

Research Article

Digital Transformation and Sustainable Urban Management: Challenges and Opportunities for Smart Cities

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<https://doi.org/10.59652/g5kb4z35>

Abstract: Digital transformation and sustainable urban management focus on the challenges and opportunities for developing Smart Cities. Digital technologies in urban areas are transforming into Smart Cities that use digital practices to provide exclusive facilities to citizens. The paper aims to develop the planning of sustainable practices for Smart Cities, where Smart Cities ensure accessibility of resources for all dwellers, and community participation in these cities fosters the decision-making process. Digital implementation in these cities is beneficial for effective traffic and waste management and for combating climate change by using renewable energy. Smart Cities largely focus on public-private partnership (PPP) projects to develop the exclusive plan discussed in this study. The use of e-government enables cities to provide citizens with effective services quickly. On the other hand, challenges such as social inequality and data privacy issues have been discussed. There is a theoretical journey to reach the conclusion. The literature review has been a great help in drawing the findings and recommendations. The paper, therefore, finds that potential efforts can help develop smart city services and address all challenges, and also recommends these as best practices during the digital journey toward sustainable growth.

Keywords: digitalization; urbanization; waste management; renewable energy; disaster management; sustainable transportation; public-private partnerships (PPP)

1. Introduction

The digital revolution, the utilisation of technologies, plays a remarkable role in planning and developing the design to ensure a high-quality life for the citizens. It is beneficial for solving challenges such as increasing demand for smart transportation and energy. The urban areas transformed by digital technologies and the Internet of Things (IoT) play a significant role in creating an effective and sustainable environment that can tackle the needs of its inhabitants. Digital technologies also facilitate access to healthcare and education services, and, from this perspective, rapid changes in digital technologies can be said to lead to the development of Smart Cities (Elvas et al., 2021). This digital innovation and competitiveness offer effective solutions in areas such as improving waste management, using renewable energy, sustainable construction, and many other aspects that are beneficial for shaping society in a better way.

This trend of digital transformation is largely driven by the increasing demand and complexity, while also providing exclusive opportunities to enhance the city management system in urban society. The modern trend among municipalities is to advance their efforts to develop Smart Cities. This trend has brought a leading approach to policy innovation and global investments in implementing technologies and utilising data to ensure urban growth by mitigating social issues (Anthony Jnr, 2021). Digitalisation helps Smart Cities collect data, enabling informed decisions for effective urban development planning. It indicates that Smart Cities are innovative cities that utilise information and communication technologies (ICT) to improve the efficiency of urban operations and services, enhance quality of life and competitiveness, and ensure the fulfilment of the next generation's needs in economic, social, and environmental terms.

The awakening of the field in urban research to the crucial role of ICT in enhancing production in urban spaces has been evident since the end of the 1990s. The interdependencies between social aspects and digital transformation include shifts in power

Received: August 5, 2026
Accepted: September 23, 2026
Published: September 29, 2026



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relations that are favourable to capitalist exploitation (Strüver & Bauriedl, 2020). It indicates that the role of economic interests is increasing significantly in the expansion of digital infrastructure in cities. This expansion of Smart Cities encompasses monitoring, surveillance, and public-private partnerships conducted by ICT companies on these platforms. In addition, digitalisation has become a core component of concurrent changes in the urban government's policy. Many governments in several cities on the northern side of the globe have largely supported the finalised development of urban areas and, in this context, follow corporate management policies. It indicates that perceptions and production of the urban city have brought significant changes in access to digital infrastructure and digital technologies.

Smart Cities are largely focused on ensuring access to their resources and effective services. The digital platforms utilised by Smart Cities facilitate real-time updates to information on healthcare resources, transportation schedules, educational opportunities, and civic engagement initiatives. Citizens living in Smart Cities are beneficiaries of these potential opportunities, and, as a result, Smart Cities build a more engaged and informed citizenry. Community engagement is an important insight into Smart Cities that helps to balance the traditional approach and the innovation activities. It indicates that, through community engagement, the governments of Smart Cities become responsive to evolving situations by implementing changes that serve the public interest. Increasing income inequalities in urban areas are a core form of social inequality in Smart Cities, and these cities are characterised by lower levels of income inequality (Caragliu & Del Bo, 2022). However, the planning of Smart Cities has a constant focus on mitigating increasing inequality in this society.

