



Meta-Analysis of Scientific Articles on the Concept of Smart Sustainable Cities in Iran and Worldwide¹

Ali Moghtafari¹, Morteza Talachiyani^{2*}, Alireza Estelaji³, Mohammad Reza Farzad Behtash⁴

¹Department of Architecture and Urban Planning, NT.C., Islamic Azad University, Tehran, Iran.

²Department of Urban Planning, SR.C, Islamic Azad University, Tehran, Iran.

³Department of Geography, Yt.C., Shahreeri, Islamic Azad University, Tehran, Iran.

⁴Department of Architecture and Urban Planning, NT.C., Islamic Azad University, Tehran, Iran.

Received Date: 28 July 2025 Accepted Date: 04 November 2025

Abstract

Background and Objective: In recent years, with the increasing growth of the urban population and pressures from environmental, social, and economic issues, the theory of the "sustainable smart city" has become one of the key concepts in urban studies. The purpose of this research is to conduct a systematic comparative review of studies conducted in the field of the sustainable smart city at the level of Iran and the world, in order to identify and analyze theoretical patterns, commonalities and differences, as well as existing research gaps in this field.

Methodology: This study was conducted using the systematic review method with a comparative approach. The research population consisted of 31 scientific articles published in reputable domestic and international databases between 2017 and 2024, which were selected using standard methods and subjected to qualitative content analysis.

Results and Findings: The findings indicate that at the global level, the sustainable smart city paradigm is understood as a multidimensional and dynamic concept in which technology serves to achieve broader goals such as environmental sustainability, social justice, participatory governance, resilience, and improving the quality of life. In contrast, in domestic Iranian studies, the predominant emphasis has been on the technical and infrastructural aspects of smartening, while the theoretical, social, and citizen-oriented dimensions of this concept have received less attention. This gap highlights the necessity of revising research and policy-making approaches in the national context to move towards the comprehensive realization of the sustainable smart city.

Keywords: " Systematic Review", " Sustainable Smart City", " Urban Planning", " Urban Management", Iran, Worldwide.

¹ This article is an extracted from a Ph.D Thesis titled " Explaining a Indigenous Conceptual Model of Sustainable Development of the City of Qom with an Emphasis on Urban Smartization (Smart City Development)", first author, supervisor: Second Author, Advisor: Third and Fourth Authors, North Tehran Branch, Islamic Azad University, Tehran, Iran.

* Corresponding Author Email: talatchian@yahoo.com.fr

Cite this article: Moghtafari, A. , Talachiyani, M. , Estelaji, A. R. and Mohammad Reza, F. B. (2026). Meta-Analysis of Scientific Articles on the Concept of Smart Sustainable Cities in Iran and Worldwide. *Journal of Sustainable Urban & Regional Development Studies (JSURDS)*, 7(2), 80-95.

EXTENDED ABSTRACT

Introduction

In the current era, marked by increasingly complex urban structures and growing environmental, social, and technological challenges, the paradigm of the "smart sustainable city" has emerged as a key integrative approach to addressing urban issues globally. Unlike purely technocratic views, this concept is founded on the principle that true smartness is achieved when technology serves broader goals such as environmental sustainability, social justice, participatory governance, and enhanced quality of life. However, the dispersion and diversity of research approaches, both in Iran and worldwide, have complicated a systematic analysis of the theoretical trajectories and dominant intellectual trends in this field. This research aims to fill this gap by conducting a systematic comparative review of studies on smart sustainable cities in Iran and worldwide to identify and analyze theoretical patterns, commonalities, differences, and existing research gaps.

Methodology

This study was conducted using the systematic review method with a comparative-analytical approach. The research population consisted of 31 scientific articles (7 Iranian and 24 international) published in reputable domestic and international databases between 2017 and 2024 (equivalent to 1396-1403 in the Persian calendar). These articles were selected using standard methods and subjected to qualitative content analysis. The analytical process involved a systematic search, extraction of key concepts, theoretical frameworks, dimensions, thematic foci, and methodologies. The data were categorized into various tables and examined comparatively between domestic and international studies.

Results and Findings

The findings reveal a significant gap between global and domestic approaches: At the Global Level: The smart sustainable city paradigm is understood as a multidimensional, dynamic concept underpinned by robust theoretical foundations (e.g., the right to the city, network society, and participatory governance). In this view, technology is merely a tool, and the ultimate goal is to achieve outcomes such as resilience, transparency, social justice, and environmental sustainability. The active participation of citizens as partners in decision-making and the role of systems thinking in aligning initiatives with the Sustainable Development Goals (SDGs) are strongly emphasized. In Iranian Domestic Studies: The predominant emphasis has been on the technical, infrastructural, and technocratic aspects of smartification. In these studies, the theoretical, social, and citizen-oriented dimensions of the smart sustainable city concept have received less attention, and a weak connection to foundational urban theories is observed. This has led to a focus on hardware-oriented indicators and a neglect of software-oriented and human-centric indicators. Content analysis of the articles showed that "smart infrastructure" and "smart buildings" were the most frequently studied dimensions, while dimensions such as "smart people" and "smart economy" received the least attention. Methodologically, the use of quantitative models like "Structural Equation Modeling (SEM)" and the "Delphi Technique" was more prevalent.

