SMARTIES Project: The Survey of Needs for Municipalities and Trainers for Smart Cities

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Abstract

In aim to contribute to already existing knowledge upon the subject of smart cities and the public sector's wider knowledge in Europe, this study investigates the perception by the municipalities and the wider public sector, responsible for implementing smart solutions in the environment. The understanding of the concept of smart cities/villages by municipalities is on a low level due to the fact that the problem is too wide, not well described, solutions even wider, accompanied by the lack of experts able to offer comprehensive solutions to municipalities. The study presents factors according to the current municipalities' knowledge (environmental awareness, knowledge and prior experience) and the existing market, of whether these factors can be said that affect the acceptance of smart cities. The public is already aware of the smart cities as a general concept, however, the study throws light upon the established knowledge that the decision makers have in five countries, Hungary, Slovakia, Italy, Lithuania, and Denmark.

Introduction

Supporting the educators, the trainers, and the public sector has not been the primary focus in the European research community. While primary focus has been given throughout the history in the academia, and lately in the business sector, start-ups and entrepreneurs (Aragón-Sánchez et al., 2003), the public sector – regions and municipalities mainly – have always been finding limited training support or

their training needs have only been internally met towards competitiveness and continuous improvement. It is not only the private organizations that should evolve and adapt to external changes, it is a need the public sector to follow. Especially, for countries with oversized public sectors and governmental agencies, this is a must. If they do not invest, there is a risk that the planned growth to take a dramatic deflection and eventually being halted (Boshier, 2018). Furthermore, the trend towards rationalisation of the public sector size – is unavoidably shrinking the sector – something, which requires the remaining staff to bear the continuously increased workload, leaving no room for staff training (Ho et al., 2011).

Under this rationale, the SMARTIES project is focusing on identifying which are the training and educational needs of the municipalities' personnel, on the concept of smart cities/villages and the understanding of this concept, and all associated concepts, such big data (Thakuriah et al., 2017), internet of things (Debauche, 2018), smart mobility and energy applications (Nanaki and Xydis, 2019), wide deployment of sensors (Gomede et al., 2018) etc, by the trainers and the responsible decision makers implementing intelligent solutions in the environment (Smarties Skills development, 2019). The understanding of the concept of smart cities/villages by the municipalities is at a low level due to the fact that the problem is wide and undefined and the proposed solutions even wider.

The role of the educators that will contribute in developing the competences of the public employees in the field of smart cities is crucial. Those will support adult learners by delivering new types of training and consultation activities (Rosas et al, 2019). This will embrace the public sector's needs and lead to open-minded approaches that eventually make the decision makers evolve and become proactive in terms of the cities' future needs. How is this going to be achieved? The SMARTIES project follows another way. It addresses questions to the public employees on aiming at identifying what is for them a smart city and its characteristics in order to strengthen the educational outputs of the project. Project members did survey the needs of the recipients (municipalities and regions) and the target group of the project (adult educators, trainers) aiming at illustrating their understanding of the problem(s) and learning needs. Based on the outcomes of this survey they will propose a curriculum, adapt it for the best needs of the municipalities and educators and afterwards work on preparing course materials. Within the scope of the project these educators will be trained (by participating on the project events such as webinars and conferences, and by using online resources) and thereafter be able to deliver their knowledge to municipalities in all the partner countries.

Methodology

For the empirical part study that guided the work, there has been a data collection part from the five countries, Hungary, Slovakia, Italy, Lithuania, and Denmark. A survey has been prepared which has been distributed to decision makers of the public sector (mainly regions and municipalities) and is based on 61 respondents from the five countries. The survey because of its distribution setup, had a number of representatives from a number of regions of each country participating. The respondents have been randomly selected, among the municipalities and the wider public sector, in order to get a rough representation of the relevant population. The questionnaire included 17 questions in total and the results were collected and were set up in tables, to give an overview of the answers received. Each question was summarized and presented as a percentage or as a net number (of total votes) of the choices given. For those interested to participate (or at least stay informed) at the events organised under the SMARTIES project, there was a section that the participants could write down their names and contact details.

