

Adaptation of smart city model(s) in rural environment

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Abstract

Although the literature of smart cities is very rich and broad, the possibility and usefulness of the application of information and communication technologies in rural areas and villages is barely researched area. The objective of our paper is to sum up the main findings of smart city approach and give a review of the notion, measurement and pitfalls of it. We would like to present how the original smart city approach has to be changed to rural communities, and what can we learn from earlier researches to avoid the so-called “ICT-hype” and focus on the problems that villages face in the first place. In the second part we will review what smart villages, smart rural development are, and how the thinking on the effects of ICT on spatiality and the role of distance has changed in the previous decades. Finally, we will present the findings of a smart rural research in Hungary. We used online surveys among mayors and notaries and semi-structured interviews in selected settlements as a methodology for research. The main value of the paper is that it is addressing what smartness means in a disadvantaged rural area. Our final conclusion is that it is possible to create smart communities in smaller territorial scales, but we also think that in this context the term ‘smart’ does not need to imply high-tech projects, or the projects that concentrate on innovative, infrastructural developments, or the project that addresses only the needs specific to advanced rural areas. Smart village is an approach to rural development where central role is played by the local community and its actions. Local governments that meet the basic needs of the local community and consider the needs of various stakeholders not only fulfil their mandated mission but also build trust and help release the creative potential of the local community.

Keywords: smart villages, disadvantageous area, rural development.

1. Introduction

The smart city concept is one of the most popular terms nowadays in urban development. Despite the widespread usage of the expression, there is no uniform, accepted definition of what a smart city means. The content of the concept largely depends on the context in which the concept was used and the background of the different stakeholders using the term.

Although the literature of smart cities is very rich and broad [1] the possibility and usefulness of the application of information and communication technologies in rural areas and villages is barely researched area, in spite of the fact that rural areas are facing challenges that can be answered using appropriate innovative solutions. As the process of depopulation of rural areas progresses, so is the heritage inherent in villages vanishing. At the same time risks, threats, and new challenges arise. These challenges are including rural shrinkage, depopulation, outmigration, aging population, lack of appropriate infrastructure (roads, electric grids, schools, health care, affordable groceries), lack of capability to attract newcomers, lack of skills to create liveable community, keeping youth in the settlements.

The concept of smart village made its inroad into the policymaking and academic debates nearly simultaneously. On the policymaking front, the European

Commission has been the champion of ‘smart villages,’ as reflected in Cork 2.0 Declaration of 2016 [2].

The aim of our study is to present how smart city approaches can be applied in rural areas, how the model can be applied to smaller settlements and communities, and what are the advantages and disadvantages of technology (ICT) in these areas, what challenges and opportunities the smart approach offers in this environment.

In the first part of the paper we will sum up the main findings of smart city approach and give a review. We would like to present how the original smart city approach has to be changed to rural communities, and what can we learn from earlier researches to avoid the so-called “ICT-hype” and focus on the problems that villages face in the first place. In the second part we will review what smart villages, smart rural development are and how the thinking on the effects of ICT on spatiality and the role of distance has changed in the previous decades. Then we will present the findings of a smart rural research in Hungary.

2. Lessons to be driven from smart city approach

The theoretical thinking on information society come to the fore at the beginning of the 1990s, although the concept of information society itself was controversial [3]. In spite of its controversiality, the notion was ubiquitously used not only in academic but in public life as well. Other concepts connected to the phenomena of information society were known earlier as post-industrial society [4] or post-capitalist society [5].

In the European Union it was the Bangemann report in 1994 which made information and communication technologies and information society an official union policy. At the beginning of this new era mainly the economic and infrastructural aspects of information society were emphasised. As a consequence of the Bangemann report new information society strategies were born affecting different spatial levels. Since 2010, cities all over the world have taken up smart city strategies to promote governance opportunities for cities [6]. The phrase of smart city is not new. It may have origins in the 80s and 90s, when a new way of thinking about examining the role of new technologies in the operation, structure and planning of cities emerged. The theory of information society was formed, with the availability, presence and quality of information and communication technologies (ICTs) in the centre of it.

