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Research article

# Smart governance for smart cities and nations

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ABSTRACT

There is an increasing emphasis on utilizing ICT to drive global governmental transformation to enhance efficiency and cost-effective service delivery. Smart governance represents a novel and data-driven progressive approach, prioritizing intelligence in operations, upholding an exceptional standard of public administration, and contributing to the development of smart cities and nations. A smart city uses advanced technology and innovation to augment urban life and efficiency to ensure sustainability and a smart nation extends these principles across regions. Although smart governance is a priority in building smart cities and nations, its challenges and strategies are still not well-defined from the perspective of developing a smart nation and city. Smart Bangladesh is an inclusive digital transformation initiative and a grand vision of the government, advancing towards becoming a developed, prosperous, and smart nation by focusing on four key pillars: smart citizens, smart government, smart economy, and smart society. This study involved interviews with multi-level stakeholders and served as a preliminary step toward providing insights into and understanding the significant challenges and priorities in transforming a smart country and building smart cities. The research identifies fourteen prime challenges of smart governance that are pivotal for transforming Bangladesh into a smart nation and creating smart cities. Among these, stakeholders particularly emphasize the need for administrative reform, robust smart infrastructure, finance, uninterrupted electricity, strong data privacy and security, and effective big data management as crucial to the success of the country's vision. The analysis proposes a conceptual framework based on stakeholders' priorities that can serve as a practical guideline for practitioners to develop a strategic roadmap for effective preparedness to transition to a smart nation and build smart cities. The study fills a research gap in governance theory concerning the evolution of transformative technology-based governance, particularly emphasizing the significance of smart governance in the development of smart nations and cities.

## 1. Introduction

In the field of public administration, scholars have long pursued the concept of a "good society," a term rooted in the intellectual heritage of notable figures from Machiavelli to Marx, characterized by industrialization, urbanization, and centralized planning, devoid of poverty, corruption, and significant wealth disparities (Frederickson et al., 2015). This vision is reflected in the

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contemporary concept of "smart governance," which seeks the pursuit of efficient governance and improved urban outcomes through technological innovation (Jiang, 2021). The use of cutting-edge technologies, innovation, the Internet of Things (IoT), and artificial intelligence (AI) is increasingly evident in the implementation of smart governance globally. Smart governance is employed to enhance administrative services and promote the development of smart cities and nations. Smart governance focuses on citizen-centric digital platforms, and innovative solutions prioritize resource distribution and social welfare, increase transparency, and strengthen public engagement and services (Liang, Liu and Wang, 2023; Van Dinh et al., 2020; Dameri, 2017; Bifulco et al., 2016). Moreover, this innovative governance system employs data-driven approaches to improve government processes and promote sustainable development (Jiang, 2021; Palumbo et al., 2023; Kaiser, 2023a; Bibri, 2021; Valle-Cruz et al. 2020). Integration of smart technologies in various public service domains hugely contributes to increasing efficiency, safety, security, and inclusivity in government services (Farmanbar et al., 2019; Kylili and Fokaides, 2015; Palumbo et al., 2023; Bibri, 2021; Ranchordás, 2020; Valle-Cruz et al. 2020; Liu et al., 2017). Progress in smart governance within smart cities and nations has shown promise in promoting sustainable development and improving societal outcomes in various domains. This advancement has also significantly improved public services and made significant contributions to national progress and environmental stewardship through multifaceted strategies.

A smart city represents a contemporary urban landscape where technologies are harnessed to improve public services, improve the living standards of residents, and promote sustainability. Toh (2022) and Bibri (2021) underscore that a smart city leverages information and communication technologies, alongside other innovative methods, to optimize urban operations, enhance the quality of life, and foster greater efficiency. By integrating these technologies, smart cities aim to create more sustainable, efficient, and livable urban spaces for their residents. The smart city concept encompasses six key dimensions: "smart living, smart mobility, smart environment, smart economy, smart governance, and smart people" (Albino et al., 2015). Among these components, smart governance plays a key role in implementing and operating the smart city project. Smart governance in the smart city domain contributes to benefiting citizens through the promotion of social cohesion (Ahvenniemi et al., 2017), improvement of quality of life (Ahad et al., 2020), and stimulation of urban economies (Rosenzweig et al. 2018). As a result, integrating digital technology into urban governance enhances city residents' quality of life while benefiting the economy, society, and the environment. Meanwhile, a smart nation extends these principles across regions to boost national growth and maximize the quality of life.

