

# Fourteen Years of Research on Smart City and Community: A Bibliometric Analysis

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**Abstract.** Smart cities have become prominent in various disciplines in the last decade. Few scholars have reviewed the current research related to smart cities. Unfortunately, limited studies have examined the smart city and community issues using bibliometrics. Therefore, this paper aims to fill the gap in the current research by systematically reviewing the paper on smart city and community research. This research was conducted by performing a bibliometric approach. The data were traced from the Web of Science Clarivate Analytics database and analysed using the R-package, Hiscite, and VOSviewer. The results of this analysis are descriptively summarised in the number of articles, citations, and the most influential author and journal. Regarding topics, we revealed six growing clusters of research covering 174 sub-topics. This study contributes to the growing body of smart cities by reviewing the current literature on the issue and providing future research directions.

## 1 Introduction

Cities are the hub for the most significant roles in an era of fast and dynamic socioeconomic and technical change. In 2018, more than 55.3% of the global population lived in urban areas; this figure was anticipated to increase to 60% by 2030 and 68% by 2050. [1]. This rapid urbanization has driven the need for innovative, sustainable, and resilient solutions to manage the growing demands of urban populations. Therefore, many countries are looking for ways to overcome the problem of urbanization by finding a solution to how a city can meet the community's needs in terms of education, services, transportation, health, infrastructure, and others [2,3]. The concept of "smart cities" has emerged as a promising approach to address the challenges faced by modern cities, leveraging the power of technology and data-driven decision-making.

Smart cities have garnered considerable attention in recent years as a strategy to tackle the challenges of metropolitan regions, including population development, resource constraints, and environmental issues. It is a concept that implies the ability to sustain urban

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growth by leading to improvements in urban management [4]. Smart city initiatives involve integrating various technologies, including the Internet of Things, data analytics, and renewable energy, to enhance the efficiency and sustainability of urban infrastructure and services [5]. These initiatives aim to create a more interconnected urban ecosystem where information flows seamlessly between stakeholders, including citizens, businesses, and government agencies. By utilizing real-time data, smart cities can optimize traffic management, reduce energy consumption, improve waste management, and enhance public safety, ultimately leading to a higher quality of life for residents. Moreover, information and communication technology-enabled cities have various benefits, such as lower expenses, maximizing resource utilization, boosting interaction, and enhancing quality of life [6].

Smart cities and smart communities have become hot topics regarding urban development in academic and governmental circles. In-depth studies are conducted regarding connotations, models, evaluation systems, problems, and policy analysis [7,8]. Cities must realize smart communities to build efficient information systems and acquire and manage information smartly [9]. A community that uses technology to enhance people's quality of life is called a smart community. If it is successful, the community will benefit from easy access to services and a cozy place to live for sustainable growth [8,10].

Many studies have reviewed smart cities using bibliometric analysis in terms of various topics, including economics [1,11], AI and technology [12,13], government [6], social [14], and climate change [15]. We understand the development of smart cities in various disciplines from the prior works. However, reviews of the smart city and community are limited. We lack information on how smart cities and communities are conceptualized. Therefore, using a systematic literature review, the current study examined smart cities and communities. This study aims to analyze the existing body of knowledge in this field, identify emerging trends, and uncover gaps in the literature that require further exploration. By employing bibliometric methods, the research will provide a comprehensive overview of the key themes, influential authors, and collaborative networks within the smart cities domain, ultimately contributing to a more nuanced understanding of how these concepts evolve in academic and practical contexts [16,17]. This study's research questions include the following:

- 1) How are articles and research related to smart cities and communities developed?
- 2) Which countries, journals, and authors have the greatest influence?
- 3) How are the study topics divided into clusters based on the issues?
- 4) What are potential topics in the future?

