Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Smart city governance and sustainable urban transformation in Srinagar, India

Nasir Ahmad Ganaie

nasirahmadganaie@gmail.com

Indian Institute of Technology Guwahati

Bodrul Islam

Indian Institute of Technology Guwahati

Case Report

Keywords: Digital Governance, Public Sector Decision Making, Smart Infrastructure, Sustainable Urban Development, Urban Resilience, Urban Sustainability

Posted Date: August 5th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10467696/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Abstract

Smart city programs are reshaping urban governance, but their implications for sustainability in conflict-affected cities remain underexplored. This study examines how the Srinagar Smart City Mission in Jammu and Kashmir, India, reconfigures public sector decision-making and contributes to sustainable urban futures. Using a qualitative case study, the present study analyses policy documents, official project reports and secondary evaluations of key interventions in mobility, public space, digital infrastructure and environmental services. The findings indicate that smart solutions improve coordination, service efficiency and environmental performance in selected corridors while also generating new risks related to exclusion, intensified surveillance and long-term fiscal burdens. The discussion argues that smart cities can foster genuinely sustainable urban futures only when embedded in broader participatory and rights-based governance reforms that prioritise social justice, ecological resilience and durable institutional capacity in Srinagar and similar cities.

1. Introduction

The smart city is now a robust idiom that has evolved over the past ten years to reinvent city governance as a result of escalated urbanisation, climate vulnerability and monetary constraints. Instead of merely technology adoption, the new policy frameworks are also starting to elaborate on the notion of smart cities as multifaceted sociotechnical systems where digital infrastructures and data analytics and interoperable platforms are guided to enhance citizen well-being, enhancing service delivery and more sustainable and inclusive patterns of urban development (Das, 2020). The latest UN Habitat report on people-centered smart cities can be regarded as setting the standard: smart projects are those that require a strong base in terms of human rights, social justice and environmental sustainability and caution against the technological deterministic view of smartness as an end but not a means to an end. The stakes of this opinion are the reorganisation of decision-making processes, institutional structure and accountability relations within which urban futures are imagined and managed and not the introduction of sensors or platforms. This smart urbanism agenda is contained in the Indian Smart Cities Mission (SCM) constitution and is among the most ambitious urban renewal and urban retrofitting plans, which were floated in 2015 (Praharaj et al., 2018). As the brainchild involves the creation of 100 cities through core infrastructures, a quality of life worth the people, a clean and sustainable environment and smart solutions, the mission is to integrate the physical, social, economic and institutional elements of development into the Union Ministry of Housing and Urban Affairs. In terms of operation, the chosen cities had to create a smart city proposal, which had to be prepared in two salient sections, such as area-based development and pancity solutions. Three theorised models of area-based development, namely, retrofitting, redevelopment and green field development, have minimal thresholds, and at least one city-wide smart solution must be applied to the entire urban area. The minimum areas needed in the North Eastern states and the Himalayan states, such as Jammu and Kashmir, are shortened in these states because of geomorphological factors and government administration challenges.

One of the institutional peculiarities of the mission of smart cities could be special purpose vehicles (SPVs). Every city has an SPV established under the Companies Act that is mandated to plan, evaluate, approve, fund, execute, manage, operate and monitor smart city projects. The representatives of the state government, city local body and, in some cases, the partners are likely to be the representatives of such bodies (Lai et al., 2020). The reason is that the company style body will be in a position to avoid some of the rigidity of the previous system of the municipal administration, bring project management into the profession and speed up the decision-making process (Tan and Taeihagh, 2020). Nevertheless, the comparative analysis of the role of smart cities in regulation reveals that those constructions are filled with serious ambiguities and contradictions: they may increase the capacity and coordination of executives, but they can also centralise power, decrease the direct power of elected councils, and confuse the state and the private. This could be defeated, especially in the fertile area of the union territory with Jammu and Kashmir in the largest city and capital city in summer Srinagar. The city is also geographically situated in the valley of Kashmir, which borders the Jhelum River and the Dal and Anchar Lakes and remains mostly known as the city of gardens and waterfronts, houseboats and handicraft culture. Srinagar had been caught in the middle of a very long-standing political game, while scholarly and policymaking discourse has often described the larger society as being among the most militarised of the global world; everyday life and space practices have been marked by demonstration, curfew and high security. It is socioeconomically a conglomeration of a large tourist industry as well as mega doses of poverty and informality that additionally places an enormous burden on the basic infrastructure in quarters and environmental facilities.

The Srinagar Master Plan 2035 is a project of the Srinagar Development Authority and the planning of Srinagar; this plan will be implemented in the planning of the Smart Cities Mission (Bashir, 2020). The plan estimates the presence of three million people at a threshold in 2035 and an estimated metropolitan planning area of 766 square kilometres, which is 84 percent greater than the previous planning limit of 416 square kilometres. This growth is achieved through the inclusion of a multiplicity of neighboring urban local bodies and 160 neighboring urban villages in the planning area, acknowledging that the urban foot print is gradually and surely increasing (Ziosi et al., 2024). The document itself invents itself as a people policy vehicle that will not become stuck in the old planning processes but will meet the new development rules, resource mobilisation rules, mixed land use rules and new implementation rules in the tailored stimulus of the new demands. The shift to making Srinagar the Smart Cities Mission is one of the vital breaking points of this extended planning time. The Srinagar Smart City proposal was the winner of the Round 3 competition challenge of the mission in April 2017 and was later included in the national list of 100 smart cities (Chettry and Surawar, 2021). The implementation of this program will take the form of Srinagar Smart City Limited (SSCL), a limited-by-share company that is incorporated under Special Purpose Vehicle and registered on 8 September 2017 and registered under the Companies Act, 2013. A continuation of the scalar structure of the national mission is the chief secretaries of Jammu and Kashmir, who serve as heads of the SSCL Board of Directors and the State-level High-Powered Steering Committee of Smart City Srinagar (HPSC).

The vision statement of the Srinagar Smart City limited is to make Srinagar a strong city, which is environmentally friendly and socioeconomic and should be proud of its natural and cultural heritage such that it is able to provide harmony and opportunities to everyone in Srinagar. Of critical concern to SSCL will be the need to harness both the natural and cultural heritage and the tourism potential of the city using innovative and inclusive solutions to enhance the quality of life of the residents. On the Srinagar Smart City portal, the statement on what a smart city is the so highly developed city in terms of the facilities in general, its sustainability in terms of real estate, communications and the accessibility of markets where there is information technology as the major infrastructural backbone of offering the needed services. These are very high-level summarised statements that are intended to provide the smart city agenda of Srinagar with a basis of sustainability, resilience, heritage conservation and economic competitiveness.

These agendas overlap with global smart urbanism, SPV-oriented Smart Cities Missions in India, Master Plan 2035 in Srinagar, and the reality of a conditioned heritage city because of the presence of conflict and worsening of the situation related to the government. In the international scene, the SDG 11 and UN habitat practices of sustainable urbanisation focus on the idea that cities must be inclusive, safe, resilient and sustainable in addition to the immense overall economic, social, environmental, and cultural value of well-planned urbanisation (Choudhary, 2025). This argument is the heart of new people's centred thinking concerning smart cities, which argues that smart technologies must be implemented in participatory, rights-focused and digital divides that are sensitive to privacy and data protection methods. Simultaneously, the OECD has given advice on how to govern smart city data, recognising that it holds importance in an era where data-driven initiatives aim at realising democratic and sustainable governance and not just optimising limited performance bullet points. The models highlight the notion that it is not the purchase of new high-tech hardware or software that bleeds the inventiveness of governance in smart cities (Hajam et al., 2022). It suggests more possible radical shifts in institutions and processes: establishing data support systems and dissipated command centres; formulating data sharing contracts to departments; establishing open data portals and digital participation platforms; and reinterpreting relationships with the suppliers and the citizenry. The stakes of the changes in it are especially high with a city such as Srinagar, where the urban space is transformed into the place of everyday life, a place of tourism and a battlefield of states and people. The services can be delivered in a more efficient, safer, and more responsive to disaster and, at the same time, intelligence to the disaster, as well as reshaping the spatial dimension of publicness in a nonnormative and neutral way through smart infrastructures such as city-wide CCTV systems and smart transport systems. Its general aim is to determine how the Srinagar Smart City project is altering the decision-making process of the folk in the sector and what it entails as far as the actualisation of sustainable urban futures is concerned with a world defined by a state of conflict. The Srinagar case is based on the fact that the case cannot be seen as a mere technical project whereby modernisation of the infrastructure takes place. Rather, the study perceives it to be a state project where digital technologies, institutional change and planning tools become complicated by primeval political, social and ecological conflicts. Given that it is located in the institutional scope and program of the SSCL with a focus on the officially provided features of the

initiative, it interprets the official descriptions of the project portfolio and incorporates it into the scope of the larger architecture of the Smart Cities Mission and the Master Plan 2035 (Lata et al., 2022). This study attempts to introduce empirically valid and conceptually explain how the concept of smart city governance is conceptualised in Srinagar on the basis of its conceptual analysis of government and intergovernmental reports on smart governance, sustainable urbanisation and smart city governance (Kumar, 2022). It does not have primary field working material, but it provides an analytical basis for an empirical study that will be conducted further and involve interviews, citizen surveys and observation studies. In general, the experience with Srinagar suggests that the opportunities and restrictions of smart urbanism to bear on the cities where the history of conflict, militarisation, and non-equality-based citizenship is a significant producer of the context in which the discourses of governance innovation and sustainability are being wielded.

2. Methodology

2.1 Research Design

To explore the understanding of the Srinagar Smart city as an entity of smart urban governance and smart sustainable urban development, this article uses a qualitative case study research model. In line with the objective of the paper, to not analyse causal relationships in a quantitative measurement domain but the ‘arrangements, processes and patterns’ of policy implementation and governance, the case is used as a qualitative study. Attention is given to the framing, governance and operationalisation of smart city interventions in an authentic urban ad/administrative setting.

2.2 Case Selection

Srinagar was chosen as a case study because it is a major urban center with unique geographical, administrative and planning features. As it is a center of heritage, tourism and public administration, it is relevant to study smart governance, institutional change and sustainable urban transformation, as it is part of the Smart Cities Mission. The case can also be consumed as related to the digital infrastructures and planning reform that is enunciated in an effervescent city.