The issue of smart cities/villages is a pressing issue for all European countries. The reason for that is an enormous penetration of IT technologies in all aspects of human life, and the untapped resources of interoperability among various networks and processes aiming to improve life of citizens, are making municipalities to struggle coping with this new environment (Curzon et al., 2019).

This goes as wide as from the energy management to traffic organisation to education system to communication of citizens with the representatives of municipalities and so on. And it is an issue from Portugal to Sweden and from Greece to Estonia. Some countries in Europe have already implemented complex projects to turn their cities to smart cities, such as Copenhagen or Vienna (Smart City Wien, 2019), research data show that more than two-thirds of smart city projects remain in the planning or pilot test phases (Rand Europe, 2019). Therefore, there is a huge potential for improvement. It is also true that EU itself among a number of initiatives is strongly supporting smart cities. There are important EU initiatives that directly support smart cities such as EU Smart Cities Information System (2019), Smart Cities and Communities European Innovation Partnership (2019) or several initiatives under Horizon 2020 programme (2020). There is also The European innovation partnership on smart cities and communities (EIP-SCC) which is an initiative supported by the European Commission that brings together cities, industry, small business (SMEs), banks, research. Yet, another programme to mention is European Initiative on Smart Cities that is part of SETIS - Strategic Energy Technologies Information System. This all clearly demonstrates that the concept is widely supported by the European Commission and its organisations and the need for the project and its transnational partnership.

Results and Discussion

The surveys were distributed either by personal emails to the recipients or by visiting the municipality having arranged a meeting in advance for this specific reason. The respondents were given sufficient time to respond (almost a month) and they either filled in the survey electronically (google forms) or the printed copy. The questionnaire did not take more than 15-20 minutes of time for the participants. Some of the most important questions of the survey are shown in figure 1 – figure 6, and the graphs are presenting some of the most important results.

One of the first questions in the survey was: "Are you aware of a municipality problem that could be solved via a smart city approach"? The respondents were sure or almost certain at about 85% that there is a municipality problem that a smart city approach could solve (Figure 1). Only 15% said replied emphatically that there is not such. This (together with the 30% that replied "maybe") could be interpreted as a clear need for training of the municipalities' personnel towards that direction.

