Shaping smart sustainable urban futures

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Abstract
Smart, sustainable, liveable, healthy, energy use-efficient and environmental-friendly cities shape the urban future. Cities are developing the potential of information and communication technology in order to ensure high quality of life, shaping smart and sustainable urban development, rediscovering a pathway for sustainable growth and smart energy city development. Smart and sustainable cities contribute to urban sustainability issues and future development, focusing on smart efficient energy management and solutions to reduce the negative aspects of urbanization. As healthy, liveable and safe communities, cities adopt a smart-driven and efficient energy use-led view to urban growth and sustainability.

Keywords: urban future, sustainable urban development, smart sustainable cities, smart energy city.

1. Introduction
Future cities preserve the wellbeing of citizens and ensure better quality of life [1], using the information and communication technology to identify a virtuous pathway to achieve urban sustainability [2]. Sustainable urban development relies on cities that are shaping healthy and liveable urban spaces, designing visions of the urban future [3]. Contemporary cities have to combine the benefits of a smart city approach and the advantages of building a sustainable city, shaping a data-driven smart sustainable city [4]. As a strategic approach to urban growth, the smart sustainable city helps cities to address a pathway for sustainable urban development, using the potential of advanced, innovative and smart technologies to facilitate a good life, improving the well-being of people living within urban communities [5]. Cities adopt a smart mind set, using the potential of information technology to achieve long-term urban sustainability and improve the quality of life [6], advancing towards a smart sustainable city and improving energy infrastructure efficiency [7]. The smart city model seems to be a satisfying response to pollution as a consequence of the urbanization. A smart city vision enables cities to face organizational and social challenges emerging within the urban environment [8]. Smart energy city development is emerging within the wider concepts of smart city and sustainable city [9]. Smart energy systems help to support the rise and implementation of smart sustainable cities [10].

Sustainable urban development relies on smart cities and communities as better places for work and life [11]. Smart cities improve the quality of life and contribute to achieving long-term urban sustainability [6]. Cities help to drive future urban development, becoming smart, sustainable and liveable communities [12], formulating intentional strategies, promoting knowledge sources and humanising technology [13]. The smart sustainable city relies on advanced information technology to ensure a better quality of life [14], developing technology, policy and community as key drivers of sustainable urban futures [15]. Despite of unsatisfying issues, the role of smart city agenda, strategies and policies is to drive

actions and behaviours leading to sustainable outcomes, enabling appropriate practices for city management and development that drive communities to build future urban ecosystems [16].

Smart and sustainable cities contribute to healthy and liveable urban spaces. Even if the themes of smart sustainable cities and communities are well investigated in their technological features, there are still few studies that elucidate the role of a smart and sustainable urban vision as a driver that helps cities to build conditions to achieve sustainable urban development and future. The aim of this study is to elucidate how cities are shaping the sustainable urban future, rediscovering the smart and sustainable city as a vision for future city development. Smart sustainable cities shape the city as an engine of social and economic growth, and intelligent driver of efficient energy use and consumption. The study relies on literature analysis and review regarding the main articles concerning the aspects related to smart and sustainable cities as drivers of sustainable future for urban growth and efficient energy usage. The paper is organized as follows. After introduction and methodological section, the literature review and theoretical background related to cities shaping future sustainable urban development are presented. In the fourth paragraph, cities are shaping the sustainable urban future, using the potential of information technology to drive smart and sustainable cities and communities as engines of urban sustainability and efficient energy management. Finally, discussion and conclusions are outlined.

2. Methodological section

The study is theoretical and analyses the literature that is related to the understanding of the concept of sustainable smart energy city that helps the cities to rethink and shape sustainable urban future development. The review of considered articles helps to focus on smart city as driver of a city which aims to proceed towards urban sustainability. A smart sustainable city shapes the city as energy management-efficient and natural environment-friendly urban community prone to support sustainable urban development. The selected contributions are interpreted in a narrative synthesis in order to elucidate new perspectives and advance theoretical frameworks on emerging issues [17], [18].

3. Cities shaping sustainable future urban development

The urban future relies on cities that are designing itineraries for sustainable urban development in order to achieve urban wealth and improve the quality of life within urban communities. Following the *UN 2030 Agenda for sustainable development*, cities will be conceived as safe, healthy and sustainable communities [19]. Sustainable urban development refers to cities that provide liveable and healthy human environments, improving quality of life, reducing both the negative environmental impacts and demand of resources too [14]. Today, the challenge is to make the city as a driver of sustainable, social and economic development within urban spaces. Sustainable urban communities contribute to healthy urban ecosystems, facing environmental, social and economic challenges that affect the contemporary and future urban development. As engines of public value creation [20], smart cities drive sustainable urban development, integrating various urban systems to enhance urban sustainability [9] which is considered as a desired state in which a city aims at balancing the socio-ecological systems through adopting and executing

sustainable development strategies [5], promoting environmental protection and integration, economic development and regeneration as long-term goals [14]. Smart and sustainable cities use the potential of digital innovation for economic development, environmental protection and social equity [21]. Smart cities contribute to achieving urban sustainability. A city not really smart is not sustainable [22]. Cities identify smart solutions and policies to achieve urban sustainability, and ensure high quality of life coherently with limits of the environment [3]. Smart sustainable cities are integrating the strengths of sustainable cities and smart cities, developing innovative data-driven technologies and smart solutions [4]. As a vision for the future, the smart city aims to shape the sustainable and ideal city [16]. With the rise of smart sustainable cities, the city is shaping dynamic, adaptive and evolving urban systems [14]. Designing a smart vision for urban growth enables responsive cities to develop smart solutions to build sustainable living standards for better quality of life. As cities changing by reinterpreting the relationship between human and natural environment, truly smart and sustainable cities are developing as post-anthropocentric cities [15].

