

Introduction

The concept of smart city has become increasingly popular and used in international policies, as well as in academic circles and literature, in the last two decades. To understand why this concept is becoming more and more known, it is important firstly to recognize the reasons cities are considered key elements of the future.

Cities and metropolitan areas are powerhouses of economic growth, contributing about 60% of global GDP¹. More than half of humanity, and that is around 3.5 billion people, live in urban areas today, and the predictions are that this proportion will increase to 60% by 2030 and almost 70% by 2050². The importance of urban areas as a global phenomenon could be seen in Asia, Africa and Latin America where the rapid expansion of megacities that have more than 20 million inhabitants is resulting in the fact that 828 million people live in slums today³. Nearly 40% of overall built-up expansion and nearly 80% of population growth has taken place in urban areas in Africa and Asia, and the build-up footprint of urban areas in Asia increased by 65% in the last 25 years⁴. Furthermore, it is estimated that around 9 400 new cities will be structured or restructured quickly by the mid of this century⁵, and what is astonishing is the fact that 75% of the infrastructure that will exist in those cities by that time is not even built yet⁶.

A prime role of cities in social and economic development goes hand in hand with a huge impact on environment. Cities generate approx. 70% of the worldwide CO₂ emissions and cause air, water and environmental pollution⁷ and consume between 60% and 80% of energy

¹ <https://www.un.org/sustainabledevelopment/cities/> accessed: 11/20/21

² https://www.undp.org/speeches/future-cities?utm_source=EN&utm_medium=GSR&utm_content=US_UNDP_PaidSearch_Brand_English&utm_campaign=CENTRAL&c_src=CENTRAL accessed: 11/20/21

³ <https://www.un.org/sustainabledevelopment/cities/> accessed: 11/20/21

⁴ <https://urban.jrc.ec.europa.eu/thefutureofcities/urbanisation#the-chapter> accessed: 11/20/21

⁵ Gil Olga, *Innovations of Governance in Cities and Urban Regions: Smart Cities in China, Iskandar (Malaysia), Japan, New York and Tarragona (Spain)* (the paper presented at EURA Conference: Cities as Sheedbeds for Innovation, Enschede, The Netherlands, 4-6 July 2013)

⁶ Dušan Damjanović et al., *Pametni gradovi Srbije: Inovativnost i rezilijentnost lokalnih zajednica u Srbiji 2021. godine* (Beograd: PALGO smart, 2021), 23

⁷ K.J.Fietkiewicz, W.G.Stock, *How "Smart" are Japanese Cities?* (the paper presented at 48th Hawaii International Conference on System Sciences, Kauai, Hawaii, USA, 5-8 January 2015)

worldwide⁸. But not only that cities are the biggest exploiters of natural resources, they also generate the larger part of waste. The metabolism of cities generally consists of the input of external resources and goods and the output of waste and other negative externalities, which further deepens economic and social issues. This is the reason why intelligent disposal together with a sustainable recycling system in congested urban areas has been one of the main themes in the international debates on sustainable development⁹. The deployment of new and advanced technologies is seen as key factor in decreasing greenhouse gas emissions and improving energy efficiency of cities, and that is the reason why the investments in ICT infrastructures and digital technologies were seen as a key in fueling sustainable growth, fighting against climate change and enhancing the overall wellbeing of citizens. This is why at a time when the term ‘smart city’ was used for the first time, and long after it, the focus was on the significance of new ICT and digital transformation of the cities. For two decades, digital innovation has been at the heart of discourse around “smart cities” to build more efficient urban environments¹⁰. However, as we will see later in this paper, the concept of the smart city is not limited to the application of smart technologies to cities, and many authors criticize this techno-oriented approach and try to put in a spotlight the role of social capital and relations in urban development.