It is obvious that smart city concept is closely linked to the use of information and communication technologies, to spread of digitization and to the Internet. In this sense, it has a numerous conceptual antecedent, in many cases used in parallel or even synonymously with other concepts such as the digital city, the smart city,

which were widely used as early as the 1990s, and there are “peer” concepts such as information city, innovative city, virtual, city, eco city, green city, sustainable city. According to Harrison and Donnelly (2011), the concept of the smart city itself began to spread in the late 1990s, as a result of studies on smart growth. One of the most influencing term in academic field can be found at Giffinger et al. (2007): “A Smart City is a city well performing in a forward-looking way in six characteristics (economy, mobility, governance, environment, people, living). It is built on the “smart” combination of endowments and activities of self-decisive, independent and aware citizens.” In our opinion, Caragliu, Del Bo, and Nijkamp [7] provide the most comprehensive definition of smart cities: a city is smart, “when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory government.”

To sum up, the smart city is constantly evolving, improving social, economic and environmental sustainability, responding to challenges such as climate change, political and economic instability, improving its relationship with society, using collaborative and participatory management methods, information and communication technologies and the data they collect and process in a way that provides a better service and standard of living for those living in the city, while respecting the needs of the present and future generations and not destroying the natural environment.

In the last 20 years city rankings become very important tools in evaluating competitiveness, development, attractiveness of city regions. In these comparative analysis cities are evaluated and ranked according to their different economic, social and geographical parameters, not least in order to determine “leaders” and those, lagging behind, performing better and least settlements. The city rankings and lists were used by the cities as well, to elaborate development priorities and to improve the prestige and image of the settlements.

Using indicators is a comparative analysis, where cities are evaluated and ranked according to their different economic, social and geographical parameters, not least in order to determine “leaders” and those, lagging behind, performing better and least settlements. The city rankings and lists were used by the cities as well, to elaborate development priorities and to improve the prestige and image of the settlements. Indicators and indexes are useful tools of preparation of location choices for enterprises or investments. They are also aiming at positioning cities according to their competitiveness, strength and weaknesses. Indicators are helping to elaborate strategic priorities and development possibilities. There are many advantages of using indicators and indexes for the evaluation of city smartness. City

rankings attract lot of attention in both scientific and public life. They generate discussion and debate on smartness, competitiveness, quality of life, helping to rethink formerly elaborated strategies and development priorities. They also allow to position cities, can be marketing tools in city promotion and contribute to the success of city leaders [8]. The usage of indicators is relatively simple, clear, easily interpretable, easy to understand, visualize, compare and reproducible in time and space.

Still, from the review of different smart city rankings and indexes some limits and problems can be derived:

- The problems of data collection. To conduct a successful smart city ranking, very well defined and available settlement level indicators are needed. The settlement level data are missing in most cases or not updated year by year. Using regional or national data is blurring the differences among cities. Most of the data arisen at city level are not collected and processed as there is no interest in them. Huge data sources owned by private enterprises are not available for research or analysis. To conduct a successful smart city assessment not only “big data”, but “right data” is needed.
- The weighing and aggregation of indicators will greatly influence the final results.
- The problems of transparency. Although the methods behind the indexes and rankings are complex, the used methods and the selected indicators are greatly influencing the results, the methodology of data collection and processing are usually not transparent.
- The correlation among indicators and different fields of analysis are quite strong.
- The problems of comparison. As the content of the indicators and the methods of data processing are not transparent and heterogeneous, there is a huge obstacle to enhance comparison. There are several studies based on indexes related to smart cities that are repeated annually (e.g. Smart cities in the world by Boyd Cohen), but even these cannot be compared to each other, as the indicators and methodology used to conduct them are changed every year.
- The lack of dynamic analysis. Indexes reflect the static state of a settlement’s “smartness” and liveability at a specific time. Little knowledge can be obtained about how the development or behaviour of a city is changing, how it reacts to certain situations or critical events. However, this might be the true essence of smartness (reduced reaction time, rapid adaptation to abrupt changes). A city cannot be studied separately from its surrounding environment; its operation influences the neighbouring areas and settlements that are also asserting a dynamic influence on each other. Using dynamic approach also allows you to provide a more appropriate definition of smartness. As well known, the physical space and the “place” are not equivalent [9].
- The lack of individual aspects. There are people living in the city who are striving to utilize the resources of their city in an optimal way to achieve a higher quality of life. They have their own motivations, expectations, needs, their own lifestyles. When we only consider indexes, the study will lack this bottom-up dimension. Several studies

have experimented with including the individual dimensions into the analyses of smart cities. For example, there are studies that try to research and present the emotional state of a given settlement from the quality and quantity of posts related to city. Utilizing text processor and analyser software solutions, these studies measure the emotional state of the people living in or talking about the city. Emotions can be studied in the temporal dimension helping researchers to clarify how the emotional state of the city follows the emotional state of its individual citizens.

