International Journal of Integrated Research and Practice (IJIRP)

Vol 2, Issue 1, January 2026, Page: 23-32 ISSN: 3107-5037

Smart Cities and Urban Sustainability: A Data-Driven Analysis

Dr. Shalini Chaturvedi
Associate professor,
Department of Public Administration,
University of Rajasthan, Jaipur.

Abstract

The high-rate urbanization has complicated the problems with the resources outflow, environment impoverishment, and efficient delivery of the social services, this is why all the cities of the world discuss the models of smart and sustainable urban development. The analytical paper will study the manner in which smart city projects contribute to improving the urban sustainability in a data-driven analytical framework. The article is dedicated to the level of improvement in the environmental results, economic effects, and social well-being of urban areas where the integration of digital technologies, big data analytics, and smart infrastructure is underway. In establishing the trends and correlation between smart governance practices and sustainability outcomes, secondary sources of data, including world smart city rankings, city sustainability reports, and city open-data sites, will be reviewed. These are energy efficiency, waste management, mobility system, water resource optimization and citizen involvement as some of the indicators that can be used to ascertain the effectiveness of data driven decision making in urban management. It has also been found that those cities which have used the opportunity of real-time data, Internet of Things (IoT) application, and predictive analytics are those which have demonstrated the measurable increase in the resource usage, decrease in emissions, and reactivity of services. However, the research also mentions such challenges as the privacy of the data, differences in the availability of technologies, and inability to control them at a large scale that can be a barrier to the sustainability of the smart cities project in the long-term perspective. The paper says that the technological aspect of the equation is lacking; institutional coordination, inclusion policies and ethical data governance are essential components to achieve sustainable outcomes. The paper presents empirical evidence of the interaction of smart technologies and urban sustainability to the body of existing evidence based urban planning. The study gives policy implications to policy makers, urban planners and city administrators who desire to make smart cities resilient, inclusive and environmental friendly as the city complexities rise.

Keywords: Smart Cities, Urban Sustainability, Data-Driven Decision Making, Big Data Analytics, Internet of Things (IoT), Sustainable Urban Development, Smart Governance