Smart Cities are largely focused on maintaining sustainability so that the residents can access more facilities. In light of this, cities are developing strategies for environmental sustainability to mitigate the impacts of climate change and natural disasters, which are leading phenomena in today's world. In addition, Smart Cities are primarily focused on implementing effective practices for sustainable transportation and mobility. Regarding this, Smart Cities promote shared transportation services that mitigate carbon emissions and reduce traffic problems. Smart Cities promote awareness of urban farming that positively impacts soil and climate protection and improves water management for human welfare and environmental sustainability (Ahad et al. 2020). The programmes on decomposition and waste management develop facilities to improve solid waste management in landfills, including recycling of glass, plastics and biomass.

Governmental policies are the primary effective factor in the development of cities, providing sustainable benefits to their residents. Policymakers in smart city governance implement an appropriate framework for managing Smart Cities (Nesti, 2020). Regarding this aspect, the governance of these cities initiates the introduction of the public-private (Liu et al., 2021). Coordination and collaboration between government and private agencies support policymakers in implementing effective practices in Smart Cities. The role of the Government is to provide city services and policy reforms that help boost the functioning of the economy in a smart city (Kutty et al., 2020). It indicates that Smart Cities intend to improve their services across sectors such as education, transportation, waste management, and health care by overcoming the challenges of urban development.

The objectives of this study are to identify the limitations and advantages of Smart Cities in facilitating the transition from traditional urbanisation to digitalisation, examine how accessible digital technologies and resources contribute to improving the quality of urban life, and recommend effective strategies for implementing digital practices to support the further development and sustainability of Smart Cities.

The technological revolution has led to the introduction of the concept of Smart Cities, which utilise digital tools to manage resources and offer better services to their residents. This study is largely relevant based on the perspective of the modern era of digitalisation. The study contains significant information on Smart Cities and their features, based on collected sources. This study outlines the potential opportunities and challenges that can be utilised for future discussion. This researcher might identify key insights from this research and, based on them, develop their discussion. It can be beneficial to focus on key insights that will be relevant in the future.

The study discusses an integrated resilience approach interconnected with critical infrastructure to improve disaster management in Smart Cities, and evaluates AI and the

effects of systematic AI adoption in cities and societies. To access the guidance of decision-making approach for developing technological implementation it has been tried to identify the role of developing technological initiatives and analyse the role of the public private partnership (PPP) in terms of developing the Smart City the discussion has been developed with the potential methods for improving PPPs in the Smart City development and to synthesize the trend of PPPs, acquire new and potential knowledge on the PPP based on critical analysis. It also guides the Smart City practitioners in practical implementation and elaborates on the policy implementation of the Smart Government for the Smart City.

2. Materials and Methods

The selection of an appropriate research methodology was essential to achieving the study objectives. Qualitative analysis of the collected information facilitated the identification of themes related to the research objectives (Mezmir, 2020). Accordingly, the interpretivist research philosophy provided a framework for examining the challenges and opportunities associated with smart city development. The inductive approach was adopted to analyse existing information and identify patterns supporting broader conclusions (Locsin & Schoenhofer, 2024). In this study, the inductive approach was used to examine different aspects of urban development, from the historical evolution of urbanisation to the growing role of digital technologies and the Internet. Particular attention was given to identifying the challenges faced by Smart Cities and the opportunities created by technological advancement (Khan et al., 2020).

The study adopted a descriptive research design to examine different aspects of smart city development worldwide. It aimed to identify major trends and patterns by examining examples of Smart Cities and analysing the challenges urban authorities face in maintaining sustainability. Secondary data were collected from academic publications and online databases containing information on sustainable urban development, digital transformation, and smart city management. These sources provided evidence for examining the role of digital technologies in improving urban planning, quality of life, transportation, waste management, and environmental sustainability.

The methodological approach was informed by previous research addressing technological, social, and environmental dimensions of smart city development. Anthony Jnr (2021) examined the management of digital transformation through enterprise architecture, emphasising the importance of integrating technological systems with urban governance and organisational processes. Similarly, Kutty et al. (2020) investigated the relationship between Smart City initiatives and the Sustainable Development Goals, demonstrating the importance of aligning technological innovation with environmental and socioeconomic priorities. These studies provided a theoretical basis for examining smart city development as a multidimensional process rather than a purely technological transformation.

