

SMART CITY STRATEGIC PLANNING: ARE THERE SOCIAL GROUNDS IN MEDIUM-SIZED POLISH CITIES?

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Abstract: The concept of the smart city is about introducing new technologies to improve urban citizens' quality of life. It is particularly connected with Information and Communication Technologies (ICTs). Every Polish city is introducing some elements of the concept of the smart city. The biggest cities are leaders in the process; the question is: what about medium-sized cities? To effectively develop and implement the concept of the smart city strategic planning process the attitude of urban citizens must be assessed. The aim of the article which could be treated as a study novelty is to answer the questions whether citizens of medium-sized cities want the smart city offices to be particularly important matter. To answer these questions a survey was carried out with a group of 2500 citizens of 5 medium-sized cities in Poland (500 respondents in each city) using the CATI method. Study results are that citizens generally support the idea of the making the concept of smart city a city priority and are even more supportive of developing of e-services in the city offices.

Keywords: Smart city, city strategic planning, ICT firms

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Introduction

The smart city is about using new technologies (especially Information and Communication Technologies–ICTs) to improve quality of life of urban citizens and it paves the way for more sustainable development. ICTs are developing at an everincreasing pace, and they alter urban experiences and they change our urban experiences as well as the way we perceive a city (Wessel et al., 2018). However the smart city should not be limited or concentrated only on new technologies and techno-centric vision (Wang, 2017, Androniceanu and Georgescu, 2023; Szpilko et al., 2023). It also provides additional means which make a substantial contribution to modelling new scenarios of urban development and increase civic participation and improve decision making processes (Moore, 2016; Cioca et al. 2011). It seems that planning and implementing the concept of the smart city without the participation of urban citizens will be doomed to failure. So far researchers have concentrated mainly on the characteristics of smart city without paying much

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attention to the urban citizens and whether they support the project (Leung and Lee, 2021). However in this respect, there have been some exceptions (Simonofski, 2019). There is a research gap in the range of smart city planning in medium-sized cities. One exception is a publication containing an empirical analysis of mediumsized Italian cities providing the assessment of their smart city planning in various dimensions. The results among others are that smart people are definitely the weakest dimension in planning documents of the medium-sized Italian cities (Bruno and Fontana, 2021). The mentioned analysis of the Italian medium-sized cities uses methodology of analyzing planning documents of 19 cities starting with key words screening (Bruno and Fontana, 2021). A Similar type of methodology is also used by researchers in other countries (Głębocki, 2021b). With this in mind starting points for the author were two research gaps in analyzing the concept of smart city: one is about medium-sized cities and another one is about their citizens. In an attempt to respond to these research needs, the author carried out a survey with answers given by 2500 respondents in five medium-sized cities in Poland. The aim of the research was reaching the answers for the following questions: "Should development using IC Technologies making citizens' life easier, be made a city priority?" and "Should e-government tools be developed to run more errands at city office and city units in electronic form?". The article starts with a review of relevant literature on the concept of the smart city, and its strategic planning. The latter part of the literature review concludes with a couple of recommendations for city planners. Next the methodology of research is presented, followed by research results and discussions. The article ends with conclusions.

Concept of smart city

The smart city concept is important because it reflects how new technologies are used by public administration in the current century (Clark, 2020). While many local authorities are trying to do something about implementing the concept of the smart city few of them know exactly how to do it in practice. There is a growing number of publications about the smart city but not many of them actually address the issue of its implementation (Noori et al., 2020). There could be also some dangers in the process of smart city implementation especially when the project is introduced in African cities. For example, it might even deepen existing inequalities and worsen spatial exclusion through privatization and marketization of urban space (Bandauko and Arku, 2022).

The diffusion of technology related to implementing the concept of the smart city enhances the process of building a new market, in which cities are clients and more importantly, places of innovation, production, distribution and consumption. It results in new products which make the urban environment to be better, safer and greener (Clark, 2020). The cities could be clients of not only big international companies but also local SMEs active in the ICTs sector (Głębocki, 2022). However, closer cooperation with big international companies could be somewhat risky, raising many doubts (Flynn and Valverde, 2019). On the other hand it could be mutually beneficial because these firms (as e.g. IBM, Cisco, Siemens) have been working on smart city solutions for a longer period of time. IBM is working on marketing, modelling, and visualization practices that reduce and simplify urban problems by selling proprietary software packages, consultancy services and hardware to city governments (McNeill, 2015).