A smart nation has an interconnected infrastructure optimized through communication and data collection from various entities to build a nation where citizens benefit from smart technology, improving lifestyles and achieving sustainability, faster and smart governance services, personal comfort, and security (Bhati et al., 2017). The smart nation initiative encompasses not only particular areas or cities but also a comprehensive, nationwide effort focusing on smart infrastructure, governance, transportation, healthcare, and economic development. A key aspect of the initiative is the open sharing of government data with the public to foster collaborative solution development (Hoe, 2016). Like a smart city, a smart country seeks to maximize its utilization of technology and innovation to improve the well-being of its inhabitants and strengthen its competitiveness. Particularly, it concentrates on governance supported by robust cybersecurity measures and transformative technology. Therefore, this effort requires cooperation among the government, industry, and individuals, facilitated by sophisticated infrastructure, open data policies, and the development of novel skills and administrative capabilities (Ho, 2017; Hoe, 2016). Considering all the points, it can be inferred that the smart nation or country initiative embodies a comprehensive strategy encompassing smart infrastructure development, technological innovation, e-participation, and administrative reforms to foster a more interconnected, efficient, prosperous, resilient, and sustainable nation. However, the smart nation concept is still evolving, and Singapore is working to accomplish this colossal task. It is challenging for any country worldwide to attain smart nation status, especially when it is a large, developing economy with a huge population.

Bangladesh's vision to transform into "Smart Bangladesh," a smart nation, has made significant technological strides, particularly in smart governance and digital service accessibility, showcasing a strong commitment to technological advancement (A2I 2024). Notably, implementing a smart governance system has been a key step in attaining Smart Bangladesh's four pivotal pillars: smart citizen, smart government, smart economy, and smart society, and transforming its cities and villages into smart cities and smart villages (A2I 2024). Previously, the country has taken the "Digital Bangladesh," which emphasizes only technological adoption in government services and digitalization (Bhuiyan, 2011; Kaiser, 2023a). Smart governance for Smart Bangladesh, beyond technology adoption, involves optimal data use in decision-making, integration of government functions, and enhanced citizen empowerment through advanced technology. Despite these advancements, challenges in realizing the smart nation vision remain, specifically the lack of expert literature identifying core challenges and strategies for overcoming them. Addressing these challenges is vital for providing a roadmap for policymakers and enriching governance theory, contributing to the global discourse on smart governance, and ensuring an inclusive, sustainable transition for Smart Bangladesh. Therefore, this paper explores the potential of smart governance as an enabler for building a smart nation, examining the challenges and identifying policy implications for truly transforming into a smart nation and implementing smart cities and villages.

To address the knowledge gap in the literature on smart governance, particularly in the context of transforming a country into a smart nation and building smart cities, this study poses two fundamental research questions: What do multi-level stakeholders from the private sector, public sector, NGOs, and academia identify as the principal challenges of smart governance in a country's transition to a smart nation and the building of smart cities? What are the multi-sector stakeholders' priorities for overcoming these challenges? To address these questions, this research employs a qualitative methodology, focusing on detailed descriptions of participants' experiences, understandings, emotions, knowledge, and beliefs (Aspers and Corte, 2019; Lune and Berg, 2017). The study conducted semi-structured interviews with stakeholders from several sectors, including government officials, ICT experts, academics, and representatives of non-profit organizations. These interviews provide us insights into stakeholders' viewpoints on challenges and solutions for the transformation to a Smart Bangladesh. In addition to conducting these interviews, the study also extensively reviewed secondary sources such as journal articles, books, strategic plans, reports, and policy documents, as mentioned by Denney and

Tewksbury (2013) regarding secondary literature. The analysis aims to identify and articulate the challenges and explore differences in perceptions among different stakeholder groups. This study emphasizes the essential need to address varying priorities and potential conflicts that might arise when implementing smart governance strategies in a smart nation and city.

This research makes a unique contribution to the development of smart governance in building smart cities and nations. It fills a substantial gap in the current literature by providing a comprehensive analysis of the application and relevance of smart governance. The study leads to insightful findings and well-reasoned conclusions, including a strategic blueprint for establishing a smart city and nation. Emphasizing the integration of smart and transformative technologies into governance processes, this research underlines the importance of transparency, technological sophistication, citizen engagement, improving quality of life, and enhancing public services. By offering a technology-based citizen-centric model and strategies to enhance public involvement in governance, the study provides a template for other developing countries. It contributes significantly to scholarly discourse, underlining the indispensability of technology-enriched governance for a progressive, sustainable, and smart country.

