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Smarter cities in post-socialist country: Example of Poland

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ABSTRACT

Currently, when discussing the development of urban areas in post-socialist countries, it is common to highlight a new stage of urbanisation known as smart city creation. Nowadays, increasingly more cities are labelled as intelligent or smart; however, there is no clear-cut definition that specifies the criteria for considering a city as intelligent or smart. The existing sets of criteria are relatively ambiguous and have different priorities depending on the region. The socio-economic transformation of post-socialist countries generated new circumstances in terms of managing cities, especially in social and governance aspects. European funding allows for building smart infrastructure. Thus, it is essential to determine whether, to what degree and on what grounds post-socialist cities may be considered smart in the entire context of their human and technical dimensions.

1. Introduction

In the last 20 years, the concept of a smart city has become important in urban development planning because technological progress is rapidly occurring and because the challenges facing local authorities regarding the resolution of climatic, energy and urbanisation problems are increasing. The key to solving these problems in cities is to develop and implement advanced technologies that aim to improve the quality of city life and reduce the city's operating costs while considering the goals of sustainable development (Ahvenniemi, Houvila, Pinto-Seppä, & Airaksinen, 2017).

Although the discussion regarding conceptual frameworks for smart cities has been occurring for several years, a single, unambiguous definition of smart cities has not yet been developed. In its essence, the concept of a smart city concentrates on the use of advanced technologies, including information technology, as well as the activity and creativity of its inhabitants. In the concept of a smart city, digital telecommunication networks are likened to a city's nervous system, while the role of the brain is played by the devices that control the system using the information obtained by a network of sensors (Mitchell, 2007). Existing definitions emphasise different aspects and often focus, to different degrees, on different areas of the city's function (e.g. Marek, Campbell, & Bui, 2017; Caragliu, Del Bo, & Nijkamp, 2011; Allwinkle & Cruickshank, 2011; Giffinger et al., 2007; Komninos, 2002, 2015; Lombardi, Giordano, Farouh, & Wael, 2012; Shapiro, 2008).

Neirotti, De Marco, Cagliano, Mangano, and Scorrano (2014) conducted a review of the literature that classified urban initiatives for smart cities and characterised individual elements from hard (e.g. energy grids, environment, transport and mobility, public security etc.) and soft domains (e.g. education and culture, e-government, social inclusion, economy). As defined by the European Commission, a smart city uses digital technology to increase productivity and improve living conditions, reduce costs and save resources, as well as increase civic activity. Key sectors of smart cities include transport, energy, health care, water management and waste management. A smart city is also capable of responding to any city crises more quickly and responsibly because it has a high level of urban resistance (Ferrara, 2015). Network infrastructure and advanced technologies are used to increase the city's economic and political efficiency, as well as its socio-economic development (Hollands, 2008, 2015). On this ground, there are some doubts related to the goals of a smart city. Critics of the concept note that there is often a lack of emphasis on ecological sustainability in the literature on the subject. The overriding approach is to presume positive links between advanced technologies, public benefits and the resulting control of urban systems (Colding & Barthel, 2017). While economic and social objectives are quite clear and do not raise much controversy, the importance of environmental goals is often diminished in the literature. As rightly noticed by Ahvenniemi et al. (2017), smart city's objectives in city policies are often close to the goals of sustainable development. However, the authors argue that in UN and EU documents on smart cities there is a predominance of goals related to the reduction of CO2 emissions or energy efficiency, with a deficit of environmental indicators in the assumptions of urban policies. In the area of mobility, smart city goals are in fact duplicating the assumptions of the “2030 Agenda for Sustainable Development” adopted by the UN General Assembly in 2015 (Zawieska & Pieriegud, 2018).

The debate on the benefits of using the smart city concept in urban development strategies seems to be endless. Undoubtedly, the use of

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ICT enhances the quality of life in cities (Cugurullo, 2013; Hollands, 2008; Komninos, 2002; Townsend, 2013; Anthopoulos, 2017), but the technocratic vision of the city adopting the full integration of its cyber-physical environments is heavily criticised. Topics include smart communities (Morse, 2004) and smart initiatives in urban governance (Van der Meer & Van Winden, 2003, Komninos, 2015), as well as social capital and the ability of cities to attract and retain top-class professionals (Murray, Minevich, & Abdoullaev, 2011). In the context of the economic sphere, smart cities are characterised by intelligent, creative industries that use information and communication technologies in the production process. In addition, this concept is also used in parks and business districts in which intelligent companies are located (Lombardi et al., 2012). Some authors underline the importance of formalising and codifying ICT-based services in a modern, intelligent economy (Anttiroiko, Valkama, & Bailey, 2014). A review of the literature and the commercial ranking of smart cities allow for identifying indicators that measure the level of urban intelligence connected with the cities' key success factors, which can be grouped from the perspective of the selected thematic area and are linked to the dimensions of the city's functioning. Their hierarchy of importance is not uniform but depends on the specificity of the region (Batagan, 2011; Giffinger et al., 2007; Klopp & Petretta, 2017; Lombardi et al., 2012).