2.3 Data Sources

Analysis and review of documentary sources, as well as secondary sources, were performed in the present study. Official policy documents, documents for “smart” city mission guidelines, planning documents, project documents and administrative and public communication documents of the authorities concerned and implementing agencies have been analysed. In addition, academic books, journal articles and policy papers are used as supplemental sources. These materials offer the study an opportunity to reinstitute the institutional logic and policy orientation and priority of implementation in the Srinagar Smart city initiative.

3. Theoretical Framework

3.1 Smart Cities as Sociotechnical Governance Projects

The analysis is organised around three phases of the conceptualisation of the papers, which are interrelated. First, it looks at the institutional structure and how this affects the authority and responsibility to implement when institutional coordination is considered a special purpose vehicle (SPV). Second, it highlights governance systems, citizen services in urban governance, mobility elements, combined governance systems and digital platforms. Third, the sustainability orientations are examined, which focus on the environmental improvement, service delivery efficiency, institutional strengthening and inclusive urban development aspects of the project. The smart city is seen here as a concept and a frame of reference; it is the focus of a systemic understanding of the smart city as a project of governance and as a policy intervention for sustainability.

The term “smart cities” was introduced in the majority of early policy discourses as technologically advanced urban places, utilising information and communication technologies (ICTs) and sensors and data platforms to simplify infrastructure and services. Nonetheless, more recent commentaries reprise the idea that smart cities are to be thought of as sociotechnical government projects: aggregates of technologies, institutions and practices that redistribute the way decisions are made, resources distributed, and rights and new responsibilities reallocated in urban space. The OECD case must lead to the well-being of citizens, a sustainable environment and the optimisation of the delivery of public services using technologies, especially digital technologies, but its success will only come with good governance structures of data, accountability and inclusion. Even the new guidelines, UN Habitat, people-centred smart cities, reflect the shift towards technology of the mode of governance on people-centred smart cities. These values define smart cities as more of a digitalisation of the urban government where technological solutions can only be useful to the extent that they can cause sustainability, inclusivity, prosperity, and human rights. In this context, smart city projects are not neutral; they reflect some images of urban order and the distribution of expertise and thematize some relations between states and citizens. The concept of smart cities is studied in terms of institutional structure, rules of decision-making and power relations in terms of the presence or absence of particular devices or applications.

3.2 From E Government to Smart Governance

This happens to be institutional attention and decision-making, which may be summarised within the concept of smart governance. High definitions of smart governance can be defined as the incorporation of digital technologies and innovation in the process of leading and aiding in the attainment of optimal decision-making and planning in government agencies, such as the introduction of democratic processes and change in the provision of state services. In other words, smart city governance is a rule system, practices, and processes by which a technologically commanding urban environment is steered and operated and decisions are made on the basis of the data efficiency, sustainability and well-being of its citizens. The definition of the policy is developed on the basis of studies on the topic, which find smart governance in the general traditions of the history of the development of modern administrations and the theory of democratisation. The literature stream, which defines the new public service paradigm,

sees smart city governance as a facilitating process of policies, rules and structures that enables the actors, each with different interests and resources, to cocreate the common good. In this discussion, we refer to the concept of public value as any form of intervention, the aim of which is to solve the problems of urban areas at the cost of the primary objective, that of efficiency or profitability. In this respect, smart governance does not imply automating decisions, that being said, but instead involves the development of new participation channels and the coproduction of subjects as well as deliberation, which digital tools can facilitate but not produce. The alternative refinement is data refinement. As part of unleashing smart city data governance, the OECD notes that a real data-driven public sector realises that data are a strategic resource, removes sharing and reuse constraints, and uses information to redesign, provide and monitor policies without violating privacy and security. Data governance is thus concerned with the ownership, access and use of city data; the flow of data within departmental silos; and the risks associated with surveillance, exclusion or discrimination. This is especially advantageous when smart city infrastructure, such as sensor networks and CCTVs, and in-built command centers produce large amounts of real-time information that can not only improve services but also take control of society (Liando et al., 2026). Collectively, these strands imply that informed governance can be analytically broken down into at least 3 levels: (1) institutional architecture (institutions of authority and accountability), (2) participatory and deliberative (how citizens and other actors are enrolled in decision-making), and (3) data governance (rules of collection, sharing and use of digital information). It is a three-lens view upon which a discussion of a smart city project such as Srinagar can start.

3.3 Urban Sustainability and People-Centred Smart Cities

Worldwide frameworks on sustainable urban development constitute the second support pillar of the conceptual scaffolding of the study. The Sustainable Development Goal 11 proposes making cities and human settlements inclusive, secure, resilient and sustainable, and the UN Habitat work towards sustainable urbanisation proposes that the economic, social, environmental and intangible benefits of well-planned cities are achieved. Sustainability in these documents considers not only environmental performance but also multidimensional state affairs, which involve access to services, social cohesion, cultural heritage, disaster risk reduction and economic possibility (Mahavir and Bedi, 2017). They are implemented through the UN Habitat flagship programme Peoples Centred Smart Cities and new International Guidelines on Peoples Centred Smart Cities in the digital age. In 2020, the flagship programme was launched, which is designed to ensure that sustainability, inclusivity, prosperity and human rights in terms of urban development are met through technological innovations (Kumar et al., 2017). The draft guidelines are an advisory guide on how national and local governments should formulate smart city rules, plans and strategies that ensure that digital infrastructures and data are used toward sustainable, inclusive and rights-responsive cities. Their reflections cover community engagement, digital human rights, equity and resilience, and they give special recommendations, including mainstreaming community partnerships in the policies of smart cities, providing participatory digital platforms, and ensuring that communities have access to and the ability to use urban data.

The same normative construct would be followed in the OECD Programme on Smart Cities and Inclusive Growth, where one of its questions is whether the efforts put in place in regard to smart technologies and digital innovations lead to the eventual improvement of the well-being of people and inclusive growth. The Programme acknowledges the possibility of trade-offs and implicit costs that smart city initiatives become a hidden source of inequalities where they are unclear and unresponsive to community views and proposes some priority to data integrity, safety, privacy, and interoperability. These contributions in sum theorise about sustainable urban futures in smart cities as a future in which the mobilisation of digital infrastructures and data practices are expressly mobilised to produce SDG-compatible outcomes: minimised emissions, an enhanced environmental situation, maximised inclusivity of access to services, security of rights and expanded capacities to make shared decisions. People centred on smart cities are made up of the people who are most concerned with technological innovation for these larger sustainability and justice ends rather than the introduction of technology as such.

3.4 Conflict-Affected Urbanism as a Critical Lens

The other conceptual question that the example of Srinagar has precipitated is the role of conflict in the development of urbanism to build smart city tracks. In the literature concerning international smart cities, it is recognised that digitalisation has the potential to introduce new risk and trade off but has been biased toward reasonably safe metropolitan regions in Europe, North America, and even in some areas of Asia (Zubiedat and Phokaides, 2025). In comparison, Srinagar is situated in the center of a historical land and political conflict and has been transformed into the topic of countless reiterations in the literature and other reporting of human rights as one of the most militarised regions of the world with the vast presence of security and constant protests and repression. This set of conditions hints at least two things in the study of smart governance and sustainability. First, concerning digital infrastructures such as CCTV networks and built-in control rooms, data platforms cannot be described as neutral; they are brought into the picture when the processes of surveillance, risk management, and securitisation are among the core aspects of urban life. To discover smart governance in Srinagar, however, the answer to the question should not merely be as follows: Do hinge on information make efficient gathering in this place, but how do information interface with already possessed security regimens, and what do information recommend civil liberties and trust? Second, conflict-prone urban households are typified by profound socioeconomic inequalities and unequal citizenship and might influence access to smart city infrastructures, the visibility of people in data ecosystems, and their participation in digital introduction ecosystems. The conflict aspect in this study is that it impacts the role of urbanism as the prism through which generic descriptions of smart city governance are made more multifaceted. It predicts the distributional and rights implications of smart interventions and to what degree the global principles of people-centered smart cities were possible in the setting where the relationships between the states and citizens were strained.

3.5 Analytical Approach for the Srinagar Case

The study is informed by the analytical framework on the basis of this discussion but takes three significant dimensions:

Institutional and governance structures: How the Smart Cities Mission and the establishment of the Srinagar Smart City Limited reshape the power, responsibility and accountability of state actors and local authorities and how they include partners in the project.

Smart governance practices: What do digital technologies, data infrastructures, and new coordination mechanisms mean, and how are they implemented to assist in planning, decision making and service delivery, and what does it imply in terms of transparency, participation, and rights?

Sustainability orientations: How the smart city vision and interventions of Srinagar are correlated with international models of smart cities as sustainable and people centred, the performance of the city in terms of the environment, its social inclusion and its emphasis on human rights.

The Srinagar case study is considered in context as supported by the qualitative analysis of official policy and plan texts, the texts of the smart city strategy and international guidelines and the assistance of secondary sources on smart governance and conflict-affected urbanism. This strategy assists the study in not only having strong reasons for the evidence recorded but also taking part in wider conceptual arguments in a critical fashion. It also offers a methodological foundation for the following sections, which proceed in a similar fashion in terms of these dimensions, which are operationalised in the actual institutional structure, project portfolio and decision-making process of the Srinagar Smart City.

4. Results and Analysis

4.1 Srinagar Smart City: Urban and Institutional Context

Srinagar, the summer capital of Jammu and Kashmir of India, is in the Kashmir Valley of the Jhelum River and Dal and Anchar Lakes. A few of those aspects that have enabled the city to be characterised by a particular cultural and economic image include tourism, retail, government work and a large handicraft sector, which comprises textiles, carpet weaving, wood carving and papier mache. Similarly, the connotation of Srinagar is usually linked to a territory of political aggression in the past, the quite high degree of militarisation and the well-established routine of protest and equipment that in fact influence the daily routine life of the city in question, not to mention the state of government, where decisions on planning are counselled by (OECD, 2023). This is the Srinagar Master Plan 2035, the main official document through which the development of the city in question is controlled. The size of the population is expected to be approximately 3 million in 2035, and the metropolitan planning region is estimated to be approximately 766 square kilometers, as opposed to the historical figure of 416 square kilometers, an estimated 84 percent growth. It is also applied to the exterritoriality of the municipalities of different urban local authorities and certain 160 extension villages as extensions, which is a recognition of the metropolitanisation of the city and, in fact, the need to plan at a more regional level. The Master Plan is,

literally, a manifestation of a policy document, as it relates archaic planning practices by reforming the regulations on land use, mixing up the land use and suggesting new means of implementation and mobilisation of resources in reaction to the socioeconomic and environmental issue of the time.