- Last but not least there is a problem related to how much effort it presents to build qualitative factors into the indicator system (e.g. quality of services).
- Numerous evaluation methods and models have been developed to explore the operation of smart cities, the aim of which is to understand the concept of smart cities, to explain their goals, structure and expansion. As the diversity of the concept of smartness is linked to the complexity of cities, it makes it difficult to develop appropriate assessment methods [10].

After decades of smart city research, countless smart city initiatives, evaluation system, index, rankings, we can formulate lessons to be learned and pitfalls to be avoid. From the literature we can usually identify four groups of shortcomings and potential reasons of failure:

- system information insecurity [11] [12];
- privacy leakage [13] [12];
- information islands [14] [15];
- digital divide [16] [7].

Furthermore, these four common pitfalls have been corroborated by Boorsma [17], the author of a book, “A New Digital Deal”. who summarised 12 pitfalls, namely:

- The Game of the Name: The problems with the definition of smart cities.
- Technology Myopia: many smart city initiatives have ended up as technology demonstrations.
- Solutionism: a situation in which the solutions become the objective of a smart city effort, rather than the solutions being a means to achieving a desired outcome.
- Lack of Clear Objectives.
- Smart Cities as a Matter of Public Sector Procurement: In many smart city endeavours, smart city propositions have been targeted purely at government, with the public sector being the presumed customer, or the only customer.
- Stuck in Silos: Many organizations have been organized in silos – enclosed environments that harbour their own hierarchies, maintain their own systems and practices, and gather and retain their own data.
- No Plan to Replicate or Scale.
- Digital Divides and the Lack of Community Communication.
- Legacy IT, Sub-optimal Networks.
- Three Traps of the Top-Down Versus Bottom-Up Dichotomy: A rich debate exists as to whether smart cities should be built with a top-down or bottom-up approach.

Neither side is right, and you often need both approaches. The third trap is to believe in the existence of that dichotomy at all.

- Closed Architectures.
- You Must Be This Tall to Enter the Smart Cities Club: For a very long time, smart city initiatives comprised a set of activities that only large cities could manage. Down the road, digitalization will likely become as ubiquitous as electricity: every community will be able to afford it and no city can afford to be without it.

According to our earlier research on smart cities, interviews with different stakeholders and experiences with (mostly pilot) smart city initiatives, we can sum up the possible pitfalls as the following:

- Although information and communication technologies are essential elements of the concept, their application is not the ultimate goal, only a tool to achieve the ultimate goal of smart cities, to increase the well-being of people. Big multinational companies like IBM, CISCO, Siemens elaborated their own smart city concepts and smart city solutions and applications. The smart city concept for IT companies means the elaboration, installation and application of complex information systems aiming at integrated operation of cities' infrastructure and services. The blurred boundaries between a policy concept and a business model that is focused on profit maximization, can give rise to semantic confusion and, more relevantly, to ethical issues. Townsend (2014) argues against the corporate likes of Cisco and IBM, who think that smart city initiatives are scalable to any other city. Smart cities need to be efficient but also preserve opportunities for spontaneity, serendipity, and sociability. If we program all of the randomness out, we'll have turned them from rich, living organisms into dull mechanical automatons. The failure of New Songdo City is a good example for this phenomenon.
- The implementation of ad-hoc smart city initiatives and projects does not help to improve the functioning of the city. The aim is that the innovative developments should not be random, but municipalities should have a smart city strategy, a vision and an idea of the necessary developments and their chronology. The strategy and vision should determine the necessary technological developments.
- The next lesson to be considered is also related to strategies, objectives and visions. Many of the implemented developments were initiated by large, multinational tech companies. The cities implemented projects with which ICT companies knocked on them, without considering how well the given program fits into the development strategy of the city or the expectations and needs of the population.
- Creating a smart city is not the sole responsibility of the city, the local government. The cooperation of the city, non-governmental organizations, IT companies, governmental, public utility and public service institutions, universities, research institutes, urban planners and the population is necessary for the development of a competitive and innovative settlement that emphasizes quality development, where the idea of sustainable development dominates. Of course, the cooperation of such different organizations, people and interests is not an easy task, but without it, the creation of a smart settlement is inconceivable. The basic condition for building a smart city is political will, the right leader to carry and manage projects at heart. It is

backed by an appropriate professional background as well as a willingness to work with the local community. Without the involvement of local communities, no smart city project or initiative can work successfully. This requires a knowledge of the needs and requirements of local communities, constant communication with the population, acceptance of criticism and feedback, and the creation of understanding and commitment on the part of the population as well.