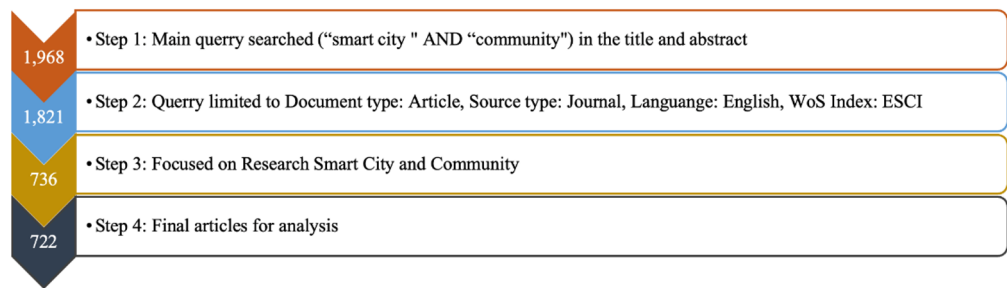
## 2 Methods

In this work, a literature review was combined with a bibliometric technique. Descriptive quantitative bibliometrics are used in this study [17]. Bibliometrics offers several advantages for understanding research trends in smart cities. Firstly, it provides a quantitative assessment of research output, enabling the identification of growth patterns, leading journals, and prolific authors within the field. Additionally, these tools visualize complex relationships between research topics, helping to uncover emerging themes and collaborations. By analyzing citation patterns and keyword co-occurrence, bibliometric analysis can pinpoint key topics and assess the impact of specific publications, highlighting influential works that shape smart city research [16]. Overall, this method clarifies the research landscape and informs strategic decision-making for future studies and initiatives.

This research comprised four steps: initially, we collected a substantial number of relevant journals indexed by WoS, identifying 1,968 articles through a search for "Smart City" AND "Community" in the title, abstract, keywords, and co-keywords. In the second step, we started filtering by including categories such as articles, journals, English, and WoS

Index: ESCI results get 1,821 articles. Lastly, we filtered by focusing the search only on smart city and community research and obtained 736 articles. The fourth step is manual keyword sorting; the final results yielded 722 articles (Figure 1).

In this study, we used a combination of software tools to answer the research questions and analyze the data. Some of the software used include R-Studio and VOSviewer. R-studio was used to find the most relevant authors, journals, articles, countries, and others [18]. VOSviewer was used to describe the research groups and main topics [19].



**Fig. 1.** Gathering Information Procedures

**Table 1.** Inclusion and Exclusion Criteria

| Category      | Inclusion Criteria | Exclusion Criteria         |
|---------------|--------------------|----------------------------|
| Language      | English            | Non-English                |
| Document Type | Article            | Article review             |
| Source        | Journal            | Book, proceeding, etc      |
| WoS Index     | ESCI               | SSCI, SCIE, AHCI           |
| Time Line     | 2010-2023          | Before 2010 and after 2023 |

Source: Author’s own processed

### 3 Results and Discussion

#### 3.1 Research Trends and Development

In this study, we used 722 articles containing biblioshiny to determine the total number of publications and citations year over year. Figure 2 displays the findings of this study investigation concerning the evolution of articles, the average number of citations per article, and the average number of citations annually. As can be observed from the figure, 2022 had the greatest number of article publications—134 total. The logical reason behind this growth may be the growing recognition of smart cities as an interdisciplinary research area that has attracted scholars from various fields, including public administration, urban studies, information technology, and environmental science. This interdisciplinary appeal has significantly increased academic publications as researchers from diverse backgrounds contribute to the evolving knowledge base on smart city concepts and applications.

Figure 3 covers several subjects: big data, artificial intelligence, sensors, cloud computing, COVID-19, blockchain, sustainability, machine learning, urban planning, security, and smart communities.

3.2 The Most Influential Author

We found the top 10 most influential authors, as shown in Table 2. The Top 10 authors include Yigitcanlar T, with six publications and 484 global citations. Followed by Kamruzzaman M (20 articles and 381 citations), Lima M (16 articles and 253 citations), Appio FP (15 articles and 244 citations), Paroutis S (15 articles and 144 citations), Cardullo P (15 articles and 248 citations), Kitchin R (15 articles and 248 citations), Buys L (15 articles and 247 citations), Da Costa EM (15 articles and 247 citations), Iappolo G (15 articles and 247 citations). Yigitcanlar receives the most citations because his work consistently underscores the importance of sustainability in smart city research. He explores how smart city practices can align with sustainable development goals, highlighting the need for cities to become “smart,” environmentally friendly, and socially inclusive. Other authors might not always incorporate sustainability into their analyses, focusing instead on technological innovation or economic benefits.