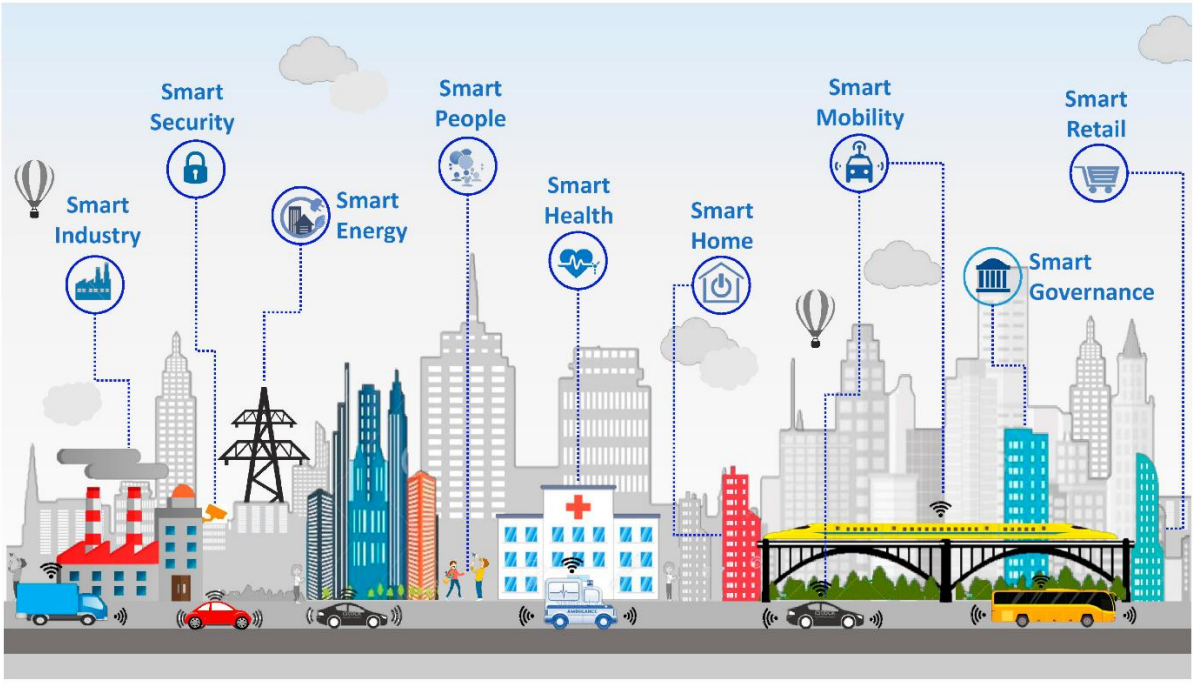
Introduction

The problem of urbanization has become one of the most meaningful trends in the world of the twenty-first century that imposes the strain on the current urban infrastructure and natural resources, and the city administration systems, to a greater extent than ever before. Traffic congestion, inappropriate energy utilization, deterioration of the environment and the increasing social inequality are some of the complex issues currently affecting the cities. The idea of smart cities has then turned into a timely approach to the process of urban sustainability as it involves the presence of digital technology, data analysis, and novel mechanisms of urban control in the process of urban planning and management.

Smart cities use the volume of information collected through the sensors, Internet of Things (IoT), and the digital environment to coordinate the work of the city, enhance the process of decision-making, and encourage the relevant use of resources. The solutions involving the use of data, when implemented appropriately, will help decrease the carbon emission, improve the

Vol 2, Issue 1, January 2026, Page: 23-32 ISSN: 3107-5037

transport infrastructure, waste management, and the quality of life of the citizens who live in the urban areas. Nevertheless, the development of smart cities should not be a simple integration of the technological establishments, but also should be informed of its sustainability criteria, inclusive, and ecological criteria in the long-term.



Source: ***https://www.mdpi.com/***

The urban sustainability is all about sustainable development which helps to make sure that the current generation will not deprive the future generation of the opportunities to have a good life. To create the principles of sustainability regarding the smart cities, it will be needed to possess a macro-view of the way the data-driven interventions will influence the environmental, economic, and social aspects of the urban life. However, as much as there has been more investments in smart technologies, there is a necessity of an empirical study, which will identify the actual contribution made by the technologies to the long-term outcomes in the city.

The paper will focus on discussing the relationship between the smart city projects and the city sustainability under data based approach to analytics. Taking into account the major indicators as derivatives of the energy consumption, mobility, quality of the environment and efficiency of governance, the analysis will give a clue on how the information-driven urban strategies will most likely ensure sustainable development. The results are anticipating that they will guide the policymakers, city planners and stakeholders to come up with smarter, resilient and sustainable cities.

Background of the study

The idea of the rapid urbanization has already turned into one of the tendencies of the twenty-first century that may bring both possibilities and threats to cities throughout the world. It is projected by the United Nations that more than 68 percent of the global population will be urban in 2050, hence putting additional strain on the infrastructure, resources and environmental sustainability. Traditional models in urban development have generally failed to create the appropriate balance in the development of growth in the economy, social inclusion, and environmental protection, which has resulted in congestion, pollution, and poor utilization of resources and poor living standards of different cities.

There has emerged the concept of smart cities to overcome these challenges. Smart cities take advantage of information and communication technologies (ICT), big data, and advanced

Vol 2, Issue 1, January 2026, Page: 23-32 ISSN: 3107-5037

analytics maximizing the urban services, decision making and overall sustainability. Data-driven solutions can also be utilized by urban planners and policymakers to monitor the real-time situation, predict the tendencies in the urban setting, and provide reactive action in transport, energy utilization, and waste minimization and relevant safety of the population. Thus, the smart urbanisation projects are increasingly turning into more of a strategy to achieving sustainable urbanisation that would meet the requirements of both the present and the future generations.

Even though the application of smart technologies is gradually gaining popularity, systematic study of the effects of this kind of intervention on the result of urban sustainability is yet to be conducted. There are significant differences between cities in the level of technological maturity, political leaders, and socio-economic status, and this aspect influences the effectiveness of data-driven plans. In addition to this, sustainability must be quantified in a multidimensional way and this must involve environmental, social and economic measures. This relationship between the use of technology and the sustainability performance is therefore significant to the development of efficient and equitable smart city projects.