- The introduced smart city initiatives were often not shaped by the needs of the city and the residents living there, but by the available resources and tenders. Thus, these - often pilot - projects did not continue after the expiration of the grant, they failed.
- The size, endowments, natural environment, traditions, historical past, and roots of each settlement can be very different. It is therefore not possible to develop and follow a single and universal smart city model that can be applied to all settlements.
- There is life beyond the megapolis. At the beginning, smart cities focused exclusively on big cities, covering projects and programs that could only be implemented in these cities. Some smaller communities were able to paint a convincing picture of how they would digitalise, but stalled at the point where broader expertise and deeper pockets may have taken them to the next stage. However, digitalisation and the integration of the advantages provided by smart solutions and technologies into urban planning and management can be extremely beneficial for smaller settlements as well. In addition, creating consensus is often easier in smaller communities, where key decision-makers are within one or two degrees of separation, than doing so in a complex megacity.

3. Smart villages, smart communities

In the previous part of our paper we presented and summarized the smart city approach and the potential pitfalls and lessons to be learned from the experiences of very diverse research and empirical studies. In this chapter we would like to present the idea of smartness for rural areas.

Alfred Marshall has written for more than a century ago that decreasing costs of means of communication are changing the forces that influence the location of industries [18]. Since then, the impact of the exponential and continuous development of information and communication technologies on the spatial organization of economic activity has provoked a whole series of scientific and political debates.

Following the research on the relationship between space and the new, information economy in the debate since the 1960s, it was believed that new technologies would shift economic activity from the centres to the peripheries, resulting in a “global village” [19]. Berry (1973) thought similarly when he believed that communication technologies will eliminate the ties of cities to core areas.

With the opening of the internet for commercial purposes in the early 1990s, the debate gained new impetus. The Internet and the accompanying communication

revolution seemed to free the economy from the shackles of geography. As ICT products easily bridge physical distance and overcome geographical barriers [20] the digital revolution will mean the “death of distance” [21].

However, the processes observed later drew attention to exact opposite trends, as ICT contributes to increasing the competitiveness of previously advantageous regions and cities. This is because, although in theory modern communication technologies can be accessed anywhere, in fact their operation depends to a large extent on the presence and construction of a fixed telecommunication infrastructure. And this infrastructure is not available everywhere, or at least not at the same time, but on the basis of a definite and strong economic logic, so pioneers can be the spatial points where supply and demand are concentrated [22]. Important decision-makers are concentrated in big cities and, despite all previous expectations, the importance of personal relationships has not diminished at all. “Dense” industrial activity results in denser network connections, which significantly increases the amount of information flowing in, thus also increasing the benefits of using ICT.

Today accessing the Internet through telephone lines is only one of several technologies available. Differences between the well-served largely urban areas and the underserved mainly rural areas are therefore growing. The lower densities and greater distances in rural areas discourage the market from investing in new technologies [23].

When advances in sophisticated information and communication technology (ICT) have led to the emergence of research on smart cities, the application and usability of ICT in the context of a village remained underdiscussed in the literature. The European Commission has been the champion of ‘smart villages,’ as reflected in Cork 2.0 Declaration of 2016. The Smart Village Initiative was launched by the European Parliament in 2017, and the EU Action for Smart Villages document was published by the European Commission together with the European Parliament. Moreover, ‘Smart Villages’ was initiated a subtheme within the European Network for Rural Development (ERND) work on ‘Smart and competitive rural areas’ between September 2017 and July 2018. In the context of European Union, the concept Smart Villages refers to “rural areas and communities which build on their existing strengths and assets as well as on developing new opportunities. In Smart Villages, traditional and new networks and services are enhanced by means of digital, telecommunication technologies, innovations and the better use of knowledge for the benefit of inhabitants and business” (EU 2014). So to apply the Smart Village concept, it is necessary to use bottom-up integrated approaches, build effective public-private-community partnerships, develop supportive policy frameworks and enable access to financing mechanisms [24].