Further consideration was given to studies addressing specific challenges of digital urbanisation. Ismagilova et al. (2022) analysed security, privacy, and technological risks in Smart Cities, highlighting the importance of effective data protection and risk management frameworks. Meanwhile, Caragliu and Del Bo (2022) examined the relationship between Smart Cities and urban inequality, highlighting the social implications of technological development. The findings of these studies informed the selection of major analytical dimensions, particularly technological accessibility, cybersecurity, governance, and social sustainability.

A semi-systematic literature review was used to examine relevant research concerning smart city development. The collected information was analysed to identify recurring themes, technological opportunities, and major challenges associated with digital transformation. The analysis focused on regulatory frameworks, technological infrastructure, data privacy, financial investment, and sustainable urban management. Particular attention was paid to the relationship between technological advancement and urban authorities' ability to provide accessible, efficient, and environmentally responsible services.

The analysis also incorporated published statistical data to illustrate global developments in smart city technologies and sustainable urban management. Statistical data on smart city revenues, digital transformation expenditures, technological investments, and transportation development were analysed to identify economic and technological trends. In addition, data

on electronic waste generation and renewable energy consumption were considered to assess environmental challenges and opportunities associated with digitalisation. These indicators complemented the qualitative analysis and provided a broader perspective on the economic and environmental dimensions of smart city development.

The synthesis of the reviewed literature and statistical evidence provided the basis for identifying the principal opportunities and challenges, which are discussed further. The analysis highlighted the potential of digital technologies to improve urban planning, public service delivery, resource management, and environmental sustainability. At the same time, it identified significant barriers associated with regulatory constraints, cybersecurity risks, infrastructural limitations, financial requirements, and unequal access to digital services. These findings informed the development of recommendations concerning effective governance, technological integration, data protection, green investment, and sustainable urban development.

The study has several methodological limitations stemming from its reliance on secondary data from academic journals, research articles, statistical reports, and other published sources. Although these sources provide valuable insights into smart city development, the research's broad scope may limit detailed examination of specific technological, social, and environmental challenges. Furthermore, differences in geographical contexts, technological infrastructure, and governance may influence the applicability of the findings. Further empirical research could provide additional insights and strengthen the evidence supporting the proposed strategies for sustainable smart city development.

3. Results and Discussion

5.1. Digital Transformation of Urban Planning and Its Impact on Quality of Life

The collective decision is a crucial aspect that boosts interaction and communication among citizens during the decision-making process, thereby enhancing the quality of life in Smart Cities (Aguilar et al. 2021; Clarke et al., 2020). It increases citizen engagement and enables them to gain knowledge of e-participation in smart city decision-making. In the modern era, e-participation has become widely popular, as it enables citizens to participate in decision-making about their needs and services. Increasing e-participation among residents of Smart Cities is associated with the provision of high-quality urban services across multiple service areas (Allen et al. 2020). Given this, the dataset used for urban planning is generated by the mobile application.

Figure 1 illustrates worldwide revenue in the smart city market, highlighting the growing economic significance of digital transformation in urban development (UN-Habitat, 2024). The expansion of this market reflects increasing investment in smart infrastructure, information and communication technologies, and innovative urban management solutions. This trend demonstrates the growing demand for technology-driven services to improve resource allocation, strengthen urban governance, and enhance quality of life. Furthermore, the economic potential of Smart Cities creates opportunities for public-private partnerships and encourages further investment in sustainable urban development.

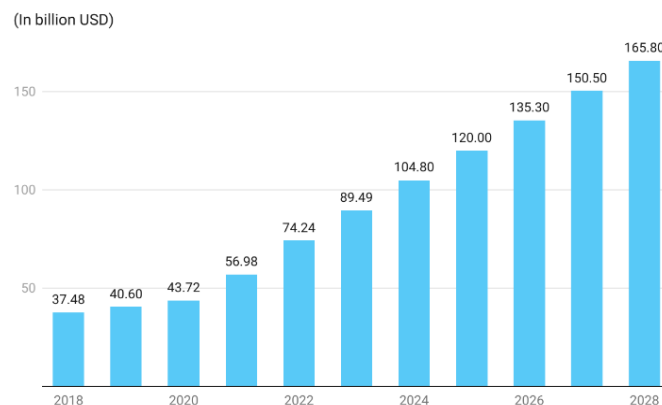


Figure 1. Worldwide revenue of Smart Cities.

Source: UN-Habitat, 2024.