Cities could shape the tactics and participate in setting goals for implementing the concept of the smart city (Clark, 2020). So the cities should and could be not only recipients of the smart city solutions but also creators and participants of the smart city implementation process in cooperation both with global ICT firms and local firms active in the sector. For this to happen leadership is important. Mayors often play a pivotal role in realization of smart city initiatives. They have important role in creation organizational arrangements also for information sharing (Gil-Garcia et al., 2021).

The concept of the smart city could assist in the process of making cities more sustainable (Courtit et al., 2020). Various theories are being developed in relation to sustainability, one of which is sustainable smart city transitions (Mora, 2021). Policies and technical solutions in respect to sustainability and smart cities are fragmented, and there are many unexplored opportunities within the field of smart sustainable development (Angelidou et al., 2018).

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Land planning and city planning have experienced various eras, attitudes, trends and methods. The emerging smart city planning, being a specific type of planning in itself, is also connected to the whole land planning field.

Land planning polices have been evolving over the last few decades. In 2012 Chapin identified four different eras of planning management policies: growth control, comprehensive planning, smart growth and sustainable growth (Chapin, 2012). In the theory of urban development, the current dominant trend observed by some is evolutionary perspective in which it is assumed that bottom-up processes of shaping cities dominate, consequently hardly any city planning makes any sense. In relation to the smart city, it should be emphasized that smart city planning is a complex process by nature being a synthesis of technologies, user engagement and windows of opportunity which are hard to predict (Komninos et al., 2018). Most planners in the US perceive smart city planning as necessary and timely. At the same time these planners indicate that there is a lack of demand from policy makers and citizens (Meenar and Afzalan, 2022). One manifestation of new attitudes towards land planning policies was a bill passed by the California Senate (SB 375) in 2008, which was to diminish greenhouse gas emissions by reducing city sprawl (Barbour and Deakin, 2012).

Methods of analyzing city planning comprise various stages and directions. One of these is an analysis of general plans in various respects e.g.: the occurrence of Environmental Justice (Brinkley and Wagner, 2022). In relation to the smart city, with its designing, implementing and assessing implementation effects, the inputoutput model could be used (Noori et al., 2020). In the analysis of smart city planning, one of the elements to be analyzed could be planning cooperation between city government and ICTs firms (Głębocki, 2021a). Smart city development studies could be linked to multidisciplinary theoretical foundations of: transition management and system innovation research, human geography, and spatial planning (Mora, 2021). Sociology, Human Resources Management, and Strategic Management could also be added to this list.

Smart citizens are crucial for the success of smart city project, yet they are rarely involved in smart city planning (Shelton and Lodato, 2019). Not only should citizens be well prepared to be recipients of smart city: they also need to be involved in its construction (Franz, 2013). Taking the above into account it is important to keep in mind that in creation of a smart city strategy a city should begin with its citizens - representative survey on the current level of support from citizens for the concept of the smart city in various aspects (the survey presented in this article is an example of the areas in which such research could be carried out). Next smart city strategy should be developed, again with the involvement of its citizens. It is not only about creating a smart city strategy with the planned involvement of citizens co-creating internet based applications (Komninos, 2013) but also about the involvement of citizens to the very process of strategy creation. Finally city budgets should reflect the smart city strategy. In the Central and Eastern Europe elements of smart cities are often being put into municipal budgets to be financed by EU funds (Ibanescu et al., 2022).

Research Methodology

Research has been carried out in November-December 2021 in form of a survey with participation of inhabitants of five cities. Out of the scope of research was surveying local government officials which could be done in the future even if there are many problems with surveys directed at city officials, especially in case of on-line surveys (Krause R. et al., 2023). Five medium-sized Polish cities were chosen for this survey: Gdynia, Gliwice, Kielce, Rzeszów and Toruń. The populations of the cities range from 175.000 (in the case of Gliwice) to 244.000 (in the case of Gdynia). By Polish standards these cities could be described as medium-sized. There are 11 Polish cities bigger than Gdynia, and there is only one Polish city with more than 1 mln citizens: Warsaw (1 796.000) (www.polskawliczbach.pl, 2021).

The method used to acquire data was the CATI interview assisted by surrounding techniques. There were dedicated two-way info-lines created with the appropriate prefix number for each area. The process of gathering data was based on telephone interview technology supported by automatic voice communication technology: Voice Bot. During the introduction, respondents were given basic information on the project and its goals as well as request for participation in the survey. If interested, respondent was connected with a real person conducting the survey. When asking the questions, a numerical rating scale was given to the respondents from 1 to 5 (1 definitely no, 2, 3, 4 and 5 definitely yes). The survey had been carried out on representative sample of citizens of each of the five cities. Representativeness related

to place of living, age and education. In the group of 2500, every city is represented by 500 respondents. Respondents were broken into six age groups: 15-24, 25-34, 35-44, 45-54, 55-64 and 65 and more. Another division was according to the education of respondents which reflects specific groups of the Polish educational system in last decades: primary education, lower secondary education, basic vocational education, secondary education and higher education.