The crucial point in the process is to put the communities themselves behind the steering wheel and not impose developmental paradigms that would not be compatible with community's desires and cultural environments [25]. The place-based nature of innovation processes was in the centre of many studies.

Theoretical considerations as to how the digital society should develop in order to create benefits for everyone are so far in great contrast with the rural reality. Under the current conditions we can expect that the urban-rural divide will persist or even grow as new, faster technologies come on-stream, perpetuating the rural penalty [26]. The community level seems appropriate intermediate level, where various local needs can be brought together.

The European Parliament has initiated a pilot project called "Smart eco-social villages", the conclusions of which will provide important information for the future use of smart village concepts. The project also developed a definition of a smart village in the European Union: "Smart Villages are communities in rural areas that use innovative solutions to improve their resilience, building on local strengths and opportunities. They rely on a participatory approach to develop and implement their strategy to improve their economic, social and/ or environmental conditions, in particular by mobilizing solutions offered by digital technologies. Smart Villages benefit from cooperation and alliances with other communities and actors in rural and urban areas. The initiation and the implementation of Smart Villages strategies may build on existing initiatives and can be funded by a variety of public and private sources." [(ENRD, 2019, p. 4); (European Commission, 2019, p. 60)].

4. Lessons of an empirical research

Our survey¹ of smart settlements and smart communities, which we conducted during 2018-2019, basically consisted of three main elements. The first element of the attitude survey was a questionnaire survey conducted in Nógrád county in Hungary (132 settlements, return rate 35.11%) and in the settlements of Banská Bystrica and Košice in Slovakia (953 settlements, return rate 15.32%). The questionnaires were sent to all the settlements in these regions², we used the publicly available e-mail addresses of local governments, mayors, and notaries. The second element consisted of interviews with mayors and representatives of non-governmental organizations in 10 selected settlements³.

¹ Interreg V-A Slovakia-Hungary Cooperation Program, the "Smart Communities" Virtual Education and Research and Development and Innovation Network in the Slovakian - Hungarian border region (SKHU / 1601 / 4.1 / 210)

² The Interreg project covered these regions.

³ Salgótarján, Drégelypalánk, Szarvasgede, Nőtincs, Patak, Szügy, Varsány, Szirák, Legénd, Kozárd. The selection is not representative, we offered the possibility to the settlements in the questionnaire, to take part in semi-structured interviews in the latter phase of the survey, and those

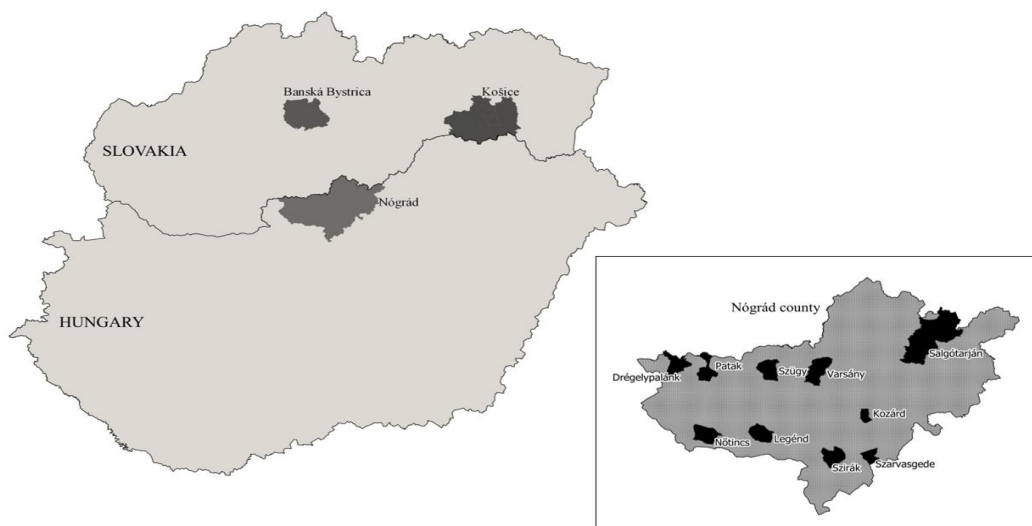


Fig 1. The research area, the selected settlements for interviews

Finally, as a third element, we asked high school students (a total of 395 students from three Hungarian and one Slovak grammar school⁴ responded to an online questionnaire survey) about their knowledge of smart communities, what digital tools they use, how they use ICT in their lives, and what they think about their settlement, its liveability, quality of life and the possibilities of using digital technologies in this field. In this paper, we mainly deal with the local government survey and its results concerning Hungarian settlements.

