






Critical Review of Citizens' Participation in Achieving Smart Sustainable Cities: The Case of Saudi Arabia

Abood Khaled Alamoudi^(✉) , Rotimi Boluwatife Abidoye ,
and Terence Y M Lam 

The University of New South Wales, Sydney, Australia
a.alamoudi@student.unsw.edu.au

Abstract. The concept of citizens' participation (CP) has been widely adopted by scholars, professionals and governments around the world. Many frameworks have been developed that include CP as a core domain. Although government agencies admit the usefulness of adopting CP, there is little written about the application of CP in the context of smart cities. The aim of this study is to critically review the literature focussed on engaging, empowering and enabling citizens to participate in achieving smart cities in relation to decision-making, digital communication and socio-cultural pillars, and to develop a conceptual framework that helps in demonstrating the interconnection of the identified fields. The data were retrieved from online search engines. Google trends, annual publications, CP in relation to other domains, authors' affiliations and active authors were reviewed. Since 1985, there has been a considerable number of articles published annually relating to CP, yet there has been a fluctuation in the number of annual publications. Authors have contributed significantly to the topic of smart cities. However, there is little in the literature that contributes to achieving smart sustainable cities through CP. Moreover, recent publications have increased dramatically compared to past years. Universities are the top contributors in terms of authors' affiliations. Subject to validation by empirical evidence, the citizens' participation framework developed can be adopted to achieve smart, sustainable urbanisation in Saudi Arabia. The framework focuses on the empowerment of CP in making decisions, the application of ICT to facilitate CP and effective stakeholder communication between citizens and government.

Keywords: Smart cities · Citizens' participation · Digital communication · Socio-cultural · Decision making

1 Introduction

Since 1968, Citizens' Participation (CP) has been adopted widely, yet to date, there is no clear definition of the role and level of CP in decision making in the built environment. Many measurable models, such as Leadership in Energy and Environmental Design (LEED), the Building Research Establishment Environmental Assessment

Method (BREEAM), the Comprehensive Assessment System for Built Environment Efficiency (CASBEE) and the smart city wheel were developed in response to rapid urbanisation challenges (Kuster 2019). These green rating systems are primarily focused on measuring sustainable project outcomes for individual projects and community development. There is no indication of how to engage citizens as the main stakeholders and users who contribute to the development of smart sustainable cities. Many governments have adopted various urban sustainable systems for decades. Urban areas are incredibly sophisticated and complicated, and a holistic system, such as the smart cities concept (SCC), is necessary to cope with their complexity (Girardi and Temporelli 2016; Neirotti et al. 2014). However, smart sustainable cities (SCC) still face challenges in delivering smart sustainable outcomes. These imply heavy techno-centricity, practice complexity and ad-hoc conceptualisation of smart cities (Yigitcanlar et al. 2018b). Smart cities, as reviewed from academia's point of view, are complex ecosystems supported by technological, infrastructural transformation of citizens' engagement, learning and participation (Andone et al. 2014). SCC has been acknowledged as a techno-centric concept because of the leverage of information communication technology (ICT). However, scholars argue that social, cultural, economic and environmental aspects are essential pillars in successfully implementing smart sustainable cities (Aina 2017).

Saudi Arabia has been judged as one of the fastest-growing countries globally (UN-Habitat 2018). Based on the best of the authors' knowledge and a review of the literature over the last 20 years, there is very limited research focusing on CP in relation to achieving smart sustainable cities in Saudi Arabia. Therefore, this paper is an attempt to examine the current state of CP in achieving smart cities in Saudi Arabia. The objectives to be pursued are (1) to identify the most reported CP in relation to decision making, digital communication and socio-cultural areas, and (2) to develop a conceptual framework that helps in demonstrating the gaps of the identified felids. Apart from this introduction section, the remainder of this paper is structured into four sections. The following section will present the background of smart cities and citizens' participation. The third section will present the research methodology adopted in this research. The fourth section will present the results and discussion. The last section will present the conclusions of the study.

2 Literature Review

2.1 Smart Sustainable Cities

The initial emergence of the smart cities concept was in the context of communicating with residents in the neighbourhood and their local businesses for leisure and convenience (Bashynska and Dyskina 2018). Since 1993, the concept of smart cities has evolved and combined more responsibilities to serve society better (see Fig. 1). It is evident that the smart cities concept attracts decision-makers all over the world. The Smart City 3.0 framework comprises six characteristics that are often considered an essential part of the smart city concept. These six characteristics are smart living, smart environment, smart people, smart economy, smart mobility and smart governance (Bashynska and Dyskina 2018).



