

Moving towards a people-centric smart city

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Abstract. European cities are getting smarter. Smart technologies such as the Internet of Things (IoT), Internet of Everything (IoE), and other AI-based technologies, are being injected more directly into the lives of citizens. Smart cities are seen as evolving ecosystems in which multiple actors act, react and interact over time to foster innovative solutions and provide better services for citizens. Despite the growing interest, existing research has to make key advances, important gaps persist as scholars lag behind theoretical development and rarely take into account the most important element of a city: people. Business and management scholars have focused on how to define strategies in smart cities, local policy, and others investigated the challenges of building a smart city. Few concerns deal with humans. In addressing these shortcomings, we tried to highlight why any smart city should be a community that learns, adapts, co-creates, and innovates. The purpose of this study is to investigate the human perspective that goes beyond the focus on technology related to smart cities in Europe, through an analysis in depth on how and how much citizens make cities smart. The focus is on people and their well-being combined with the shared knowledge and development that arises from each player in the ecosystem. To get an overall vision of the people-centric smart city we carry out an exploratory literature review with a PRISMA protocol that guides the identification of the studies to be included in the review. We finally provide implications for scholars and practitioners and suggest future research opportunities.

1 Introduction

European cities are getting smarter. New technologies such as the Internet of Things (IoT), Internet of Everything (IoE), and other AI-based technologies, are being injected more directly into the lives of residents [1]. To implement a digital transformation, cities need to build and provide a platform to improve and optimize existing digital services and encourage the design and development of new services [2-4]. The European Commission (2022) has defined a smart city as being able to integrate physical, digital, and human systems into innovative networks and services to better utilize energy resources and reduce emissions for the benefit of citizens and businesses. Despite the growing interest in smart cities, the extant literature still calls for further research on an essential and often neglected

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element of a smart city, people. This is because the business and management literature mainly focus on the building of smart cities [5], their strategic management of [6], and the related local/urban policy [7]. Thus, this work aims at contributing to bridging this gap, investigating smart cities as communities able to learn, adapt, co-create, and innovate [8]. It follows that the purpose of this study is to better investigate the human component of smart cities, through an in-depth analysis of Citizens' contribution to a city's smartness [9]. In doing so, smart cities have been approached according to an ecosystem perspective [10-11], able to better focus the way people contribute to their well-being by taking part in other actors in knowledge sharing and development. Dealing with people's contribution to a smart city, it is worth noting the essential contribution of digital platforms [12] in enabling multiple actors' interactions pointing to design and offering innovative solutions [10] and services to citizens.

To achieve the aforementioned goal, a systematic literature review has been conducted to get an overall vision of the investigated phenomenon. A PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol guides the identification of the studies to be included in the review [13].

To guide the review, the following research questions were stated:

RQ1. *How are "people-centric" smart cities conceptualized and defined in business and management literature?*

The paper has been organized as follows. Parag. 2 starts by highlighting the people-centric smart cities as an emerging topic in recent advances of worldwide literature; Parag. 3 deals with systematic literature review, particularly with the methodology used here insightfully focused on the PRISMA retrieval process (sub-3.1), with results specifically reached (sub-3.2) and relative discussion (sub-3.3); Parag. 4 ends with implication and final remarks.

2 Towards a people-centric smart cities

The concept of the "smart city" has gained more and more traction in recent years among academics, professionals, urban planners, and even citizens [14, 15]. This is mainly due to their potential to address problems related to urbanization, environmental burdens, and social issues such as the global trend of aging populations, social inclusion, and public service accessibility [11-12].