4.2 Smart Cities' Mission Selection and Vision

The transformation of Srinigar as one of the urban centers of the Smart Cities Mission of India in this regard of urbanisation planning is a milestone in the history of urbanisation of the city. Official documents that are available at the district administration site have stated that Srinagar was selected and entered Round 3 of the Smart Cities Challenge in April 2017, which is one of the first entries on the list of 100 smart cities in the country. The 2015-launched Smart Cities Mission is intended to encourage cities with a core infrastructure, with a decent standard of living to its populace and clean and sustainable surroundings, with the so-called Smart Solutions being supervised by the Ministry of Housing and Urban Affairs in general. The Srinagar Smart City project is designed in line with national guidelines and contains two great blocks; in the first case, 2,869.24 crore for the city, and in the second case, the solutions of the pan city are at a rough cost of Rs. 765.03 crore, which will be used to implement smart technologies for the larger urban population (Praharaj and Han, 2019). Vision, the officially declared variant of the Srinagar Smart City Limited (SSCL), aims to develop Srinagar into an eco-friendly and sustainable city that values natural heritage as well as cultural heritage to bring harmony into it and to create equal opportunities to everyone, and smart interventions are explicitly associated with sustainable, resilient and heritage-based development.

4.3 Institutional Architecture of Srinagar Smart City Limited

As a special purpose vehicle, in the Companies Act, 2013, Srinagar Smart City Limited was established on 8 September 2017 and is incorporated and registered under the Companies Act, 2013, as a limit by shares. The institutional design of the Smart Cities project presented as the Smart Cities Mission suggests that the SSCL will design, assess, award, fund, deploy, run and oversee and monitor the projects of smart cities in the city (Singh and Upadhyay, 2023). It has multiple levels of governance, unifying central state-level actors and urban-level actors. The overall management of the architecture is known as the High Powered Steering Committee (HPSC) of Smart City Srinagar, and the layer is headed by the Chief Secretaries of Jammu and Kashmir, who are supposed to provide strategic guidance and coordination of departments. The chairperson of the Board of Directors of SSCL at the city level is the Housing and Urban Development Department Government of Jammu and Kashmir (Prasad et al., 2021). The representatives of the Srinagar Municipal Corporation and other interested agencies are also included in the Board, which is extremely consistent with the needs of the mission according to which SPVs are expected to include representatives of the state government, as well as the urban local body. In this model, smart city decision-making is institutionalised at the level of higher administration and leads to a formal hold of the position of the municipal institution.

4.4 Strategic Pillars and Thematic Focus

As can be observed with regard to the official documentation, the development of the Srinagar Smart City is based on a multitude of thematic pillars, which are more or less rooted in national priorities but on the grounds of them being local. The smart city strategy page of Srinagar lists area-based projects and aims to rejuvenate the city through urban renewal and heritage-based development of the selected precincts and pancity projects, which set out to provide integrated mobility, digital governance, and systems of public safety (Kociuba et al., 2023). The redevelopment, retrofitting and green field typologies of the area-based interventions will be organised following the Smart Cities Mission that the smallest standards of areas would be localised in the Himalayan context of the city. The list of which specific projects are always under continuous revision but always appear in official descriptions includes streetscape improvement and public space improvement, waterfront and lakefront improvement, modernisation of the draining and basic services and introduction of intelligent transport systems and expansion of nonmotorised transport infrastructure and introduction of digital connectivity and command and control systems. These theme areas are classified on the basis of the vision of a green city that is resilient, eco-friendly and socioeconomic and takes advantage of its natural and cultural heritage. Moreover, they are also more generally about smart city missions in which the lighthouse clearly lies in mobility, in the shape of the public space, and in the digital infrastructure. The Srinagar Smart City emphasises the framework of making the city institutional and strategic so that the city is central to the country and international governance plans (Zhu et al., 2022). Srinagar has become one of the 100 cities in India to experiment with the Smart Cities Mission of implementing a pan city, which places more stress on the resilience, inclusivity and preservation of cultural heritage as well as the new principles on people centered on a mix of a centrally funded mix of a centrally funded mix. The SSCL vision can be recognised in the framing of the sustainable urbanisation of UN Habitat, which places more stress on the resilience, inclusivity and preservation of cultural heritage as well as the new principles of people centred on smart cities, emphasising more community involvement and the rights-conscious use of digital technologies.

4.5 Smart Governance and Public Sector Decision Making in Srinagar Smart City

One of the most crucial details of the smart city direction of Srinagar is the restructuring of the decision-making process of the public sector, which is based on the Special Purpose Vehicle, Srinagar Smart City Limited (SSCL) and the steering bodies. As an institutional implementation of the Smart Cities Mission in India, SSCL was established on 8 September 2017 as a company limited by shares under the Companies Act, 2013 (Lai and Cole, 2023). It is headed by a Board of Directors who is the Administrative Secretary of the Housing and Urban Development Department of Jammu and Kashmir and the High Powered Steering Committee (HPSC) of Smart City Srinagar, with the State being the head of the Board of Directors. The list of Board and key staff also includes the senior officials, the Divisional Commissioner Kashmir (as Chairperson/BoD) and the Commissioner of Srinagar Municipal Corporation (as Director/CEO), the Inspector General of Police (Srinagar) and the Vice Chairperson of the Srinagar Development Authority and the representatives of the archives and museums, a nominee of the Ministry of Urban Development and the independent directors. The Board of Directors discusses and approves most of the project proposals, detailed project reports (DPRs) and thematic priorities. A board meeting

held in October 2019 by the Principal Secretary, Housing and Urban Development Department, indicates that the Board had conferred with the recommendations of the Chief Executive Officer, with some of the DPRs being approved and others being reissued and value added. On the six identified upgraded twenty-five government schools into smart schools with state-of-the-art facilities, development of a cycle track, conservation of three heritage shrines, upgrading of the Maharaj Gunj historical market and redevelopment of Yarkand Serai at Safakadl, the following projects were passed or accepted.

The decisions of the board also include the infrastructure, service and digital projects. During the fifth meeting, the Board of SSCL settled on a list of the projects, which included an Integrated Command and Control Centre (ICCC), an emergency operations center, CCTV surveillance, smart power and water metering and a smart street vendor market zone. Other meetings in which the same meeting was resolved included real-time water and air quality checkups; display and noise pollution checkups; smart street lights; biokilets; reverse vending machines; and electric buses; and the creation of a system of community engagement and grievance management (Guenduez et al., 2024). The local media coverage of the smart city facilities restates that the Srinagar Smart City project carried off Round 3 in the national challenge in April 2017, with an area-based development component of 2869 crore and pan city solutions of 765.03 crore with SSCL as the SPV being boarded with them. These choices suggest that the policymaking of the public sector of the smart city model has been displaced to a multisectoral portfolio that extends beyond common municipal engineering to health, education, mobility, heritage, public space and digital governance. In 2019, the Board Decision lists smart healthcare, smart schools and smart bus stops as the equivalent of heritage conservation, market revitalisation and underflying redevelopment and thematic heads such as urban façade renewal; enhanced mobility, heritage and culture tourism; artisan cluster rehabilitation; and e-governance services (Prakash, 2025). Equally, the 2020 approvals put the ICCC in the same breath as the smart metering, intelligent traffic systems and the community engagement platforms, which implies that there has been an effort to intercut the digital infrastructures as the mediators of the multiple service provisions. They are not completely sequenced and implemented projects; hence, they are not by themselves an area of research activity in this section; the documentary testifications of such multisectoral interventions in this respect are, of course, the center around which the Board of SSCL has been accredited and structured.

The most crucial argument of data-driven change in administering the city in this form of governance is the proposed Integrated Command and Control Centre (ICCC). As it has been reported to the local media about the ICCC, it appears to be a large-scale project and is already under implementation as part of the Smart City project; the civil works are currently being done, and the design comprises a data center and an Emergency Operations Centre. It also assumes that the ICCC will also make available, on a single platform, the civic and vital services to monitor and manage the matters of the people in time and that the representatives of all the departments involved will also be available in the headquarters to offer so-called synergy and coordination on time (Hollands, 2015). The elements listed above are incorporated to form call centers, grievance management cells, operations planning and coordination cells, emergency response systems, and IT units, and smart services, such as emergency call boxes, panic buttons, city-wide CCTV monitoring, environmental sensors to monitor the quality of air and solid waste management

sensors, smart parking and traffic management, early warning systems and tools to maximise the efficiency of power and water supply and address consumer complaints. An Intelligent Traffic Management System (ITMS) is the most likely of such an ICCC architecture that has been proposed and will aid in 24x7 real-time detection of road icons such as red light violation cases and speed violation and intelligent control of parking. The identical sources as a national government technology news portal report show that the project on an ICCC, emergency operations center, CCTV surveillance, smart metering and an ITMS, a community engagement and grievance management system has been endorsed by the Board of SSCL, and this puts the ICCC at the heart of the combined smart services. These trends are an expression of an approach to governance where data streams and sensor networks are centrally located to facilitate coordinated response with and through departments and offer new horizons of citizen complaints and citizen communications. Finally, the board structure and presence of positions such as social/environmental expert and statistical officer planning on the organisational chart of the SSCL give the impression that, at least in the field of pure design, the need to raise social and environmental issues and skills in data analysis into the decision-making process was met. Simultaneously, the large numbers of senior-level administrators of the state, police and planning authorities can also be presented in the context of the more developed level of the bureaucracy and security apparatus with which the depth of the process of smart city decision-making of the public sector on Srinagar is supported (Landsbergen et al., 2022). The necessary organisational and procedural contextualisation on which the sustainability and inclusiveness of the Srinagar smart city pathway would be taken into account in the following sections would have to depend on such a twin model of integrating multisectoral project-portfolio-based and information-based management models and centralised leadership.