Research Results

The research results are presented below in the following order:

- Table 1 shows the average results based on answers from the five cities and the total average result for the Question 1: "Should development using IC Technologies, making citizens' life easier, be made a city priority?"
- 2) Table 2 shows the average results based on answers received from the five cities and the total average result for Question 2: "Should e-government tools be developed to run more errands at city office and city units in electronic form?".

	Gdynia	Gliwice	Kielce	Rzeszów	Toruń	Total
1. Should development using IC Technologies, making citizens' life easier, be made a city priority?	3,45	3,69	3,60	3,52	3,50	3,57

Table 1. Average results based on survey responses toQuestion 1 in the 5 cities and in total.

Source: Own survey: in every city N=500, in total N=2500. Scale from 1 to 5.



 Table 2. Average results based on survey responses to

 Question 2 in the 5 cities and in total.

	Gdynia	Gliwice	Kielce	Rzeszów	Toruń	Total
2. Should e-government tools	3,80	3,96	3,87	3,79	3,80	3,84
be developed to run more						
errands at city office and city						
units in electronic form?						

Source: Own survey: in every city N=500 and in total N=2500. Scale from 1 to 5

The figure below shows the total results for the two questions, broken down by age and education.



Figure 1: Answers to Question 1, broken down by age and education Source: Own survey, N=2500

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Figure 2. Answers to Question 2, broken down by age and education Source: Own survey, N=2500



Figure 3: Structure of the survey's respondents, broken down by five examined cities

Discussion

In this study the author examined the attitude of citizens of medium-sized Polish cities' towards the concept of the smart city in terms of: 1. Making development using IC Technologies a city priority and 2. Developing e-government tools to run more errands at city office and city units in electronic form.

The key findings which emerged are that citizens are generally in favor of making development using IC Technologies as a city priority and that citizens are even more in favor of developing e-government tools to run more errands in city office and city units in electronic form. The total average result in case of the question on ICT development as city priority for all five cities combined was 3,57, which could be described as a "general yes" with the highest result being recorded in Gliwice (3,69) and the lowest in Gdynia (3,45). The difference between average results in cities was not very great -0,24. The total result for all five cities combined to the second question was 3,84, which could be described as a simple "yes", with the highest result being recorded in Gliwice (3,96) and the lowest in Rzeszów (3,79). Again the difference between average results in cities was not great. In fact it was even less than Question 1: only 0,17.

The results generally mean that there are already good social grounds for implementing the concept of the smart city in medium-sized cities in Poland. This is despite the fact that there are no campaigns promoting smart city concept in any of the cities surveyed (with the exclusion of Kielce), which could increase support from citizens for making a development using IC Technologies a city priority. If the whole concept were explained to citizens in detail, especially its benefits for citizens which would make their life easier, the level of support would probably be much higher.

Of course, it is not only about promotion but also developing ICT tools to be more friendly to citizens. The gap between citizens and technologies should be reduced and, The city ICT systems should be more interactive. Not only does it relates to key points of the city but also to improving interfaces provided by the ICT industry to cities' governments (Oliveira et al., 2020).

After the survey was carried out, the city of Kielce was the first one in Poland to create a strategy for making it a smart city. A better response to the idea of making development of e-government than to making smart city implementation as a city priority showed that the citizens support more concrete proposals.

One interesting finding is that there are no great discrepancies between cities in relation to the two issues. In the case of making development using IC Technologies a city priority the difference between the city most in favor and a the city least in favor is only 0,24, while in case of developing e-government, the value for the same indicator is just 0,17. This could possibly stem from the fact that the state structure and administration of Poland is a kind of unitary state and current Polish society is relatively uniform in comparison with other European countries (Kulas, 2022).

The reluctance of some urban citizens to developing a city which makes much more use of ICT technologies could result from fear of insufficient data security and

privacy. However these problems should be solved in the future. In a smart city strategy, data security and privacy must be a top priority, otherwise engaging citizens in developing and implementing the concept of the smart city as well as their support for the whole idea will be endangered.

