable economic development. On the other hand, Hollands (2008) is far more critical of the concept. Among the main criticisms are the inability to define what 'smart' means, the self-importance of 'smart cities' (referred to as a 'market based self-advertisement without substance'), and the unsubstantiated belief that technology will transform the behavior within a city.

Despite the fact that there has already been some academic research of the smart city concept (e.g. Meijer and Rodríguez Bolívar, 2013), if we look at the CEE countries, we find a lack of systematic research in this field, despite some earlier surveys (e.g. Ifinedo and Davidrajuh, 2005; Giffinger *et al*., 2007; Roztocki and Weistroffer, 2008). However, although the concept and related issues have not been the subject of extensive scholarly analysis, they have moved well beyond mere theory into experimentation in practice and full implementation by city governments (Linders, 2012, p. 446). Hollands (2008) refers to the list of cities proclaiming themselves as smart, e.g. San Diego, Ottawa, Amsterdam, Manchester, Edinburgh. The European Commission also discussed smart cities in the EU 2020 Strategy (EC, 2010) and presented its own communication on 'Smart Cities and Communities – European Innovation Partnership' in July 2012 (EC(2012) 4701). According to this document, the smart cities and communities concept is trying to promote 'progress in areas where energy production, distribution and use; mobility and transport; and information and communication technologies (ICT) are intimately linked and offer new interdisciplinary opportunities to improve services while reducing energy and resource consumption and greenhouse gas and other polluting emissions'.

Most research and literature is imbued with a general optimism about the use of technology and how new technologies bring new opportunities. However, almost no attention is paid to how citizens perceive smart cities and whether they are an option

they are willing to implement. Our research tries to address this gap in the literature. It investigates the potential for implementing smart cities by using two case studies from CEE countries. Since smart cities are a rather new and unknown concept for the general population (even if the term is sometimes used), we examined whether people would accept the possibility that their lives could be improved by the use of technologies. This is especially important in cases where the participation of local residents is expected to enable the potential of certain technologies to be used in full. However, various authors (Bannister and Connolli, 2012; Ostling, 2010; Davies, 2009) have realized that ICT-supported participation does not provide any significant improvement in residents' engagement with public affairs.

Giffinger *et al.* (2007) define 'smart people' as one of six sets of 'smart' characteristics that are a precondition for the introduction of smart cities. The characteristics of 'smart people' are the level of qualifications, affinity to life-long learning, social and ethnic plurality, flexibility, creativity, cosmopolitanism/open-mindedness and participation in public life. Even when these elements are present, they show that human and social capital can jeopardize the project of smart city development.

1.2. Smart cities as perceived by their residents

Smart cities can be understood as enabling individuals to indicate which of their needs are not met, to report their needs and to have a reasonable expectation that local authorities will help them satisfy their needs. This was observed in the case of Singapore by the end of the last century (see Mahizhnan, 1999). Such an approach supports the general idea of participatory governance as part of today's mainstream politics (e.g. Linders, 2012). Since modern public sector resources and capacities are inadequate for the scale of public needs, solutions also need to mobilize the efforts of the business and associational sectors (Lovan, Murray and Shaffer, 2005). In other words, this means the empowerment of residents to do what they need, within the general limits of acceptable behavior. However, public participation is far from being a cure-all tool. In recent years, some authors, such as Mosse (2001), Cleaver (2001) or Beall and Hall (2005), have pointed out that there are some shortcomings which make the outcomes of public participation very relative. On the one hand, the state has expanded its activities into too many fields. The fact that both resources and government efficiency are insufficient should lead us to reflect on how governments could carry out their functions more effectively. Government failures are also frequently linked to the fact that sub-optimal results serve the interests of certain politicians and government officials (Mitlin and Satterthwaite, 2004; Coursey and Norris, 2008; Paulin, 2013). A new allocation of competences between government and society is needed in order to give citizens more responsibilities and possibilities to act on their own. There is a need for more opportunities to develop citizens' initiatives (Schultz, 2001). Although the combination of allowing more participation and less state influence appears ideal, in practice what happens is often the exact opposite. New technologies that are supposed to empower citizens, in fact enable the authorities to manipulate

citizens according to their own ideas of how the territory should be run (e.g. Pan *et al.*, 2013).