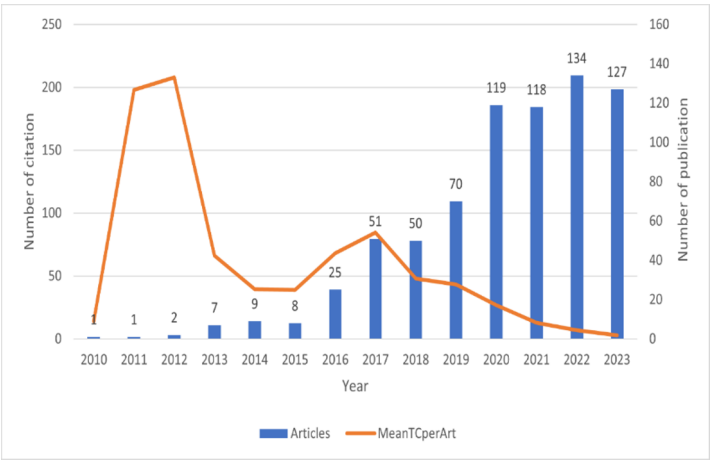
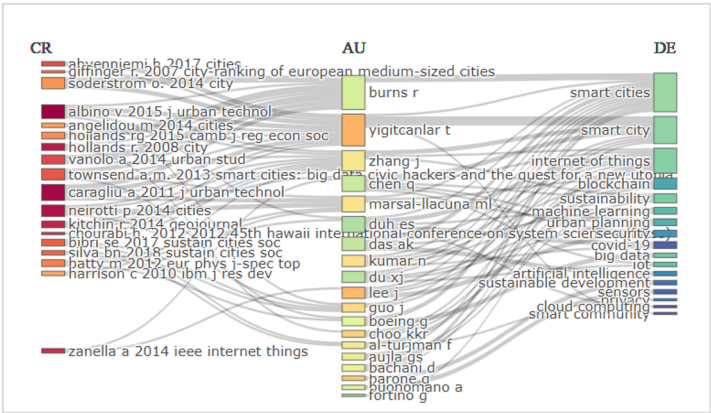


Fig. 2. Research Trends and Citations



Note: CR, Reference; AU, Author; DE, Keyword

Fig. 3. Three Plot Map

**Table 2.** The Most Influential Authors (Sorted by TLCS)

| Rank | Author        | Rees | TLCS | TGCS |
|------|---------------|------|------|------|
| 1    | Yigitcanlar T | 6    | 25   | 484  |
| 2    | Kamruzzaman M | 3    | 20   | 381  |
| 3    | Lima M        | 2    | 16   | 253  |
| 4    | Appio FP      | 1    | 15   | 244  |
| 5    | Paroutis S    | 1    | 15   | 244  |
| 6    | Cardullo P    | 2    | 15   | 248  |
| 7    | Kitchin R     | 2    | 15   | 248  |
| 8    | Buyis L       | 1    | 15   | 247  |
| 9    | da Costa EM   | 1    | 15   | 247  |
| 10   | Ioppolo G     | 1    | 15   | 247  |