4.6 Smart City Interventions and Emerging Sustainability Outcomes in Srinagar

The Srinagar Smart City is currently in the planning stage and has already reached a considerable implementation phase according to the updated official statistics released. In a reply to Lok Sabha, it is reported that in Jammu and Kashmir, 288 projects to the tune of 6,603 crores were under the Smart Cities Mission, of which 281 projects to the tune of 6,464 crores were in implementation by mid-January 2026. Srinagar: 161 of these types of projects, which cost 3,634 crores, are actually implemented in Srinagar; 156, which cost 3,524 crores, are already implemented; and only five, which cost 111 crores, are actually implemented. Outlaywise, Rs 713.94 crore on the Srinagar Smart City Project in 2018 and 2023-24 and 265.08 crore until February 2025 have also been registered by mapping previous data, which are available in the Legislative Assembly (Shin et al., 2021). These statistics provide an idea where investment was and how it was enforced in later years of the mission. Themes reported on by officials and the media, under a broad classification of general headings, include those on projects of the Srinagar smart city: Jhelum Waterfront Development and Water Transport, Urban Mobility, Street/Intersection Development, city beautification and Urban Art, Heritage Conservation, and downtown renewal, Central Business District Upgradation, Dal Lakefront Conservation, the Shalimar Canal project, and an Integrated Command and Control Centre at HMT.

4.7 Urban Mobility and Low-Carbon Transport

Among the most evident interventions suggested within the framework of the Srinagar Smart City, formal introduction, scaling up and delivery of an electric bus system can be identified. Until 2023, the city did not have an organised city bus service, with small privately operated diesel minibuses and shared modes being their modes of transportation (Hartt et al., 2023). Rollout of 100 smart electric buses on four key routes on-location air conditioning and onboard cameras Implementation of the Smart City authorities also plans to roll out 100 smart electric buses in August 2023, first, on four major routes, and, second, with onboard cameras and air conditioning that will minimise the environmental load and modernise the transport. A year later, it reports that it will have a fleet of 100 electric buses by the end of 2023 and 2024, that it is under contract with Tata Motors, whose total 16 routes that run between 6:00 am and 1:15 am in the day. Assuming 70000 km/per year, an electrification of these 100 buses will produce a mobility analysis in the hydro case in which this 100 km of streets is redeveloped as the so-called complete street model that combines cycle tracks, footpaths, landscape, and signage.

4.8 Public Space, Heritage, and Urban Design

Interventions of the public space and heritage are the other pillar that contributes to the Srinagar Smart City program to a great extent. One such flagship will be the redevelopment of the polo view market, a renowned street of handicrafts and handlooms within the city, into the first ever totally pedestrian and wire-free market within the city. In this project, all varieties of electrical and communication cables that are commercially available on the market have been buried underground, drainage has been improved, access facilities have been universalised along with the modernising of the front sides of the buildings, and a good portion of stone work has been achieved and new public conveniences created (Tekin and Dikmen, 2024). Local coverage indicates that the new-found beauty of the market has been well accepted by both local and visiting populations as well as the existence of a new road interconnection between MA Road and Residency Road behind the market and that the reorganised street is an extension of the circulation. In addition to the polo view, a central business district street (such as MA Road or Lal Chowk) redeveloped or redeveloped the Rajbagh riverfront and reused or conserved a few heritage buildings and markets, becoming a component of the Smart City plan, as these are the Maharaj Gunj historical market and the shrines listed in the Board decisions. Such programs are contextualised in the role of beautifying the urban image and improving business life, in improving the image of Srinagar as a heritage tourism center and in trying to improve the image of Srinagar to ensure that the pedestrians are more secure and comfortable with the help of universal design.

4.9 Energy Efficiency, Lighting, and Digital Infrastructure

Energy efficiency interventions, especially street lighting, are another type of smart city intervention that directly influences the issue of sustainability. In response to legislators of at least 2000, other LED lights have been built as well in response to the Smart City Mission to replace thousands of the old fashioned streetlights in Srinagar with energy-saving LED lights. Moreover, the electric cabling of large-scale roads (approximately 11 km) in the city is also underground, eliminating technical losses and possible

temporary outages and increasing the sense of safety and aesthetic value, as overhead cables are eliminated. Other smart lighting solutions, which have already been covered in local media, include the installation of dimmable LED systems and the corresponding control infrastructure that are remotely controlled. A fibre-optic backbone of 175 km and the creation of an Integrated Command and Control Centre (ICCC) enhance the digital infrastructure and have the highest likelihood of enabling the establishment of a hub of many smart services. As mentioned above, the data center, emergency operations center, grievance management and call center operations, and specialist cells to strategise and plan operations will be hosted in the ICCC (Angelidou et al., 2018). It is anticipated that the aim of this study will be to incorporate the feeds of CCTV cameras, intelligent traffic control systems, environmental sensors, and smart parking and solid waste management systems, which will facilitate real-time monitoring and coordination among various departments. The enabling infrastructure and through which energy management, mobility optimisation and quick reactions to environmental/public safety events are enabled are the applications of such types of digital platforms that mediate their sustainability effects.

4.10 Solid Waste Management, Sanitation, and Public Safety

Other projects in the smart city in Srinagar include solid waste management, sanitation and the development of public safety infrastructure. In accordance with official expenditure documents, they have embraced smart garbage bins, which are tracked in real time, and have embraced the door-to-door divided collections of waste materials by the use of compactor bins as a measure of increasing the effectiveness of the collection process as well as decreasing spillover (Jeelani and Goyal, 2016). No specific results are included in the sources, i.e., the increase in collection coverage and the rates of diversion, but these activities are forecasted to result in more efficient primary waste management and a clean city environment. With reference to sanitation and people security, smart city resources can be utilised to build new toilets to improve the amenities of people with disabilities, such as universal access to remodelled markets or open spaces (Zaman et al., 2022). Investments in fire boats in Dal Lake and fire safety systems for the ICCC have also been made in terms of the hazard to which the city is exposed with respect to water-based settlement and wooden city fabrics. On the other hand, the CCTV surveillance systems have been extended as a more general measure of enhancing traffic control and providing enhanced protection to its citizens; feeds have also been sent to the ICCC, although privacy and surveillance should be kept in check and should be listed in international guidelines on people-centered smart cities and smart city data governance.

Collectively, the measures indicate that the smart city program in Srinagar has introduced real changes in various dimensions that can be transferable to urban sustainability. A more equitable transition to low carbon and more equitable mobility can support electric buses and complete streets, LED lighting and underground cabling, walkability and urban form, and more equitable mobility; a transition to better waste management, sanitation, and fire safety. At the aggregate roll, Jammu and Kashmir have one of the higher-performing jurisdictions of the Smart Cities Mission; at least in terms of outputs and financial delivery, the projects were nearly totally realised, and the fund utilisation rates were rather significant

(Khan, 2014). However, as far as the documentation can show, there are enormous gaps in analyses that will be filled in subsequent parts of the study. Information on distributional effects (settlements of the benefits and losses on the income groups or neighbourhoods) is nomadically reported in publicly available sources only on the long-term fiscal consequences of running and maintaining new infrastructures and attitudes of citizens towards the safety, accessibility and trust of digitally mediated governance (Mir et al., 2023). Although its answer to an RTI inquiry of SSCL that 990 crore was already paid out over Smart City projects in Srinagar that 131 projects were already established and that 10 new projects were still in the process of being consolidated, it still admits that it lacked consolidated data on the number of jobs created or the amount of revenue created, but it still admits that it was still compiling it on the amount

4.11 Governance Innovation, Citizen Participation, and Data Practices

It is among the best selling points of the Srinagar Smart City project because it will transform the city to digitalise it, despite providing integrated platforms and alternative networks of connections with citizens. The Srinagar Smart City Limited (SSCL) Chief Executive Officer launched The Smart City Mission, which has transformed Srinagar into a healthy, habitable and sustainable city or, in other words, better delivery of municipal services by using information technology and 60 km Srinagar Complete Streets (Bashir et al., 2024). This rhetoric can be used as an explanation of the discourse of world politics, where smart governance has assumed the form of adopting digital technologies to ensure ease in decision making, cross agency coordination and more transparent and participatory public administration. The question, however, is how far these innovations can extend the formal design to instigate the disruption of practices of citizen–state interaction and the use of data in Srinagar. One such mission is the Smart Cities Mission, where citizens will be consulted on the design process earlier. In the process of preparing the Smart City Proposal of Srinagar, the Smart City Cell of the Municipal Corporation utilised different on-line and off-line tools to seek the input of the emergent vision, area-based development opportunities and pancity offerings. Approximately 200 recommendations were referred by the officials to the online questionnaire on the special portal smartcitysmc.com; the municipal site was registered with approximately 30,000 hits, 450 emails, and 500 recommendations via WhatsApp, 389 likes on a Facebook page with the title of the Smart City Project, and approximately 70,000 printed questionnaires were sent.

Since the implementation process is in process, the governance toolkit was transformed into what might not be a one-on-one consultation but the initiation of the long-term digital interface between the citizens and the urban authority. The Srinagar mobile application designed as part of the Smart City project and connected with the Integrated Command and Control Centre (ICCC) is currently being sold to the residents and tourists in the form of a stop shop to access day-to-day civic services. As stated in the official sources, the app will offer a two-way communication platform: the citizens will be able to pay bills on electricity, water, and city services; obtain news, alerts and notices provided by the authorities; and get to know about the tourists and, most importantly, leave a grievance or a complaint anywhere in the city. The complaints made via the app will be referred to the ICCC and the respective individual staff

members in a department, where it will be discussed; thus, the principle of digital grievance redress will be consistent with the new command and control system (Bhat et al., 2023). Such technologies of smart cities are informed by the experiments of e-governance, which have been performed in Srinagar. In 2017, the Android application made available at Srinagar Municipal Corporation was named “complaint handling”, ward-level GIS mapping, geo-tagged images and autreassigning of complains to ward officers. This was done in such a way that the complainant only has the option of closing a case, and any delay in action will lead to the senior authorities with the aid of SMS notifications and one password. This has since been succeeded by civil society organisations such as the Praja program in Srinagar to enable citizens to gain access by developing an enhanced e-governance structure and communicating the municipal government with citizens, including youth-based capacity-building initiatives. Put simply, these processes demonstrate that the governmental innovation of Srinagar is not built only upon the material infrastructure but is oriented toward the voice of the citizens and responsiveness of the administration based on the living ecosystem of the digital technologies.