The technology-based practices of governance are innovative and encompass a wide range of technologies, services, processes and potential social standards for sustaining the city governance. This governance practice strengthens IT collaboration and utilises technologies, creative strategies, and relevant business models to boost a smart city's economy.

The lives of people across the world have been shifting from rural to urban societies, and this has led cities to transform into Smart Cities (Bhattacharya et al., 2020; Mishra & Chakraborty, 2019). AI and sensor networking are largely impactful in generating customised services for the residents of Smart Cities in eco-friendly environments. Smart Cities have smart features in their education, transportation, government, health care, energy, office, business and eco-friendly environment (Mishra & Chakraborty, 2019). All these facilities are directly involved in improving the quality of life for citizens. In this context, the mission of Smart Cities is to hold a central position in urban development projects and attract investment from other countries. It is evident that the smart city market is developing. Total revenue in Smart Cities was \$116.36 billion in 2020 and increased to \$129.01 billion in 2021 (Slotta, 2025). It indicates that the market share of global Smart Cities has increased and has a promising future (figure 2). This upward trend highlights the growing adoption of digital technologies and rising investment in smart urban infrastructure, indicating considerable potential for future market growth.

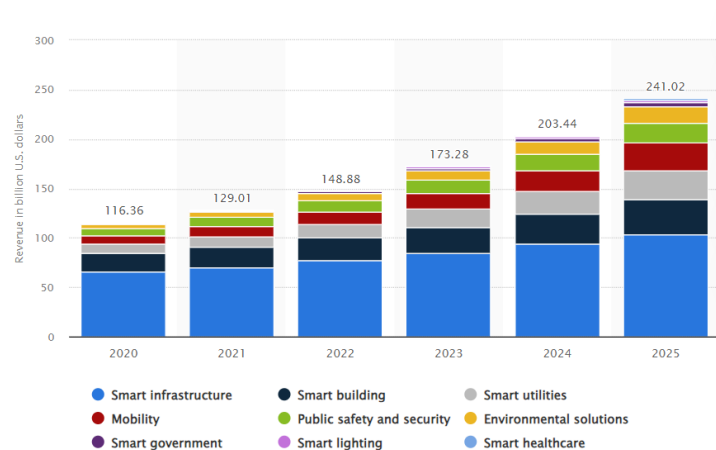


Figure 2. Revenue of the global smart city market.
Source: Slotta, 2025.

The core contribution of technological advancements such as blockchain, big data analysis, mobile computing, and cybersecurity integration is to a robust era, as it enables the effective implementation of every technological procedure (Javed et al., 2022). It is evident that the proliferation of IoT devices improves human-computer interaction and provides scope for the open integration of new technological methods into everyday life.

5.2. Challenges of Policy and Regulatory Factors

Smart Cities play an active role in introducing a range of smart services to facilitate their citizens. The establishment of a Smart City relies on navigating a difficult regulatory environment and implementing the strength of policy. The emerging concept of Smart Cities poses potential barriers to city administrators in planning, managing, and governing the modern city from the perspective of the digital era (Allahar, 2020; Khan et al., 2020). It indicates that these cities used to face challenges in implementing policies on cybersecurity, data privacy, and technology deployment, while innovation initiatives can be undertaken by this society. A lack of initiative to strengthen cybersecurity adversely affects the government's data privacy management and that of citizens. The technological landscape has evolved day by day, indicating that the government must take the initiative to address cybersecurity issues. Without modifying policies, it is difficult for the government to take appropriate action regarding cyber threats that pose a leading risk to Smart Cities.

Figure 3 illustrates the growing research attention devoted to security, privacy, and associated risks in Smart Cities. This research focus highlights the increasing importance of

cybersecurity, personal data protection, and effective regulatory frameworks in ensuring the safe and sustainable development of digitally connected urban environments.

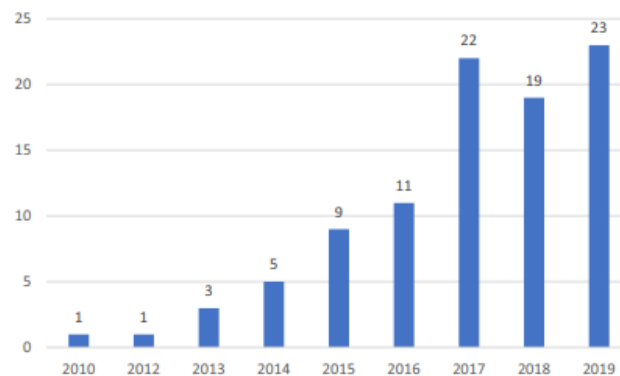


Figure 3. Publication on the risks, privacy, and security in Smart Cities.