Note: TLCS, Total local citation Scope; TGCS, total global citation scope

**Table 3.** The Most Influential Articles (Sorted by LCS)

| Rank | Author and Title of Article                                                                                                                                                                                                                  | LCS | GCS |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|
| 1    | Lazaroiu GC, Roscia M. “Definition methodology for the smart cities model Energi.” 2012; 47 (1): 326-332 [20].                                                                                                                               | 15  | 350 |
| 2    | Yigitcanlar T, Kamruzzaman M, Buyis L, Ioppolo G, Sabatini-Marques J, et al. “Understanding ‘smart cities’: Intertwining development drivers with desired outcomes in a multidimensional framework.” <i>Cities</i> . 2018; 81: 145-160 [21]. | 15  | 247 |
| 3    | Appio FP, Lima M, Paroutis S. “Understanding Smart Cities: Innovation ecosystems, technological advancements, and societal challenges.” <i>Technological Forecasting and Social Change</i> . 2019; 142: 1-14 [22].                           | 15  | 244 |
| 4    | Vanolo. “A Is there anybody out there? The place and role of citizens in tomorrow’s smart cities.” <i>Futures</i> . 2016; 82: 26-36 [23]                                                                                                     | 14  | 175 |
| 5    | Cardullo P, Kitchin R. “Smart urbanism and smart citizenship: The neoliberal logic of ‘citizen-focused’ smart cities in Europe.” <i>Environment and Planning C-Politics and Space</i> . 2019; 37 (5): 813-830 [24]                           | 13  | 203 |
| 6    | Yeh HP. “The effects of successful ICT-based smart city services: From citizens’ perspectives.” <i>Government Information Quarterly</i> . 2017; 34 (3): 556-565 [25]                                                                         | 12  | 171 |
| 7    | Leydesdorff L, Deakin M. “The Triple-Helix Model of Smart Cities: A Neo-Evolutionary Perspective.” <i>Journal of Urban Technology</i> . 2011; 18 (2): 53-63 [26]                                                                             | 10  | 198 |
| 8    | Mora L, Bolici R, Deakin M. “The First Two Decades of Smart-City Research: A Bibliometric Analysis.” <i>Journal of Urban Technology</i> . 2017; 24 (1): 3-27 [27]                                                                            | 9   | 298 |
| 9    | Macke J, Casagrande RM, Sarate JAR, Silva KA. “Smart city and quality of life: Citizens’ perception in a Brazilian case study.” <i>Journal of Cleaner Production</i> . 2018, 1; 182: 717-726 [28]                                            | 9   | 132 |
| 10   | Sun YC, Song HB, Jara AJ, Bie RF. “Internet of Things and Big Data Analytics for Smart and Connected Communities.” <i>IEEE Access</i> . 2016; 4: 766-773 [29]                                                                                | 8   | 522 |

Note: LCS, local citation scope; GCS, global citation scope

**Table 4.** The Most Influential Journal and Number of Citations

| Rank | Journal                                       | Recs | TLCS |
|------|-----------------------------------------------|------|------|
| 1    | Journal of Urban Technology                   | 12   | 33   |
| 2    | Cities                                        | 21   | 25   |
| 3    | Technological Forecasting and Social Change   | 12   | 24   |
| 4    | IEEE Access                                   | 39   | 18   |
| 5    | Government Information Quarterly              | 5    | 16   |
| 6    | Energy                                        | 2    | 15   |
| 7    | Environment and Planning C-Politics and Space | 4    | 15   |
| 8    | Futures                                       | 1    | 14   |
| 9    | Journal of Cleaner Production                 | 9    | 9    |
| 10   | IEEE Internet of Things Journal               | 11   | 6    |

Source: Author’s compilation

3.3 The Most Influential Articles

We picked the top 10 most influential articles, as seen in Table 3. In the first place is an article entitled “Definition methodology for the smart city models” in 2012 by Lazaroiu & Roscia [20] with a local citation count of 15 and a global citation count of 350. Then, it is followed by the article of Yigitlancar et al. with 15 local and 247 citations [21], Appio et al. [22] (15 local and 244 global citations), Vanolo (14 local and 175 global citations) [23]; Cardullo et al. (13 local and 203 global citations) [24]; Yeh (12 local and 198 global citations) [25]; Leydesdorff et al. (10 local and 198 global citations) [26]; Mora et al. (9 local and 132 global citations) [27]; Macke et al. (9 local and 132 global citations) [28]; Sun et al. (8 local and 522 global citations) [29].

3.4 The Most Influential Journal

Many journals are involved in studying smart cities and communities. In this study, we revealed that the top 18 journals can be seen in Figure 4, which are the publications with the most contributions, followed by the number of citations. Journal of Urban Technology is the most influential journal, with 12 articles published and 33 citations per year. Cities (21 articles dan 25 citations), Technological Forecasting and Social Change ( 12 articles dan 24 citations), IEEE Access (39 articles dan 18 citations), Government Informations Quarterly (5 articles dan 16 citations), Energy (2 articles dan 15 citations), Environment and Planning C-Politics and Space (4 articles dan 15 citations), Futures (1 article dan 14 citations), Journal of Cleaner Production (9 article dan 9 citation), IEEE Internet of Things Journal (11 article dan 6 citation).

3.5 The Most Contributed Countries

In this study, we revealed the top 10 most influential countries, although approximately 65 countries contributed. China is leading the pack with 109 publications, followed by the US with 76, Italy with 67, the UK with 47, Spain with 41, India with 36, Canada with 29, Korea with 29 publications, Australia with 24 publications, and Poland with 24 publications.