Fig. 1. The development of the smart city concept. **Adapted from:** Bencardino and Greco (2014), Shields (2014)

The idea of SCC has attracted many researchers in a wide range of disciplines. However, this concept has been used as a ‘label’, and its meaning and objective are inconsistent (Bibri and Krogstie 2017a, b). The phrase ‘smart city’ is interchangeably used in a variety of disciplines under various names: smart city, creative city, resilient city, smart community, knowledgeable city, intelligent city, information city and sustainable city (Yigitcanlar et al. 2018b). For example, the Ministry of Municipal and Rural Affairs (MOMRA) in Saudi Arabia announced that they have successfully implemented the smart city concept, which turned out to be smart parking (Alsitre 2019). Although smart parking is a minor aspect of the concept as a whole, it does not represent the holistic idea of smart cities as it was advertised. Because of the variety of interpretations of smart sustainable cities and the tremendous number of existing performance and measurement systems of smart cities and urban sustainability, pragmatism in measuring the smartness and sustainability of cities is even more challenging and complicated (Ahvenniemi et al. 2017). Researchers argue that to date, the meaning of smart cities is not clear and is inconsistently understood (Ahvenniemi et al. 2017; Yigitcanlar et al. 2018b).

Scholars have been developing frameworks and models around this concept, most of which have not included citizens’ participation. For example, the smart city wheel (Lekamge and Marasinghe 2013), European Smart Cities Ranking (Fusero et al. 2013), Smart Benchmarking in China (Lu et al. 2015), Triple-helix Network Model for Smart Cities Performance (Lombardi et al. 2011), Smart City Profiles (Storch 2018), City Protocol (City Protocol 2018) and Citykeys (Airaksinen et al. 2017) are frameworks and models acknowledged in academia, yet participative approaches are less likely to be found in authoritarian states. Likewise, the discussion on ‘smart’ cities is rather uncritical. There have been a range of researchers that pointed at the risks of smart city concepts, such as its inherent lack of data security and socio-spatial connectedness (Colding and

Barthel 2017), a lack of face-to-face governance, and the tendency to embrace corporate control, which may turn a city into a profit-driven living laboratory (Duffield 2016).

2.2 The Role of Citizens' Participation in Promoting Decision Making

Arnstein (2019) argued that CP is a pillar of policies and governance focused around developing a real sustainable city. Stakeholder Management Theory (SMT) is an approach that involves humans in the development and management of a city and avoids centralised policies and decision making (Garba 2004; Wu and Kang 2013). Freeman and Reed (1983) believe that strategic management is an essential part of any development. However, some countries still do not involve their citizens in development (Bouzguenda et al. 2019; Granier and Kudo 2016). In implementing smart cities, it is crucial to gain insightful datasets by supporting citizens' participation, which could be done quickly and save cost. Yang and Pandey (2011) define citizens' participation as decision-making and management processes that use a bottom-up approach for decision making. The rationale of CP is to design and build services tailored to citizens' real needs. Scholars such as Bouzguenda et al. (2019) see the hierarchy of citizens' participation in three nodes: (1) digital citizens' participation, (2) community engagement and (3) social-cultural sustainability. Other scholars, such as Arnstein (2019), proposed a typology for CP called the ladder of CP that consists of eight levels. The steps of the ladder from bottom to top are as follows: 1- Manipulation, 2- Therapy, 3- Information, 4- Consultation, 5- Placation, 6- Partnership, 7- Delegated Power, 8- Citizen Control. Burke (1968) believes that CP depends on certain conditions and assumptions; thus, not all strategies are effective for all organisations. Best practices are an essential component when learning from others' experiences of successes and failures. For example, the Indian 100 smart mission experienced major challenges that affected the previous implementation and made it difficult for the Smart Cities Mission (SCM) to be accepted in the Indian built environment. Moreover, the European experience was notable and noteworthy for understanding how the government that involves citizens' participation helped their cities to solve many urban issues. Singapore Missions, on the other hand, recorded a tremendous achievement in terms of adopting ICT. Finally, Masdar City witnesses that technicality and technology are not everything in achieving urban sustainability, as humans are one of the pillars of urban development.

3 Research Methodology

This study aims to comprehensively review the existing body of knowledge on CP in achieving smart sustainable cities. Literature reviews are widely used among scholars to determine existing studies (Liberati et al. 2009). Therefore, the method used in this paper is a systematic review of the literature that proposes to support and understand the essential aspects and dimensions related to citizens' participation and smart cities. This study adopts the Preferred Reporting Item for Systematic Reviews and Meta-analysis (PRISMA) framework to identify, screen and assess its literature review (Liberati et al. 2009). The study follows a three-stage procedure via the methodological approach shown in Fig. 2. In Stage 1, keywords are identified based on the literature search. A Google

search trend is investigated for the formulated keywords. Stage 2 applies the inclusion and exclusion criteria. Accordingly, yearly publications, authors’ affiliations and focus study areas are analysed and synthesised. Stage 3 involves developing a conceptual framework for citizens’ participation in relation to decision making, digital communication and socio-cultural factors.

