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DOES CITIZENS' INVOLVEMENT REFLECT SUSTAINABILITY IN SMART CITIES?

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Abstract

Though being highlighted for years as a core driver for smart cities to advance, a small body of research revealed the significant role of citizens in contributing to smart cities' maturity and sustainability. This paper emphasizes the importance of citizens' involvement in the decision-making process in smart cities through obtaining a high quality of life, ensuring rapid urban growth, attracting brains, talents, and skills in addition to raising productivity. All these serve as solid foundations for sustainability in smart cities and opens doors wide for future studies.

1. INTRODUCTION

Throughout recent years, the integration of advanced technologies in urban contexts led to the rise of the 'smart cities' concept and brought it to light. The term "smart cities" was first put into use in the 1990s. This period witnessed a remarkable link between the new ICT "Information and communications technology" and the term "smart cities", believed by many that the new ICT plays a crucial role in finding solutions for the newly rising challenges among cities (Chourabi et al., 2012). However, the related research intensity sharply increased after 2009 (Jong et al., 2015) when sustainable development, settlements, and management systems' reformation (Kulcsár & Szemerey, 2016) became the major focus of urban areas. Today, the term 'smart cities' is strongly associated and replaced by various terms including sustainable cities, digital cities, knowledge cities, humane cities, eco-cities, cyber cities, networked cities (Bibri & Krogstie, 2017), and many others of which all stress the use of ICT within the urbanized contexts.

As per UN DESA (2018), 55% of the world's population lives in urban areas today with an expectation of an increase of 13% to reach 68% by 2050. Yet, this sudden and rapid increase created new challenges and threatened the sustainability of smart cities (Neirotti et al., 2014) and their livable conditions (Chourabi et al., 2012) creating an urgent need for maintainable solutions that shield the core dimensions of smart cities where social and environmental implications become vital (ChuanTao et al., 2015, Bibri & Krogstie, 2017).

Through reviewing the literature, this paper tends to highlight the importance of citizens' involvement in the decision-making process in smart cities. Clarified through a conceptual model (Figure 1) this paper reveals how obtaining a high-quality of life, ensuring a rapid urban growth, attracting brains, talents, and skills in addition to raising productivity serve as solid foundations for sustainability in smart cities and opens doors wide for future studies.

2. LITERATURE LANDSCAPE
2.1 Smart Cities

A huge body of literature defined the term "smart cities" (Ramaprasad et al., 2017) and classified it differently. Eremia et al. (2016) believe that a smart city must be sustainable, and Sınmaz (2016) says that it's about strong individual security opportunities. Bakıcı et al. (2012) define a smart city as a high-tech intensive and advanced city, which aims to connect all three information, city elements, and people using new technologies. Bakıcı (2012) also adds that using high technologies, sustainable cities would form and so an increased quality of life will be reached. Caragliu et al. (2011) consider a city smart when high quality of life and sustainable economic growth are reached through smart investments in human, social capital, ICT, communication infrastructure in the presence of wise resources' management. Guan (2012) claims that when a city is equipped to face challenges brought by global, environmental, social, and economic trends to provide a happy and healthy community, it is said to be smart.

Moreover, Su et al.2011 define a smart city as "the product of a digital city combined with the IoT". It is also considered an urban environment that is capable of improving "the overall quality of their life" through the advanced services it provides to citizens (Piro et al., 2014:169), and this notion is shared again by Giffinger et al. (2007) claiming that cities that search and identify intelligent solutions to provide a great quality of services to its citizens are set to be smart. On the other hand, O'Grady and O'Hare (2012) argue that no single template or unified definition can frame a smart city.

2.2 Main Pillars of Smart Cities

Believed to form the main pillars of a smart city, scholars have sturdily shed light on several dimensions. Egedy's (2017) focus was on sustainability, efficiency, and wide participation. Giffinger et al. (2007) add smart economy and smart mobility to the previous list. Nevertheless, education, integration, applications, and innovation were part of Nam and Pardo's (2011) key dimensions, while Eger (2009) claims that job growth must be the main element too. Other scholars including Kourtit and Nijkamp (2012) in addition to Chourabi et al. (2012) consider entrepreneurial, infrastructural capital, governance, technology, and natural environment significant and therefore must be listed among such dimensions.

On the contrary, citizens were highly considered as a key dimension of a smart city by many authors including and not limited to Giffinger et al. (2007), who mentions it as "people", Barrionuevo et al. (2012) as "human talent, innovation, creativity, and education" Kourtit and Nijkamp (2012) as "human capital" including "skilled labor force" as an example, Chourabi et al. (2102) as "people and communities", in addition to Thuzar (2011), Eger (2009) and Mahizhnan (1999) who link people to life, spotting their significant existence in the list through including "quality of life" as a key dimension too. Lombardi et al. (2012) believe that "a smart city has smart inhabitants", emphasizing the percentage of educated people in a city's population in terms of foreign languages, high skills' level, inhabitants' applications, and surely life-long learning. Lazaroiu and Roscia (2012) emphasize this notion when accentuating the "flexibility of labor market" as a key indicator of the smartness of a city. Accordingly, all these contribute to the fact that doubtlessly smart citizens do form a key indicator of smart cities.