### 3.6 Sub Topics and Clusters

To find the co-occurrence network, we used VOSviewer. The results show that there are 6 clusters with 174 sub-topics. The first cluster consists of 38 sub-topics, encompassing “China, circular economy, community resilience, consumption, demand response, design, electric vehicles, energy, energy efficiency, energy management, energy transition, generation, ICT, implementation, indicators, innovation, integration, microgrids, model, network, operation, optimization, performance, power, renewable energy, simulation, smart city and community, smart grid, storage, sustainable development, system, uncertainty, urban resilient, waste, waste management, water.”

Second cluster consists of 37 sub-topics: “algorithm, artificial intelligence, attacks, authentication, big data, big data analytics, blockchain, challenges, cloud, covid-19, cyber-physical system, deep learning, digital twin, efficient, fog computing, health-care, internet, internet of things, intrusion detection, machine learning, monitoring neutral-network, performance evaluation, prediction, privacy, real-time system, safety, scheme, security, sensors, service, smart communities, smart healthcare, smart mobility, surveillance, wireless sensor networks.”

The third cluster consists of 25 sub-topics: “air pollution, architecture, co-creation, communication, community engagement, crowdsourcing, data mining, e-government, engagement, framework, informations-technology, methodology, network analysis, open innovation, opportunities, public-participation, sentiment analysis, social media, social networks, strategies, technologies, trust, Twitter, wireless communication, wireless network.”

The fourth cluster consists of 25 sub-topics: “Citizens, classification, cloud computing, context, data models, edge computing, growth, information, interoperability, knowledge, migration, mobility, network, ontology, participation, patterns, perspective, platform, quality of life, services, smart, software, sustainable cities, trends.”

The fifth cluster consists of 25 sub-topics, including “access, autonomous vehicles, city, climate change, community, digital divide, environment, future, geographies, governance, government, impact, India, inequality, lessons, place, policy, politics, resilience, Singapore, social sustainability, state, technology, urban sustainability, and urbanism.”

The last cluster consists of 24 sub-topics involving “accessibility, built environment, citizen participation, GIS, health, infrastructure, land-use, open data, scale, smart city, smart homes, social innovation, space, support, sustainability, sustainable urban development, transport, transportation, united-states, urban, urban development, urban health, urban planning, urbanization.”





communities. So far, there have been many studies on the topic, but no research has used the bibliometric review. This study aims to identify key trends, influential authors, and significant publications that contribute to the discourse on smart cities and communities by employing a bibliometric review.

This study found that 2012 there was a very rapid growth in citations, and from 2020 to 2023, there was a very drastic increase in publications. This indicates that the smart cities and communities issue has received wide attention among researchers. That year, researchers were interested in smart cities and community research in technology. In particular, this surge in interest suggests that scholars are increasingly recognizing the importance of technology in addressing urban challenges and enhancing community engagement. This period's growing body of literature reflects diverse research topics, Incorporating modern technology, including artificial intelligence, machine learning, and the Internet of Things (IoT), into smart city frameworks. This trend highlights the relevance of technological advancements in urban planning and management. It underscores the urgent need for innovative solutions to promote sustainability and improve the quality of life in urban environments [30].

Cardullo from Australia is included in the category of most influential authors. Australia has the second-highest number of publications, with 76. Ioppio from Italy has 67, Paroutis from the United Kingdom has 47, and Yigitcnalar and Buys L from Australia have 29. It demonstrates that the most prominent writers and influential nations are related. This demonstrates a clear correlation between the most prominent authors and the leading nations in smart city research [15,31]. The concentration of influential scholars in Australia suggests a robust research environment that supports innovative studies in smart cities and communities. Furthermore, this trend reflects the global recognition of the significance of these topics, with researchers from various countries contributing valuable insights and perspectives. This interconnectedness underscores the importance of international collaboration in advancing the field and addressing the complex challenges urban areas face.

China and the United States lead in smart city publications, followed by Italy and the UK. It can be logical because China and the United States have invested significantly in smart city initiatives as part of their national and urban development strategies. The government has launched extensive programs and funding to promote urbanization and sustainability through smart city projects in China. Similarly, U.S. federal and state governments have implemented policies encouraging research and development in smart technologies, facilitating innovation in urban environments. Furthermore, the U.S. and China are home to numerous technology companies and research institutions that drive IoT, data analytics, and artificial intelligence innovation. This technological ecosystem fosters academic, industry, and government collaboration, enhancing research output [6,30].