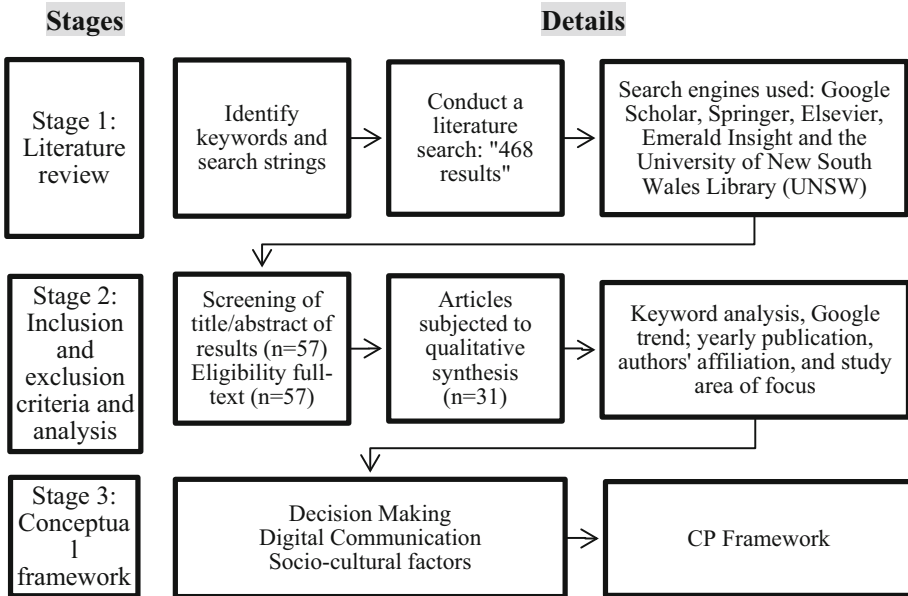


Fig. 2. Research methodology

Stage 1 focusses on addressing the research gap of adopting CP in decision making and examines the extent to which it supports the implementation of smart sustainable cities. Searches were conducted through five databases, namely Google Scholar, Springer, Elsevier, Taylor Francis and the University of New South Wales Library (UNSW). This step required searching for valuable and reliable sources for the collected data. Articles published in journals, conference proceedings and government documents were reviewed. Theses, dissertations, and unpublished articles were not selected for this study because such data may not be publicly available. Moreover, academic journals between 1980 and 2021 were selected for this study were the first published paper was in 1980 (Whitaker 1980) and the most recent studies were published in 2020. Several thematic searches were performed, which consisted of multiple words (Yigitcanlar et al. 2018b). The keywords used in all thematic searches were ‘smart cities’, ‘citizens’ participation’, ‘socio-cultural sustainability’, ‘policies and governance’ and ‘Saudi Arabia’. As suggested by Jabareen (2008), there are three steps to determining keywords for a literature search: 1- recognition of similarities, 2- synthesis action of general themes and 3- formation of a multidimensional framework. By applying these steps, three general themes were retrieved: digital communication, decision making and socio-cultural sustainability.

The initial thematic search was conducted using the keywords: ((TitleCombined:(smart cities)) AND ((TitleCombined:(Policies)) OR ((TitleCombined:(Citizens' Participation)))). The search resulted in 71 articles, 45 conference proceedings and three government reports. The second thematic was conducted by using the following keywords: ((TitleCombined:(‘socio-cultural sustainability’)) AND ((TitleCombined:(Policies)) OR ((TitleCombined:(Citizens' Participation)))). The search resulted in 130 articles, 69 conference proceedings and 25 government reports. The third thematic was: ((TitleCombined:(‘smart cities’)) AND ((TitleCombined:(socio-cultural sustainability)) OR ((TitleCombined:(Policies)))). The search resulted in 30 articles, 55 conference proceedings and 40 government reports (see Table 1).

Table 1. Distribution of research thematic

Thematic search	Publisher			Conference proceeding	Government report and websites
	Elsevier	Taylor Francis	Springer		
Smart cities and policies and governance or citizens' participation	45	8	18	45	3
Socio-cultural sustainability and policies and governance or citizens' participation	67	45	18	69	25
Smart cities and socio-cultural sustainability or policies	20	7	3	55	40
Total number	132	60	39	169	68
Percentage	49%			36%	15%

Stage 2, inclusion and exclusion criteria, is an essential step in this study because it applies further visual examination to exclude papers that are not related to the study area but might have been included due to a keyword search. Tijani et al. (2020) adopted a comprehensive scan of abstracts, which exclude the papers that do not fit within the study area. Table 2 shows only that 57 (30 articles, 22 conference proceedings and five government documents) out of 468 articles met the selection criteria for this study and were subjected to further analysis. Table 2 show that 57 papers were initially read to retrieve the most relevant papers. A further reduction was made after reading the full texts and excluding unrelated articles that did not discuss CP in relation to smart cities. The selection of qualified papers was ultimately limited to 31. The 31 selected papers

were read, reviewed and then analysed using descriptive analysis to explore the trends in keywords, years and geography of publication, author affiliation, focus study area and active authors.