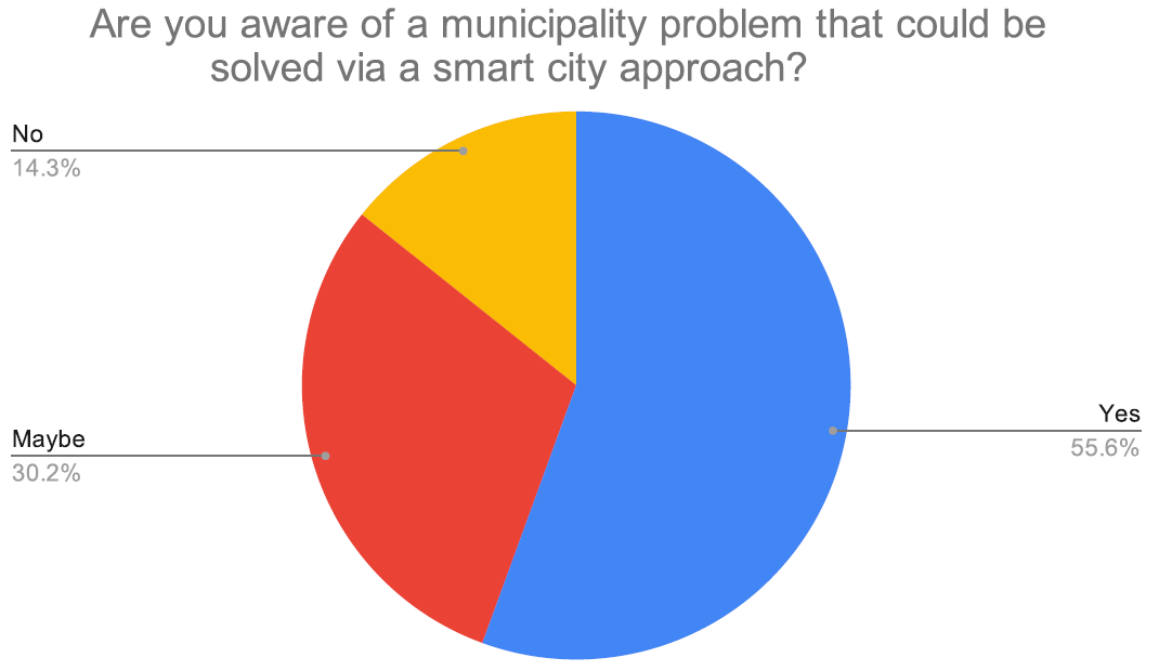

Figure 1. Question: "Are you aware of a municipality problem that could be solved via a smart city approach"?

Open-ended questions followed in the survey asking the participants to describe a) what is a smart city for them, b) which smart city strategies will first come in mind if the respondent is a city policy maker, and c) if there are any benefits of having smart cities. Figure 2 presents the answers. On the question "what do you think is a smart city" 1 respondent out of 3 replied that is a tool that improves sustainability and create

development. 1 out of 5 replied that it is another ICT/Internet of Things concept and another 1 out of 5 that it is a concept that uses technology to minimise deficiencies.