Moreover, the exponentiation of virtualised digital infrastructures accumulates demand concerns against the backdrop of data operations, confidentiality and claims. The ICCC in Srinagar will centralise the information of CCTV surveillance, smart traffic light, environmental surveillance, solid waste and citizen complaint under one operation center, and the department heads will be on the grounds to facilitate cooperation among them. Having such a paradigm in place would result in a more informed and swift decision-making process; however, surveys of smart city surveillance-related and AI-assisted surveillance mention the risk of such a system wearing out privacy and gaining control over informational power and naturalising mass surveillance unless a strict legal framework of rules and checks can aid in interfering with it (Wani and Ahmad, 2013). Specifically, the UN Habitat International Guidelines on People Centred Smart Cities alerts about the potential adverse or even disastrous consequences of urbanising digital technologies without sufficient attention to human rights and urges cities to develop strict policies to protect their information and encourage transparency and local jurisdiction. The OECD initiative of smart city Dovernance also means that the roles of data governance, data quality, and invoking the idea of human agency, participation, fairness and accountability in smart city initiatives need to be elaborated.

Available data on the population in Srinagar are highly sparse in terms of the advantages in a practical sense of the ICCC and any other system (enhanced traffic management, environmental management and emergency management) compared with the legal and institutional uncertainty of data ownership, use and storage. Despite the fact that even the indication of the interest in simplifying the system of relations between citizens and authorities can already be traced in the mySrinagar application, not mentioning the existing systems of serving citizens with complaints, much of the information on such issues, such as the permission of the system, data sharing between agencies, or independent control over surveillance technologies in the city, is not shared publicly (Shah and Wani, 2014). This lack has an analytic interest in the light of a more broadly securitised environment in which it operates: this assumes that there is now intensive stress in the sources of publications on the rights-based protection and participatory data governance form of people centred on the international principles of people centred

on that matter. Hence, the later sections of the study shed more light on how these tensions between innovation, participation and rights are in fact achieved toward the establishment of the sustainability of the Srinagar smart city path.

4.12 Urban Sustainability, Resilience, and Emerging Trade Off

Recent reviews have indicated that under the rubric of the Smart City program in Srinagar, quantitative (measured) impacts on a range of aspects of the environment have already been realised, particularly in relation to the process of urban mobility and energy efficiency. Under a formal electric bus program that would be fit to 100 e buses with 16 routes, approximately 5,642 tonnes of CO^2, 5.6 tonnes of NOx and 0.041 tonnes of PM/year would be saved (Singh et al., 2021). The 60,000 passengers a day indicate that they are becoming famous rapidly, and they are also succeeding in substituting more polluting minibuses and personal cars. In these mobility reforms, these are complete street interventions involving more than 100 km long road swathes, such as foot paths, cycling, landscape and underground cabling, and thus add to the atmosphere of nonmotorised transport and improve the quality of the public realm. A second outcome, the environmental sustainability principle, is more energy efficient in terms of street lighting. According to government records, thousands of existing lights on the streets have already been lit up with LED lights and more than 2000 additional lights on the streets installed as part of the Smart Cities Mission in Srinagar and underground of some 11 km of the electricity cabling in the major streets. These factors reduce the waste of power and technicality, increase safety and enhance the process by eliminating these overhead wipers. Subsidy proposals on infrastructure (e.g., the Integrated Command and Control Centre (ICCC)) and the supply of digital infrastructure (e.g., the proposed 175 km fibre optic network) to support the consumption of energy, environmental monitoring and response to incidents are being financed alongside them, and the real environmental benefits of such investment depend on the circumstances of use and regulation.

Waste management and sanitation of solid waste have also been addressed. The development of a reverse-vending machine (RVM), or the promotion of the use of plastic waste and other nonbiodegradable waste to form a scientific disposal of waste, is important for the development of segregated waste collection, compactor vehicles and a greater resource for Jammu and Srinagar (Maqbool, 2025). It has been reported that they have reduced the extent of pollution and have also improved hygienic positions, although certain values, such as ratios of diversion, coverage and littering, are not available publicly. Other cleaner and more inclusive public spaces in line with Sustainable Development Goals (SDGs) 6 and 11 include gender-sensitive and universally accessible public toilets, women-only SHE suffices, pink toilets and neighbourhood-led planning challenges.

4.13 Social sustainability: Quality of life, inclusion, and safety

With respect to the dimension of social sustainability, it appears that the Smart City Mission in Srinagar has paid off in the areas of basic city services and the city environment, which are not listed. In the JammuSrinagar case study, it is evident that the two cities had problems of unemployment and poverty and no management of waste or community services because before the Smart City project, there was

no transportation infrastructure, and the two cities had no methods of health, education or community services. It states that immense improvements in transportation, waste collection and community delivery services have been made because of the interventions of the smart city and that the quality of life is elevated owing to the utilisation of the smart technologies that make the technologies more interconnected, cleaner and accessible. This is evident in the form of things such as multilevel parking spaces, stadium renovations, emergency healthcare installations and, in turn, LED street lighting, which are claimed to help city environments become safer and more habitable. Social inclusion is also created through the creation of digital governance and digital service platforms. The citizen-centric issue is implemented by the provision of citizen-centric services in Srinagar on the basis of ICT interventions to increase transparency, accessibility and accountability in the provision of community services such as the mySrinagar mobile application and embedded e-governance mechanisms (Dada et al., 2022). These places mean that grievances can be posted by residents, bills can be paid, and information can be viewed at a cost saved in both money and likely extending the reach of the town services. Moreover, attempts to target access to newly designed streets and markets, as well as safer sanitation plants for women, directly benefit women in urban areas that are historically underserved.

In the meantime, official and analytical sources comment on the reproduction and creation of social problems. The JammuSrinagar case study also indicated that infrastructural works were delayed; there was no coordination among different agencies, jams, and solid waste management, and little attention was given to some of the old heritage buildings, which were all old problems. It also determines the threats of the potential problems of smart city missions that have not been previously proven, such as the pressure of city resources, the possible threat of having displaced marginalised groups, and the issues of data privacy and cybersecurity. The risks intersect with the even more general problem of surveillance and injustice in smart cities, where researchers have cautioned that the highly technological modalities of state may recreate or multiply current tendencies of exclusion unless it is subjected to a radical restraint and supported by the creation of strong rights-based protections.

4.14 Economic sustainability: Growth, investment, and fiscal uncertainty

The Smart City Mission stands poised to be on the front line as an instrument to guarantee the inclusive development and competitiveness of Srinagar. With respect to the case of smart cities in particular, official reports and independent analyses could prove that investments in smart cities in terms of infrastructure, waste management and the handing of services to people generated new investments and job opportunities in the information technology, renewable energy and urban infrastructure development sectors. In the Jammu Srinagar case study, the urban environment has been beautified courtesy of projects carried out in these areas, river front development, multilevel parking and improvement of the public space, which has enabled economic development because the cities are now presentable to people, tourists and investors (Murugesan et al., 2024). This aligns with the aim of the Smart Cities Mission, which entails stimulating the economic development of the target cities and economic impacts on the surrounding areas in the spillover zone. However, long-term fiscal sustainability and the distributional effects of such investments are matters of concern. The local media

has also written a reply to RTI, stating that 990 crore has been invested in the Srinagar Smart City project and 131 has been completed and that 10 projects are presently in progress. That solution goes further to include the fact that SSCL does not have conventionalised information on job creation or revenue related to smart city initiatives and how revenue-related data were coming together. In the absence of similar reporting on indicators of economic performance at that time, there would be no convenient way to know whether the smart city project is achieving sufficient returns on its long-term financial, social or environmental capital and operating expenditures such that it would be reasonable to justify its capital and operating expenses. The other factor is that the prospects of incorporating disaster risk reduction and resilience into the development agenda of the city were not exhausted, at least in the first place, as has been experienced in the resilience study of the Smart City Proposal (SCP) in the city of Srinagar (Wani et al., 2020). The plotting of the SCP vs. the Sendai Framework of Disaster Risk Reduction revealed that the proposal touched on the grounds of understanding disaster risk, enhancing preparedness to respond and transform disaster risk to successful recovery, rehabilitating and reconstruction and never obtaining the grounds of the government of disaster risk or resilience building by investing in disaster risk reduction. Additionally, the SCP did not specifically target aspects such as reliable communication and mobility; the advancement of natural and man-made resources; leadership and good management; community health, security and justice, livelihoods, and cohesive communities; or the economic prosperity and empowerment of stakeholders.

4.15 Resilience and the Limits of “Smart” Sustainability

The results of the resilience analysis reveal that there is an increase in crashes in the Srinagar smart city trajectory: the majority of the activities are framed toward sustainability in a narrow sense, i.e., a reduction in emissions, improved delivery of the services offered to citizens, and city livability; i.e., the systemic quality of the urban system, i.e., resilience, is not prescribed in official planning documents. This resilience study reveals that the current disaster management plans that already exist in Srinagar are largely reactive and that the smart city mission, as envisioned in Srinagar, has no opportunity to offer overall resilience in new projects. It recommends a five-stage resilience maturity model (RMM) between Starting and Resilient, which incorporates a gradual accretion of leadership and governance, institutional, planning, technical and funding structures and an inclusion of a special resilience team in SSCL, the incorporation of resilience in mission and vision statements, and the development of resilience-specific indicators and systematic stakeholder and special funding engagement. This diagnosis resembles the skepticism of smart cities, in general, which cautions against the spread of notions of technical sophistication and bodily power. Finally, intelligent city monitoring and AI profiling internationally enabled the effects of stress, such as a cyber attack, system crash, or a massive intrusion of privacy, unless the city is subject to government and strict control mechanisms and democratic measures. The UN Habitat International Guidelines on People-Centred Smart Cities especially warn that the adoption of technologies that fail to give due credence to human rights could be detrimental or even disastrous and suggest that cities should embrace the tenets of community engagement, data protection and mechanisms, which can bring digital technology to life to make cities live long term sustainably and in an equitable manner.

The available data in Srinagar suggest that implementations of smart cities have already begun to benefit the different dimensions of the environmental and service provision component of sustainability and have already spawned mammoths in terms of capital and institutional creativity. However, they also reveal past shortsights into the conceptualisation and computation of risk governance, social justice, and rights-based protections about resilience and sensitivity to conflicts. The second segment of the study then changes the angle of the study more to a critical discussion of these governance issues and trade-offs and what would be needed to bring the smart city roadmap of Srinagar much closer to the international benchmarks of people centred on resilient and sustainable urban futures.