Table 2. Retrieved publications with selected journals

No.	Journals	Number of previous searches	Number of final searches
1	Journal of the American Planning Association	10	3
2	Sustainable Cities and Society	8	5
3	International Journal of Urban Policy and Planning	12	4
4	Journal of Social Sciences and Humanities		3
5	Malaysian Journal of Society and Space	1	1
6	Advances in Economics, Business and Management Research	3	1
7	Resources Conservation and Recycling	4	1
8	Journal of E-Learning and Knowledge Society	3	2
9	Government Information Quarterly	2	1
10	Socio-Economic Planning Sciences	2	2
11	Journal of Advanced Science and Technology	1	1
12	Cities	4	3
13	The Electronic Journal of Information Systems in Developing Countries	3	2
14	Social Indicators Research	2	1
15	Journal of Information Systems and Operations Management	2	1
	Total	57	31

Table 2 shows the journals in which the selected 31 papers were published. This number is a reason to conduct a critical review on smart cities in relation to CP when

compared with previous studies. For example, Yigitcanlar and Kamruzzaman (2015) conducted a literature review with 35 papers focused on smart cities being sustainable, Marrone and Hammerle (2018) conducted a review with 25 papers in the area of stakeholder management and Tijani et al. (2020) performed a review with 38 papers on mental stress in construction.

Stage 3 involves developing a framework related to smart cities and urban sustainability that takes into consideration the CP concept. The framework consists of three main pillars: decision making, digital communication and socio-cultural pillars. Each pillar of the framework was studied and addressed.

4 Results and Discussion

4.1 Global Smart Cities Trends

Figure 3 shows a world map for the top contributing countries based on the keywords used in this study. The results show the top five countries where the studies originated. In terms of geographical distribution, it is clear that the literature review did not fill in the gaps in the Saudi Arabia region. Asian and European countries have intensely adopted the smart cities concept. In Asia, developed and developing countries such as Japan (Granier and Kudo 2016), Korea (Lee and Hancock 2012) and China (Shah et al. 2017) analyse smart cities through digital communication tools, while India (Praharaja et al. 2016; Rajput and Sharma 2017) considers the smart cities concept through policy tourism (Praharaja 2018). The smart cities concept in Asian countries is considered a promising urban planning and management framework and an answer to their urbanisation and environmental challenges (González 2011). The growing interest in smart cities to solve urban issues has attracted governments, institutions, companies and even individuals. In 2012, there were 143 ongoing funded projects, of which 55 were based in Asia, 47 in Europe, 30 in the United States and fewer than 10 in the Middle East and Africa (Ahvenniemi et al. 2017; Albino et al. 2015). On the other hand, the concept of smart cities in European Union countries supports the idea of urban sustainability by promoting the reduction of greenhouse gas emissions through the deployment of technology (Ahvenniemi et al. 2017; Caragliu et al. 2009). The European Union adopts smart cities through six dimensions, which were invented by Boyd Cohen¹ and are commonly known as the European smart cities wheel (Andone et al. 2014; Soe 2017). The dimensions are smart people, smart economy, smart mobility, smart living, smart governance and smart environments (Andone et al. 2014). Although technology has played a key role in smart cities in both East and West, the applications and focus differ (Praharaja 2018). The role of human capital and social capital in urban development based on the availability and quality of ICT may define smart cities (Caragliu et al. 2009).

¹ Boyd Cohen is a scholar at the university of Victoria, Canada, who invented the smart cities wheel for the European Union.

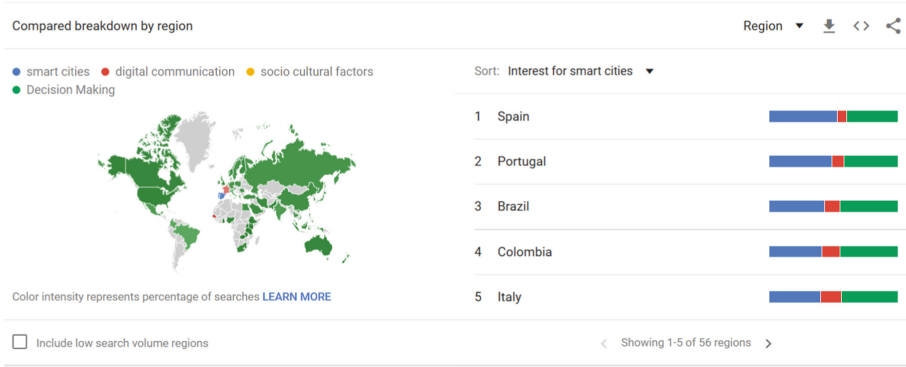


Fig. 3. Compared breakdown by region using Google Trends for global search.