Source: Ismagilova et al. 2022.

It indicates that Smart Cities need to improve their strategies to address income inequality. In addition, creating job opportunities can be part of the action plan for Smart Cities. A wide range of activities that facilitate citizens are associated with the implementation of Smart Cities, but citizens cannot access these facilities due to Income inequality.

5.3. Technological Integration and Infrastructural Problems of Smart Cities

While posing a significant challenge, technological advancement also holds immense potential to shape digitalised cities. The conflict between the pre-existing infrastructures of urban civilisation can be overcome by upgrading structural formations to embrace technological innovation. Rather than being a hurdle, this challenge is a stepping stone towards a digitalised society with robust IoT services, data-providing centres, and high-speed internet facilities. The innovation potential is vast and promising, characterised as creative destruction that creates a competitive advantage over other developed cities through the development of its inner structure (Saeedikiya et al., 2024).

Figure 4 shows global spending on digital transformation technologies and services, highlighting the increasing financial commitment to technological advancement. This trend reflects the growing importance of digital infrastructure, automation, and data-driven solutions in modern urban development, while emphasising the need for sustained investment in smart city initiatives.

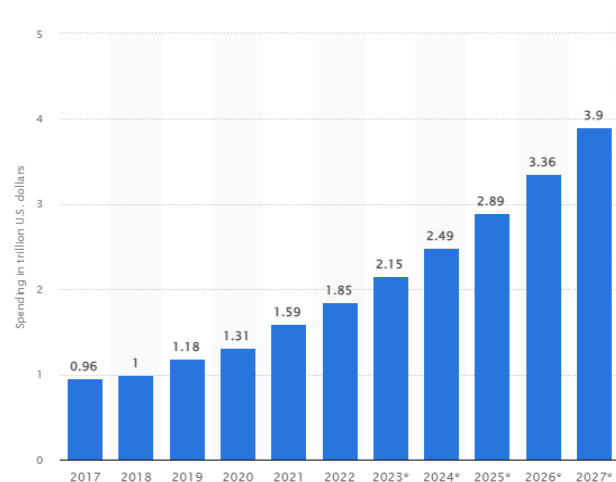


Figure 4. Spending amount for the digital transformation of society.

Source: Vailshery, 2025.

This transformation requires significant investment and creates logistical challenges, especially for underdeveloped cities, to acquire technological growth (Khan et al., 2020; Shee

et al., 2021). Digital transformation has opened up several areas for creating more accessible Smart Cities, including automation, big data analysis, and digital interfaces, maintaining the connectivity (Elg et al., 2021). Various infrastructural problems exist in both underdeveloped and developed cities, including the need for technological adaptation to transform urbanised society into a digitalised one. Limited economic resources and internal conflict among the countries hinder the development of technologies in the structure.

5.4. Data Privacy and Security Issues for Smart Cities

The success of the digitalised society and technological adaptation depends on users' trust, the authenticity of the services, and security and privacy concerns related to technological adaptation (Chentouf et al., 2025). Additionally, the implementation of blockchain technologies for data maintenance is subject to scrutiny by advisory bodies due to issues with the design, implementation, and testing of these devices (Majeed et al., 2021). Despite various security and privacy challenges, blockchain technologies are used to create secure data.

Considering this, figure 5 highlights concerns regarding digital privacy and information security, emphasising the growing challenges associated with personal data protection (Prince et al., 2024). These concerns demonstrate the importance of implementing effective cybersecurity measures, strengthening data protection policies, and building public trust in smart city technologies.