In an effort to fill this gap, the proposed research paper presents a data-based analysis of smart city projects, in establishing the size of their impact on urban sustainability. The study will benefit policy makers, city planners and other stakeholders who would be interested in developing intelligent, resilient and sustainable cities due to its analysis of empirical evidence and identification of patterns, challenges, and the best practice.

Justification

The world is growing faster than ever before in terms of urbanization that presents a challenge and an opportunity to sustainable development. Cities are emerging to be the economic life centres, creative life, and social interaction but they present some formidable challenges such as road congestion, pollution, poor resource management and poor infrastructure. In response, the concept of smart cities has been developed as one of the strategic methods to unite technology, data analytics, and urban planning to enhance the quality of life, optimize resource utilization, and make the city sustainable over the long term.

The research is justified by the fact that the sustainability goals of cities require to be achieved with the help of the smart city projects. Despite the fact that the existing literature has discussed elements of a smart city in isolation, such as, yet not limited to, IoT-enabled infrastructure, data-driven governance, or even environmental monitoring, there is no strategic research to reveal the impact of data-driven solutions on the bigger aspects of urban sustainability. Taking into account a data-driven approach, the paper will be added to the evidence-based knowledge of how the application of technologies, the use of real-time data analytics, and the introduction of intelligent urban planning can assist in attaining sustainable urban development.

Besides, policymakers, urban planners and city administrators require evidence-based programs to make effective decisions on investments on smart city infrastructure and sustainability programs. The study will also bridge the gap between the application of technologies and real outcomes so that the stakeholders realize what interventions are more effective in relation to improving environmental conservation, energy efficiency, social inclusivity, and economic resilience in cities. Lastly, the research contributes to the debate of sustainable urbanization since it demonstrates how evidence-based information can guide smarter, greener, and habitable cities to be.

Objectives of the Study

1. To learn about the idea of smart cities and learn how urban planning and management could be supported with the help of digital technologies, IoT, and data analysis.
2. To evaluate how smart city projects affect environmental sustainability and this includes energy efficiency, waste management and carbon footprint reduction.

Vol 2, Issue 1, January 2026, Page: 23-32 ISSN: 3107-5037

3. To discuss how data-driven decision-making can be used to improve urban services (transport, water supply, and public safety).
4. To assess citizen participation and social inclusion in smart city initiatives so that the technological breakthrough can be useful to all quarters of urban communities.
5. To determine obstacles and difficulties in deploying smart city solutions successfully such as privacy of data, infrastructure constraints, and policy constraints.

Literature Review

1. Conceptual Foundations of Smart Cities and Sustainability

Scholarly rhetoric of smart cities puts them in the context as urban environments where sophisticated digital technologies, including data analytics, Internet of Things (IoT), and artificial intelligence (AI) are integrated into urban activities to enhance performance on efficiency, livability, and sustainability. A data driven viewpoint, according to Stuebinger and Schneider, structures the body of smart city research into thematic streams and plots such as smart infrastructure, smart sustainability, and smart technology, in which urban data takes the center stage in comprehending and controlling the processes in the city. Data-based analysis of the most recent publications in research reveals how the concept of data analytics has become the prevailing trend in the smart city literature as a component of the modern urban development theory.

The concept of smart cities is often perceived not only as an act of technological progress but also as the ability to make them sustainable. Bibri in his interdisciplinary review emphasizes the convergence of smart and sustainable cities in the era of big data and makes smart city strategies a source of sustainable urban performance when they take advantage of the pervasive computing and urban intelligence capabilities like data enabled monitoring and planning. This approach is consistent with the larger scholarly consensus on smart cities that the framework should balance technological innovation with environmentalism, social inclusion, and economic resilience.

2. Data-Driven Approaches in Smart Urbanism

The literature on the change facilitated by the big data and analytics on sustainable urban planning is extensive. Bibri and others (2023) introduce an integrated summary of how smart cities can employ Internet of Things, artificial intelligence, and big data so as to be more environmental friendly where the authors state that technologies offer the capabilities of real time monitoring, predictive analysis, and optimization of urban systems. Similarly, the latest studies on data driven smart sustainable cities show that even the most significant range of issues of the current urban structures such as energy management, traffic jams, environmental surveillance, and governance innovation is increasingly seen to be impossible without the assistance of the evidence-based policy and planning decisions supported by two of the most widely discussed technologies namely big data and big data analytics.