Information and communication technologies enable the authorities at any level to create the illusion of participation (by allowing citizens to contact authorities in a 'harmless' way) and, at the same time, to develop their own understanding of the 'right' public goods. Information and communication technologies give citizens a voice long before they feel the need to take to the streets and demonstrate for their rights. Various authors (e.g. Bannister and Connolli, 2012; Ostling, 2010; Davies, 2009) have already observed that e-participation was a general failure in the sense of its definition, and this corresponds with the previous observation about general political participation. Technologies reduce public pressure on politicians to a tolerable level. At the same time, technologies enable the authorities to track citizens' feelings (by following the information they provide) and to react when needed in order to prolong the period of social peace (e.g. Ostling, 2010; Pan *et al.*, 2013; Rebollo-Monedero *et al.*, 2014).

The third generation of Internet is usually considered the 'Internet of things', and it is a relatively recent concept in the development of the technological society, where technologies are meant to ease life and improve its quality (Mahizhnan, 1999). However, even an IT specialist dealing with smart cities, Robinson (2013), agrees that the Maslow (1954) hierarchy of needs can be used as an appropriate basis for understanding the quality of life. In this sense, all our needs are shaped in a pyramid where each higher need is a characteristic of fewer people. Smart cities as a social manifestation of the technical development of urban areas would mainly influence two different types of human needs according to the Maslow hierarchy (1954): security and self-actualization.

The security aspect is strongly connected to surveillance, and technologies can only increase the feeling of security if the major forms of undesirable behavior defined are reduced: crime (thefts, murders, etc.) as well as delinquency (urinating in public, alcohol abuse in public spaces, etc.). Quality of life in the sense of greater security will increase as long as citizens feel more secure than controlled. When people feel they are under a 24/7 surveillance with no privacy, they would probably start to complain about too much surveillance and a consequent decline in the quality of their lives[1]. This will happen even faster if citizens do not notice any change in their personal security (Leman-Langlois, 2008).

According to Maslow's hierarchy of needs (1954), self-actualization in smart cities can be seen as the empowerment of citizens who are willing to participate (security does not necessary demand active participation, even if it helps prevent crime.)

1 Interestingly, there is a very limited amount of scientific literature (e.g. Bennet, 2009; Weber, 2015) questioning trust in government in relation to the (mis)use of the newly available data for purposes other than those intended.

Therefore, local authorities provide residents with opportunities to improve their local environment by suggesting various activities, actions or changes that should be carried out by the authorities or the community itself (see Kim and Lee, 2012; Linders, 2012). For participating individuals, quality of life could increase when their suggestions are not only taken into consideration, but are also accepted and implemented (for instance, suggestions about new street lighting, improving or revitalizing a park). If their ideas are not even discussed and are rejected without careful consideration, or if all suggestions are rejected, then individuals will perceive such behavior as a waste of time (see Mahrer and Krimmer, 2005; Islam, 2008). In the sense of their need for self-actualization, their quality of life might decline. For example, if someone reports a garbage problem twice and it still exists after a certain period of time, then their perception would be that nobody cared, and they could even feel silly for having bothered with 'other people's problems' (e.g. Ostling, 2010). In many cases, positive acceptance of someone's need for self-actualization by the authorities will produce a positive effect on the quality of life even of those who do not participate. For example, when people are happy that their ideas about a new public park have been accepted, everybody else is also able to enjoy the benefits of the new park.

It appears that smart cities, as inbuilt technology in urban areas, can increase citizens' quality of life if the authorities are willing to use technology for the general benefit and with no hidden agenda.

The smart city concept is new in the CEE region, and its roots can be found in the e-government concept. But despite the longer history of the e-government concept and its implementation in the CEE countries, empirical studies (e.g. Azad *et al.*, 2010; Singh, Das and Joseph, 2007) show that CEE countries also lag behind Western European countries with respect to the development and use of e-government facilities (Ifinedo and Singh, 2011). At the same time, different measures, including the introduction of smart cities, demand a relatively high level of municipal autonomy if they are going to be put into action effectively.

From the perspective of the CEE countries, one can argue that smart cities are a technologically possible future that will be blocked mainly by the administration's inability to accept and use technology to the fullest.