In the first part of the questionnaire, we examined the knowledge of local governments on the topic of smart cities and smart communities. 66.6% of Hungarian respondents had heard of smart settlements, 57% were familiar with the concept on the Slovak side. In light of the fact that the questionnaires were completed by the vast majority of mayors and notaries, i.e. municipal leaders, it seems to be a rather low proportion. We also asked the respondents to formulate in their own words what they think the term smart city, smart settlement means. The presence of information and communication technologies played an important role in the formulation of the concept of a smart city, it was included in almost all the formulated definitions. The second most important element formulated was sustainability. Several respondents also used the term “liveability”. Some have narrowed down the smart city to more efficient provision of public services, others have interpreted it much more broadly, linking it to sustainability, environmental

willing to take part were called by phone to participate. We wanted to have at least 8-10 settlements including smaller and bigger ones as well, but the selection is not representative, it is based on the participation willingness only.

⁴ In Hungary we sent the request for participation to all grammar schools in the county, in Slovakia we selected one grammar school, the sample is not representative.

protection, the use of renewable energies, and the involvement of the population. We then asked respondents to select the most important elements of smart settlements from the list we compiled (Figure 2).

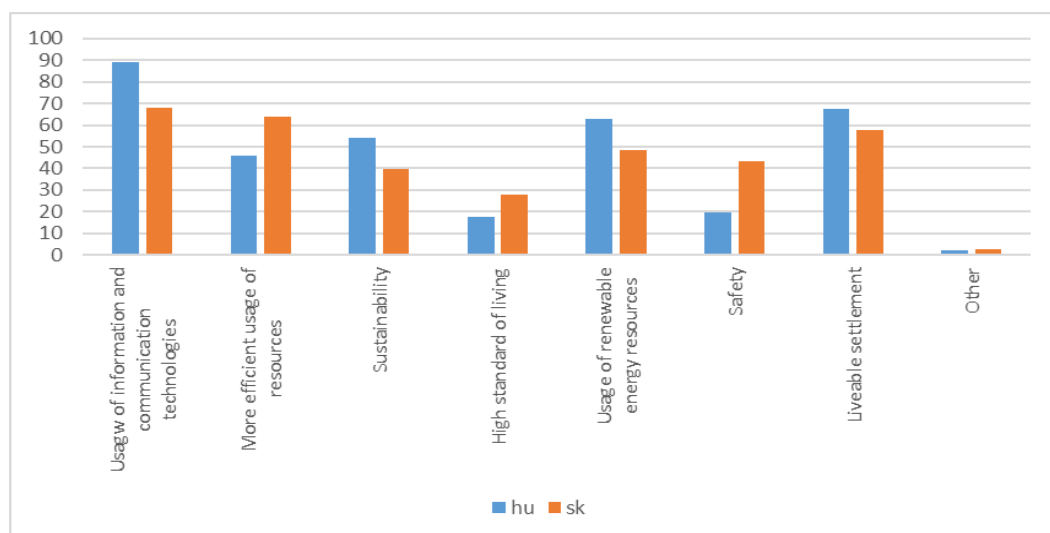


Fig. 2. According to you which are the essential elements of smart cities, smart settlements, by the country of respondents(%)

Source: Interreg SK-HU Settlement survey (2018)

In the interviews, the respondents expressed in a very diverse way what makes a settlement smart and liveable for them. We received quite extreme answers, one of the endpoints of which was a settlement where no one was starving and freezing, and the other of which was the wording of the presence of information and communication technologies, liveability, environmental protection, environmental quality, both effectiveness and active community participation were found.

The technological background is still not appropriate, only 8 percent of the settlements indicated that the broadband internet connection in their settlement is excellent. Another 34.2 percent say the internet connection is good. 8 percent indicated that the Internet connection was inadequate, and 15 percent of the municipalities did not have a broadband Internet connection. In Hungarian settlements the proportion of those dissatisfied with broadband internet connection was higher, while in Slovak settlements the proportion of those dissatisfied with mobile internet was higher than on the Hungarian side. 30.6% of settlements had free wi-fi connection. 37% of Hungarian settlements considered the digital knowledge of their inhabitants to be insufficient (Figure 3), while on the Slovak side this proportion was only 15.6%. Thus, it is obvious, that the knowledge required for the use of technologies needs to be significantly developed among Hungarian settlements.