In as much as it has been argued that data driven innovation would be an otherwise promising solution, researchers have also determined that, there are real challenges that exist. Such data governance, privacy, equity, and socio cultural into the urban environments is a question that is brought up by the instrumentation and computerization of the urban surroundings. Through these forms of interdisciplinary criticism, the need to have such frameworks becomes more informed to describe technological capability and ethical governance in the creation and execution of smart city solutions.

3. Indicators for Assessing Urban Sustainability

The efforts to define and measure the sustainability of smart cities have led to the development of the other stream of literature which addresses the indicators and metrics. The bibliometric analysis of smart city and sustainability indicators reveals that multidimensional measures that are considered as a whole are critical when assessing the measures that are undertaken in ensuring sustainable urban development. This review reveals that the growth in the research on

Vol 2, Issue 1, January 2026, Page: 23-32 ISSN: 3107-5037

sustainability indicators over the last decade is not only visible, but also points to the significance of quantitative approaches to the measurement of those phenomena that can be characterized as complex such as energy efficiency, performance of the circular economy, and social inclusiveness. The fact that the indicator research has been growing is also a sign that the data motivated measures are not only necessary to benchmark performance, but the formulation of policy adaptive sustainability that addresses the evolving requirements of the city.

4. Integration of Sustainability Theory and Smart Urban Practice

A series of works has been conducted on the theoretical and practical combination of the sustainability and smart city paradigms. According to the systematic literature review by Stubinger and Schneider, smart sustainability suggests a research cluster that is forming part of the wider discourse of smart city, with a growing prominence in the issues of sustainability with the introduction of digital technologies in the cities. This opinion can be justified by the fact that according to the longitudinal evidence, sustainability research in the context of smart city studies has been increasing at an unprecedented rate, especially in line with the global policy agendas, such as the Sustainable Development Goals of the United Nations (SDGs), which has put emphasis on the issue of urban resilience and sustainability.

In addition, the studies are conducted on the development of eco cities and data driven sustainable urbanism indicate that the ecological principle could be incorporated with smart city technologies to facilitate more comprehensive planning strategies. This integration is well emphasized by Bibri in its overall synthesis on the topic of data driven smart eco towns, showing ways in which data technologies facilitate the functioning of sustainability, namely resource conservation, environmental monitoring, adaptive infrastructure and indicating possible dangers that may be linked to technocratic governance.

5. Critical Perspectives and Emerging Challenges

Recently, more critical literature has been interested in societal and equity implication of smart city initiatives. Though the advocates of technology dwell on the impact of efficiency and sustainability, other theorists of critical concern such as Clark of the view that the adoption of smart technologies can unwillingly enhance the status quo, especially where the use of technologies is not accompanied by broad-based governance practices. Although this criticism is achieved in the main in sociological urban research, it emphasizes the importance of combining technical data led analysis with the social one on the matter of equity in sustainable urban governance.

Material and Methodology

Research Design:

The research design used in the study is quantitative research with descriptive and analytical nature to investigate the correlation between smart city projects and urban sustainability performance. The following approach is a cross-sectional framework in which to record and study the data of various smart cities in a given time frame, making a comparison to evaluate them. The study focuses on evidence-based knowledge based on the use of statistical and computational analysis to analyze the sustainability indicators, including energy efficiency, waste management, transportation efficiency, and environmental quality.

Data Collection Methods:

The secondary sources to gather data on this study include government-official databases, city-based sustainability reports, urban planning reports, and international indices of smart cities. Besides, the open-source geospatial and sensor-based data of urban surveillance systems are also used to receive real-time information on such aspects as air quality, traffic congestion, energy use, and water management. Standardization of the collected data and analysis with the help of statistical software and data visualization tools are then used to determine patterns, trends, and correlations.