This article has eight main sections. Following this introduction, the next section presents the theoretical framework, discussing smart governance and its components and model. Then, a brief overview of Smart Bangladesh and its four pillars. This is followed by a detailed explanation of the study's methodology, including data collection and analysis techniques. Subsequently, the article presents its findings, focusing on the challenges of implementing smart governance to become a smart country and build smart cities and comparing stakeholder challenges. After the findings, there is a comprehensive discussion section that delves deeper into the implications of these findings and the priorities of stakeholders regarding smart governance. The article concludes with a final section outlining the study's unique contribution, limitations, and suggestions for future research.

## 2. Theoretical frameworks and model

### *2.1. Smart governance and its components*

ICTs are essential to modern administration and serve as the backbone for the evolution of e-government and e-governance (Estevez and Janowski, 2013). The advanced technologies facilitate the transition from traditional government operations to more integrated, efficient, and participatory models, known as smart governance. A robust smart governance framework incorporates several components, such as artificial intelligence (AI), machine learning, data analytics, blockchain, and the Internet of Things (IoT) in its governance system. By utilizing these technologies, governments can process large volumes of data swiftly, thereby improving decision-making processes and delivering better citizen services. Jiang (2021) argues that smart governance can improve the efficiency and responsiveness of governments. By leveraging advanced technologies and data analytics, governments can promote the development of smart cities and nations that are better equipped to meet the needs of their populations in a transparent and efficient manner. These benefits can be significant and act as catalysts for growth. Fig. 1 delineates the fundamental elements constituting smart governance, emphasizing smart government and other components as a critical aspect. These components underscore the adoption of ICT for administrative efficacy (Kim et al., 2022), the importance of meeting citizen demands (MacLean and Titah, 2022), and the need for effective operational management to foster technology-empowered governance (Charalabidis and Koussouris, 2012). In addition, smart governance integrates different functionalities with ethical, legal, and normative standards, ensuring practices align with principles such as transparency, accountability, inclusivity, and public engagement (Tay et al., 2018). The integration of technology is critical for governments to establish a better connection with their citizens and promote democratic engagement. Scholl and AlAwadhi (2016) suggest the use of agile and perceptive approaches in policy-making to efficiently respond to technological advancements. These approaches involve utilizing ICTs to enhance effectiveness and create platforms that encourage citizen participation, data-driven decision-making, and democratic engagement.

Smart governance has numerous benefits, but it also has potential drawbacks. For instance, it is crucial to ensure the privacy and security of government data to protect individual privacy and prevent any infringements. Citizen participation is essential, but it is often limited due to the digital divide, which marginalizes certain demographics, and a general lack of interest in civic engagement (Pansera et al., 2022; Przeybilovicz et al., 2022). Furthermore, as we know, using technology effectively in smart governance is essential. This involves using digital tools to enable one-way and two-way communication, e-participation, policy support, data collection and management, and collaboration. However, an excessive reliance on complex technological projects can reduce understanding and participation, highlighting the importance of maintaining face-to-face interactions for effective collaboration between citizens and the government. Data security and privacy are of utmost importance in today's technologically advanced society. Decentralized e-government systems that use blockchain and artificial intelligence (AI) are recommended to improve privacy and maintain data integrity (Yang et al., 2019). Conversely, an excessive reliance on technology-driven solutions is often considered to hinder the provision of services to the broader public (Jiang, 2021). This presents challenges such as cyberattack security risks, the need for initial funding and ongoing maintenance, and dependence on foreign expertise and technology to operate governmental services (Popova and Popovs, 2023). To address these challenges, future endeavors should prioritize improving security protocols and incorporating AI capabilities, such as automated registration, to strengthen system security and privacy. Collaborative efforts in smart governance aim to establish partnerships and alliances that utilize shared expertise to promote innovation and enhance service delivery, resulting in a strong and flexible governance model. Therefore, participatory governance theories emphasize direct citizen inclusion in decision-making processes rather than relying predominantly on technological solutions. With the advancement of urbanization and the growing participation of citizens in governance, technology has become a crucial element in contemporary cities and nations. To achieve efficient smart governance, it is crucial to establish comprehensive frameworks and protocols that seamlessly incorporate technology, citizens, and governments while surpassing existing limitations. The subsequent subsection will present an elaborate overview of the smart governance model.