Research on the topic [12; 16] focused on several multifaceted issues, some of the most critical are urban policies and planning, mobility and transportation, emergency services, e-Health, smart living/community, urban security. It follows that an inner complexity characterizes smart cities' theoretical definition as well as the operationalization of their intelligent applications and cross-sectoral services [15, 17]. Thus, the literature provides different conceptualizations of smart cities, ranging from a general definition which considers them as innovative approaches to increase the efficiency of cities [18] to more specific ones, which considers them functional urban areas defined by Information and Communication Technologies (ICT) and modern infrastructure to face urban problems efficiently and sustainably [19-20]. This conceptualization shed light on ICT's "potential to promote prosperity and competitiveness at the local level, a method that incorporates integrated urban development incorporating multi-actor, multi-sector, and multi-level views"[21, p. 411]. In a similar vein, the OECD (2019) defined smart cities as initiatives or approaches that effectively leverage digitalization to boost citizens' well-being and deliver

more efficient, sustainable, and inclusive urban services and environments as part of a collaborative, multi-stakeholder process. It follows that the foundational element at the core of smart cities' conceptualization is their disruptive and technology-based contribution to urban development and management [22]. More recently scholars approached them as a concrete application of the Internet of Things (IoT) identifying at the core of smartness, sustainability, quality of life, and urbanization based on citizens' involvement [14].

To summarize, Buhnova et al., (2022) [12] classified smart cities into three main categories (a) technical, (b) organizational, and (c) social. According to a technical perspective, a smart city is defined as a complexity of integrated technologies aiming to increase the overall effectiveness of city administration (e.g., to improve service quality, facilitate citizen interaction and engagement, and mitigate environmental impacts through technology [14]). Moving the focus to the organizational perspective, it approaches smart cities as a multi and transdisciplinary research and application field, which can improve connections and interactions between organizations, services, people, resources, and processes [23]. Finally, from a social perspective, a smart city represents a unique innovation platform for companies, government agencies, and researchers [3], [24], [25]. In this sense, the smart city projects aim to improve citizens' engagement in urban life management affecting their quality of life and well-being and boosting, among others, urban services accessibility, social equity, and security [2], [3], [26].

It is worth noting that smart cities have been also criticized; thus, some scholars and policymakers considered them a too generic concept and/or space in which the use of digital technologies is promoted [27]. Others focused on their negative issues (e.g., the digital divide, the possible exclusion of peripheral areas, etc.) as well as the fact that they often fail to meet the initial purposes [28], [29]. In particular, a recurrent criticism is related to smart cities' major focus on technologies, with no sufficient attention to environmental and human-related needs [29], [30]. This has recently put at the forefront of research the concept of human- or people-centric smart cities [31], which are "cities that practice smart governance, are collaborative, focused on user needs, supportive of innovation, and are ultimately oriented towards the development of wellbeing and the creation of public value" [32 p. 5]. This renewed approach to smart cities emerges from the evident limits of the typical technocentric approach, which does not consider the needs and the contribution of citizens in the creation, management, and evolution of these intelligent cities. According to this emergent and human-centric approach, Lara et al. (2016) defined a smart city as "a community that systematically promotes the overall well-being of all of its members, and flexible enough to proactively and sustainably become an increasingly better place to live, work, and play" [33] (p. 9). It follows that this new approach points to integrating and further exploiting technology's potential in addressing people's needs [32], enacting smart and collaborative practices pointing to improving collective well-being as the OECD (2020) suggested. This opens the emergent paradigm of Industry 5.0, which is defined as the industrial and technological infrastructure whose deployment is aimed at creating a value for everyone including humans, society, and environment [34]. The leading elements at the core of this paradigm, human-centricity, sustainability, and resiliency, as well as a synergistic interaction between humans, their creativity, and autonomous machines are also essential for the creation and future development of human-centric smart cities. This is because the industry 5.0 approach aims at bridging the main Industry 4.0 gap, which is the lack of attention to human intervention in automatized processes [35]. It follows that smart cities designed and developed according to the foundational element of the industry 5.0 paradigm will be based on 1) strategies and policies defined overhand IoT systems, 2) the commitment to research and development at various levels, and 3) taking care of educational reforms including technology literacy [3]. In sum, all digital and non-digital efforts that collaborate to raise citizens' quality of life are included in a complete definition

of smart cities. They concentrate on technical and physical factors, embracing new technology and enhancing their infrastructure as part of the process of becoming smarter and operating more effectively. However, it is worth noting that despite the rising interest [36], the literature on human/people-centric smart cities is still in its infancy.