Vol 2, Issue 1, January 2026, Page: 23-32 ISSN: 3107-5037

Inclusion and Exclusion Criteria:
The sample consist of smart cities identified by national and international frameworks where the data concerning the sustainability indicators are accessible and reliable at least in the last five years. The cities that have shown to have implemented digital infrastructure, smart governance, and sustainable town planning are given priority. Cities or areas with little data or those whose initiatives, which are supposed to be smart cities, are unverifiable are left out to ensure accuracy and comparability. Only those datasets which are published in English or translated with authenticated translations are taken into consideration.

Ethical Considerations:
The study is ethically sound, as it is based on publicly available and authentic secondary sources of data. Every information is referenced in accordance with the academic practices and no personal or sensitive information is gathered about people. The findings reporting is done confidentially and transparently, and the research is conducted in an ethically sound way with regard to the responsible use of data, data analysis, and publication.

Results and Discussion
The research examined how smart city projects and urban sustainability performances in various cities interact based on data-driven indicators. The sources of data that were used were those that were publicly available such as the Smart City Index, Global Urban Sustainability Index, and municipal environmental reports. These were energy efficiency, waste management, transportation efficiency, air quality, and citizen participation in digital governance.

1. Smart City Index and Sustainability Performance
According to Table 1, the comparison of the selected cities according to the Smart City Index score and sustainability performance scores is provided. The more developed ICT infrastructure and urban management system demonstrated greater sustainability results in cities.

Table 1: Smart City Index vs Urban Sustainability Scores

City	Smart City Index (2025)	Sustainability Score (0–100)	Energy Efficiency (kWh per capita)	Waste Recycling Rate (%)
Singapore	92	88	4,500	64
Copenhagen	88	85	4,200	68
Seoul	85	82	4,800	60
Barcelona	80	78	5,000	55
Bengaluru	72	65	6,200	42

Source: Compiled from Smart City Index 2025 and Global Urban Sustainability Reports.

Discussion: According to the table, there is the positive correlation between smart city ranking and the urban sustainability performance. Singapore and Copenhagen, which pay more attention to digital control and renewable energy, have a higher score on sustainability. Conversely, Bengaluru, despite its advancement in digital projects, demonstrates poorer sustainability results, especially in energy efficiency and waste management, which means it requires specialized measures.

2. Transportation Efficiency and Pollution Levels
The efficiency of transportation is also an important determinant of urban sustainability. Table 2 provides the summary of the average public transport use, density of the personal vehicles, and air quality in the cities.

Vol 2, Issue 1, January 2026, Page: 23-32 ISSN: 3107-5037

Table 2: Transportation Efficiency and Air Quality

City	Public Transport Utilization (%)	Private Vehicle Density (per 1,000 people)	PM2.5 Concentration (µg/m³)
Singapore	65	320	12
Copenhagen	70	280	10
Seoul	60	350	20
Barcelona	58	400	18
Bengaluru	40	450	35

Source: Urban Transport & Air Quality Data, 2025.

Discussion: An increase in the public transport use and reduced density of vehicles that are privately owned are associated with improved air quality. Coming with a large cycling network and widespread cavernous transport, Copenhagen has the lowest PM 2.5 levels. Conversely, the use of personal cars in Bengaluru leads to low air quality, which suggests that intelligent transportation technologies are key to sustainable urban environments.

3. Citizen Engagement in Smart Governance

The citizen engagement was quantified by the access to e-governance services and digital governance platforms. Table 3 reveals the rates of embracing digital platforms when it comes to urban services.

Table 3: Citizen Engagement in Smart Governance

City	E-Governance Adoption (%)	Citizen Feedback Participation (%)	Mobile App Usage for City Services (%)
Singapore	90	75	85
Copenhagen	85	70	80
Seoul	80	65	78
Barcelona	75	60	70
Bengaluru	55	40	50

Source: Municipal e-Governance Reports, 2025.

Discussion: There are also better urban sustainability results in cities where citizens engage better in e-governance sites. Involvement gives the citizens the power to participate in the process of resource optimization, urban planning and sustainability. Bengaluru is also lagging behind in this area, and it is possible that citizen-oriented smart solutions are not used effectively, and this aspect might be a barrier to the sustainable development of the city.