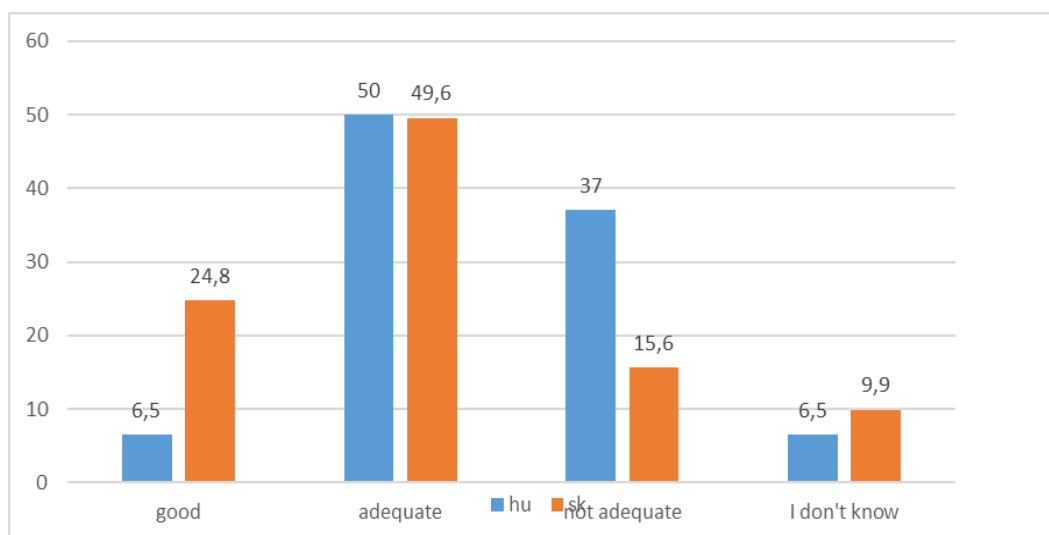


Fig. 3. How do you assess the digital knowledge of the inhabitants living in your settlements (%)
Source: Interreg SK-HU Settlement survey (2018)

Based on the experience of the interviews, there are settlements where digital knowledge can be said to be good, gaps in this field are only characteristic of the pre-retirement age group, while serious deficiencies can be found in other settlements. People living in the settlement are happy to take part in trainings to develop digital skills, especially those programs had great success, in which the participants were also given tools, e.g. tablets. At the same time, there is demand for training available to the older generation, the Digital Welfare Program of the government did not allow the population over the age of 65 to participate in the training.

One of our interviewees remarked that the involvement of businesses in improving digital literacy is also low, especially for those over 50, although there are free opportunities as well. Digitalization could improve efficiency, and it will be very useful in production-service sector to acquire and retain markets. There are more and more SMEs with website, but there are serious problems with maintenance, the websites are static. Many people created a website as it was mandatory because of an application or proposal, but they don't deal with it afterwards.

All municipalities except 2 (Slovakian) had a website. In the case of Hungarian settlements, the most frequent update is a few times a month (33.3%). The maintenance of the websites can be considered adequate, taking into account the size of the settlement.

The experience of the interviews also presented that the websites usually contain only very basic information, so their potential is not exploited at all. Many places

lack e.g. interface to search for municipal ordinances. They're not user-friendly, they just follow their own logic, they pay less attention to what kind of information people would be interested in. Functions related to e-government (eg tax balance inquiry) do not work in several places. Nothing works except on e-paper, and as long as nothing can be submitted electronically, we cannot talk about a smart city, a smart settlement.

In smaller settlements, the cost of regular maintenance and updating of the website is also a problem. After a while, they did not have the opportunity to allocate resources to it, and prefer to use the free social media interfaces.

Overall, the possibilities of e-democracy were considered useful by the respondents from the point of view of their municipalities. Nearly half of the municipal leaders who filled in the questionnaire had already heard about the concept of e-participation (49.1 %), but only one tenth of the settlements can participate electronically in decision-making processes (9.4 %). In most cases, this participation means a simple e-mail comment or a vote on the facebook page.