The literature analysis identified six major research clusters within the field of smart cities, each encompassing various sub-topics. Among these, the research cluster focusing on 'Sustainable Energy' is currently leading the most innovation in smart city studies. While all research clusters contribute to the broader goals of smart city development, the sustainable energy cluster stands out for its current leadership in innovation. It is propelled by innovations in renewable energy integration, smart grid technologies, and a pronounced emphasis on sustainability and efficiency [32].

AI, IoT, and blockchain are frequently mentioned in research clusters related to smart cities and communities. These findings show that AI analyzes large datasets generated within smart cities, enabling more effective urban planning and community services. For example, AI can optimize public transport schedules based on real-time demand, enhancing accessibility for community members. Literature suggests that AI-driven insights improve the responsiveness of city services, leading to better resource allocation and community satisfaction [33].

Citizen engagement is essential for the effective advancement of smart cities, as it guarantees that urban innovations correspond with the requirements as well as needs of citizens. Several strategies can be implemented to enhance citizen involvement in smart city initiatives. First, developing user-friendly digital platforms can facilitate communication between city officials and residents. These platforms can include forums, mobile applications, and social media channels where citizens can provide feedback, share ideas, and discuss smart city projects. Second, implementing participatory planning allows citizens to be actively involved in decision-making. This can include workshops, town hall meetings, and collaborative design sessions where community members contribute to developing smart city policies and projects. Lastly, increasing awareness about smart city initiatives and their potential benefits is essential for encouraging citizen participation. Educational campaigns can be conducted through local media, community events, and school programs to inform residents about the importance of their involvement and how they can contribute [34,35].

Concerning potential avenues for advancing smart cities and communities is grounded in a conventional literature review methodology that involves qualitatively assessing the literature. We derived our future research inquiries from examining proposed research directions in leading journal articles, making slight adjustments to ensure their applicability across various smart city and community research frameworks. This approach allows us to identify gaps in the current literature and propose targeted research questions that can guide future investigations. By synthesizing insights from prominent studies, we aim to foster a deeper understanding of the complexities and interdependencies within smart city initiatives. Additionally, this method encourages interdisciplinary collaboration, highlighting the need for diverse perspectives in addressing the multifaceted challenges of urban development and sustainability. The smart city concept aims to tackle various urbanization challenges, particularly those related to sustainability, efficiency, and quality of life. Here are some of the most pressing challenges that smart cities can effectively address. For instance, urban areas often face severe traffic congestion due to increased population density and vehicle usage. Smart city initiatives, such as intelligent transportation systems (ITS), can streamline traffic flow, mitigate congestion via real-time traffic monitoring, and improve public transit systems [36].

Smart cities significantly contribute to reducing environmental impact, particularly in waste and energy management, by integrating advanced technologies. By utilizing IoT-enabled sensors, smart waste management systems optimize collection routes based on real-time data, thereby minimizing fuel consumption and emissions while promoting recycling initiatives [37]. In energy management, smart grids enhance efficiency by allowing real-time monitoring of energy consumption and integrating renewable energy sources, leading to reduced reliance on fossil fuels. Additionally, smart transportation solutions encourage public transit usage and the adoption of electric vehicles, further decreasing greenhouse gas emissions [38]. Green building practices, such as energy-efficient designs and renewable energy installations, also play a critical role in lowering the carbon footprint of urban areas [39]. Overall, these strategies enhance operational efficiency and support sustainable urban development, making smart cities key players in combating environmental challenges.