Figure 4 shows the world publication’s trends from 2004 to 2021 based on decision making, socio-cultural factors and digital communication pillars. Although this study explores publications since 1980, the topic is relatively new, and no record is presented in Google Trend. Figure 4 shows that there is a gap between these keywords. In addition, there was an abrupt increase between 2012 and 2016 in smart city publications. Also, Fig. 4 shows a flat trend for socio-cultural factors in relation to other keywords. This is followed by digital communication. Decision making is the publication since 2004 that has received the most focus. This is probably because it could be embedded with any research topic, in contrast with socio-cultural factors and digital communication, where very few publications were recorded.

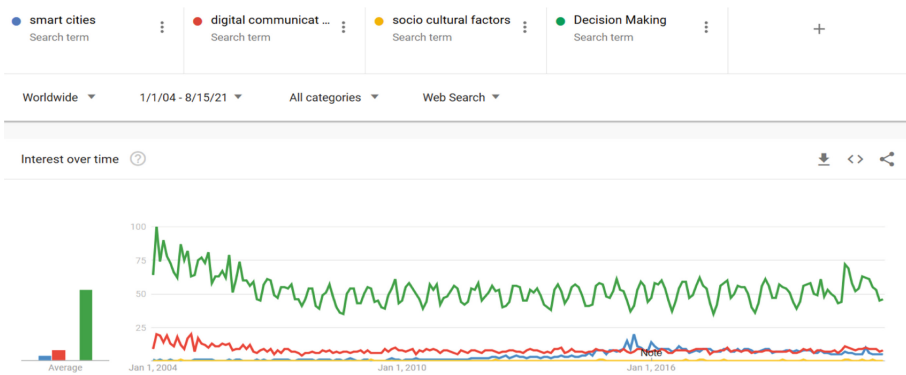


Fig. 4. Keywords and strings using Google Trends for global search.

4.2 Annual Publication of Studies on CP

CP was not given attention among scholars in the past. Figure 5 shows that the degree of interest in the context of smart cities has increased dramatically in the past few years.

Whitaker (1980) published the first article that demonstrates CP in service delivery. The number of publications on CP increased steadily, from one paper to two between 2007 and 2015, then to three papers in 2016. The reason behind the low number of publications per year is related to the unavailability of data between 1980 and 2007, and also the appearance of the smart cities topic, which increased in 2013/2014 when ICT gained huge attention among scholars (Neirotti et al. 2014). Thus, it can be assumed that the increasing number of studies on smart cities and urban sustainability contributes to the increasing number of studies on CP. In addition, the number of publications recorded in 2020 was the highest, and this is because CP has become a global trend among government bodies and the private sector through various initiatives and programs (Kapoor and Singh 2020).

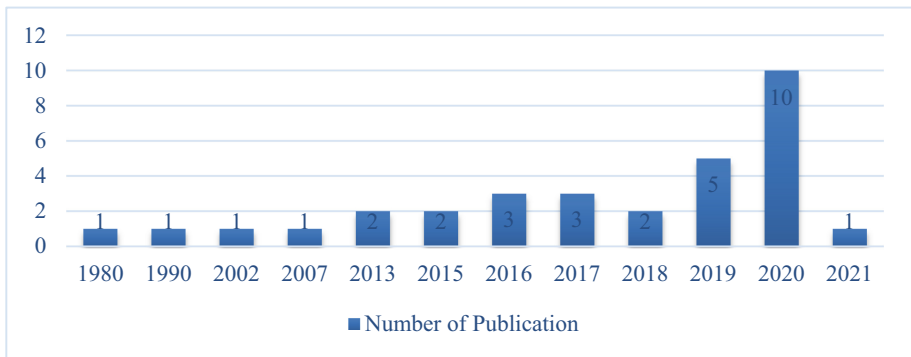


Fig. 5. Number of publications per year. **Source:** Authors' compilation

4.3 Citizens' Participation Publications in Relation to Smart Cities

As mentioned earlier, finding articles that address the role of CP in achieving smart cities was one of the research objectives. Therefore, Table 3 shows information about the authors, findings and domain of each paper. It also demonstrates that CP is interconnected heavily with both urban sustainability and smart cities. Papers published prior to 2016 were mostly focused on considering citizens as a part of stakeholder management. However, recent articles demonstrate that CP is not only a shared opinion but is also bridging the gaps between technology and human needs (Bouzguenda et al. 2019). The only article that addressed governance and CP was conducted by Aina et al. (2019). Therefore, there is a need to discover the relationship between decision making, socio-cultural factors and digital communication with relation to citizen participation. Table 3 shows evidence that developing a framework is necessary to bridge the gap between decision making, digital communication and socio-cultural factors to support CP in achieving smart sustainable cities.