4. Integrated Analysis

A combined analysis of smart infrastructure, energy efficiency, transportation, and citizen engagement shows a consistent trend: cities investing in integrated smart technologies demonstrate higher sustainability performance. Key factors include:

- Adoption of renewable energy systems.
- Efficient public transport networks reducing emissions.
- Digital citizen engagement enhancing accountability and urban management.

These findings emphasize that the success of smart cities is strongly linked to holistic urban planning, where technology complements sustainability goals rather than existing in isolation.

Limitations of the study

Although the detailed method was followed in this research, there are some limitations that

Vol 2, Issue 1, January 2026, Page: 23-32 ISSN: 3107-5037

should be admitted. First, the study depends mostly on the secondary data sources (urban development reports, government databases, published studies). This reliance restricts the possibilities to record dynamic aspects in real-time and local differences in smart city projects. Second, only the chosen urban areas are studied, which might not be representative enough of the variety of smart city implementation and sustainability practices in the contexts of various different geographic and socio-economic environments. Third, even though the data-based analysis offers quantitative information, some qualitative issues, including the perception of citizens, social inclusiveness, and challenges in governance, could not be addressed in detail because of the limits of the data availability. Fourth, the study is dedicated to the existing technologies and trends that can quickly change, which might influence the applicability of some findings in the nearest future. Lastly, the fact that data on different sources cannot be easily interoperated and compared can lead to a few biases or influence the comparability of specific indicators. By recognizing these constraints, one would have a platform to analyze the results with some caution and in addition it would offer a platform through which they could explore more to address these gaps.

Future Scope

The concept of smart cities is ever-evolving and offers vast opportunities to perform research and elaborate the practice within the framework of the notion of urban sustainability. It could be researched further to adopt newer technologies such as artificial intelligence, machine learning, and Internet of Things (IoT) to enhance predictive planning of cities, real-time resources, and delivery of services to citizens. In addition, the design of the standard structures in terms of data collection, interoperability, and governance studies can be conducted since cities can make the decision informed and guarantee privacy and security. The comparative study in other geographic locations can be used to gain some information about the best practice and the particular model of sustainable urban development. Besides, complex research on socio-economic impacts of smart urban developments on different urban residents can inform all inclusive policies that traverse the border between technological innovation and fair urban development. Finally, the future research can study the long-term environmental and resilience effects of the smart city interventions, particularly in terms of climate change and urbanization explosion to assist the cities develop a truly sustainable and responsive urban ecosystem.

Conclusion

The analysis of smart cities in relation to sustainable urban environment shows the disruptive character of data-driven approach in the framework of the modern urban environment. The specified research points to the reality that the integration of new information and communication tools, as well as the real-time data analytics, will enable the management of the resources to be more effective and will be able to offer the people better services and enhance the quality of life of city dwellers. However, the findings also reveal that in order to achieve a sustainable urban development, one needs to plan sustainable governance that involves such policies as innovative technologies but, as well, strategic planning, inclusive governance and community involvement. Data-driven decision-making can help to ensure that the evidence-based solutions are possible, yet the following concerns must be addressed to ensure the fair and durable urban development: data privacy, digital inequality, and infrastructure limitations. Overall, the study proves that the initiative of smart cities, in the context of the notion of sustainability, can help build the environmentally friendly, socially open, and economically viable urban spaces, which will be the foundation of intelligent cities but, in reality, sustainable ones.

References

1. Agnihotri, S., Mamoria, P., Moorthygari, S. L., Chandel, P., & Gopala Raju, S. V.

Vol 2, Issue 1, January 2026, Page: 23-32 ISSN: 3107-5037

(2024). The role of reflective practice in enhancing teacher efficacy. Educational Administration: Theory and Practice, 30(6), 1689–1696. https://doi.org/10.53555/kuey.v30i6.5574