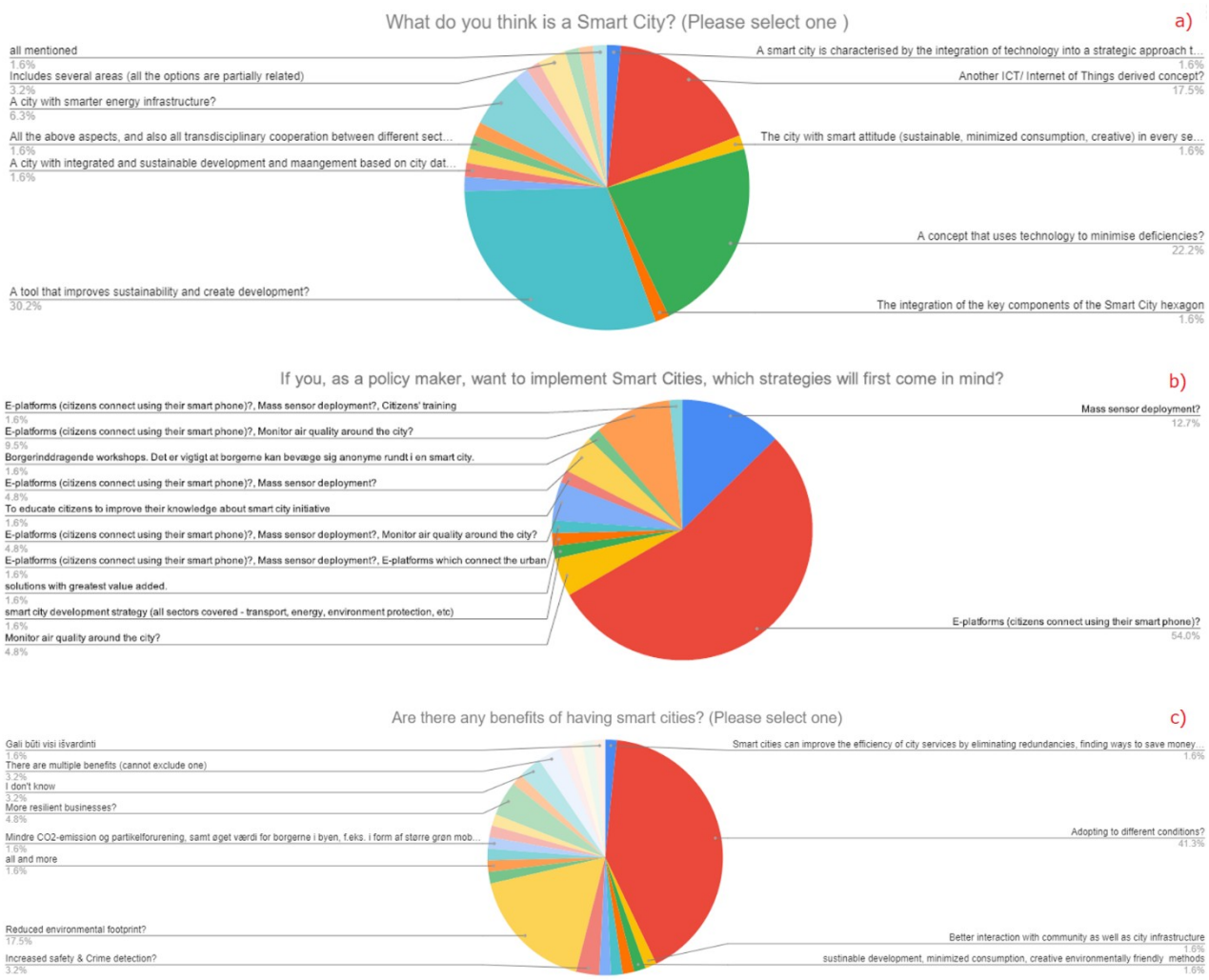

Figure 2. Questions: a) what is a smart city, b) which smart city strategies will first come in mind if the respondent is a city policy maker, and c) if there are any benefits of having smart cities

In figure 2b, it is seen that more than half replied, if the respondent acted as a city decision maker, that E-platforms (citizens connecting using their smart phones) is the preferred smart city strategy that first comes in mind. In the question if there are any benefits of having smart cities (figure 2c), more than 40% replied that the obvious benefit is that it gives the opportunity to be able to adapt under different conditions. 17% replied that smart cities means reduced environmental footprint. Therefore, as a result, what was ranked high in the respondents' opinions (in total almost 60%) was adaptability and environmental benefit.

It was believed by the authors that in the wide smart city deployment in the near future, Artificial Intelligent (AI) and Machine Learning (ML) will play a crucial role. Therefore one of the questions asked in

the survey was to answer if they think that the services to the citizen will get better, worse, or stay the same if artificial intelligence and machine learning will be widely implemented under a smart city concept (Figure 3).