Table 3. Studies on the relationship between smart sustainable cities and citizens' participation

Author	Findings	Domain
Bouzguenda et al. (2019)	The study proposes that the move toward smart sustainable cities requires bridging the gaps between sustainability, social sustainability, community engagement and digital public participation through the application of ICT	Smart sustainable cities
Aina et al. (2019)	Posits a need for a framework of legislation and administration procedures for a top-down approach initiated by those in the top echelon of society who can have a significant influence on the move towards sustainability	Governance, Citizens' Participation
Arnstein (2019)	Proposes a typology of citizens' participation. It is presented in the form of a ladder pattern	Citizens' Participation
Aina (2017)	Developing a smart city by leveraging ICT is necessary but not sufficient; it requires citizens' participation	Smart cities, Citizens' Participation
Gupta and Hall (2017)	This research explores the concept of a smart city and focuses on how Indian cities are defining smart cities as part of the SCM	Smart cities, Citizens' Participation
Granier and Kudo (2016)	The level of citizens' participation in Japan goes beyond involving citizens in city governance and examines both the roles they are assigned and their actual practices	Smart Cities, ICT, Citizens' Participation
Vrabie and Tirziu (2016)	Present a framework on how e-participation can be inclusive and how it might bring citizens closer to the idea of living in a smart city	Smart Cities, ICT E-participation

(continued)

Table 3. (continued)

Author	Findings	Domain
Marsal-Llacuna 2015	Studies city indicators of social and cultural sustainability as standardisation technologies for smarter (citizen-centred) governance of cities. It shows that citizens, private stakeholders and city councils represent the inclusion of governance of cities	Urban Sustainability, Citizens' Participation

Table 2 summarises the literature review in the areas of smart sustainable cities, smart cities, governance, citizens' participation and urban sustainability. Furthermore, it outlines the most recent body of knowledge in the area of smart sustainable cities, and it informs the research from a global perspective. Scholars such as Bouzguenda et al. (2019), Yigitcanlar et al. (2018b), and Ahvenniemi et al. (2017) have discussed the definition of smart sustainable cities. However, these studies demonstrate the complexity of adopting the concept and discuss how to bridge the gaps between sustainability, social sustainability, community engagement and digital public participation. Other studies consider the smart cities concept as an outcome of a particular aspect in smart cities, such as citizens' participation (Gupta and Hall 2017), smart and human-centred communities (Granier and Kudo 2016; Vrabie and Tirziu 2016), governance (Chourabi et al. 2012; Lazaroiu and Roscia 2012) and urban sustainability (Marsal-Llacuna 2015). The studies mentioned show how scholars view smart cities and their implications for serving the built environment.

As a result, there is very little or nothing in the literature that contributes to the knowledge of smart sustainable cities in the Saudi Arabian context. Researchers have been studying the area of urban planning, including urban sustainability and urban governance (Garba 2004; Senior 2016). Scholars such as Aina et al. (2019) see smart GeoICT as an influence on the development of smart cities. Other scholars see ICT as a tool to serve E-commerce (Al-Hudhaif and Alkubeyver 2011), e-government (Alassim et al. 2017) and academia (Alkhasawneh and Alanazy 2015). The only study that supports leveraging ICT was conducted by Aina (2017). On the other hand, UN Habitat (2018) focused on promoting urban sustainability in three primary aspects: quality of life, economic competitiveness and environmental protection. However, ICT and citizens' participation are not considered in their report.

4.4 Authors' Affiliations

This study shows that most authors are affiliated with universities, which represent 90.4% of publications, while governmental bodies and the private sector represent 9.6% together. Table 4 shows each author's affiliation, department, country, type of organisation, number of authors and number of publications, showing that university scholars are

the main contributors to smart city research. It is also notable that governmental engagement is present since their contribution is significantly important to this topic. However, there is not much contribution from and engagement with university scholars. It is worth mentioning that the smart cities concept and CP are not limited to Built Environment departments, but also, as seen in Table 4, that Engineering schools, Industrial Environmental Management, Schools of Politics and Public Administration, and Management Information Systems Departments are contributing to knowledge in this area.