2. Methodology

Based on the previous arguments, we can formulate two hypotheses that will be tested:

1. Citizens are in general not using all the potential that is offered by modern ICT.
2. There is still a gap in how people perceive the role of technology which prevents them from using the possibilities that enable smart cities to become a valuable service for all inhabitants.

In order to test these hypotheses we used an opinion poll in two medium-sized CEE cities in Slovakia (Košice) and Slovenia (Maribor). At the same time, they are

the second biggest cities in their respective countries (both with urban population between 100,000 and 250,000 citizens)[2] and they share some historical similarities as well. An opinion poll was carried out with 150 randomly selected people on the streets of the city centers. The questionnaire was composed of 25 questions, including basic demographics (age, sex, education, occupation and relationship to the city conducting survey). The survey covered the use of different e-tools from the general (internet, e-mail) to the specific (e-banking, e-government), the use of mobile services, contact between the respondents and administrative institutions (if and how they establish the contact with their local administration), the attitude of respondents to e-privacy (with questions asking to whom and how they are willing to send personal data, and who has the right to request and to get personal data), and e-surveillance (whether anyone has right to conduct surveillance of their activities, and if so, who).

The statistical data were analyzed with an SPSS programme in order to calculate possible correlations among the indicators and connect them to demographic data when appropriate. All questions in the opinion polls were standardized and thus comparable on an international level.

2.1. Characteristics of the samples

Random sampling in the streets of Košice and Maribor has given us comparable samples. A general characteristic is that in both cities analyzed, more than 50% of people interviewed come from the respective city. Concerning sex distribution, in both Košice and Maribor the sample was approximately representative (53.7% male and 51.7% female respondents respectively). The age structure was most representative in Maribor, with a majority of the respondents between 31-60 years of age (69.1%), while in Košice the sample was almost equally distributed among all four age groups in quarters (under 30, 31-45, 46-60, and 60+). Most of the respondents in Košice (more than 54%) have secondary education, while in Maribor there is approximately the same share of those with secondary and those with tertiary education (37-38%).

In Maribor, the respondents were office workers (18.8%), unemployed (18.1%), manual workers (16.8%), pensioners (16.1%) and civil servants (12.1%). In Košice, there is the same share of students and pensioners (24.2% each), 15.4% of manual workers, 10.7% of civil servants and 10.1% office workers. Other categories of 'occupation' in the individual countries are represented by shares smaller than 10 per cent. According to our survey, in Maribor 59.7% of daily respondents are internet users and in Košice 52.3%.

2 Each technology has its ideal size for use and also smart cities request critical population, willing to participate in providing an adequate information input. In this manner, smaller towns or bigger cities are less appropriate for introduction of smart cities technologies, because its costs will be higher than the expected benefits.

3. Empirical results: Public perceptions of technology, trust and surveillance

In the first part of our research we wanted to find out how residents in the selected Central and Eastern European cities use technology. Even if we accept the premise that the two countries have modern, information-based societies, there are still questions about how information and communication technologies are used in reality, which are important for assessing their potential for successfully introducing smart cities. In Maribor, there is a statistically significant connection between the use of the internet and e-mail and age, education and employment. Both e-government and e-banking are strongly connected with employment: in both cases, the Pearson correlation coefficient is between 0.35 and 0.6 with the correlation significant at the 0.01 level. On the other hand, when it comes to multi-tasking use of mobile phones, there is only such a significant correlation in the case of age. Other correlations, although significant, are weaker. In general, we can say that younger and better educated people who have better jobs will use the internet for more diverse purposes. In the case of mobile phones, younger people are more likely use them for different purposes. In Košice, one can see the strongest connection between demographics and the use of the internet and mobile phones as key technologies. In all following cases, the Pearson correlation coefficient is between 0.35 and 0.7 with significant correlation at the 0.01 level. The internet, e-mail and e-banking are more likely to be used by younger and better educated people. At the same time, younger people are statistically more likely to use their mobile phones for texting, internet browsing, e-mail communication and for games. It appears that a digital divide (predominantly based on age) still exists. In these cases, the Pearson correlation coefficient is between 0.35 and 0.7 with significant correlation at the 0.01 level.