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The highest average results for the two questions among the five cities were recorded in Gliwice. Not only is this city well-known for the Silesian University of Technology but also for its conscious and consistent policy set on IC Technology economic development. In both questions the second highest results were attained by Kielce. The reason could be that it is the first city in Poland to begin long preparation for creating a smart city strategy. The city won a grant in a competition entitled "Human Smart Cities. Intelligent Cities Co-created by Citizens", awarded by the Polish Ministry of Investments and Development. The grant was awarded to Kielce for the years 2019-2022 as the city received the highest number of points in a competition involving the 13 biggest cities in Poland. The project was about the system of monitoring the effectiveness of intelligent city in a municipal audit. The project served as a pilot scheme, and there are hopes that its results will improve management of the city. It was implemented by the city of Kielce together with the Kielce University of Technology and Jan Kochanowski University of Kielce. A surprisingly low level of support in the case of both questions was recorded in Gdynia, a city which lists cooperation with the ICT sector as one of top priorities in its municipal strategy. The possible reason is that there is no university of technology in Gdynia.

In the first question, the age groups most in favor of making the development of ICT a city priority was 25-34 and 35-44 and in the group least in favor ICT city priority was the age group 55-64. The fact that younger groups are even more in favor of developing ICT as city priority confirms that the potential for smart city solutions will grow in medium-sized Polish cities in the future. As far as education is concerned, people with higher education are most in favor of making ICT a city priority. This confirms that citizens with a lower level of education are more afraid of using ICT tools – which could also be because they may be less literate in IC Technologies.

In the second question most in favor of developing e-government were the age groups 35-44 and 45-54. Probably it is so, because these age groups are most burdened with running errands at the city offices and city units and they perceive developing public e-service as helpful in their daily life. As far as education of respondents is concerned groups most in favor of developing e-government were those with primary and higher education and secondary education. It seems that in the second question one can not make a conclusion: the higher education the stronger support for developing public e-services. The reason could be that in running errands at public offices the citizens in every education group are skilled enough to use e-government tools.

Conclusion

The smart city is about using new technologies to improve quality of life of a city citizens and it paves the way for sustainable development. It is particularly connected with Information and Communication Technologies (ICTs). Implementation of the concept of the smart city may assist in making cities more sustainable. Cities should not only be recipients of smart city solutions but also creators and participants in the process of implementing the concept of the smart city, in cooperation with both global and local firms active in the sector.

Few steps in planning smart city concept realization could be: 1) creating a smart city strategy, starting with its citizens (a representative survey on the current level of support from citizens for the concept of the smart city in various aspects should be carried out), 2) a smart city strategy should be developed with the involvement of citizens, 3) concrete actions with the involvement of citizens should be included in city budgets.

So far, researchers have concentrated mainly on the characteristics of the smart city without paying much attention to urban citizens or whether they support the concept of the smart city. However, this seems to be a crucial point. There are quite a number of works on the smart city in general but very few about the smart city as a concept to be implemented by medium-sized cities. In an attempt to fill these two research gaps, the author carried out a survey in five medium-sized cities in Poland. The results are that citizens of these medium-sized cities generally support making the concept of smart city a city priority and are even more supportive developing eservices in city offices and units.

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PLANOWANIE STRATEGICZNE SMART CITY: CZY W ŚREDNICH POLSKICH MIASTACH ISTNIEJĄ PODSTAWY SPOŁECZNE?

Streszczenie: Koncepcja inteligentnego miasta polega na wprowadzaniu nowych technologii w celu poprawy jakości życia mieszkańców miast. Jest to szczególnie związane z technologiami informacyjno-komunikacyjnymi (ICT). Każde polskie miasto wprowadza pewne elementy koncepcji inteligentnego miasta. Liderami tego procesu są największe miasta; pytanie brzmi: co z miastami średniej wielkości? Aby skutecznie rozwijać i wdrażać koncepcję inteligentnego miasta, konieczne jest przyjęcie pewnego rodzaju strategii. Na początku procesu planowania strategicznego inteligentnego miasta należy ocenić postawę mieszkańców miast. Celem artykułu, który można potraktować jako nowość naukową, jest odpowiedź na pytania, czy obywatele miast średniej wielkości chcą, aby koncepcja inteligentnego miasta była priorytetem miasta i czy uważają rozwój e-usług urzędów miast za szczególnie ważną sprawę. Aby odpowiedzieć na te pytania, przeprowadzono badanie metodą CATI na grupie 2500 mieszkańców 5 średnich miast w Polsce (po 500 respondentów w każdym mieście). Wyniki badań wskazują, że obywatele generalnie popierają ideę nadania koncepcji inteligentnego miasta priorytetu miast, a jeszcze bardziej popierają rozwój e-usług w urzędach miejskich.

Slowa kluczowe: inteligentne miasto, planowanie strategiczne miasta, firmy ICT