3 A literature review

3.1 Methodology

The main aim of this paper is to perform an exploratory literature review, applying the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) method, which is an evidence-based analysis that identifies, selects, and critically appraises relevant research on a specific topic using a minimum set of items [37]. According to this method, the selection process was performed in four steps: (1) the identification of relevant research by briefly searching through the selected databases; (2) a screening of abstracts; (3) a full-text assessment; and (4) decision-making concerning papers' eligibility (see figure 1).

In November 2022, three researchers independently queried two of the most widely used databases for literature review analysis, Web of Science (WoS) and Scopus to identify as many eligible studies as possible. The searching strategy was based on the following keywords: "smart cit*" AND "human*", OR "people-cent*", (*= wildcard plural) as keywords for the topic (WoS), article title, abstract, and keywords (Scopus). The query was based on these words with an asterisk to include plurals and other words such as "smart cities", "smart citizen/s", "people centered", "people centric", "people centred", "humanity", "humanness" "human beings" etc. in our query. We included both "people-centered", "people-centred" and "people-centric" because they are often used interchangeably to refer to a smart city approach that prioritizes the needs and well-being of its citizens. Thus, in our opinion, either term can be used to describe a smart city that prioritizes the needs of its citizens. The inclusion criteria were 1) language (English), 2) time (paper published from 2002 up to the third trimester of 2022), and 3) search area (title, abstract, keywords). The documents were searched in the categories, 1) "Business and Management" in WoS, and 2) "Business, Management, and Accounting" in Scopus. Moreover, as Paul and Criado (2020) [38] recommended, papers from Web of Science (WoS)/Social Science Citation Index (SSCI), Scopus, or Journal Citation Report (JCR) indexed journals were considered to preserve the review's quality. After the implementation of this search strategy, 159 papers were selected.

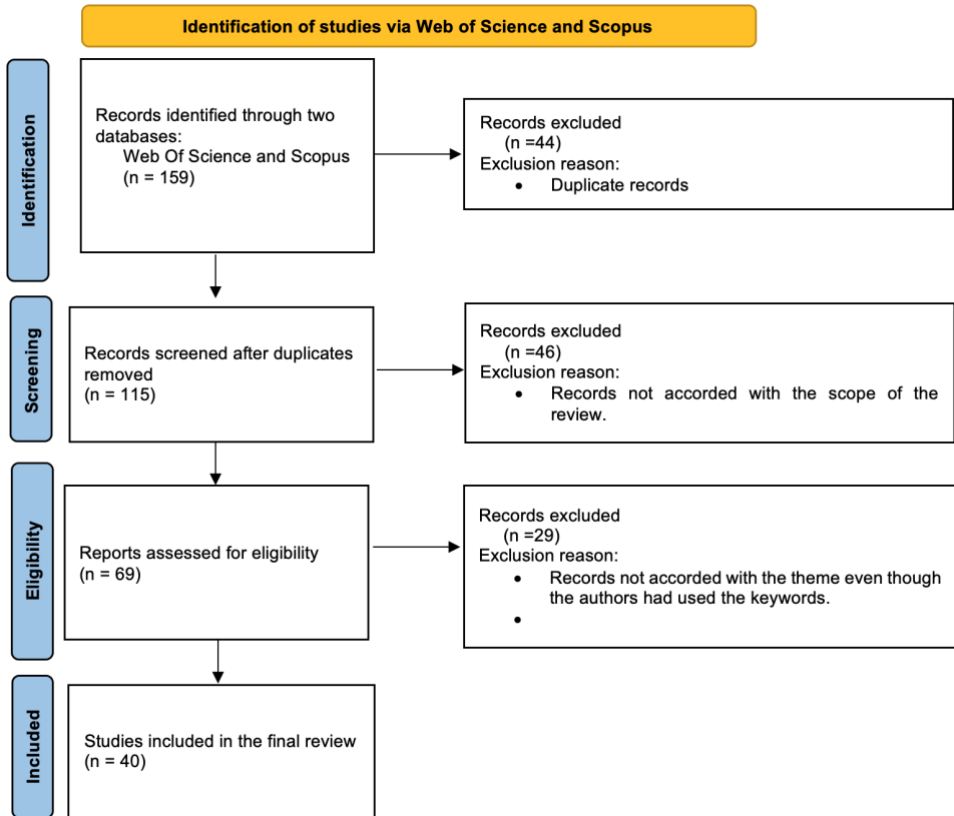


Fig. 1. PRISMA retrieval process.