4. Building the urban future by smart sustainable cities managing efficiently energy use

The future of sustainable urban development relies on cities that use technologies in order to shape a smart and sustainable urban community, and promote efficiency management in urban energy development. Smart sustainable cities contribute to social, inclusive and economic growth [6]. Smart city is an important future-oriented concept by integrating technologies, social systems and ecological concerns [8]. Sustainable urban future development relies on cities that are promoting technology, community and policy as key smart city drivers [23], and revitalizing the role of smart urban communities as engines of innovation processes [24]. A sustainable city is also really smart [22]. Future urban communities adopt a smart energy vision to achieve both urban sustainability and energy efficiency through smart applications and solutions for sustainable urban growth and better quality of urban life. Future urban development relies on smart cities that are managing efficiently the use of energy leading to less consumes of resources [3].

As ideal places for work of life, future cities identify a digital and smart vision for urban growth. As digital spatiality embedded into the physical spaces of cities, the smart city is an engine of the future [25]. The urban future relies on cities adopting a smart view as a vision to ensure high urban quality of life, sustainability and innovation. Smart city refers to an urban environment that utilizes technologies to enhance urban performance efficiency and quality of services for citizens. Smart cities improve the living standards of urban community with regards to economic, social and environmental aspects [26]. Sustainable urban future relies on smart cities shaping a human-centred community and promoting the well-being of people [11]. Cities adopt a smart mindset, designing smart applications and solutions for sustainable future city development [27], improving everyday urban life [28]. Sustainable cities use economic, social and cultural achievements to benefit their inhabitants without threatening the viability of the natural and social systems [29]. Smart and sustainable cities identify new ways to address urban development, meeting the needs of their inhabitants, using the technology to support a good life for citizens, preserving capabilities for meeting the needs of future generations [30]. Smart sustainable urbanism

relies on cities that are bridging both the impact of human activities and the protection of the natural environment. As urban healthy system of systems, a smart sustainable city develops balanced practices of economic, societal, environmental and governance activities that produce benefits and desired outcomes for people and non-humans [31]. A smart sustainable city supports sustainable urban development through advanced technologies. Smart sustainable cities shape a long-term image of the future, and help to address sustainable urban development, integrating strategies and technological innovations to support urban policy and planning [5]. In particular, the vision of a smart sustainable city relies on cities that are using digital technologies to make efficient service infrastructures, to drive lower resource consumption, to ensure high environmental quality, and to reduce carbon emissions [21]. The smart sustainable city relies on massive use of advanced technologies in connection with various urban systems in order to enable the city to manage resources efficiently, improving economic and societal outcomes, and monitoring city management for urban sustainability [14]. Driving the smart and sustainable transformation of cities helps to support urban change design coherently with a continuous long-term process. In particular, driving cities into smart sustainable cities relies on technologies as a means to shape healthy and sustainable urban spaces, improving living conditions, facing environmental and social challenges of urban communities [32]. Smart sustainable cities contribute to managing efficiently the use of energy. The benefits of smart and sustainable cities regard the efficient management of energy in order to reduce pollution and support liveable and environment-friendly urban spaces. Constructing a smart city helps to drive sustainable urban development, and to support the efforts to alleviate negative effects of the urbanization [33]. Smart sustainable cities contribute to developing greener policies to mitigate negative impacts of urbanization and improve environmental quality, shaping natural environment-friendly cities, employing technologies to develop intelligent infrastructures that enable energy safety and control pollution [34]. The vision of a smart sustainable city supports smart energy city policies and applications that incentivize the urban actors and stakeholders to reduce the negative impact of climate change and support efficient energy management systems. A smart energy city helps cities to develop technology and economy to ensure both a better quality of urban life and urban energy efficiency and sustainability [9], advancing towards more sustainable growth [35], by removing barriers that obstacle the successful implementation of sustainable smart energy projects [36].

5. Discussion and conclusions

Future smart and sustainable cities contribute to shaping healthy, energy efficient and environment-friendly urban communities, identifying a pathway for driving sustainable urban growth. The urban future relies on cities developing smart solutions to reduce pollution and build sustainable and healthy urban communities. The use of technology helps cities to improve the quality of life, opening up to new services for citizens and social innovation for sustainable urban change and prosperous growth. Cities of the future contribute to shaping sustainable urban development, using technologies to promote healthy and inclusive urban growth. Cities are advancing as smart and sustainable communities that contribute to future urban development. The adoption of a smart energy and sustainable city vision helps cities to drive sustainable and energy efficient urban growth, making healthy and safe urban communities. Smart sustainable cities and

communities contribute to identifying an intelligent city which is able to build prosperous urban futures and support continuous processes of innovation and change. Smart sustainable cities mitigate and reduce the negative impact of pollution, by using the potential of information technology in order to ensure high standards of living within urban communities. There are organizational, social and managerial implications. Cities have to design adequate organizational patterns to implement the smart and sustainable city that empowers citizens who play a proactive role as co-producers of urban value. A smart sustainable city helps cities to develop managerial capabilities in designing and shaping the urban future to drive sustainable growth and contribute to urban value creation. The study is descriptive and provides only a theoretical analysis without empirical research. Further research implies to investigate how Italian cities are developing urban intelligence for building long-term sustainability within urban spaces.

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