Theoretical perspectives of the concept “smart city”

The concept “smart city” was introduced in 1994 and since then much of the discussion related to smart cities has revolved around, as we said, technological dimension, mostly because of the initial lead role by corporate organizations and their initiatives that tended to focus on the development of cloud based platforms¹¹. The literature which highlights the use of ICT and modern technologies as a key to a smart city is extensive, and even though this concept was first used more than 25 years ago, there is still no single template or a coherent and inclusive

⁸ Vito Albino, Umberto Berardi & Rosa Maria Dangelico (2015) “Smart Cities: Definitions, Dimensions, Performance, and Initiatives”, *Journal of Urban Technology*, 22:1, 3-21.

⁹ K.J.Fietkiewicz, W.G.Stock, *How “Smart” are Japanese Cities?* (the paper presented at 48th Hawaii International Conference on System Sciences, Kauai, Hawaii, USA, 5-8 January 2015).

¹⁰ OECD (2019), *Enhancing the Contribution of Digitalisation to the Smart Cities of the Future*, 4.

¹¹ *Ibid.*, 6.

definition of it. This allows a lot of space for individual interpretations and preferences, which leads to saturation of discourse related to this concept. Almost every author and private company, even different countries and national policies, have their own definition of “smartness” and what “smart city” should look like. Covering and analyzing all those definitions extends the range and capacity of this paper, so we will try to focus on major perspectives and main debates that dominated in the discourse related to the concept we are talking about.

In general, there are two mainstreams in the present smart city discussion:

1. the ICT and technology oriented approach and
2. the people oriented approach.

Angelidou calls this a dimension of smart cities ranging from strategies that target the efficiency and technological advancement of the city’s **hard infrastructures**, such as natural resources, mobility, buildings, logistics, water and waste management, where ICT plays a decisive role in the functions of the systems, to those focusing on the **soft infrastructure** and people where the application of ICT is not usually essential, such as education, culture, social inclusion, government and policy innovations¹².

All definitions stress the importance of ICT and modern technologies for the 21st century. Possible confusion related to the technology perspective of a smart city comes from the initial top-down and company-driven actions taken for creating a smart city. This approach was criticized for being too focused on technological infrastructure of urban development, neglecting the actual knowledge of how cities function and disregarding the value of complexity, unplanned scenarios, and the mixed uses of urban spaces. It could be said that more recent definitions took into consideration these critics since we can see that more and more authors are orienting towards stressing the importance of the social capital of the city, and adapting smart technologies to people’s needs rather than adapting their lives to technological demands.

¹² Hannele Ahvenniemi et al., “What are the differences between sustainable and smart cities?”, *Cities*, 60(2017): 234-245.

From the technology perspective, Nam and Pardo define a smart city as a city with great presence of ICT applied to critical infrastructure components and services¹³. According to Lombardi et al. several smart city definitions emphasize the use of modern technologies in everyday urban life resulting in innovative transport systems, infrastructures, logistics and green and efficient energy systems¹⁴. However, in this paper we will focus on broader understanding of smart cities that also highlights the use of modern technologies, but sees them more as an enabler for better quality of life and decreased environmental impacts. In the center of this understanding are the people, a component which was missing for a long time in defining a smart city. According to this anthropocentric approach, people are the protagonists of a smart city and they shape it through their interactions, knowledge, creativity and connections. The accent is on the role of human capital in improving environmental, economic and social sustainability in urban areas, instead of high tech solutions and modern infrastructure. However, this perspective doesn't disregard the relevance of ICT technologies in developing smart city projects, but rather promotes the reciprocal relationship between social and technological components. For example, Bakici et al. define smart city as "high-tech intensive and advanced city that connects people, information and city elements using new technologies in order to create a sustainable, greener city, competitive and innovative commerce, and an increased life quality"¹⁵. In accordance with this, Kourtit and Nijkamp see smart cities as mix of four different types of capital (infrastructural, social, human and entrepreneurial), while Thuzar suggests that smart cities should converge economic, social, and environmental goals¹⁶. The United Nations Economic Commission for Europe's (UNECE) attitude towards the concept of smart cities is in compliance with these perspectives, defining it as "an innovative city that uses ICTs and other means to improve quality of life, efficiency of urban operation and services, and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social, environmental as well as cultural aspects"¹⁷.