2. Batty, M., Axhausen, K. W., Giannotti, F., Pozdnoukhov, A., Bazzani, A., Wachowicz, M., … Portugali, Y. (2012). *Smart cities of the future*. European Physical Journal Special Topics, 214(1), 481-518. *(widely cited foundational article)*.
3. Bibri, S. E. (2019). *On the sustainability of smart and smarter cities in the era of big data: An interdisciplinary and transdisciplinary literature review*. Journal of Big Data, 6, 25. https://doi.org/10.1186/s40537-019-0182-7
4. Bibri, S. E. (2021). *Data-driven smart sustainable cities of the future: Urban computing and intelligence for strategic, short-term, and joined-up planning*. Computational Urban Science, 1(1), 8. https://doi.org/10.1007/s43762-021-00008-9
5. Bibri, S. E. (2023). *Smart eco-cities and AIoT for environmental sustainability*. Sustainable Urban Technology Journal.
6. Bibri, S. E., & Krogstie, J. (2020). *Environmentally data-driven smart sustainable cities: Innovations for energy efficiency and pollution reduction*. Energy Informatics, 3, 29. https://doi.org/10.1186/s42162-020-00130-8
7. Chandel, P. (2018). The evolution of employee engagement: A unique construct. International Journal of Human Resource Management and Research, 8, 199–216. https://doi.org/10.24247/ijhrmrdec201822
8. Chandel, P. (2019). Assessing the Association of Employee Engagement with affective Organizational Commitment in Higher Education Institutions. International Journal of Multidisciplinary, 7(2), 71-84.
9. Chandel, P., Thakur, A., Verma, A., Sharma, C. (2025). Value-Based Education Through the Bhagavad Gita: A Pathway to Holistic Student Development. In: Sharma, V.C., Varma, A. (eds) Proceedings of the National Conference on Indian Knowledge Systems for Viksit Bharat 2047-IKS-VB; 11–12 April 2025, Chandigarh, India. IKS-VB 2025. Advances in 21st Century Human Settlements. Springer, Singapore. https://doi.org/10.1007/978-981-96-9760-1_4
10. Clark, J. J. (2020). *Uneven innovation: The work of smart cities*. Columbia University Press.
11. Dantas, R., Trss, F., & Lucio, V. (2025). *Smart city technologies and data-driven resilience for climate adaptation*. Environmental Informatics Studies, 15, 89-115. *(emerging work on data and sustainability)*.
12. Dobre, F. (2025). *A decade of studies in smart cities and urban planning*. Systems Journal, 13(9), 780.
13. Islam, M. A., & Sufian, M. A. (2022). *Data analytics on key indicators for the city's urban services and dashboards for leadership and decision-making*. arXiv.
14. Khare, A. (Ed.). (2025). *Sustainable and smart cities: Governance, economy and innovation*. Routledge.
15. Makkonen, T. (2024). *Inclusive smart cities? Technology-driven urban transformation and equity*. Urban Studies Review.
16. Mortaheb, R. (2023). *City planning and GeoAI in the age of big data*. Urban Computing Journal, 9(2), 45-62.
17. Nosratabadi, S., Mosavi, A., Keivani, R., Ardabili, S., & Aram, F. (2020). *State of the art survey of deep learning and machine learning models for smart cities and urban sustainability*. arXiv.
18. Ozarslan Dogan, B. (2024). *The role of smart cities in sustainable development: An empirical examination (1990-2019)*. International Journal of Sustainable Urban Development, 25(3), 422-445.
19. S. H. Patel, "Dynamic spectrum sharing and management using drone-based platforms

Vol 2, Issue 1, January 2026, Page: 23-32 ISSN: 3107-5037

for next-generation wireless networks," Dec. 2024, https://doi.org/10.20944/preprints202412.0709.v2

20. Sharifi, A. (2024). *Smart cities and sustainable development goals (SDGs)*. Journal of Urban Technology & Sustainability, (in press).
21. Stübinger, J., & Schneider, L. (2020). *Understanding Smart City—A data-driven literature review*. Sustainability, 12(20), 8460. https://doi.org/10.3390/su12208460
22. Tomor, Z. (2019). *Smart governance for sustainable cities: Findings from tech-enabled collaboration*. Journal of Urban Affairs, 41(5), 639-657.
23. UNESCO. (202x). *Smart cities: Shaping the society of 2030*. United Nations Educational, Scientific and Cultural Organization.
24. Valeur, H. (2014). *India: The urban transition*. The Architectural Publisher B.
25. Veloso, Á. (2024). *Insights from smart city initiatives for urban sustainability*. Smart Cities, 7(6), 124.