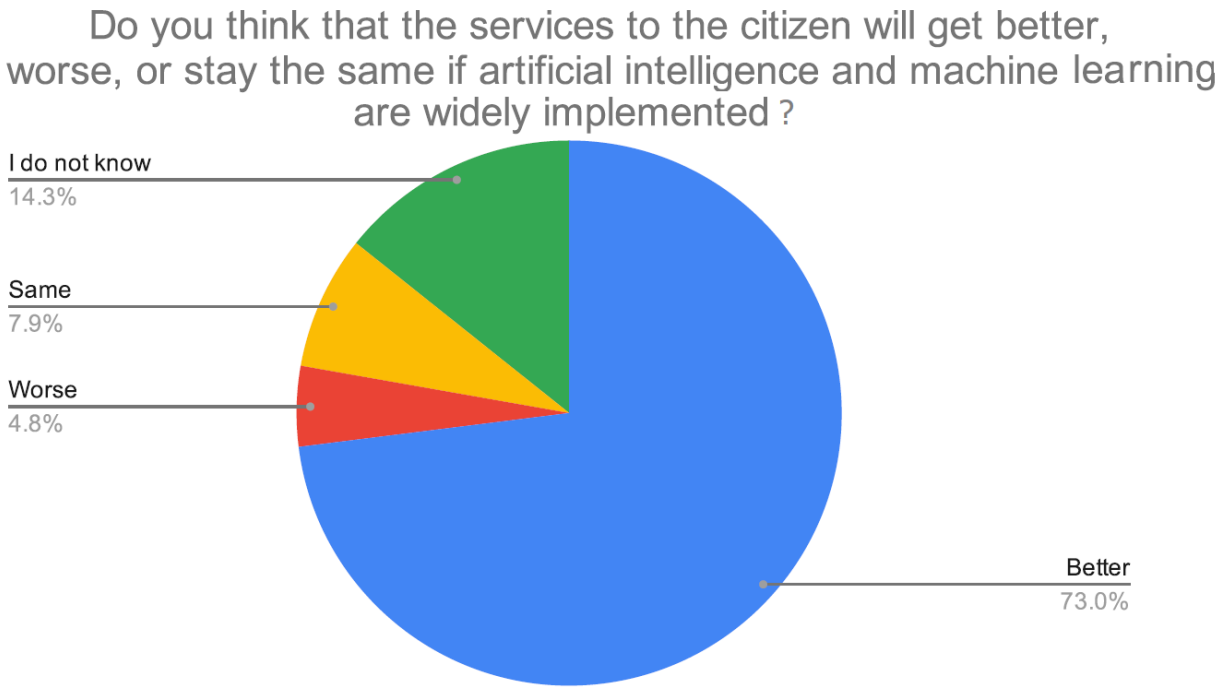

Figure 3. Question: "Do you think that the services to the citizen will get better, worse, or stay the same if artificial intelligence and machine learning are widely implemented under a smart city concept"?

The results showed that 3 out of 4 from the personnel in the regions and in municipalities believed that the services to the citizens would become better and only 5% was convinced that the services would be worse. The same question was included in the survey about data analytics, distributed energy resources, electronic cards (smart cards), and smart phones (figure 4). Under the same rationale, the authors wanted to compare the reaction of the personnel in less established and clearly defined concepts such as about data analytics or more tangible options, such as smart phones, which are already widely worldwide been used. What should be stressed is that while in all the other options an answer "worse" was selected – even by few – in the case of smart phones, it was not. While for the data analytics or the AI and ML they had to guess and imagine how is it going to be, in the case of smart phones they all already knew that the services to the citizen have already been improved in various ways. For both data analytics and distributed energy resources, the addition of "same" and "I don't know" was approximately 20%. This can be interpreted as the respondents were reluctant, since the description of "data analytics" and "distributed energy resources" was limited in the questions. On the other hand, when it comes to the question of electronic cards, the addition of "same" and "I don't know" reached to more than 30%. This 10% difference it is

obviously proof of skepticism and correlation to the fact that so many have beard heard about e-cards and privacy issues and personal data protection, especially since this questionnaire was shared after the European legislation passed in 2016, setting new rules on how SMEs and large Enterprises manage and distribute personal data.

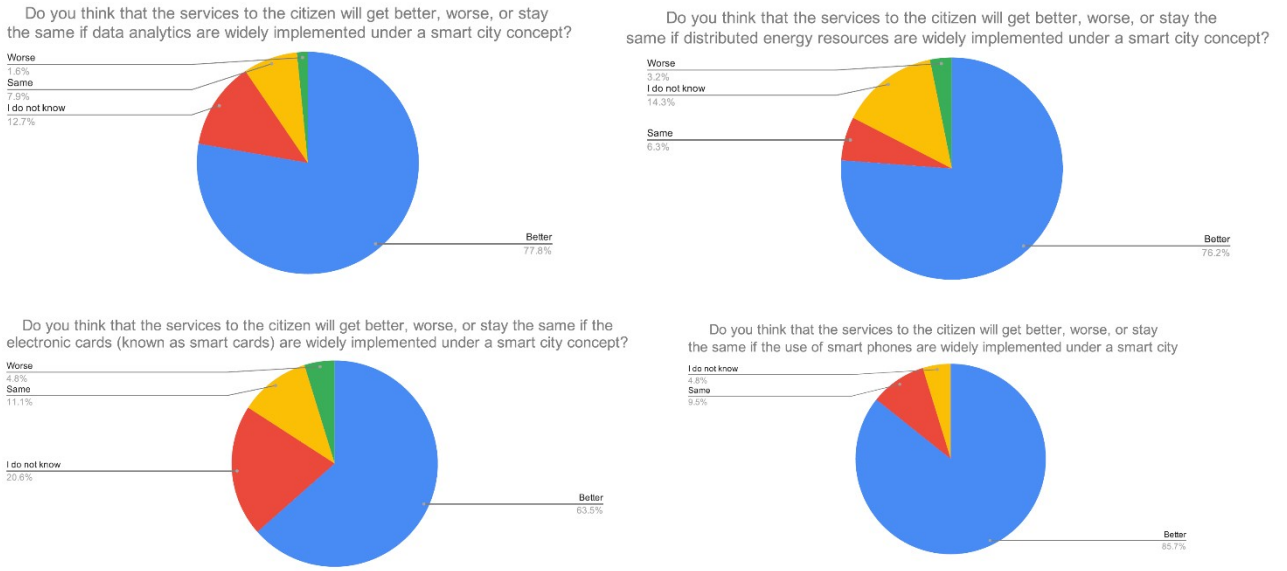

Figure 4. Questions: “Do you think that the services to the citizen will get better, worse, or stay the same if data analytics, distributed energy resources, electronic cards, and smart phones are widely implemented under a smart city concept”?