¹³ Vito Albino, Umberto Berardi & Rosa Maria Dangelico (2015) "Smart Cities: Definitions, Dimensions, Performance, and Initiatives", *Journal of Urban Technology*, 22:1, 3-21.

¹⁴ Hannele Ahvenniemi et al., "What are the differences between sustainable and smart cities?", *Cities*, 60(2017): 234-245.

¹⁵ Vito Albino, Umberto Berardi & Rosa Maria Dangelico (2015) "Smart Cities: Definitions, Dimensions, Performance, and Initiatives", *Journal of Urban Technology*, 22:1, 3-21.

¹⁶ *Ibid.*

¹⁷ <https://unece.org/housing/sustainable-smart-cities> accessed: 11/20/21.

As we mentioned before, main discussions in the smart city discourse were set around two domains – “hard” and “soft”. Other metaphor that is used to categorize smart city views is “top-down” vs. “bottom-up”. Former views are the ones initiated by companies and national governments, while the latter address the importance of citizens’ participation and motivation for improving the quality of life in cities. For example, the concept of smart growth was largely used in the 1990s within the framework of New Urbanism, as a community-driven reaction to worsening trends in traffic congestion, school overcrowding, air pollution, and loss of open space. These goals are still among the reasons smart cities are attractive¹⁸. Bottom-up scheme implies that, according to Nam and Pardo, the community of a smart city needs to feel the desire to participate and promote a smart growth and, as Eger emphasizes, it has to make a conscious decision to use technology as a catalyst to solving socio-economic and environmental needs while respecting the goals of sustainability¹⁹.

The viewpoints that start with bottom-up perspective underline the significance of partnership between community members and institutions. However, company-driven initiatives also engage with political and institutional components and see smart cities as a product of cooperation between private and public sector. The result of one of European Union’s research projects that dealt with smart city concept was the finding that governance has a leading role to play in building the smart city, and that “cities should develop collaborative digital environments to boost local competitiveness and prosperity by using knowledge networks”²⁰. As Abdoulaye Mar Dieye, the UNDP special advisor to the administrator said: “smart cities do not rise by themselves; they have to be planned, designed, implemented, and managed effectively and thus require strategic policies and investments”²¹. The OECD definition of a smart city sees it as a combination of ICT and citizen participation, navigated by complex system of governance that consists of local administrations, public agencies, citizens, communities and firms²². No matter

¹⁸ Vito Albino, Umberto Berardi & Rosa Maria Dangelico (2015) “Smart Cities: Definitions, Dimensions, Performance, and Initiatives”, *Journal of Urban Technology*, 22:1, 3-21.

¹⁹ *Ibid.*

²⁰ Gil Olga, *Innovations of Governance in Cities and Urban Regions: Smart Cities in China, Iskandar (Malaysia), Japan, New York and Tarragona (Spain)* (the paper presented at EURA Conference: Cities as Sheedbeds for Innovation, Enschede, The Netherlands, 4-6 July 2013)

²¹ https://www.undp.org/speeches/future-cities?utm_source=EN&utm_medium=GSR&utm_content=US_UNDP_PaidSearch_Brand_English&utm_campaign=CENTRAL&c accessed: 11/20/21.

²² OECD (2019), *Enhancing the Contribution of Digitalisation to the Smart Cities of the Future*, 7.

how important is developing the latest high tech technologies and inspiring communities' motivation and creativity, urban and environmental public policies are the ones that decide where the resources will be directed, how the right environment for investments will be created, and if digital innovations will ultimately contribute to citizens' quality of life. As Thuzar pointed up, "smart cities of the future will need sustainable urban development policies where all residents, including the poor, can live well"²³.

To summarize, anthropocentric perspective is considered as more holistic understanding, since it implies that smart cities bring together technology, government and society to enable a smart economy, smart mobility, smart environment smart people, smart living and smart governance²⁴.

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²³ Vito Albino, Umberto Berardi & Rosa Maria Dangelico (2015) "Smart Cities: Definitions, Dimensions, Performance, and Initiatives", *Journal of Urban Technology*, 22:1, 3-21.

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