**Table 5.** Future Research Recommendations

| No | Research Cluster                                           | Future Research Questions                                                                                                                                                                                                                                                                                                                                      | Authors |
|----|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 1  | Smart city for government purposes                         | What is the effect of a smart city on the national and local government services?                                                                                                                                                                                                                                                                              | [40]    |
| 2  | Technology for supporting smart city                       | How can appropriate technology be implemented in a smart city?                                                                                                                                                                                                                                                                                                 | [41]    |
| 3  | Sustainability of smart city                               | Can smart cities exist in different communities and circumstances?                                                                                                                                                                                                                                                                                             | [42]    |
| 4  | Citizen involvement                                        | How about citizen participation in the smart city program?                                                                                                                                                                                                                                                                                                     | [23]    |
| 5  | Environmental impact                                       | What are the positive and negative impacts of smart cities on environmental preservation? What is the relationship between smart cities and climate change?                                                                                                                                                                                                    | [43]    |
| 6  | Smart city in developing countries                         | What are the unique challenges faced by developing countries in implementing smart city technologies, and how can they be addressed? How do socio-economic factors influence the adoption of smart city initiatives in developing regions? What role does citizen participation play in successfully implementing smart city projects in developing countries? | [44]    |
| 7  | The integration of ethical considerations and data privacy | How do ethical considerations impact the design and implementation of smart city technologies, particularly concerning surveillance and data collection? What are the challenges and best practices for balancing data utility and privacy concerns in smart city environments?                                                                                | [45]    |
| 8  | Interdisciplinary approaches to smart city                 | How can interdisciplinary collaboration enhance the development and implementation of smart city technologies across various sectors, such as urban planning, environmental science, information technology, sociology, and economy?                                                                                                                           | [46]    |
| 9  | Future technological changes                               | How will technological advancements such as IoT, AI, and big data analytics transform urban infrastructure and services in smart cities over the next decade?                                                                                                                                                                                                  | [29]    |
| 10 | Smart city for all social classes                          | How can smart city initiatives ensure equitable access to technology and services for all social classes, particularly marginalized and low-income communities?                                                                                                                                                                                                | [28]    |

Ultimately, the proposed research inquiries serve as a roadmap for scholars and practitioners seeking to contribute to the evolving landscape of smart cities and communities. The future research recommendations for the field of smart cities encompass several key areas that warrant further exploration. Firstly, the impact of smart city initiatives on national and local government services is crucial to understand how these developments can enhance governance and public administration. Research should investigate the implementation of appropriate technologies within smart cities, as technological integration is vital for their success and functionality. Additionally, the sustainability of smart cities needs thorough examination, specifically addressing whether these urban models can adapt to different communities and diverse circumstances. Another significant aspect is the role of citizen participation in smart city programs, which is essential for ensuring that initiatives align with the needs and expectations of residents. Then, understanding the environmental implications of smart cities is paramount; future studies should assess both the positive and negative effects these urban developments have on environmental preservation and investigate the intricate relationship between smart cities and climate change. Collectively, these research questions will contribute to a more comprehensive understanding of smart cities and guide effective initiatives in urban development. In addition, studies should focus on the unique

challenges developing countries face in adopting smart city technologies, exploring socio-economic influences and the role of citizen participation.

Additionally, integrating ethical considerations and data privacy is crucial, emphasizing the need for best practices that balance data utility with privacy concerns. Interdisciplinary collaboration across urban planning, environmental science, and sociology sectors is also essential for effectively developing smart city technologies. Furthermore, research should investigate how IoT, AI, and big data analytics advancements can revolutionize urban infrastructure and services in the coming decade. Lastly, ensuring equitable access to technology and services for all social classes, particularly marginalized and low-income communities, is vital for fostering inclusive smart city initiatives. The future research agenda is summarized in Table 5.

## 4 Conclusion

In this study, we concentrate on research on smart communities and cities. This research focuses on three main themes and their numbers, as well as publications, journals, authors, and the most powerful nations. We reveal that the number of articles has increased, especially in 2022, but has decreased since 2012. However, 2012 and 2022 were the most influential years, with 208 and 134 citations, respectively, showing that the number of publications has fluctuated over ten years. We identified the ten most influential authors as Yigitcanlar T, Kamruzzaman M, Lima M, Appio FP, Paroutis S, Cardullo P, Kitchin R, Buys L, da Costa EM, and Ioppolo G. We also found ten influential journals Journal of Urban Technology, Cities, Technological Forecasting and Social Change, IEEE Access, Government Information Quarterly, Energy, Environment and Planning C-Politics and Space, Futures, Journal of Cleaner Production, and IEEE Internet of Things Journal. The results revealed six research clusters in 174 sub-trends, including “Internet of Things, Blockchain, Sustainability, Machine Learning, Urban Planning, Security, Covid-19, Big Data, Artificial Intelligence, Sensors, Cloud Computing, Smart Community and others.” To make the research findings useful for future studies on smart cities and communities, this study adds to the body of knowledge on smart cities and communities.

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