Another batch of questions in the survey were those focused on the grade of agreement with some statements of the personnel of the regions and municipalities. The questions were focused on how much they agree or disagree that a) citizen participation (Kopackova and Libalova, 2019) can be increased in a smart city context, b) networks of sensors can be used, c) wide adoption of smart meters can be used (figure 5). The results revealed that although everyone strongly agreed that the citizen participation will be increased, that was not exactly the case in the other two questions regarding sensors and smart meters adoption. Especially for the networks of sensors, there were clearly some disagreements in comparison with the other two questions. A rough interpretation could be linked to the fact that a large deployment of sensors could again violate in some degree the personal data freedom levels.

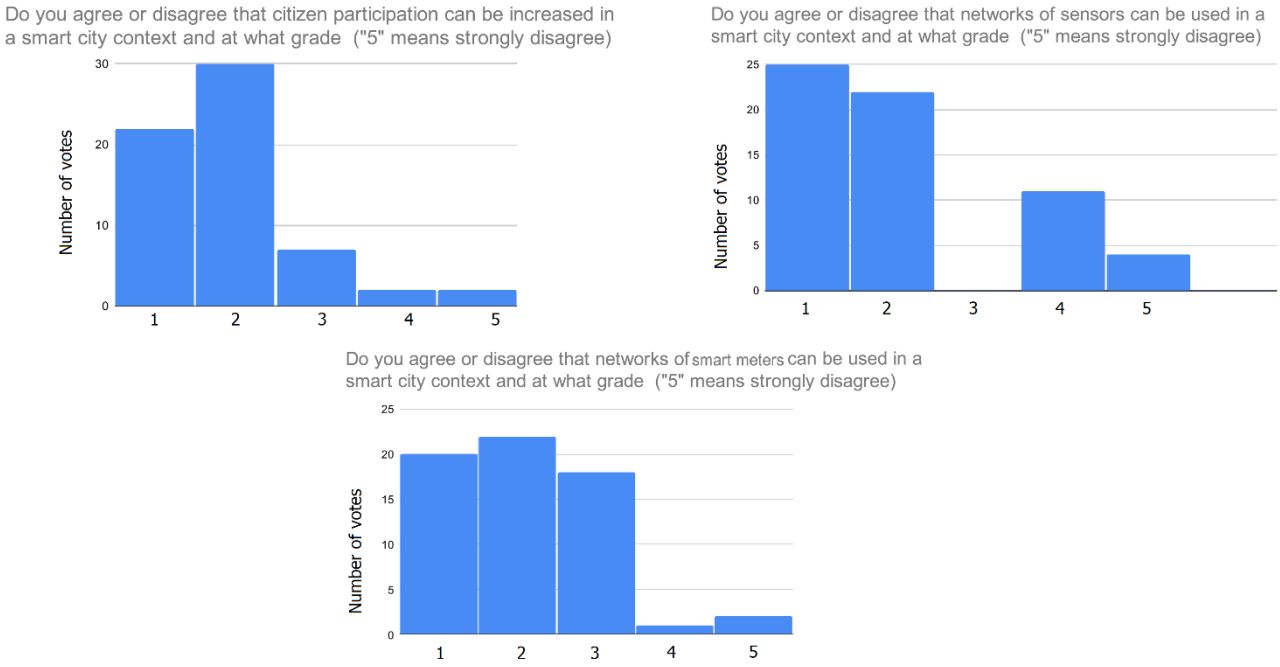

Figure 5. Questions: "Do you agree or disagree that a) citizen participation can be increased in a smart city context, b) networks of sensors can be used, c) wide adoption of smart meters can be used, and at what grade"?