4.16 Governance challenges and democratic risks

Among the oldest questions that were introduced in the sphere of governance are connected with the trade-off in the context of the efficiency of technocracy as well as representatives of democracy. The outcome of the observation is that the executives' offices and the sellers of the technology are more prone to spearhead the projects in international research on smart city governance and that the decision/trade-off decisions and actions implemented behind the scene are not in the form of a rule. The related problem of the transparency of the decision-making process and likely the marginalisation of elected municipal representatives in the model of smart city governance in Srinagar is also foisted by the company style Special Purpose Vehicle comprising top officials of the state on the steer and the high concentration of the security agencies in the smart city governance model. Despite its online system of grievances and a system of consulting on citizens, these are institutionalised and are put in the hands of the higher administration, which is likely to dilute the transformative potential.

The second problem is surveillance, data protection and data rights management. The combination of the CCTV network, intelligent traffic control, environmental sensors and information feeds on citizens to the Integrated Command and Control Centre will not only present a more responsive and coordinating form of governance to the city but also provide an infrastructure for all-seeing surveillance (Ganaie et al., 2026). The UN Habitat report about AI and cities indicates that AI-driven technology, as it is currently designed, without the required governing system and rights-related precautions, can have a detrimental or even devastating impact on people, including violating privacy or creating a discriminatory impact. Greater generalisation of the argument on smart cities and democracies highlights that smart city projects may bypass the outcomes of rule of law, enable politicisation and, in effect, disintegrate civically unless they are undertaken with the highest transparency and accountability. Particularly interesting at this point is the fact that there are no publicly stated policies on data protection or external control agencies and the general ambiguity of the situation in the war-torn Srinagar, where the practice of security has already become a part of the life of the city and where the need to coordinate local practices with the new requirements introduced by people centred on smart cities is the most acute.

Third, the digital divide and capability gap threaten the concept of inclusive smart governance. The world smart cities perspective or UN Habitat is tired of them, and therefore, the majority of cities are ill placed in terms of digital infrastructure, skills, and even weak systems of governance, which is why social

disparities are present as they are. Policies According to the draft International Guidelines on People-Centred Smart Cities, 36 percent of global cities have established ethical AI regulations, 20 percent of these cities have laws related to data protection, and as such, there is no linkage between adopting technology and the normative framework. Although access to services and involvement are bound to improve, as the use of the mySrinagar app and the use of other e-governance applications would tend to improve, the lack of publicly accessible data on the usage of applications by individuals, gender-based, and income-based disparities in the usage of these applications, or the existence of supportive programs that might improve the digital literacy of marginalised populations and access to the risk that the benefits of smart cities will be felt by more connected and better-off citizens unless some actions are taken to reduce the digital divide will nullify the goal of inclusive growth that the mission will seek to apply.

Fourth, there are no answers to the questions of long-term fiscal and institutional sustainability. They say that, to the best of their ability, tools of smart cities can only supplement well-being and inclusive growth when they are combined with holistic frameworks to integrate efficiency, effectiveness and sustainability and redesign business and contractual models to conform to a fast-changing environment, according to the OECD Programme on Smart Cities and Inclusive Growth. This highlights the importance of smart city performance measurement in terms of multiple sectoral indicators and the ability to construct a smart city policy together with citizens in the policy cycle. With high completion rates, high fund utilisation rates, and the ability to execute in Srinagar, the answers obtained by the authorities reveal that the consolidated data on the employment and revenue impacts, in most cases, are not maintained and that the initiatives oriented toward greater resilience are not reflected on the printed document. This means that smart city investments are quantified in terms of the number of dollars and number of projects that are completed compared to the quantification of the social, environmental and economic impact on a long-term basis.

There are several policy implications of such issues. First, the rights-based data governance of a transparent legal regime of data protection, the independent power of monitoring instruments and the free distribution of data usage and data storage would have to be institutionalised so that Srinagar would be on the path of the international standards of people-centric smart cities. Second, the participatory processes cannot be confined to a single consultation of developing proposals to cocreation and coproduction processes that involve diverse communities in the agenda setting, design and monitoring of smart city initiatives as facilitated by the OECD and the UN Habitat. Third, digital bridges involve similar investments in connectivity, digital literacy and outreach among poorly served people to transform digital platforms such as MySrinagar into reality and not as a solution to enable the delivery of services that have already been delivered to already connected groups.

Finally, the resilience and conflict sensitivity provide an invitation to the smart city governance at Srinagar to go beyond sectoral operations so that the leadership, institutional efforts and empowerment of the stakeholders around the risk governance can be increased. Resting on the proposed resilience maturity model to be applied in the framework of the Srinagar Smart City, the following potential

measures can be proposed: the establishment of a special resilience unit within the SSCL, the integration of the resilience goals into the mission and vision statements, and the development of resilience-specific indicators and stakeholder retention in planning and assessment. These would introduce into the life of the city today the promise of people centred, rights-based, and robust urban future as described by the world models and would then offer a more stable platform of reckoning with the multitouching of digital change, environmental stress and political struggle today that is presently hallmarking the city today.

5. Discussion

On the basis of the findings of this paper, the concept of the smart city of Srinagar has broadened from being a smart urbanism of technologies toward greater institutional change, infrastructure development and a system of services now offered digitally to the public. This paper provides evidence that the government of Srinagar is looking for smart governance and is exploring new horizons of ideas, including special purpose vehicles, integrated digital systems, mobility reforms, the redevelopment of public areas and the improvement of environmental services. Accordingly, this paper aims to adopt a nonmechanical perspective; it does not simply assume that smart cities are merely the result of the introduction of information and communication technologies (ICTs) but rather that they also rely on the redirection of decision-making processes in the governance of the city and its administration and the provision of city services.

Inclusive and democratic urban change does not, however, necessarily translate into a governance innovation, as is proven in the Srinagar case. The institutional structure of Srinagar Smart City Limited has certainly nurtured the ability to coordinate and implement at the executive level since it has brought a wide spectrum of actors (administrative, planning, municipal and sectoral) together under a single roof to make decisions. The projects, digital infrastructure and interventions in transport, lighting, public space, waste management and heritage conservation greatly increase the capacity of the city to carry out multisectoral urban projects. However, the same governance system also results in the centralisation of power within the business, such as the institutional governance system, and one has to wonder the following: regarding accountability and transparency in the governance system and regarding the real power of the elected local governance system with regard to priority setting.

The paper has also established that the advantages of a smart city, despite being touted as being sustainable, are not comprehensive and are not well documented in the case of the Srinagar Smart City program. EBS, CS, street lighting based on LEDs and networking underground cables, and waste and sanitation systems are all good indicators of going in an environmentally focused direction in urban management. Of course, these are all smart city investments that can contribute to lowering emissions, enhancing public safety, improving public spaces and optimising services. However, there are additional instances of positive infrastructure products rather than social and economic impacts. There is a much greater level of structure around using public sources reporting on projects completed and the amount of investment not looking to report the distribution of outcomes, ongoing maintenance costs, jobs generated or income in neighbourhoods. The contribution of the paper is as follows: It identifies how the

innovation of governance manifests both physically and digitally in Srinagar. This indicates an evolution toward a more data-driven public administration and the important function that information flow might be in decision-making and responsiveness. However, there are some open questions about issues of data governance, transparency and privacy and institutional control in the creation of these new systems, the paper notes. Open documentation is far more about what these platforms can do and how they can be of functional and managerial benefit rather than the legal, procedural and ethical frameworks that can allow data to be accessed, retained, consented to, and held accountable.

Additionally, the key difference between participation as consultation and participation as shared governance is highlighted. With respect to the development of smart city proposals, different consultation mechanisms have been implemented online and offline to collect citizens' views, and a digital platform has been created for citizens to identify issues and make a service request. These findings indicate that the involvement of the public has not been completely shut off in the smart city process. However, the content of the paper does not signal an evolution toward the cocreation/codecision or self-monitoring of communities relevant to smart city activities. This seems to have strongly discussed and institutionalised this position and, as a result, some kind of participative aspect of governance innovation as such.

Another key point in the paper is that the concept of 'resilience' is less entrenched in the Srinagar Smart City pathway than 'sustainability', from the point of view of the narrower dimension of 'infrastructure'. In general, several aspects involve addressing urban problems in some way in the program, mostly in terms of mobility, lighting, sanitation and environmental monitoring, and public space upgrades. However, in this paper, the resilience of the smart city is still underdeveloped with respect to several aspects, such as leadership, public health, community cohesion, livelihood, stakeholder empowerment, and systematic disaster risk governance. This suggests that the modernisation of technology and the delivery of projects through capital-intensive means is important but is not sufficient to create an urban system that is resilient.

This illustrates that, in principle, smart city projects can play a role in upgrading the infrastructure, coordination and improvements in selective service domains but require a friendly institutional environment, such as that of Srinagar. This paper therefore argues that there is a need to move beyond project or technology-based interventions to achieve sustainable futures in cities. Instead, they must have a larger consortium of citizen engagement, better data governance protection and make their plan and assessment of the smart city more transparent in terms of social equity and resilience. There is a risk in the above interpretation; Srinagar Smart City is not a blueprint for the sustainability of a city but an ongoing idea laboratory and experiment in governance innovation and, as much as anything, for its tensions.

6. Policy Implications

In terms of policies for the future directionality of governing smart cities, especially in the context of Srinagar and similar urban contexts, the results of this paper have several implications. They can be summed up in the first implication, which is a change of paradigm with regard to how urban transformation happens today: governance-centred urban transformation rather than a ‘project implementing urban transformation', i.e., a change from completed projects and the provision of infrastructure towards being governance centred. Srinagar smart city policy has enormous potential for smart city projects, but attention is required at ensuring that investments in smart city projects are complemented with accountable, participative and institutionalised governance stakeholder processes to ensure that the policy is successful.