Additionally, in terms of geographical contributions to this topic, authors from many countries have published their research findings. It could be concluded that Europe is leading the contribution in smart cities. Twenty-two out of 52 researchers are from Europe, six are from Australia, three are from the United States, and eight are from Saudi Arabia. On Saudi Arabia universities' affiliations, only two out of 13 universities have conducted research on smart cities. Surprisingly, even the two universities are government entities. Lastly, it is worth mentioning that the total number of authors in this study, as reported in Table 2, is 52, while the total number of publications is 31. The plausible reason is that there is a major collaboration between scholars globally. For example, there is a collaboration between researchers from the Queensland University of Technology in Australia and The University of Manchester in Spain, as well as the Delft University of Technology in the Netherlands, Fudan University in China and Soochow University in China. However, Saudi Arabian universities have not witnessed any international collaboration among scholars to adopt the concept of smart cities while taking into consideration citizens' participation. The collaboration between scholars and professionals needs to be promoted to a higher level, which could result in effective research outputs.

Table 4. Authors' affiliations

Affiliation	Department	Country	Type of organization	No. of authors	No. of publications
Queensland University of Technology	School of Civil Engineering and Built Environment	Australia	University	6	5
Norwegian University of Science and Technology	Computer and Information Science and Department of Urban Planning and Design	Norway	University	3	4
The University of Manchester	School of Environment	Spain	University	12	4
Clemson University	City planning and real estate development	USA	University	3	3
King Saudi University	Department of Urban Planning	Saudi Arabia	University	5	3

(continued)

Table 4. (continued)

Affiliation	Department	Country	Type of organization	No. of authors	No. of publications
Yanbu Industrial College	Department of Geomatics Engineering Technology	Saudi Arabia	University	3	2
University of Genoa	Department of the Built Environment	Italy	University	1	1
University of Cambridge	Department of Engineering	UK	University	2	1
Nazarbayev University	Department of Civil and Environmental	Kazakhstan	University	3	1
Yarmouk University	MIS Department	Jordan	University	3	1
AR Riyadh Development Authority	N/A	Saudi Arabia	Governmental Body	2	1
Lulea University of Technology,	Industrial Environmental Management,	Sweden	University	1	1
Soochow University	School of Politics and Public Administration,	China	University	2	1
Delft University of Technology	Faculty of Technology, Policy and Management	Netherlands	University	1	1
Leiden University	Institute for Area Studies	Netherlands	University	2	1
The Ural Branch of Russian Academy of Sciences	Department of Informatics, Bioengineering, Robotics, and Systems Engineering	Russia	Governmental Body	2	1
Technical Research Centre of Finland	Research Centre	Finland	Private sector	2	1

4.5 Active Authors

Table 5 shows the most active authors who have contributed to this research topic. It also presents their contributions in the area of smart cities and citizens' participation.

Nevertheless, some of the authors' papers were not considered for this study because they did not meet the selection criteria outlined in the methodology section of this study. Yigitcanlar, T., Bibri, S. Krassimira, P. and John G. have published five, four, three and three articles, respectively, and they have contributed to the smart cities area the most. While John G.'s studies focus on CP, Yusuf A. contributes to the knowledge in terms of understanding the relationship between smart cities in Saudi Arabia. On the other hand, the work of Al-Hathloul S. is oriented toward urban sustainability and legal policies. There is no active author currently in Saudi Arabia who studies smart cities and takes into consideration decision making, socio-cultural factors and digital communication with relation to citizens' participation. Table 5 shows that there are 52 authors who significantly contributed to this research topic from different disciplines.

Table 5. Authors' contributions

Authors	Studies	Affiliation	Number of publications
Yigitcanlar, T	Yigitcanlar and Kamruzzaman (2015, 2018), Yigitcanlar et al. (2018a, b, 2021)	Queensland University of Technology	5
Bibri, S	Bibri (2018a, b), Bibri and Krogstie (2017a, b)	Norwegian University	4
Krassimira, P	Martina et al. (2018)	The University of Manchester	3
John, G	Gaber (2017, 2019), Gaber and Gaber (2010)	Clemson University	3
Yusuf, A	Aina (2017), Aina et al. (2019)	Yanbu Industrial College	2
Al-Hathloul, I S	Al-Hathloul (2017), Al-Hathloul and Anis-ur-Rahmaan (1985)	King Saudi University	3

4.6 Conceptual Framework of the Study

CP is a pillar embedded in various models and frameworks, and in the literature in general. According to Arnstein (2019), understanding users' expectations will improve decision making in government services. Based on the three domains identified in the literature review, a conceptual framework is proposed. Through the literature review, the following gaps were identified. Figure 6 presents a conceptual framework for this study and the relationship between the domains to achieve outcomes linked to smart sustainable cities. These domains are decision making, digital communication and socio-cultural pillars. This model suggests how to answer the research questions about how, where and when CP would be determined and what level of empowering CP governments are willing to

promote. This model is designed in accordance with stakeholders management theory and urban system theory, which are based on determining the relationship between power, legitimacy and urgency that suggests a separation of stakeholders from non-stakeholders and the extent to which their contribution can influence decision making. Moreover, urban systems theory is a coherent technological infrastructure that is vital for the advancement of smart cities. The framework, therefore, focuses on the empowerment of CP in making decisions, the application of ICT to facilitate CP and stakeholder communication between citizens and government, which can fill in the gaps between the three domains.