A similar question – requiring though synthetic thinking and a critical approach was asked to the respondents, asking if connecting various industrial sectors via smart cities, would have a positive or a negative effect overall (figure 6).

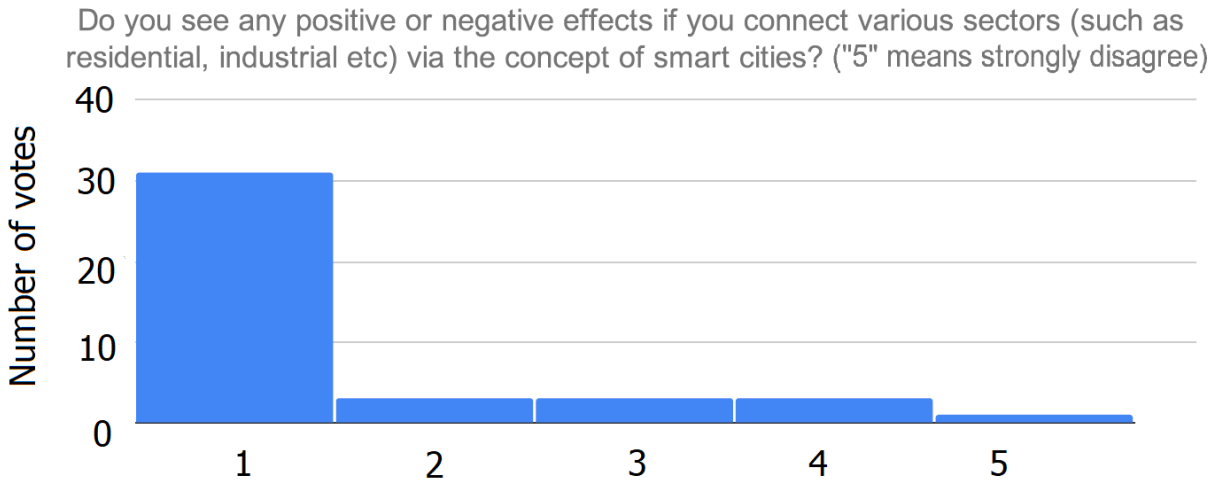

Figure 6. Question: Do you see any positive or negative effects if you connect various sectors (such as residential, industrial etc) via the concept of smart cities?

What should be stressed here is that most respondents believed that it would have positive effects and very few negative, but what should be pointed out is that a significant number of personnel of the regions

and the municipalities decided not to answer in this question. Limited skillset of the personnel on correlating complex meanings could be another reason and could decisively prove that there is a clear need for specific training on smart cities with material developed to create complex thinking synthesizing ideas and goals.

A well-known smart city framework for Vienna was followed in order to ask the participants in the survey questions relevant to the overall quality of life improvement. The Smart City Wien Framework Strategy (SCWR) was developed to set the priorities and pave the way for the city Vienna to focus on the wider European climate targets for the next decades, specifically focused on energy, mobility, buildings, and infrastructure (Smart City Wien, 2019). The questions to be answered were trying to link the different SCWR categories with the quality of life of the citizens (figure 7).