There was a huge difference in the use of social media interfaces between Slovak and Hungarian settlements. 68.9 percent of the Hungarian responding settlements use social media, while only 23.1 percent of the Slovak settlements. They are mainly present on Facebook, the entire circle of Hungarian settlements using social media use this interface, and to a lesser extent they are active on Instagram (12.9%).

The experience of the interviews was that there is a significant difference in community life participation in each settlement. In the case of aging and depopulated settlements, the lack of activity, the missing highly educated and young people and the lack of interest are serious problems. In settlements where there is no school, there are particularly serious problems of attachment and activity. Lack of conceptuality is also a huge problem in many places, as well as lack of long-term development strategy, over-politicization. At the same time, other settlements have managed to build on youth, retain and activate them in the settlement, and the first smaller results bring with them further ones, the village retention force is increasing. Mobilizing young people and increasing their attachment is essential, and the experience of the students' questionnaire shows this well, as most of them do not want to stay in their current place of residence for a longer period of time.

The presence of the Roma minority and the problems of the coexistence of the minority majority have been raised in several places. The interviewees stressed the need for a change of attitude, the cessation of hostility, the elimination of segregation. It is important to accept the roots, many deny their identity. It was also considered important to raise needs awareness by development activities and health

programs, as the health status of the Roma population is worse, and information is needed.

According to the interviews, municipal communication was clearly placed to the social media, mainly Facebook, instead of websites. According to our interviewees, this type of communication works very well, it is free, instant and also allows feedback easily and simply.

Based on the experience of our interviews, it can be said again that there is a significant difference in the quality of life and the retaining power of the settlements. There were places where young people were significantly mobilized, a very active, living community was formed, with many participants, child and family programs, active civic life, active associations and organizations, willingness to do for the community, voluntary offerings, even painting a doctor's office, or offering food and raffle items for events. Elsewhere, on the other hand, it has become almost impossible to mobilize people, due to the lack of school, young people have low attachment to the settlement, older people cannot be mobilized, the intellectuals are missing, and most people work in shifts in several plants and factories which makes it impossible to organise programmes.

It was also mentioned that it would be important to establish co-operation with the surrounding settlements, even to establish cross-border division of tasks and functions, and to establish regional development associations.

According to the interviews, simple solutions and projects would be needed, ones that provide an experience for young people, but can also be used for the older age group. It is essential to concentrate on employees still living in the settlements. For them the possibility to check in for a date, e.g. through a digital interface is very important. In aging settlements, it would be very important to increase the retention power of the community, to activate it, they are very much looking forward to ideas, guidance on how these small settlements could develop a more active community life with the help of few resources and people. There are no longer any civil or community initiatives in these settlements, often there is no experience or knowledge on how to run an association, how to do all the administrative work necessary for that or to submit a proposal. Here, perhaps the solution could be to unite the surrounding smaller settlements and employ a common employee.

5. Conclusion

Our final conclusion is that it is possible to create smart communities in smaller territorial scales, but we also think that in this context the term 'smart' does not need to imply high-tech projects, or the projects that concentrate on innovative,

infrastructural developments, or the project that addresses only the needs specific to advanced rural areas [27].

„Smartness” in rural areas means nothing more than the use of resources, methods and technologies in a way that benefits all stakeholders, with the ultimate goal of creating a much fairer and more inclusive (smart) settlement [28]. From the perspectives of rural areas smartness means that communities are capable of responding challenges associated with change, so smartness is an ability to constantly learn and adapt to the changes in the ecosystem. Smart villages approach may also be adapted to the introduction of services in rural areas as well as job creation and the meeting of basic social needs.

Smart village is an approach to rural development where central role is played by the local community and its actions. Local governments that meet the basic needs of the local community and consider the needs of various stakeholders not only fulfil their mandated mission but also build trust and help release the creative potential of the local community.

The essence of a smart settlement is to make the best possible use of the given opportunities and resources by exploiting the opportunities provided by technologies, it is necessary to use place-based approaches in order to elaborate and implement spatial development strategies that are well situated in their socio-economic contexts. Success depends to a large extent on the commitment, enthusiasm, knowledge, and ability of the leaders of the settlement to activate and win for change the population of the settlement. The involvement and activation of young people and the increase of the retention power of the settlement are of key importance, because young people have a high tendency to emigrate.

There is no smart city or village strategy or approach that is appropriate for each settlement, the development route must be determined based on the characteristics of the given place.

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