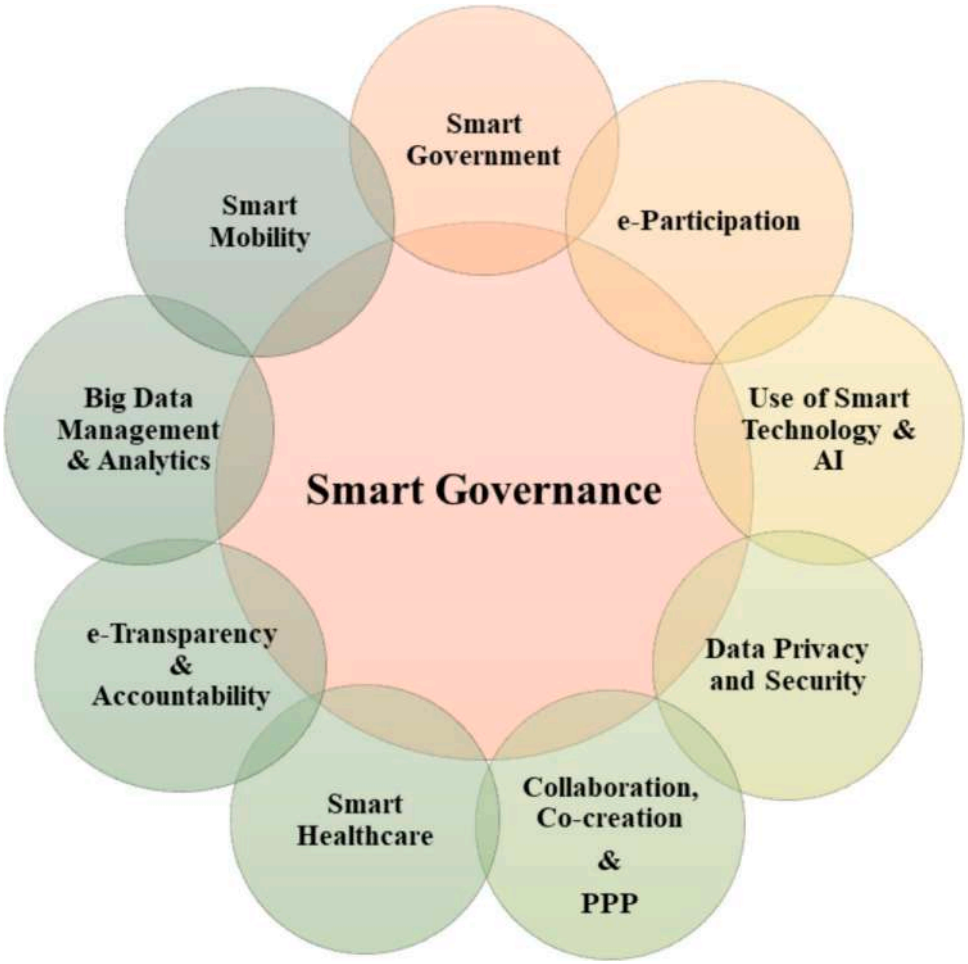


**Fig. 1.** Components of smart governance.

### *2.2. Smart governance model*

In this study, a smart governance model has been developed to evaluate the preparedness and challenges of smart governance (See Fig. 2). This model is based on the findings of Bolívar and Meijer (2016), Mergel et al. (2019), and Meijer and Bolívar (2016), and it utilizes a comprehensive framework that includes inputs, outputs, and outcomes. The model encompasses a range of tangible accomplishments, results, and impacts. "Inputs" refer to essential modifications and strategies for implementation, such as adjustments to policies, reforms in legislation, and the reallocation of resources. "Outputs" refer to tangible accomplishments, such as open data, use of ICT, innovation, collaboration, finance, and citizen engagement. "Outcomes" refers to the results or effects of these implementations, which can result in enhancements in services, procedures, relationships, and policies. This study will also investigate Bangladesh's progress in becoming a smart nation and building smart cities using this model.