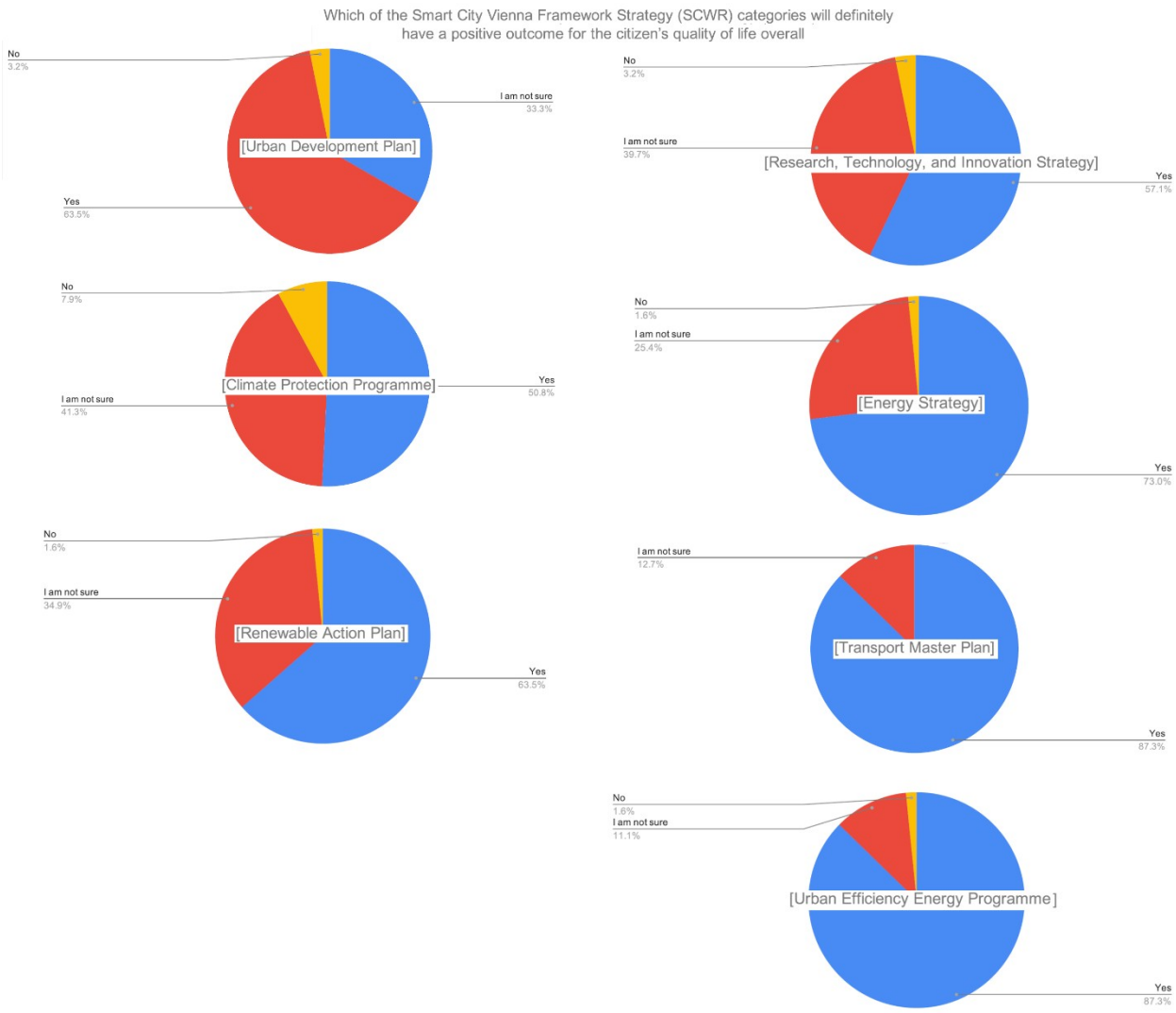

Figure 7. Question: Which of the Smart City Vienna Framework Strategy (SCWR) categories will definitely have a positive outcome for the citizen's quality of life overall?

It was revealed that in all cases (and different SCWR categories) the respondents believe that they will have overall a positive outcome for the citizen's quality of life. This was more profound in the cases of "Transport Master Plan" and "Urban Efficiency Energy Programme" where the positive answer was more than 87%. The lowest positive percentages – still high enough and clearly higher than 50% – were observed in the "Climate Protection Programme" and "Research, Technology, and Innovation Strategy".

Conclusions

This study was focused on registering the ideas and viewpoints of personnel working on municipalities, regions, and the wider public sector relevant to smart cities deployment. The study took place in five countries and answers were collected by respondents from Lithuania, Denmark, Slovakia, Italy, and Hungary on the matter. In general, it was revealed that there is need for further training for the public sector in order to deal with the increasing challenges that the transition to more intelligent communities will bring along. Complexity of tasks towards this direction needs further support. It was also interpreted that smartness and evolvement should not violate privacy and careful data sharing and management – the one should not preclude the other and scepticism should not backfire and destroy the huge potentials of the future intelligent and integrated communities.

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