3. DISCUSSION

Despite the noticeable number of scholars highlighting citizens as a key dimension and driver for a smart city, very little research has been produced to prove the significant role of citizens' contribution to smart cities. Therefore, the following sections will unveil the impact of involving citizens in the decision-making process on smart cities' sustainability refined through the conceptual model (Figure 1).

3.1 Smart Citizens' Involvement Ensures Rapid Urban Growth

As per Littig and Grieler (2007), social sustainability intends to respond to human needs with an aim to improve the quality of their lives through housing, health care, healthy environment, safety, freedom, education, social relationships, self-fulfillment, and others. Chan and Lee (2008) add that employment forms a significant role here, where a sustainable income helps improve the emotional well-being of individuals in addition to their social relations. He also suggests that it strongly reduces divorce, suicide, alcoholism, poverty, and social exclusion. Mostashari et al. (2011b) claim that such an urban environment where citizens do learn, understand, and respond to environmental changes and then adapt their behavior accordingly rises to the level of smartness becoming a "cognitive city". He then emphasizes his point by stating that citizens improve resource allocation and the decision-making process creating even a more cognitive city.

More scholars have emphasized the importance of citizens' education and the great impact it has on developing smart cities and promoting sustainability. Thuzar (2011) emphasizes the central roles knowledge, learning, and creativity have in a smart city. Winters (2011) underlines the same notion too stressing smart cities being a center of better-educated individuals and surely a skilled workforce. A creative class of citizens will emerge when smart cities wisely invest in human potential (Partridge, 2004), and create the suitable climate needed as per (Florida, 2002, 2005) thus reflecting a rapid urban growth rate than other cities (Glaeser & Berry, 2006). Therefore, a "knowledge-based urban development" is enhanced through skillful, clever, creative, connected, and competitive citizens (Dirks et al., 2010) that will eventually lead cities to become smarter and more sustainable.

3.2 Smart Citizens' Involvement Boosts Productivity

Simonofski et al. (2018) believe that citizens might be engaged as democratic participants, co-creators, and ICT users. Subsequently, the fundamentality of engaging and involving citizens results in attaining smart goals and successfully reaching social sustainability. By doing so, the city will be more capable of satisfying the needs of its citizens by including them as active agents and following their feedback.

Highly educated citizens can play a great role in raising a smart city's productivity (Kourtit et al., 2012) through their creativity, innovation, smart solutions, prudent plans, optimal use of resources, sustainable activities, and wise initiatives. According to Alberti and Susskind (1996), achieving social and cultural development help get rid of problems rising in smart cities. Munda (2004) adds that the human capital forms an essential aspect on which urban sustainability can rely, and so is agreed by Cutcher-Gershenfeld et al. (2004), stating

that urban sustainability helps achieve goals related to several areas of which the social behavior of citizens lies within.

3.3 Smart Citizens' Involvement Arattacts Brains, Talents, and Skills

Though fostering social acceptance and behavior change could result from citizens' engagement (D. Geelen, A. Reinders & D. Keyson, 2013), Khansari et al. (2013) suggest that citizens need to change behavior to ensure smart cities' reflexivity, where smart cities are usually a great attractor for brains, skills, and talents from all over the world. Such cities usually fall under the impression of globalization and internationality, where a mix of cultures, languages, education, backgrounds, talents, skills, beliefs, abilities, creativity, and innovation, altogether being mutually linked and related, would unify to rise with the citizens' smartness, behavior, and positive input. Thus, adopting and generating a beneficial social capital in a smart city serves not only the city but the smart people within (Winters, 2011). Winters (2011) adds that here smart cities form magnets for creative people creating a smarter circle "connecting people and creating relationships" (Alawadhi et al., 2012).

3.4 Smart Citizens' Involvement Reflects Sustainability

Therefore, optimizing the use of resources (Hall, 2000) to improve the quality of life (Jasrotia & Gangotia, 2018) and ensure sustainability at many levels (Szlávik, 2013) can take place through the emphasis on the cruciality of citizens' involvement and the worth of educating and training a smart workforce, whereas per Chourabi et al. (2012), people and communities form a critical and crucial part of smart cities, however, he adds that the topic "traditionally has been neglected". Hollands (2008) also argues that smart cities are not just about ICT but require citizens' engagement as well to reach a linked system (Kanter and Litow, 2009). S. Mellouli, L. F. Luna-Reyes, and J. Zhang (2014) reveal the strong link between citizens and a sustainable smart city in their work and emphasized their significance for a "good society" as they add that creating great services for citizens is not the only way to improve their life's quality, but through involving them in these new services. Many other scholars highlighted the power of citizens' input and decision-making within a smart city (R. Giffinger, C. Fertner, H. Kramar, R. Kalasek, N. Pichler-Milanovic, & E. Meijers, 2007) where a smart city must be a city that "takes direct citizen involvement as its starting point" (A. Meijer, 2016).