In general, the internet is used daily in both cities (between 50 and 60% of respondents). The use of e-mail is widespread and ranges from 39.6% in Košice to 54.3% in Maribor. In Maribor and Košice a majority of the respondents never use e-banking (37.8% and 40.3% respectively). Similar relationships can be observed in the case of the e-government: in both Maribor and Košice many respondents state that they do not know what e-government is.

Concerning the use of the mobile phone, almost all respondents use it for calling and texting. When it comes to using mobile phones for other activities such as internet browsing, e-mail, mobile banking or administrative purposes, the share in both cities is lower than 30%. In both cities, between 30-40% of respondents use the mobile phone for fun.

From this perspective, one can argue that citizens are not interested in using modern technologies for more demanding tasks, which includes participation in the development of smart cities.

At the same time, trust in technology is important for smart cities. It is a matter of trust that each of the stakeholders involved will behave according to the rules and expectations, based on the legal and legitimate postulates of privacy, anonymity and ethical behavior. Based on the Weberian types of authority, trust has three different

aspects. It can be traditional (e.g. family), charismatic (e.g. friends) or granted by law (e.g. institutions) (Weber, reprinted in Etzioni, 1969). In this case we did not question trust in family, but in friends and different institutions. Respondents were asked how they felt about sending private data to authorities, then how they sent sensitive data, and to whom they would send such data using information and communication technologies.

The respondents in Maribor (60.8%) and in Košice (69.8%) are concerned about privacy in the sense that they want to know how their personal data will be used by local authorities if it is requested (Table 1).

Table 1: Attitudes towards the handling of personal data by local authorities

	Slovenia	Slovakia	Average
Want to know	60.8%	69.8%	65.3%
Care	27.7%	9.4%	18.5%
Ignore	10.8%	20.8%	15.8%

Source: own research

In Maribor, the respondents have no problem with sending private information via mobile (60.7% already did so) while in Košice most of the respondents used e-mail for sending private information (43%). It appears that despite the high level of concern about the protection of privacy by local authorities, the respondents in Maribor and Košice often endanger their privacy by using insecure communication. The respondents in Maribor most often send sensitive data to their friends (which shows a high level of interpersonal trust, but could also, in some cases, be considered irresponsible), while the inhabitants of Košice do so in the case of local authorities (62.4%).

Personally sensitive information is often sent to banks in Košice (60.4%). In this case, personal data are also relatively often sent to people who are 'able to prove they are have a right to receive some information' (45.6%). Surprisingly, in Maribor, a relatively high number of respondents also send personal data to people who claim that they have the right to know (25%), while in the case of Košice respondents are much more careful (5.4%t) (Table 2).

Table 2: Sending personal data to someone who claims they have the right to know

	Slovenia	Slovakia	Average
No	75%	94.6%	84.8%
Yes	25%	5.4%	15.2%

Source: own research

Surveillance/tracking is one of the main elements needed for smart cities to work in practice. We measured two components of surveillance. One is awareness of the possibility of surveillance and the second is the attitude towards surveillance.

Awareness of the possibility of surveillance can be measured via simple statistics about a few basic issues that are connected to the use of new information and communication technologies. We asked the respondents about their opinion on the following statements: all information activities can be tracked; a computer can be monitored when it is connected to the internet; and a computer from which e-mails are sent can be tracked; (all statements are correct, although the tracking would be illegal). Then they were asked whether their mobile phone can be located when it is switched on, switched off, and when the battery is removed; (it is technically impossible to track the mobile phone only when the battery is removed). This is especially important due to the fact that smart cities technologies use different devices that have to carry out some kind of tracking so that individuals' privacy can be jeopardized.

There are no significant differences in the sex, age or education of people who recognize different security and privacy risks in Maribor and Košice (although in Maribor there are some weak correlations showing that the older generation more often realizes that a mobile phone is still traceable when switched off. However, these differences are unlikely to be connected to age as an independent factor (in both cases Cramer's V or Phi is less than 0.3).

For additional comparison, we took the information on the frequency of internet use and correlated it to different types of surveillance. From the collected data it is not possible to prove any statistically significant correlation for either of the cities. Therefore we cannot really say that using the basic technology needed for smart cities' development increases the level of knowledge about it, or at least the awareness of its pitfalls.