Direct references to the smart city concept can be found in many commercial city rankings, such as the Spatially Adjusted Liveability Index (Economist Intelligence Unit), the Quality of Living Survey (Mercer Consulting Human Resources), the Networked Society City Index (Ericsson), the Smart Cities Index (IDC) and World's Smartest Cities (IEES). However, the rankings apply heterogeneous methodologies that consider not only different indicators, but also different urban dimensions. In this context, it is difficult to disagree with Angelidou (2015), who notes that intelligent urban solutions are driven mainly by supply and not by demand, and supply is the main factor that affects the quantity and price of smart urban products offered on the market.[1] Undoubtedly, the characteristics of the intelligent city also apply to its inhabitants. It is recognised that the higher the level of qualification of city dwellers, the greater their cultural and social diversity, the more open and creative the urban community and the higher the standard of living in the city. Education plays a key role in this area, as it increases and levels the job market (Betz, Partridge, & Fallah, 2016). Equally important is the development of advanced technologies that have a positive impact on the social and economic sphere of the state by transforming existing employment, governance, education, production and service systems. In connection with the social dimension, the smart city concept uses terms such as social inclusion, e-governance or e-democracy (Silcock, 2001; Torres, Vicente, & Basilio, 2005; Lombardi, Cooper, Paskaleva, & Deakin, 2009; Lombardi et al., 2012; Tranos & Gertner, 2012). Advanced technologies that ensure interoperability and data exchange between different actors in collaborative activities are an important tool (Alfazan, Sanchez, & Evans-Cowley, 2017; Sorrentino & De Marco, 2013).

The remainder of this article is organised as follows: part two contains a short background on the development of Polish cities after the political and socio-economic transformation of 1989 and justifies the choice of the topic. Part three contains a description of the test method and its results. The fourth part contains discussion, conclusions and recommendations for the Polish city authorities to implement the vision of a smart city in the future.

2. Background

Understanding the current dynamics of urban development processes, not only in Poland but also in other Central and Eastern European countries, requires a reference to the historical determinants and causes of development delays in the economic and material-spatial dimensions. After the Second World War, the way of rebuilding the cities of the Eastern Bloc was significantly different from that of Western Europe. In cities, large prefabricated housing estates of low quality were often built, often as the base for the emerging industry (Zborowski, Soja, & Łobodzinska, 2012). Nationalised townhouses in city centres have fallen into disrepair due to the lack of funds for current operations and the required repairs.

The changes in Central and Eastern European cities after the fall of communism were primarily concerned with the negative effects of multi-year planning errors and the resulting problems, including, but not limited to, subsequent urban depopulation, spatial chaos and the lack of financial resources for further development (Schmidt, Fina, & Siedentop, 2015; Sykora & Bouzanovsky, 2012; Stanilov, 2007; Hirt, 2006; Tsenkova & Nedović-Budić, 2006; Hamilton, 2005), as well as the progressive suburbanisation caused by the outflow of economically stronger populations from the devastated city centres to the suburban areas (Górczyńska, 2014). After the transformation of the Polish economy, Polish cities were in a new situation in terms of management and operation. The intensive socio-economic changes taking place in Poland considerably impacted the urban spatial structure and political decisions aimed at raising the quality of life in cities. The appearance of these negative transformational effects has led to dramatic changes in urban populations, and many cities have fallen into the trap of shrinking (Haase, Rink, & Grossman, 2017; Rink et al., 2014).

The consequence of the fall of communism in Poland was a change in the rules governing the country. In 1990, in addition to government administration, a self-governed local government was established, which was characterised by independence and autonomy in carrying out its tasks. Since then, local government has enjoyed a new status in ownership relations, consisting of the right to own property and other property rights that constitute municipal property. However, in this new reality, local authorities lacked sufficient financial resources for the renewal of cities, especially their central areas, which were underinvested under communism. Groups of economically more powerful populations flowed from the increasingly devastated city centres, resulting in effects such as suburbanisation, socio-spatial segregation, social inequality and gentrification (Marcińczak, 2012; Marcińczak & Sagan, 2011).

Poland's accession to the European Union[2] and subsequent receival of EU funds has initiated the regeneration of the central areas in Polish cities. Revitalisation and urban renewal were, however, significantly delayed processes in relation to Western European countries (Ciesiółka, 2014). The smart city concept in EU documents originally focused only on the possibility of rapid progress regarding the goals of EU energy strategies and climate targets. Its intent was initially to support cities and regions in pioneering greenhouse gas reduction through a sustainable energy economy (European Initiative on Smart Cities, 2010; Smart Cities and Communities, 2012) and then evolved towards an information and communication infrastructure to support the city's harmonious development in areas such as economy, transport, the environment, society, quality of life and co-ordination (Mapping Smart Cities in the EU, 2014).

In the modern debate on the development of urbanised areas in Poland, more and more cities are labelled “intelligent” or “smart”, despite the lack of clear definitions and criteria that cities must fulfil to be considered intelligent or smart. At the same time, these cities, which

[1] In the case of Poland, this is particularly evident during national smart city conferences and forums, in which keynote speakers are mostly representatives of companies involved in the implementation of intelligent products for cities.

[2] Poland entered the European Union in 2004. Since 1999, a three-tiered administrative division has been in power, dividing the country into 16 regions (NUTS-2), 314 districts and 66 district cities (NUTS-4) and 2478 municipalities (NUTS-5). Large regions are by definition capable of carrying out regional policy and performing supra-local tasks. Municipalities carry out their own tasks at local level, at their own responsibility and financed from their own income (mainly non-income taxes).