The reference lists of the eligible articles included were also manually searched. Subsequently, some duplicates ($n=44$) were removed, and the remaining 115 documents were further analyzed by reading the abstracts. This led to excluding 46 documents because they were not in line with the scope of the review. In detail, these articles did not address the people-centric smart city, i.e., they did not mention the priorities, needs, and well-being of citizens in the design and implementation of smart city technologies and infrastructure. The final 69 papers were thoroughly examined. Each researcher individually checked the content of the papers during the "full-text screening" phase, evaluating their applicability according to the inclusion criteria mentioned above. Differences in document evaluation and coding were thoroughly discussed before between the researchers to reach a consensus. The full text has been retrieved from the "Web of Science" database and, if not, from outside sources. Hence, a further 29 articles were excluded because, even the application of specific selecting criteria and the same keywords, were not in line with the main research topic/aim. Thus, the final dataset included 40 research papers published in academic journals between 2007-2023 Drawing on Palmatier et al. (2018), who recommend a descriptive analysis as a beneficial technique to begin the data analysis to uncover patterns and gaps in the subject, paper distribution was analyzed to offer a description of the current state of the art.

3.2 Results presentation

This study addresses the people-centric smart city. Figure 2 illustrates the progression of publications available in the WOS and Scopus data in the period 2007-2023. There has been a surge in publications: from a single article published in 2007, more recently (2020-2022) about 18 articles have been published on the topic, and to date, 1 article is already available online and will be published in 2023.

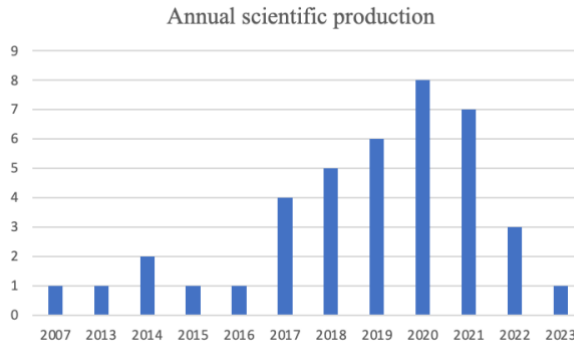


Fig. 2. Annual scientific production

The 40 publications analysed are dispersed across several journals. Table 1 presents the list of the 10 most prominent journals published on the topic. *Technological Forecasting and Social Change* tops the list with 9 published articles. *Journal of Science and Technology Policy Management* and *Manufacturing & Service Operations Management* rank second and third with 5 and 3 publications respectively.

Table 1. Most relevant sources

#	Journals	Articles No.
1	<i>Technological Forecasting and Social Change</i>	9
2	<i>Journal Of Science and Technology Policy Management</i>	5
3	<i>Manufacturing & Service Operations Management</i>	3
4	<i>International Journal of Services Technology and Management</i>	3
5	<i>Journal of Business Research</i>	2
6	<i>Journal of Strategy and Management</i>	2
7	<i>Business Ethics-A European Review</i>	2
8	<i>Technovation</i>	1
9	<i>Service Industrial Journal</i>	1
10	<i>Ieee Transactions On Engineering Management</i>	1

The most cited papers of the collection are shown in table 2. The most cited document with 578 total citations (TC) is “an integrated service-device-technology roadmap for smart city development” in which the authors bridge the smart city concept and its developments to three integrated dimensions: mainly technology, people, and institutions [23]. Technologies, their characteristics, drivers, and challenges are a recurring concept in most of the articles analyzed in this review (e.g., [14],[39], [40]). The following two most-cited articles relate instead to a) the understanding of the smart city concern to a) technological breakthroughs and social challenges [14] and b) the strategic view of smart city technology [39]. Intriguingly, the papers that received the most citations were those that appeared in the collection's most productive journal (see table 1).