Conclusion

The results of this comparative systematic review indicate that a successful transition towards smart sustainable cities in Iran requires a fundamental revision of research and policy-making approaches. To move from a merely technology-driven smartness towards a sustainable and human-centric one, it is essential to: Strengthen the link between theory and practice: Theoretical foundations and socio-critical analyses must become the cornerstone of

smart city projects. Develop localized models: Global frameworks should be adapted to the cultural, social, and economic characteristics of Iranian cities. Institutionalize citizen participation: Citizens should be elevated from the role of service consumers to that of active stakeholders and decision-makers. Expand interdisciplinary research: Fields such as urban sociology, human geography, and the philosophy of technology should be further integrated into research in this domain. In conclusion, the comprehensive realization of the smart sustainable city depends on the synergy and dynamic interaction between technology, scientific theorizing, social participation, and intelligent policymaking.

Declarations

Funding

There is no funding support for this study.

Authors' Contribution

Authors contributed equally to the conceptualization and writing of the article. All of the authors approved the content of the manuscript and agreed on all aspects of the work declaration of competing interest none.

Conflict of Interest

The authors declare no conflict of interest.

Acknowledgments

We are grateful to all the scientific consultants of this paper.

References

- Abbas, Z., and Jaber, H. S. (2020). Accuracy assessment of supervised classification methods for extraction land use maps using remote sensing and GIS techniques. In IOP Conference Series: Materials Science and Engineering (Vol. 745, No. 1, p. 012166). IOP publishing. <https://doi.org/10.1088/1757-899X/745/1/012166>
- Abdelkarim, S.B.; Ahmad ,A.M.; Ferwati, S.; Naji, K. Urban Facility Management Improving Livability through Smart Public Spaces in Smart Sustainable Cities. Sustainability 2023, 15, 16257. <https://doi.org/10.3390/su152316257>
- Addas A (2023), The concept of smart cities: a sustainability aspect for future urban development based on different cities. Front. Environ. Sci. 11:1241593. <https://doi.org/10.3389/fenvs.2023.1241593>
- Ahvenniemi, H., Huovila, A., Pinto-Seppä, I., & Airaksinen, M. (2017). What are the differences between sustainable and smart cities? Cities, 60, 234–245. <https://doi.org/10.1016/j.cities.2016.09.009>
- Alamoudi, A.K.; Abidoye ,R.B.; Lam, T.Y.M. Implementing Smart Sustainable Cities in Saudi Arabia: A Framework for Citizens 'Participation towards SAUDI VISION 2030. Sustainability 2023, 15,6648. <https://doi.org/10.3390/su15086648>
- Albino, V., Berardi, U., & Dangelico, R. M. (2015). Smart cities: Definitions, dimensions, performance, and initiatives. Journal of Urban Technology, 22(1), 3–21. <https://doi.org/10.1080/10630732.2014.942092>
- Bibri, S. E., & Krogstie, J. (2017). Smart sustainable cities of the future: An extensive interdisciplinary literature review. Sustainable Cities and Society, 31, 183–212. <https://doi.org/10.1016/j.scs.2017.02.016>