The second has to do with institutional design. In particular, for the special purpose vehicle model, the centralisation of administrative powers and minimisation of the fragmentation of procedures have facilitated the faster coordination and implementation. However, the paper also argues that power centralisation might negatively impact the functioning of local traditional democratic institutions if there are no more effective accountability and oversight mechanisms. Linkage between the Special Purpose Vehicle (SPV), municipal institutions and other public agencies, however, should continue to be developed and should not be hampered by the negative effect of the Special Purpose Vehicle because of the lack of general institutional legitimacy, which may hamper the effectiveness of the instrument of SPV. More transparency and pillar 2 (transparency of decision-making) and transparency of the reporting of the results of smart cities would help to increase the public accountability of smart city governance, and prioritisation of smaller projects would also be helpful.

Finally, the paper demonstrates an engrained institutionalised and structured approach towards data governance. There should be policy on integration and monitoring because as more functions are integrated and monitored by an Integrated Command Control Centre (ICCC) with CCTV and environmental sensors, digital grievance platforms and traffic management systems, there should be more than just operations benefits. The data/collection and access policies and policy on the retention and sharing of the data should be known to different departments. Most critically important is the development of protection organisations, which clearly defines the responsibilities of institutions and public accountability with respect to digital systems. However, data-driven governance, if unaccompanied by these, can increase the staffing of administration and failure to address important normative and regulatory issues.

Fourth, it is recommended that citizens' involvement should be extended beyond initial involvement and grievances redressal procedures. There is a desire to talk to residents by authorities—conferative mechanisms are used when proposals are prepared and when complaints are handled digitally. However, efforts should be made to increase the voice of the public in terms of agenda setting, project design, monitoring and evaluation in more ongoing and institutionalised ways. This might lead to more of an integrated element of urban governance, as opposed to a reactive one. In practice, this could include structured consultations at the ward level and on-going feedback on project outcomes to increase

community organisation and market association and/or the involvement of other local stakeholders in the project process.

Fifth, the results of this study suggest that greater attention should be given to the effects of smart city policy on aspects of urban outcomes and inclusive access. However, there is less publicly available information that would indicate who benefits the most, who is being prioritised and who can access it and benefit from improvement, and if there are disparities between social groups and/or neighbourhoods in the city. Systematic monitoring of the distributional effects of investments, in terms of service use, should also systematically take into account the use of platforms and differences at the local level in impact projects in this regard in policy frameworks. This could be used to measure the equity and public value, financial use and infrastructure deliverables of smart city investments.

Finally, the need for a more integrated approach in the future roadmap of the Srinagar Smart City program in terms of resilience is discussed. The work has helped advance the targets set for mobility, environmental management and service provision, but the urban resilience analysis drawn out in this paper has pinpointed a few larger areas of urban resilience that have gone unaddressed. It is therefore essential to strive for a more concrete articulated policy response in the relationships between the modernisation of the infrastructure and long-term preparedness, interagency coordination, social capacity and institutional adaptability. This includes indicators, better and more systematic planning processes across sectors and planning with a risk-based approach in the smart city agenda.

Overall, the results indicate that, for smart city policy, the use of technologies should be enhanced in Srinagar and that the aspect of governance in which the technologies are running has paramount importance. A more robust policy framework includes increased efficiency of implementation, institutional responsibility, digital innovation and data security, infrastructure building, social inclusion, and readiness for resilience. The policy lesson of the paper is that by focusing on smart city governance as a process of public policy and institutions in the longer term, its sustainability can be increased as opposed to a set of single urban projects.

7. Conclusion

The Srinagar Smart City is a rather good example of the power of change, and the government lacks the decisiveness of smart urbanism in a war-torn and environmentally conscious city. The project lays a Srinagar smart city agenda in the context of the national Smart Cities Mission of India, and its vision is publicly stated to develop the city as an eco-friendly resilient socioeconomically vibrant urban center that builds on the natural and cultural heritage of the city. The vision has a strategic map that includes area-based development and pancity solutions with a foundation on three areas of strategic focus, i.e., reimagining the public realm with heritage conservation; developing resilient and sustainable infrastructure; and creating socioeconomic opportunities and three P principles of promotion, participation and performance. There are far too many unanswered questions, as the analysis of the study revelation suggests, on whether the world is making gigantic strides towards bringing this vision to

life in projects and digital infrastructures and whether these interventions are creating inclusive, right-based and compliant transitions to urban futures. The Smart City program in Srinagar positively influenced several aspects of urban sustainability, and they can be measured in terms of positive effects on the side of the beneficial side. The rough calculation of the electrification of the bus fleet (which now consists of 100 e-buses and 16 services routes with an approximate flow of 60,000 passengers) saved the project thousands of tonnes of CO2 and other environmental stressors every year, which proves that smart mobility projects can truly have a visible effect on the decrease in air pollution in a mountain metropolis. Street lighting retrofits using LED street lighting, with underground cabling and along the riverfront, investments in waste management, sanitation and fire safety have made the streets more pleasant to walk, they are energy efficient and give an urban appearance, and basic gaps in basic services have been filled. The addition of online platforms and the launch of mySrinagar application and inbuilt e-governance portals have created more redresses of grievances and delivery of services, which can cost fewer transactions and transform transparency. All these interventions express how, in a favourable environment, smart city investments result in the development of sustainable development goals, including safe, resilient, and sustainable cities.

In the meantime, the benefits that come with this are subject to governance issues and trade-offs that are long-term problems. The fact that decision-making power has been vested at the top of administrative structures and that the SPV structure has been largely influenced by security and planning authorities is a matter of concern as long as the marginalisation of elected municipal bodies in priority setting is considered. Despite the existence of the first phase of the proposal already within the realm of consultations and the next online tools, where citizens are granted an opportunity to chime in, most evidence reveals that the norm of cocreation and codecision-making lies in the governance of smart cities. This kind of critique restates more broad-based critiques of smart cities as being the ultimate manifestation of an algorithmic technocracy where technocratic and vendoristic reason stands to crowd out the democratic process and local knowledge. The other disruptive question also raised in the study is the contribution that the data-intensive infrastructures have to the stage that has been defined by long-term conflict and securitisation. It will be an effort to centralise information about CCTV networks and smart traffic systems, environmental sensors and citizen complaints under a single active center known as the Integrated Command and Control Centre (ICC) in Srinagar that will be more receptive and coordinated to govern the place. However, in one of the articles by the authors of the University of Sheffield, the authors remark that AI and smart city monitoring can reduce privacy levels, accumulate informational power and put the lives of civilians in stagnation unless advanced laws, proper control policies, and effective information security practices underlie these advances. This absence of officially proclaimed data management policies, as well as external checks, is particularly inappropriate in Srinagar, where security measures have already taken the place of the city. Smart city governance has become operationally efficient and control focused as opposed to a rights-based and people-centred approach, which has been propagated by the International Guidelines on People-Centred Smart Cities by UN Habitat.

Ressilience is one other area that the smart city mission in Srinagar has failed to achieve. Special resilience comparisons of the Srinagar Smart City Proposal and the Sendai Framework of Disaster Risk Reduction and Rockefeller Foundation City Resilience Framework reveal that although the aspects of disaster risk, preparedness, and continuity of critical services are covered in the parts of the proposal, the other parts, such as disaster risk governance and risk, support the view that the technological and infrastr. This study assumes that to realise the above dream of an eco-friendly, resilient and socioeconomically active Srinagar, a project-centric orientation in smart city implementation will need to be shifted toward a more holistic, governance-centered orientation in smart city implementation. This would entail, first, the institutionalisation of rights-based data governance at the national level through the introduction of clear legislation, a sense of autonomy and the disclosure of surveillance and the use of data through new international standards. Second, it would appeal more to citizens than to consultations on real cocreation and the coproduction of smart city strategies and projects with reference to international best practices, with an emphasis on community-based design and monitoring. Third, it would be the long-term investment in digital inclusivity, resiliency-oriented planning and capacity building in both public institutions and civil society to which digital and infrastructural innovations overall would be deployed as the instrument of social justice as well as conflict-sensitive development and not an aim in itself.

The study concludes by providing some future research directions. Systematic empirical and mixed methods research that should identify who the clients of Srinagar smart projects are, who can be involved in the design and implementation of such projects and how the relations between the parties can be transformed are also needed. This kind of research may be applied to further develop any existing survey-based research on the impact of sustainable development and resilience to introduce disaggregated evidence on distributional effects, rights effects and citizen perceptions. Programmatically, unlike other Indian and world cities that are smart and, in particular, cities with a history of strife or a high degree of inequality, this action would help clarify under what conditions smart governance can be facilitative or inhibitive toward inclusive and sustainable urban futures. Theoretically, one can investigate the relationships among the works of smart cities, critical urbanism and peace and conflict studies at a more comprehensive level at their intersection, where the correlation between digital governance and militarisation, protest and negotiated citizenship can be explored. In general, the Srinagar Smart City is an attractive yet unfinished project of reorganising the decision-making process of the material sector with the help of digital infrastructures and area-based investments. This practice validates the idea that the activity of the smart city can become the catalyst for the remarkable input to the betterment of the environment and the provision of services and the introduction of new institutional tools for city management. Moreover, it reinforces the need to balance such work on the basis of powerful images of democratic accountability, rights-driven data management and social justice, particularly in cities where the culture of confrontation and inequalities contributes to the historic status quo of the city.

Declarations

Ethical approval

Not Applicable as no humans were studied

Consent to participate

Not Applicable

Consent to publish

Not applicable, as the study does not contain any individual's or person's data in any form.

Author Contribution

The paper has been developed and prepared by the authors jointly with equal efforts.

Review and Editing

The authors performed the initial review of this paper, and feedback was sought from collaborators in the same field.

Acknowledgements

The authors are highly thankful to my academic collaborators who have performed an initial double peer review for this paper, and their suggestions and comments have greatly improved the paper.

Funding

Not Applicable

Conflict of Interest

The authors declare that there are no potential conflicts of interest.

Data Availability Statement

The datasets analysed during the current study are available from the corresponding author on reasonable request.