Table 2. Most cited papers of the collection

#	Author(s)/Year(s)	Papers	Source	TC
1	Lee, J. H., Phaal, R., & Lee, S. H. (2013).	An integrated service-device-technology roadmap for smart city development.	<i>Technological Forecasting and Social Change</i>	578
2	Appio, F. P., Lima, M., & Paroutis, S. (2019)	Understanding Smart Cities: Innovation ecosystems, technological advancements, and societal challenges	<i>Technological Forecasting and Social Change</i>	371
3	Paroutis, S., Bennett, M., & Heracleous, L. (2014).	A strategic view on smart city technology: The case of IBM Smarter Cities during a recession.	<i>Technological Forecasting and Social Change</i>	325
4	Capdevila, I., & Zarlenga, M. I. (2015)	Smart city or smart citizens? The Barcelona case.	<i>Journal of Strategy and Management</i>	319
5	Kumar, H., Singh, M. K., Gupta, M. P., & Madaan, J. (2020).	Moving towards smart cities: Solutions that lead to the Smart City Transformation Framework	<i>Technological forecasting and social change</i>	280
6	Lytras, M. D., & Visvizi, A. (2018).	Who uses smart city services and what to make of it: Toward interdisciplinary smart cities research.	<i>Sustainability</i>	264
7	Spickermann, A., Grienitz, V., & Heiko, A. (2014).	Heading towards a multimodal city of the future?: Multi-stakeholder scenarios for urban mobility.	<i>Technological Forecasting and Social Change.</i>	239
8	Visvizi, A., Lytras, M. D., Damiani, E., & Mathkour, H. (2018).	Policy making for smart cities: Innovation and social inclusive economic growth for sustainability.	<i>Journal of Science and Technology Policy Management.</i>	175
9	Trencher, G. (2019).	Towards the smart city 2.0: Empirical evidence of using smartness as a tool for tackling social challenges.	<i>Technological Forecasting and Social Change</i>	169

10	Ardito, L., Ferraris, A., Petruzzelli, A. M., Bresciani, S., & Del Giudice, M. (2019).	.The role of universities in the knowledge management of smart city projects	<i>Technological Forecasting and Social Change</i>	156
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3.3 Discussion

The digital revolution has ignited the evolution of current society, highlighting both the bright and the dark side of a lot of socio-economic processes. Among these, a renewed and intelligent approach to urban management - often based on advanced digital technologies - has come to the forefront of policymakers, scholars, and citizens. This led to a focus on the need for challenging the several issues (e.g., energy shortages, inadequate urban infrastructure, health issues, educational difficulties, urban mobility congestion, etc.) that affect contemporary cities [4], [23]. To achieve this goal, advanced and innovative urban policies and strategies are needed. Thus, they should contribute to facing the problems [30], [41], [42] and ensure a shared long-lasting urban and social well-being [4], [8], [43], also through the implementation of digital, smart, and wise services [44], [45]. However, to be designed and provided these services should be approached according to a co-production logic [46],[48], which is intended to enhance (public) service provision through public engagement and participation in its related processes [46-48]. It is worth noting that public service co-production and provision can benefit from the implementation of advanced and smart technologies [48]. ICT and IoT platforms offer an open, comfortable, and livable urban environment for urban residents. This is possible especially when these technologies are people-centric [32] Li et al., 2021) and, therefore, able to boost networked cyber-social relationships between urban actors. Dealing with public/citizens engagement, some scholars proposed the Living Labs (LLs) as a new strategic element for boosting innovative co-production initiatives and contributing to adding smartness to current cities [21],[50], [51]. In this vein, scholars maintained that smart cities can contribute to the development of a creative economy based on the co-production of innovative services pointing to improving urban well-being by responding to unaddressed social issues and needs [43]. However, other scholars argued that smart city remains an overly normative concept, often discussed separately from the broader socio-political and economic contexts in which it is embedded [44] [52]. In this vein, some studies [44] focus on the "normative bias of smart city research" (p.223), stressing the importance of a holistic, scalable, and human-centered smart city agenda.