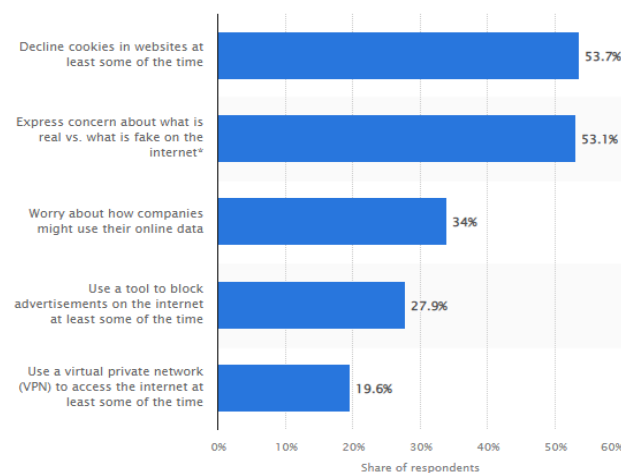


Figure 5. Increasing rate of the privacy interlocking of digitalised systems.

Source: Prince et al., 2024.

Due to the advancement of digitalisation, people have become more concerned about information security issues. Studies show that 53.1% of people are concerned about distinguishing real from fake information, and only 53.7% know about the private data held by different types of organisations (Prince et al., 2024). Developing technologies for creating advertisements has drawn more attention from hackers seeking to cover information.

5.5. Funding and Investment Arrangements

Sustainability in managing a digitalised society requires potential financial support and investment. Meeting both private and public requirements is the greatest challenge for advisory bodies when allocating funds to build Smart City infrastructure. Figure 6 presents the distribution of investments in smart city technologies across different sectors (Kumar et al., 2025). It highlights the importance of financial resources in supporting technological innovation, infrastructure development, and the implementation of digital solutions, emphasising the role of strategic investment in sustainable urban transformation.

Despite the rising investment rate, investors and fund providers are concerned about the development and are becoming less interested in investing. Smart City encompasses the combined processes of deploying and disseminating digital technologies, ensuring information security, and implementing improved measurements to improve people's livelihoods (Strielkowski et al., 2020). On the management scale, implementation barriers across different project types within the leading economic concentration play an important

role in sustaining smart city formation.

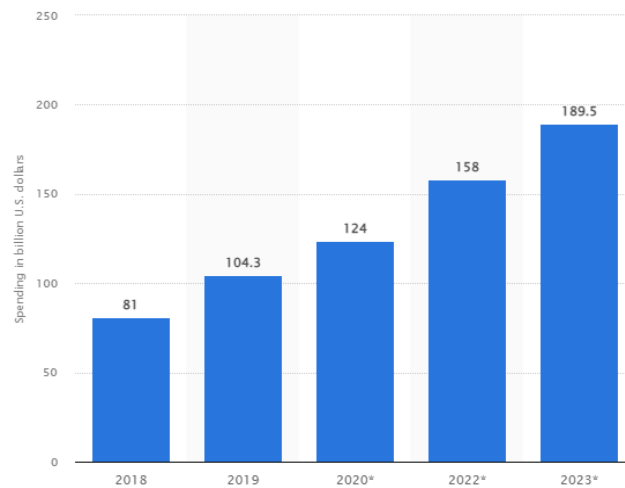


Figure 6. Investment in the technological development of Smart Cities.
Source: Kumar et al., 2025.

5.6. Sustainable Urban Management and Smart Mobility

Smart Cities need to implement technologies that support social sustainability in urban environments. The core factor of social sustainability in the modern era is the community's responsive engagement, which generates feedback on environmental monitoring (Anthony Jr., 2023). Community engagement plays a significant role in transforming Smart Cities, serving as a medium for interacting and collaborating with various stakeholders in society. This technological implementation facilitates enhanced efficiency in service delivery, such as transportation, waste management, and energy provision, by Smart Cities. It also helps Smart Cities save public money and boost their economies. The availability of these technologies largely facilitates Smart Cities in boosting public participation in urban planning decision-making (Levenda et al., 2020). From this perspective, ICT plays a crucial role, as it enables the government of Smart Cities to carry out work in collaboration with the community.

The IoT-based data-collection process is an effective way to generate traffic information in Smart Cities. It is beneficial for collecting real-time traffic information using the algorithm. This algorithm can detect demand for the resource and reroute to promote the deployment of emergency vehicle services.

Figure 7 presents the projected growth of the global smart transportation market from 2023 to 2028. This trend highlights the growing demand for intelligent mobility solutions, including digital traffic management and connected transportation systems, emphasising their potential to reduce congestion, improve urban mobility, and promote environmental sustainability.