Clinical Trial Number

Not Applicable

References

1. Abreek-Zubiedat, F., & Phokaides, P. (2025). Living in and with ruins: decolonising spatial pedagogies in territories of conflict. *City*, *29*(3–4). https://doi.org/10.1080/13604813.2025.2517459

2. Ahmad Khan, N. (2014). Municipal Solid Waste Management-A case study of Srinagar city. *J Econ Bus Manag*, *1*(5).
3. Angelidou, M., Psaltoglou, A., Komninos, N., Kakderi, C., Tsarchopoulos, P., & Panori, A. (2018). Enhancing sustainable urban development through smart city applications. *Journal of Science and Technology Policy Management*, *9*(2), 146–169. https://doi.org/10.1108/JSTPM-05-2017-0016
4. Bashir, J., Bhat, M. Y., & Equbal, M. S. (2024). Willingness to pay for improved solid waste management: a case study of Srinagar Municipal Corporation. *International Journal of Environment and Waste Management*, *35*(1). https://doi.org/10.1504/IJEWM.2024.140970
5. Bashir, O. (2020). Operationalising resilience for Srinagar Smart City 1, 2. In *PM World Journal: IX*.
6. Bhat, M. Y., Bashir, J., & Equbal, Md. S. (2023). Willingness to Pay for Improved Solid Waste Management : A Case Study of Srinagar Municipal Corporation. *International Journal of Environment and Waste Management*, *1*(1). https://doi.org/10.1504/ijewm.2023.10048360
7. Chettry, V., & Surawar, M. (2021). Assessment of urban sprawl characteristics in Indian cities using remote sensing: case studies of Patna, Ranchi, and Srinagar. *Environment, Development and Sustainability*, *23*(8). https://doi.org/10.1007/s10668-020-01149-3
8. Choudhary, S. (2025). Impact of ICT-based Smart Solutions in Smart Cities: A Study of Jammu and Srinagar Smart Cities of Jammu and Kashmir. *Research Review International Journal of Multidisciplinary*, *10*(7). https://doi.org/10.31305/rrijm.2025.v10.n7.024
9. Dada, Z. A., Batool, N., & Shah, S. A. (2022). GIS-based analysis of green space in urban Himalayas and modelling the effects on destination business performance. *International Journal of Tourism Cities*, *8*(4). https://doi.org/10.1108/IJTC-06-2021-0121
10. Das, D. (2020). In pursuit of being smart? A critical analysis of India's smart cities endeavor. *Urban Geography*, *41*(1), 55–78. https://doi.org/10.1080/02723638.2019.1646049
11. Ganaie, N. A., Mir, T. A., Jaysingh, M. Das, & Rath, D. M. (2026). Algorithmic governance and surveillance federalism: transforming the digital state in India and ASEAN. *Frontiers in Political Science*, *8*, 1757636. https://doi.org/10.3389/fpos.2026.1757636
12. Guenduez, A. A., Mergel, I., Schedler, K., Fuchs, S., & Douillet, C. (2024). Institutional work in smart cities: Interviews with smart city managers. *Urban Governance*, *4*(1). https://doi.org/10.1016/j.ugj.2024.01.003
13. Hajam, M. R., Singh, M., & Akther, R. (2022). Impact of Smart City Mission on Promotion of Sustainable Development in Srinagar City of Jammu & Kashmir. *International Journal Of Early Childhood Special Education*, *14*(3).
14. Hartt, M., Zwick, A., & Webb, B. (2023). The Promise and the Peril of the Smart City. *The Platform Economy and the Smart City*, 213–228. https://doi.org/10.1515/9780228007944-012/HTML
15. Hollands, R. G. (2015). Critical interventions into the corporate smart city. *Cambridge Journal of Regions, Economy and Society*, *8*(1), 61–77. https://doi.org/10.1093/CJRES/RSU011
16. Jeelani, A., & Goyal, K. (2016). Characterisation and management of solid waste of Srinagar city. *Indian Journal of Science and Technology*, *9*(44). https://doi.org/10.17485/ijst/2016/v9i44/105247

17. Kociuba, D., Sagan, M., & Kociuba, W. (2023). Toward the Smart City Ecosystem Model. *Energies*, *16*(6). https://doi.org/10.3390/en16062795
18. Kumar, P., Gupta, K., Karnatak, H. C., Siddiqui, A., & Senthil Kumar, A. (2017). Geo-enabled e-Democracy Tools and Services for Smart Cities. In *Advances in 21st Century Human Settlements*. https://doi.org/10.1007/978-981-10-4035-1_13
19. Lai, C. M. T., & Cole, A. (2023). Measuring progress of smart cities: Indexing the smart city indices. *Urban Governance*, *3*(1). https://doi.org/10.1016/j.ugj.2022.11.004
20. Lai, C. S., Jia, Y., Dong, Z., Wang, D., Tao, Y., Lai, Q. H., Wong, R. T. K., Zobaa, A. F., Wu, R., & Lai, L. L. (2020). A Review of Technical Standards for Smart Cities. In *Clean Technologies* (Vol. 2, Number 3). https://doi.org/10.3390/cleantechnol2030019
21. Landsbergen, D., Girth, A., & Westover-Muñoz, A. (2022). Governance rules for managing smart city information. *Urban Governance*, *2*(1), 221–231. https://doi.org/10.1016/J.UGJ.2022.05.003
22. Lata, K., Ahmed Chundeli, F., & Ramamurthy, A. (2022). Smart Master Plan and 3D GIS Planning Support system—A Case of Chennai City, Tamil Nadu, India. In *Advances in 21st Century Human Settlements*. https://doi.org/10.1007/978-981-19-2564-1_3
23. Liando, D. M., Ganaie, N. A., & Yuslaini, N. (2026). Smart City 2.0 governance policy model: institutional configurations and the politics of urban inclusion in India, Singapore, and Indonesia. *Frontiers in Political Science*, *8*, 1730870. https://doi.org/10.3389/fpos.2026.1730870
24. Mahavir, & Bedi, P. (2017). Integration of Existing Information Systems as a Spatial eDemocracy Tool for Smart Cities in India. In *Advances in 21st Century Human Settlements*. https://doi.org/10.1007/978-981-10-4035-1_12
25. Maqbool, S. (2025). Urban Vegetable Clusters as Engines of Sustainable Urban Livelihood: A Case Study of Narkara, Srinagar. *International Journal for Research in Applied Science and Engineering Technology*, *13*(6). https://doi.org/10.22214/ijraset.2025.72596
26. Mir, A. A., Mushtaq, J., Dar, A. Q., & Patel, M. (2023). A quantitative investigation of methane gas and solid waste management in mountainous Srinagar city-A case study. *Journal of Material Cycles and Waste Management*, *25*(1). https://doi.org/10.1007/s10163-022-01516-4
27. Murugesan, S., Baba, S. H., Majeed, U., Gul, A., Shaheen, F., Sultan, A., Dhekale, B., & Gautam, K. (2024). An Economic Insights of Agricultural Sustainability in the Himalayan Districts of Jammu and Kashmir, India. *Journal of Scientific Research and Reports*, *30*(9). https://doi.org/10.9734/jsrr/2024/v30i92340
28. OECD. (2023). *Smart City Data Governance*. OECD. https://doi.org/10.1787/e57ce301-en
29. Praharaj, S., & Han, H. (2019). Cutting through the clutter of smart city definitions: A reading into the smart city perceptions in India. *City, Culture and Society*, *18*. https://doi.org/10.1016/j.ccs.2019.05.005
30. Praharaj, S., Han, J. H., & Hawken, S. (2018). Urban innovation through policy integration: Critical perspectives from 100 smart cities mission in India. *City, Culture and Society*, *12*. https://doi.org/10.1016/j.ccs.2017.06.004

31. Prakash, D. (2025). Why do smart city projects fail to create impact? Understanding decision-making in smart city policy implementation. *Urban Governance*, *5*(1). https://doi.org/10.1016/j.ugj.2025.02.004
32. Prasad, D., Alizadeh, T., & Dowling, R. (2021). Multiscalar Smart City Governance in India. *Geoforum*, *121*. https://doi.org/10.1016/j.geoforum.2021.03.001
33. Shah, S. A., & Wani, M. A. (2014). Geospatial Based Approach for Enhancing Environment Sustainability of Srinagar city - A Study on Solid Waste Disposal. *International Journal of U- and e-Service, Science and Technology*, *8*(3). https://doi.org/10.14257/ijunesst.2014.7.3.25
34. Shin, S. Y., Kim, D., & Chun, S. A. (2021). Digital divide in advanced smart city innovations. *Sustainability (Switzerland)*, *13*(7). https://doi.org/10.3390/su13074076
35. Singh, P., Singla, S., & Bansal, A. (2021). Evaluation of Land Use and Land Cover Transformation and Urban Dynamics Using Multi-Temporal Satellite Data. *Geodetski List*, *75*(3).
36. Singh, U., & Upadhyay, S. P. (2023). Fractured smart cities: Missing links in India's smart city mission. *Environment and Planning B: Urban Analytics and City Science*, *50*(7). https://doi.org/10.1177/23998083221144321
37. Tan, S. Y., & Taeihagh, A. (2020). Smart city governance in developing countries: A systematic literature review. *Sustainability (Switzerland)*, *12*(3). https://doi.org/10.3390/su12030899
38. Tekin, H., & Dikmen, I. (2024). Inclusive Smart Cities: An Exploratory Study on the London Smart City Strategy. *Buildings*, *14*(2). https://doi.org/10.3390/buildings14020485
39. Vinod Kumar, T. M. (2022). Smarter Master Planning. In *Advances in 21st Century Human Settlements*. https://doi.org/10.1007/978-981-19-2386-9_1
40. Wani, A., & Ahmad, S. (2013). Challenges, Issues of Solid Waste Management in Himalayas: A Case Study of Srinagar City. *African Journal of Basic & Applied Sciences*, *5*(1).
41. Wani, A. B., Singla, S., & Sachar, A. (2020). A case study of integrated land use planning for sustainable infrastructure. *International Journal of Scientific and Technology Research*, *9*(2).
42. Zaman, M. U., Pandit, Dr. B. A., kumar, Dr. R., & Khan, S. (2022). Challenges, Issues and Opportunities towards Management of Solid wastes in Indian Cities: A Case Study of Srinagar City. *International Journal for Research in Applied Science and Engineering Technology*, *10*(12). https://doi.org/10.22214/ijraset.2022.48196
43. Zhu, H., Shen, L., & Ren, Y. (2022). How can smart city shape a happier life? The mechanism for developing a Happiness Driven Smart City. *Sustainable Cities and Society*, *80*. https://doi.org/10.1016/j.scs.2022.103791
44. Ziosi, M., Hewitt, B., Juneja, P., Taddeo, M., & Floridi, L. (2024). Smart cities: reviewing the debate about their ethical implications. *AI and Society*, *39*(3). https://doi.org/10.1007/s00146-022-01558-0