3.5 Conceptual Framework Model

Considering the above, we propose the following conceptual model (Figure 1). This model illustrates the cruciality of citizens' involvement in the decision-making process of smart cities in order to 1) ensure a high-quality of life and a rapid urban growth through ensuring qualities such as safety, security, welfare, employment opportunities, and human rights, 2) boost productivity through guaranteeing traits such as a smart vision, smart services, waste management in addition to AI, connectivity, and digitalization, 3) attract brains, talents, and skills through confirming characteristics such as innovation, investments and cultural experiences. All these accumulate to feed into the sustainability of smart cities.
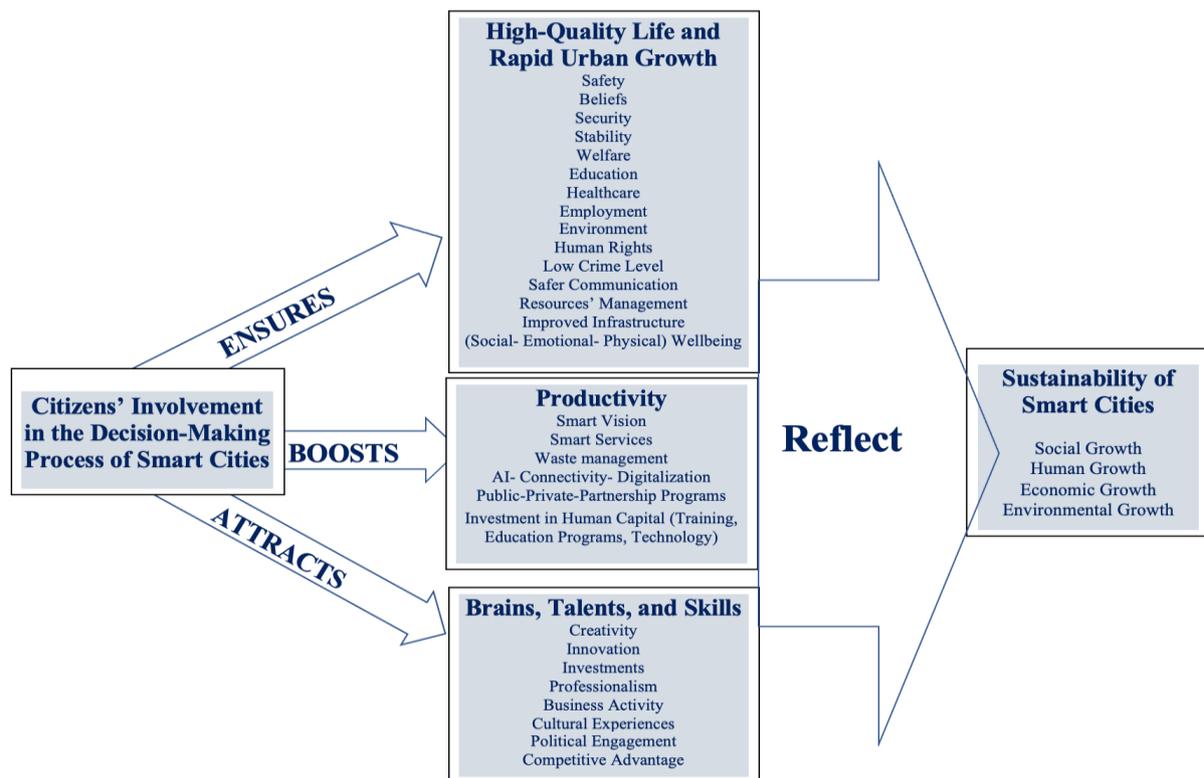
Fig.1: Conceptual Model

4. LIMITATIONS

The main limitation of this paper was the scarcity of prior research studies that were relevant to the topic. This emphasizes the need for additional research in the field as well as identifying new gaps in the prior literature.

5. CONCLUSION

Overall, this paper highlighted the main aspects that connect the citizens' involvement in the decision-making process with the sustainability of a smart city through ensuring a rapid urban growth and a high life-quality, boosting the cities' productivity, and attracting a skilled workforce and talented abilities. As a result, a conceptual model was developed to emphasize and demonstrate these aspects. Such model helps open doors for future studies to investigate other aspects that could link citizens' involvement to smart cities' sustainability including and not limited to smart cities' transport, food, buildings, crowdsourcing, and energy.

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