The attitude towards surveillance was measured by interconnected questions, and respondents were asked to clarify who was responsible for providing data to local authorities, if local authorities had the right to carry out surveillance of the population, and if authorities needed to do so. On the international level, there is a strong positive correlation (Pearson's correlation coefficient = 0.713 with statistical significance at 0.01 level) between the right and the need for surveillance by local authorities, and a modest correlation between the right of surveillance and the need to provide data to local authorities (Pearson's correlation coefficient = 0.421 with statistical significance at 0.01 level). On this base, one can argue that people who agree that local authorities have the right to conduct surveillance of all citizens are much more likely also to agree with 'the fact' that authorities need to do so. At the same time, many of these people also agree that residents should inform the authorities of their own accord about all changes in relevant data. On the other hand, people who think that local authorities have no right to conduct surveillance of citizens are also most likely to see no need for surveillance and in many cases they will oppose the idea that local authorities should be informed of various changes of citizens' personal details (it is assumed that such changes are important for authorities, e.g. a change of address).

In Maribor, most of the respondents believe that data should be provided to authorities on request (59.1%), while in Košice most of the respondents believe that data should normally be reported to authorities (51.7%) (Table 3).

Table 3: Need for reporting personal data changes to authorities

	Slovenia	Slovakia	Average
Always provide data	13.4%	52.0%	32.7%
Provide data on request	59.1%	33.1%	46.1%
Not needed	27.5%	14.9%	21.2%

Source: own research

In Maribor, 49.7% of the respondents believe that municipalities have the right to check up on only (undefined) suspicious activities (49.7%). In Košice even more respondents believe this (63.1%). In Maribor, 49.7% of the respondents believe that there is need to check up on suspicious activities, while in Košice 71.1% of the respondents do. Most of the other respondents oppose any right or need for surveillance (Table 4, Table 5).

Table 4: Authorities' right to carry out surveillance

	Slovenia	Slovakia	Average
Right to conduct surveillance	14.8%	10.1%	12.45%
Right to check up on suspicious activities	49.7%	63.5%	56.6%
No right to conduct surveillance	35.6%	26.4%	31.0%

Source: own research

Table 5: Authorities' need to conduct surveillance

	Slovenia	Slovakia	Average
Need to track everything	13.4%	2.7%	8.05%
Need to track suspicious activities	49.7%	71.6%	60.65%
Surveillance forbidden	36.9%	25.7%	31.3%

Source: own research

There is no statically significant relationship between the sex of respondents and their attitude towards surveillance in either of the countries analyzed. In both cases, both men and women responded equally when asked about surveillance by local authorities.

In both Maribor and Košice, there was no statistically significant relationship between the age of respondents and their acceptance of the need for surveillance. In Maribor, there is no statistically significant connection between education and attitudes to surveillance, while it seems that in Košice education strongly influences attitudes (compared to Maribor: Cramer's V is still between 0.33 and 0.25 with approx. sig. between 0.046 and 0.002). The data show that respondents with lower levels of education are the most likely to reject surveillance. No statistically significant correlation between respondents' occupations and their attitude to surveillance by local authorities can be observed.

In this sense we cannot argue that there is any obvious concern about surveillance in either of the cities analyzed. Most of the respondents believe that a certain level of surveillance is appropriate, especially if something is marked as suspicious behavior.

The survey results mainly show a general indifference towards the use and potential use of technology. The respondents in both cities generally showed no statistically significant interest in one of the most important premises of smart cities – surveillance. They feel satisfied with a certain level of checks without any special questioning of what this means for them. At the same time, they show a strong ignorance about the management of their personal data, which gives us the feeling that the local authorities in the cities analyzed could use technologies in any way they want as long as they do not limit citizens in their daily behavior or as long as they do not request any active response from them.

From the perspective of gathered data, one can assume that citizens in both cities are not using all the potential of the new technologies; especially for the services of e-banking and e-government (despite some demographic related differences). This way we can validate our first hypothesis. Based on this, we can also support our second hypothesis on the gap between possible and actual use of technologies for common benefits of the society. However, we need to point out that the reason for non-use of the technologies for advanced purposes does not rest on the presumable lack of trust in e-government, but mainly in the ignorance of the available possibilities.