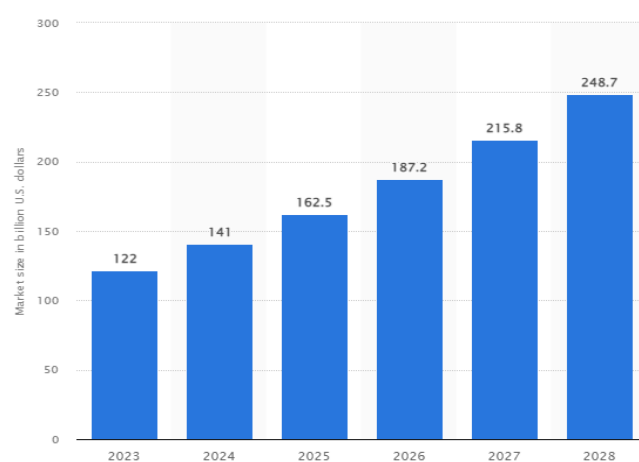


Figure 7. Global smart transportation market from 2023 to 2028.

Source: Slotta, 2025.

Mobility is an essential part of the Smart Cities agenda and is supported by the effective adoption of sustainable transportation practices. Sustainable mobility encompasses smart mobility with a clear objective, such as mitigating traffic jams and reducing pollution. Improve public safety (Angarita-Lozano et al., 2025). The four perspectives, such as system, infrastructure, design and use, are included in Sustainable mobility. Mobility in Smart Cities helps implement projects that address community needs and align with sustainability trends.

5.7. Waste Management Strategies for Smart Cities

This solution can increase the use of garbage bins and reduce manpower effort in municipal management (Ali et al. 2020). IoT-based devices monitor and control electric bins and are connected to the main hub.

While IoT-based technologies improve the efficiency of municipal waste management, the rapid expansion of digital infrastructure also contributes to increasing electronic waste generation. As illustrated in figure 8, global e-waste volumes are projected to rise considerably between 2022 and 2030. This trend highlights the need to integrate effective recycling systems and environmentally responsible disposal practices into smart city waste management strategies.

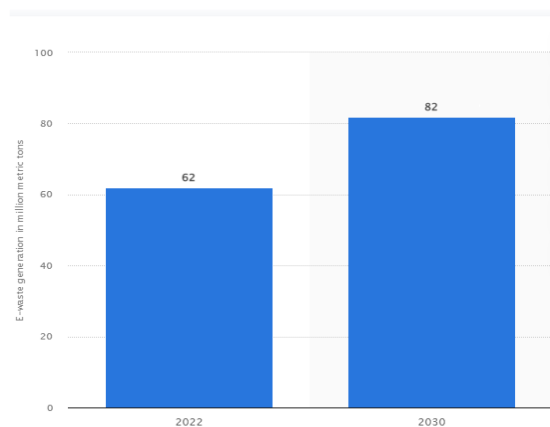


Figure 8. E-waste generation worldwide: comparison between 2022 and 2030.

Source: Quinto et al., 2025.

The latest technologies are used in smart projects to meet community expectations in Smart Cities by managing resources (Liu et al., 2021). The key advantage of these cities is that they address climate change, optimise energy resources, and improve environmental quality. The source of energy consumption is street lights, which are a crucial aspect of daily life. The traditional street lighting system relies on human operation and wastes potential energy. This lighting system needs a huge installation cost. The energy-efficient process is deployed in Smart Cities to control streetlights, and the innovative system is automatically switched on or off via an intelligent on/off mode (Aleran et al., 2025). Energy costs have been reduced in Smart Cities through the implementation of these systems. IoT-based sensors are a core solution for improving energy efficiency. It indicates that sustainable energy infrastructure can be implemented through IoT-based cities. A potential solution to increase energy efficiency in the smart city is to equip electronic appliances with IoT sensors.

In addition to improving energy efficiency through IoT-based technologies, Smart Cities increasingly emphasise the adoption of renewable energy sources. Figure 9 illustrates global renewable energy consumption from 2000 to 2022, highlighting its overall upward trend (Hoa et al., 2023). This growth underscores the increasing importance of clean energy in reducing environmental impacts and supporting sustainable urban development.

The implementation of smart projects can be affected by localness, as the local environment of Smart Cities is largely shaped by PPP projects (Quan & Solheim, 2023; Liu et al., 2020). The local firms are also active in adopting the technology to meet local needs in a particular area. Stakeholder complexity is a core aspect of PPP projects, as diverse groups are involved with smart city projects. The methods of implementing PPP rely on effective

interaction among the potential components within an ecosystem.