Assuming a human-centered approach, Andreani et al. (2015) [50] proposed an alternative perspective to the technocentric and universalistic approach to smart cities to bridge the gap between the so-called "dual nature of the smart city movement". On the one hand, the strategic visions and on the other hand, tangible urban interventions. Toward a socio-technological hybridization of the city, they stress that a city can only be truly "smart" if it uses technology to empower citizens and "strengthen democratic debates about the kind of city it wants to be, and the kind of city people want to live in." (p.24).

It follows that a human-centric smart city should be developed and managed through participatory decision-making processes, based on a co-productive approach to smart services design and provision [27],[32],[53]. It follows that digital technologies are essential for these service design and provision, even though their effectiveness is directly influenced by people's acceptance [52], [54], [55]. Similarly, Capdevila and Zarlenga (2015) [8] focused on the city's ability to innovate through the exploitation of technologies by implementing both top-down and bottom-up initiatives synergistically. More in detail,

the authors maintained that the bottom-up perspective is related to the "smart citizen" ability in promoting innovative and intelligent initiatives, while the top-down perspective is related to the "smart city" and its governance ability in fostering a fertile environment for innovation. It follows that smart technologies represent just one of the foundational elements of a smart city because they provide the required intelligent technological architecture essential for designing and providing new and smart urban services [27].

Trencher (2019) proposed the concept of "smart city 2.0," framed as a decentralized, people-centric approach in which smart technologies are employed as tools to address social problems, respond to residents' needs and promote collaborative participation. This second generation of smart cities deals with technology to a) mitigate or tackle social problems, b) foster citizen's well-being, and c) identify and respond to citizen needs and/or urban problems [14], [27], [40], [43]. This implies that urban policies based on the provision of smart services necessarily put people at the core of the related actions, while technologies represent a way or the technical infrastructure for ensuring the provision of these intelligent services [56-57].

4 Implications and final remarks

This analysis was mainly intended at contributing to the nascent research on human/people-centric approaches to smart cities. Thus, the results of the literature review offered some interesting and additional insights in terms of human or "soft" elements which contribute to a smart and even wise approach to urban management and development [30], [32], [53]. This was possible by analyzing the extant literature and the way different authors approached this topic, especially over the last four years. However, it is worth noting that the achieved results have demonstrated some differences in theoretical perspectives assumed for boosting the human component of smart cities and its influence on managerial strategies and development policies [44]. Thus, in terms of theoretical implications, this analysis pointed to further potential research areas and some methodological approaches useful for better analyzing their current knowledge gaps, even though more studies based on a clear and quantitative empirical methodology are still needed.

The study also offered interesting managerial and policy implications. The analysis pointed out that the building of a people-centric smart city needs a co-productive approach that is essential for changing the role of citizens from passive customers demanding public administrators for services to real contributors to the development, implementation, and enhancement of smart urban services [44], [58]. However, research and theoretical constructs pointing to addressing people-centricity in smart cities remain poor and needed for further exploitation. This opens a further implication related to the role and influence of digital smart technologies. Thus, these technologies, especially those based on the paradigm of Industry 5.0, are even more useful to share experiences and information for supporting urban problem-solving and decision-making. This is particularly useful for moving toward a humanized urbanization, based on people-centric policies and strategies intended to achieve sustainable city management, based on transparency, inclusiveness, and people commitment.

In this sense, stakeholders' integration and inclusion are crucial to smart city management and, therefore, to its ability in enacting specific actions pointing at creating a shared and long-lasting social well-being [4]. This implies that city planners and administrators must seek the views and needs of citizens while designing and developing smart services [27], [58]. Even though this study pointed out interesting results in terms of the human-centric approach to smart cities, it also has some limits related to 1) the analyzed dataset, which is not comprehensive for interdisciplinary research such as this, 2) the nature of keywords,

which are not all-encompassing, and 3) the number of analyzed databases; thus, future research should include for example also Google Scholar.

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