4. Discussion

As we stated in the introduction, it is important to understand citizens' perceptions of the concept of smart cities and the prospect of introducing them. As we stated in the theoretical part of the article, there are plenty of different definitions of smart cities, from very technical ones to very daring ones that state that 'smart people' are one of the elements of smart cities. This produces confusion about what smart cities should really be, but as we stated in the second part of the theoretical background, the main feature of smart cities is that they should improve citizens' lives and consequently the concept has only limited value if it is not able to contribute to this. Based on other research we took the position that in CEE countries there are often gaps in the innovative use of technology. This was later also confirmed by the empirical data, which showed that people in two CEE countries would only use ICT to a limited extent and that they are not aware of possibilities offered by ICT and accompanying concepts.

This raises the question of how likely it is that smart cities could be successfully introduced in the form of ICT tools supporting the needs of local communities. Based on the survey, citizens show little general concern about surveillance by the authorities, and are also willing to cooperate in administrative procedures when initiated by the authorities although they obviously lack a real understanding of concepts such as e-government, so one can therefore argue that the authorities should pay attention to two basic activities: 1) the development of simple services which are available through the use of the ICT, and 2) the active promotion of them by providing additional incentives for their use. Even if this looks simple it has budgetary consequences since active promotion adds extra costs to the project. There is consequently an unanswered question about whether such projects are justified in localities where the

local administration has problems with performing basic tasks like the maintenance of local infrastructure and basic services, as it is the case in many CEE cities.

Despite this, it is obvious that the digital divide still exists, especially in the sense of understanding and exploiting the potential of technology. This prevents people from using technologies in a smart city. Consequently, one of the crucial components of the smart cities' concept – human resources – is jeopardized. This corresponds with research by Giffinger *et al.* (2007) and their definition of 'smart people'. Our research has shown that people in two CEE cities do not fully comprehend what can be considered 'smart' use of ICT, and one can expect that smart cities will also be a political project that does not enjoy the general participation of citizens. Similarly, our research supports the thesis of Ifinedo and Singh (2011) that people in the CEE area are not at the level of 'maturity' to use technology to support the development of opportunities offered by e-government tools.

Based on the data, particular communities should, before developing a smart city, get informed about what citizens need and how they use technology. They need to start from the basics, including complete provision of free Wi-Fi coverage. This would enable better access and increase the use of ICT devices for secondary purposes, including feeding information into the smart cities systems.

This research opens a few possible directions for further investigation. If we consider our findings valid for the countries as a whole, then we need to investigate people's use of technology, how they participate and what they would consider worth doing and when. From this perspective, the so-called we-government is lacking the main component, and even if it is theoretically solid (see Linders, 2012), it is not taking into account that participation is a crucial issue. It seems that in times of economic crisis people are more concerned about maintaining their standard of living than about political participation. A second area worthy of further research is that all big concepts such as e-democracy, public participation, participatory democracy are something that should be defined by citizens and not by governments or research institutions. Lack of any strong and significant results shows that definitions created top-down can leave out the reality in the streets.

5. Concluding remarks

Smart cities may be the future for the development of local areas and enable the introduction of more flexible management in certain urban areas, where and when the automation of administration processes is possible and where it is appropriate and desirable to update information more speedily, and where authorities are not able to monitor all their activities. It would enable a faster response to a number of different issues.

However, our research showed certain issues that need to be addressed before we can conclude that smart cities are a new 'e-democracy' story of citizens' empowerment. Empirical data from two post-Communist cities show that citizens are not fully aware either of the potential of ICT or of the threats to their privacy when they try to

help improve their environment. They are also not yet using ICT at an optimal level. We are able to confirm the hypothesis that citizens are not using the full potential of ICT since a majority of respondents do not use ICT in a way that indicates their potential for use in the development of smart cities. Also the second hypothesis about the gap in the perception of use of ICT can be confirmed in the sense that people refuse to use ICT for administrative communication. Moreover, the data show that there is a strong statistical correlation between education, occupation and age and the use of ICT, which indicates that the digital divide is still present to a significant extent. Here one should be aware of the limitations of the research due to the small number of the cities included into the survey, which limits the value of the data. It is more of a preliminary case study, and further research is necessary before we can be confident in presenting general conclusions.

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