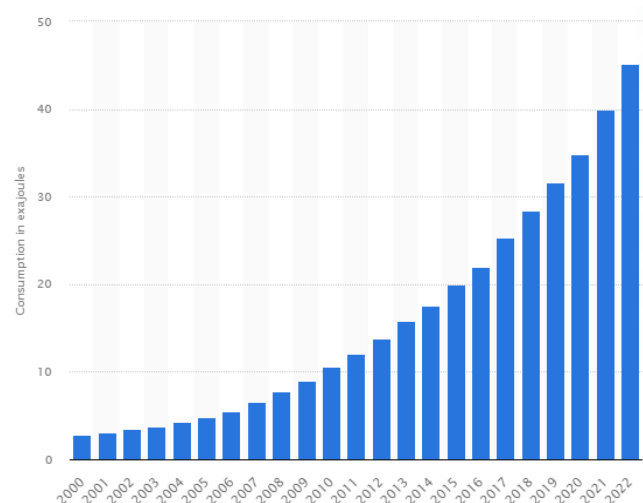


Figure 9. Consumption of renewable energy from 2000 to 2022.

Source: Hoa et al., 2023.

The implementation of smart projects can be influenced by local factors, as the local environment of Smart Cities is largely shaped by PPP projects (Quan & Solheim, 2023; Liu et al., 2020). The local firms are also active in adopting the technology to meet local needs in their respective areas. Stakeholder complexity is a core aspect of PPP projects, as diverse groups are involved with smart city projects. The methods of implementing PPP rely on effective interaction among the potential components within an ecosystem.

To ensure the sustainable development of Smart Cities, governments should adopt comprehensive strategies that integrate effective governance, technological innovation, financial investment, and environmental responsibility. Particular attention should be paid to strengthening transparency and public participation through open data initiatives and accessible digital platforms. Such measures can improve urban planning, facilitate evidence-based decision-making, and encourage greater community engagement in municipal governance (Neves et al., 2020). At the same time, the successful implementation of smart city initiatives requires advanced technological planning and the establishment of standardised digital infrastructure. The integration of intelligent sensors, analytical tools, and innovative monitoring systems can enhance the efficiency, reliability, and interoperability of urban services (Lai et al., 2020).

Financial sustainability represents another essential consideration in the digital transformation of urban environments. In this regard, promoting green finance and financial technologies can stimulate investment in environmentally responsible infrastructure and support the transition towards more sustainable urban economies (He et al., 2020). However, technological advancement must be accompanied by effective data privacy and cybersecurity measures to protect sensitive information and strengthen public trust in digital services. Secure communication networks, including virtual private networks, can help protect data transmission within smart city systems. Furthermore, urban development strategies should maintain a balance between technological innovation and environmental sustainability. Supporting environmentally responsible industries, particularly those based on biochemical technologies, can contribute to resource efficiency and the preservation of ecological systems (Ögmundarson et al., 2020). Collectively, these measures can provide a foundation for developing resilient, inclusive, and environmentally sustainable Smart Cities that can respond effectively to emerging urban challenges.

4. Conclusions

Technological advancement and rapid urbanisation have given rise to the concept of a smart city, which focuses on sustainable development. Smart Cities aim to become technologically advanced and to provide a safe, efficient, and conducive environment that supports a high quality of life for their citizens. It indicates that Smart Cities provide an

enhanced quality of life for their citizens through technological implementation. The IoT plays an essential role in transforming urban areas into Smart Cities, helping overcome potential challenges through its capabilities. Digital networking and wireless devices are employed in Smart Cities to collect and analyse data and information.

The practical implementation to facilitate a decision-making system so that infrastructure can support disaster management in Smart Cities. It allows cities to prepare to recover from the disaster and implement effective disaster management strategies. It provides advantages for Smart Cities in increasing their resilience.

In the process of transforming Smart Cities, decision-making is influenced by both the public and private sectors. Despite their differences, the cities can adopt the same digital implementation. Technological initiatives address social needs and the inequality of the digital realm. A wide range of municipalities remain in the initial stage of digitalisation and can shape the cities based on the socio-ecological ecosystem.

Acknowledgements: I acknowledge the support and encouragement of all media friends and public officials for completing the research and writing this research article.

Conflicts of Interest: The authors declare no conflict of interest.

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