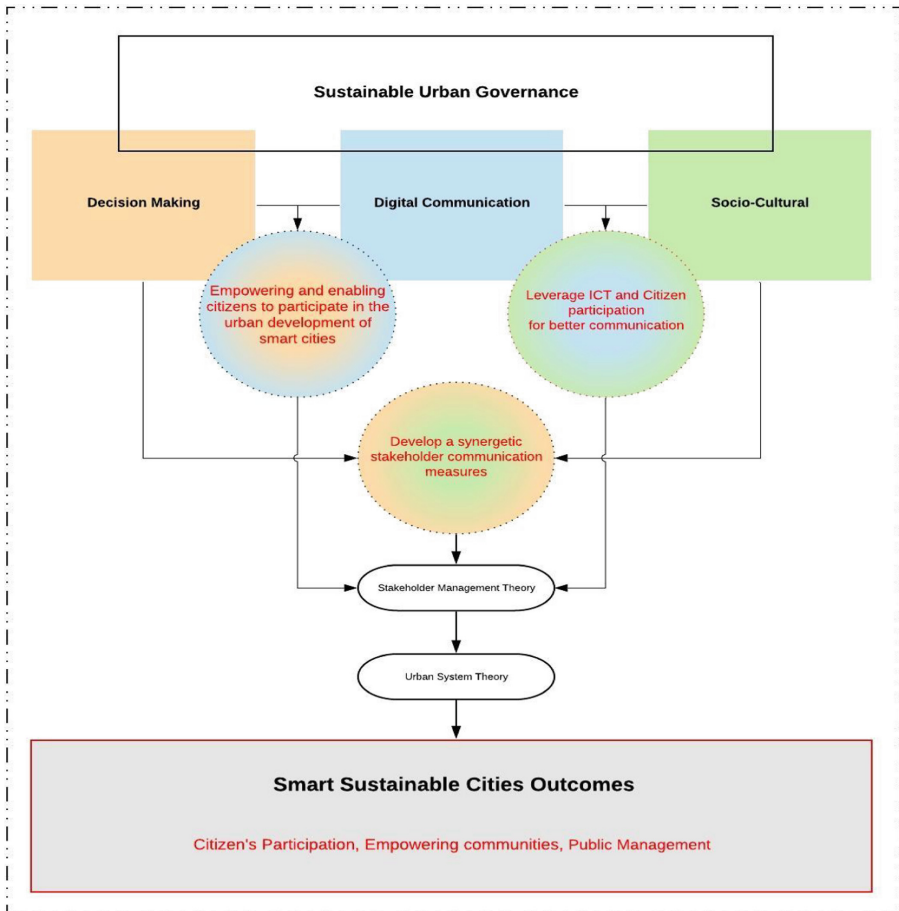


Fig. 6. A conceptual framework for achieving smart sustainable cities that takes CP into consideration

5 Conclusions

This study reviewed the literature on smart sustainable cities from different angles and lenses. This study aims to examine the current body of knowledge of CP in achieving smart cities globally; thus, the objectives are (1) to identify the most reported CP in relation to other domains and (2) to develop a conceptual framework that helps in demonstrating the interconnection of the identified fields. This research adopted a critical review methodology by conducting thematic searches to retrieve the most relevant papers to this study. This resulted in 468 papers overall, and 31 papers were chosen as the best-matched. The findings of this study contribute to the body of knowledge about the involvement of CP globally by investigating Google trends, annual publication, CP in relation to other domains, authors' affiliation and active authors. It could be concluded that Europe is leading the contribution in smart cities, yet a widespread global collaboration between scholars has been observed. In terms of annual publications, the unavailability of data and the appearance of smart city topics were the reasons for the low number of publications in the past years. In addition, the main contributors to this study were scholars affiliated with universities. This study shows that there are gaps that must be filled between the following domains: decision making, digital communication and socio-cultural domains. There is a lack of research focusing on CP as the driver in achieving smart sustainable cities. Therefore, this study presents a conceptual framework that will fill the gaps in these areas. This review study was limited to the online database and scholarly search engines; thus, the articles, conference proceedings, or government documents that are not available online might have been missed out. Regardless of the limitations, the authors ensured that the retrieved documents were available online. In addition, due to the Covid-19 pandemic, this paper was limited to only online papers, whereas offline documents like books and government documents were not available to the public. For future studies, there is a need to examine the level of power to discover if governments are willing to share their decisions with citizens. Moreover, there is a need to explore these challenges and opportunities to provide ideal solutions to achieving the smart cities concept, which will help to successfully achieve sustainable urbanisation.

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