- Buyannemekh, B. ;Gasco-Hernandez, M.; Gil-Garcia, J.R. Fostering Smart Citizens: The Role of Public Libraries in Smart City Development. *Sustainability* 2024, 16 ,1750. <https://doi.org/10.3390/su16051750>
- Castells, M. (1996). *The Rise of the Network Society*. Oxford: Blackwell. <https://DOI:10.1002/9781444319514>
- Choi, H.-S.; Song, S.-K. Direction for a Transition toward Smart Sustainable Cities Based on the Diagnosis of Smart City Plans. *Smart Cities* 2023, 6, 156–178. <https://doi.org/10.3390/smartcities6010009>
- Costa, D.G.; Bittencourt, J.C.N.; Oliveira, F.; Peixoto, J.P.J.; Jesus, T.C. Achieving Sustainable Smart Cities through Geospatial Data-Driven Approaches. *Sustainability* 2024, 16, 640. <https://doi.org/10.3390/su16020640>
- Gazzeah, K. Ranking Sustainable Smart City Indicators Using Combined Content Analysis and Analytic Hierarchy Process Techniques. *Smart Cities* 2023, 6, 2883–2909. <https://doi.org/10.3390/smartcities6050129>
- Geldenhuis, H.J.; Brent ,A.C.; De Kock, I.H. SSUIT Smart Sustainable Urban Infrastructure Transitioning. *Sustainability* 2023. <https://doi.org/10.3390/su151813729>
- Hashem, I.A.T.; Usmani ,R.S.A.; Almutairi, M.S.; Ibrahim ,A.O.; Zakari, A.; Alotaibi, F. ; Alhashmi, S.M.; Chiroma, H. Urban Computing for Sustainable Smart Cities: Recent Advances, Taxonomy ,and Open Research Challenges. *Sustainability* 2023, 15, 3916. <https://doi.org/10.3390/su15053916>
- Javidroozi, V.; Carter, C. ;Grace, M.; Shah, H. Smart ,Sustainable, Green Cities: A State-of-the-Art Review. *Sustainability*2023, 15, 5353. <https://doi.org/10.3390/su15065353>
- Kim, N.; Yang, S. Sociotechnical Characteristics of Conceptually Related Smart Cities ’ Services from an International Perspective. *Smart Cities* 2023, 6 ,196–242. <https://doi.org/10.3390/smartcities6010011>
- Kitchin, R. (2014). The real-time city? Big data and smart urbanism. *GeoJournal*, 79(1), 1–14. DOI:[10.1007/s10708-013-9516-8](https://doi.org/10.1007/s10708-013-9516-8)
- Lefebvre, H. (1991). *The Production of Space*. Oxford: Blackwell.
- Livability through Smart Public Spaces in Smart Sustainable Cities. *Sustainability* 2023, 15, 16257. <https://doi.org/10.3390/su152316257>
- Louati, A.; Louati, H.; Kariri, E.; Neifar, W.; Hassan, M.K.; Khairi, M.H.H.; Farahat, M.A.; El-Hoseny, H.M. Sustainable Smart Cities through Multi-Agent Reinforcement Learning-Based Cooperative Autonomous Vehicles. *Sustainability* 2024, 16, 1779. <https://doi.org/10.3390/su16051779>
- Pastor, R.; Fraga, A.; López-Cózar, L. Interoperable, Smart, and Sustainable Urban Energy Systems. *Sustainability* 2023, 15, 13491. <https://doi.org/10.3390/su151813491>
- Pinem, R.J.; Kustedjo, A.K.; Iskandar, Y.A.; Yahya, B.N. Investigation of Smart Sustainable City Indicators of Sustainable Development—A Case Study of the City of Suwon. *Sustainability* 2023, 15, 14283. <https://doi.org/10.3390/su151914283>
- Sadeghi, H., Mohammadi, H., & Rezaei, M. (2020). A critical review of smart city initiatives in Iran: Gaps and prospects. *Iranian Journal of Urban Studies*, 9(2), 45–66. DOI:[10.1016/j.cities.2006.08.002](https://doi.org/10.1016/j.cities.2006.08.002)
- Salama, R.; Al-Turjman, F. Sustainable Energy Production in Smart Cities. *Sustainability* 2023, 15,16052. DOI:[10.3390/su152216052](https://doi.org/10.3390/su152216052)
- Treude, M.; Schüle, R. Haake, H. Smart Sustainable Cities—Case Study SüdwestfaleGermany. *Sustainability* 2022, 14, 5957. <https://doi.org/10.3390/su14105957>
- Ajali, M. (2025). Identification and Evaluation of Factors Affecting the Realization of the Sustainable Smart City and Assessing the Preparedness in Metropolitan Tehran. *Journal of Urban and Regional Studies on Sustainable Development*, 6(3), 1-18. (in Persian)

- Hatami Afshar, S., Pourfarzaneh, S., Ziparo, A., & Soleimani, M. (2021). Sustainable Smart City: Concepts, Dimensions and Indicators. *Applied Research in Geographical Sciences*, 21(60), 315-335. <https://doi.org/10.52547/jgs.21.60.315> (in Persian)
- Saadati, Z., & Mehreshad, B. (2017). Internet of Things and Big Data Applications in Sustainable Smart Cities. *Science and Technology Policy Letters*, 7(3), 6-17. <https://doi.org/20.1001.1.24767220.1396.07.3.2.6> (in Persian)
- Shams Najafi, F., Kamiabi, S., & Arghan, A. (2022). Providing an Optimal Smart City Model from the Perspective of Sustainable Urban Development (Case Study: Rey City). *Territorial Planning Scientific Journal*, 14(2), 623-649. (in Persian)
- Shams Najafi, F., Kamiabi, S., & Arghan, A. (2022). Presenting a Smart City Model Based on Sustainable Urban Development with an Exploratory Mixed Approach. *Researches in Economic Geography*, 3(10), 54-70. (in Persian)
- Shiravi Pour, S., Mortazavi, S. M., & Bayat, R. (2023). Presenting a Model of Factors Affecting the Future Development of Sustainable Smart Cities with Emphasis on Optimal Energy Management. *Urban Economics and Planning*, 4(4), 116-130. <https://doi.org/10.22034/uep.2024.423160.142> (in Persian)
- Mahdzadeh, M. (2019). Investigating the Relationship Between Smart City and Sustainable Development and the Challenges of Achieving a Sustainable Smart City. *Shabak*, 5(7), 119-128. <https://sid.ir/paper/524871/fa> (in Persian)