## 3. Smart Bangladesh: building a developed, prosperous and smart nation

Under the auspices of the "Smart Bangladesh Vision 2041," the government of Bangladesh is spearheading a transformative agenda aimed at remolding the nation into a beacon of technological advancement by 2041. A "smart Bangladesh" is characterized by leveraging cutting-edge technologies, networks, and data to develop technological solutions that support and enhance national development. This ambitious initiative revolves around four pivotal pillars: smart citizens, smart government, smart economy, and smart society (See detailed in Fig. 3). According to Aspire to Innovate, Smart Bangladesh aims to become a high-income nation with a GDP per capita of over $12,500, achieving zero extreme poverty with less than 3 % overall poverty. It targets macroeconomic stability with 4–5 % inflation, budget deficits capped at 5 % of GDP, and boosts in investment and tax revenues to 40 % and 20 % of GDP, respectively. To leverage its demographic dividend, the country plans to ensure that 100 % of high school students achieve digital literacy and implement universal health financing. With 80 % urbanization and complete electrification, mostly from renewable sources, it also intends to offer 100 % paperless and cashless public services, accessible instantly in the preferred manner of all citizens (Chowdhury, 2023; A2I 2024). The Bangladesh government has undertaken several projects to advance the vision of Smart Bangladesh and its four pillars. Below are the core matters, strategies, projects, and outcomes for each pillar.

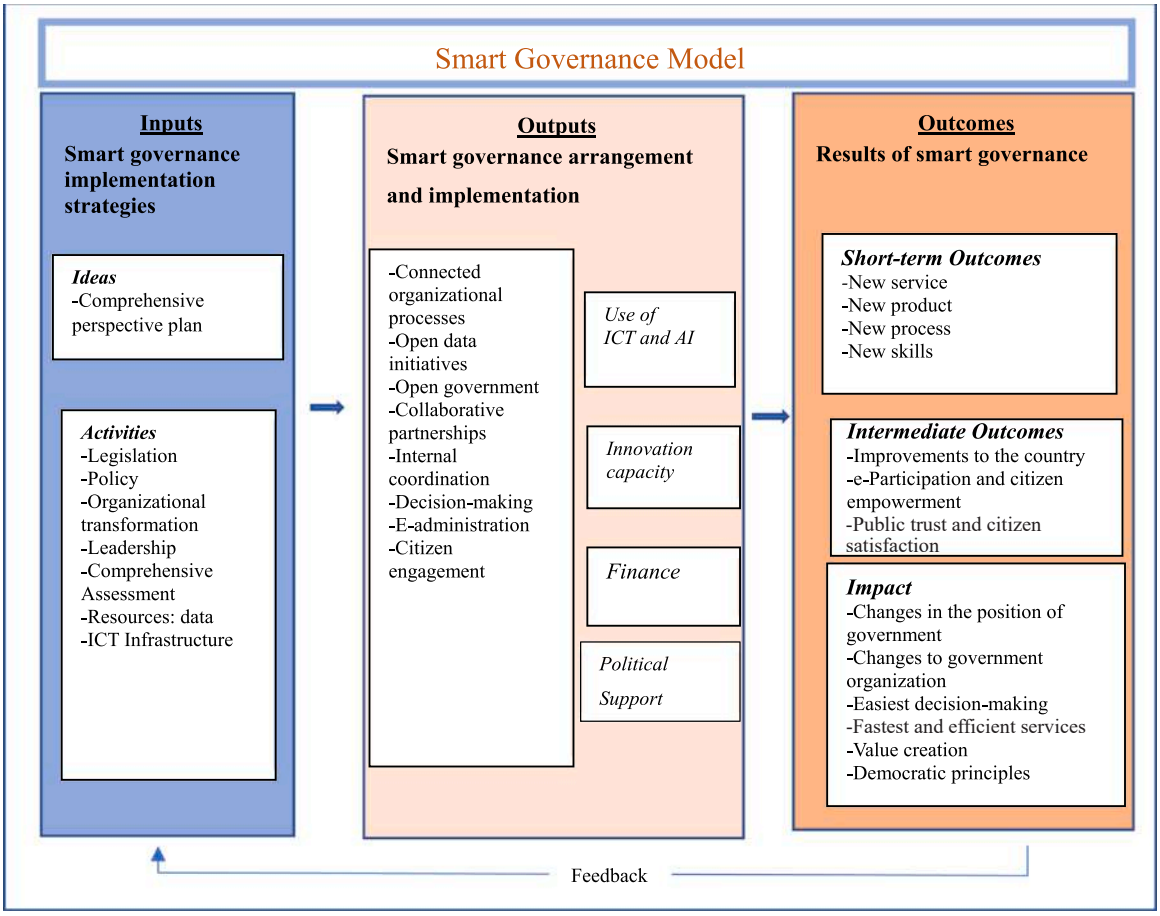


**Fig. 2.** Smart governance model.

### 3.1. Smart citizens

The "Smart Citizens" entails nurturing individuals who are equipped with digital literacy, quality education, entrepreneurship skills, and a smart apps-based lifestyle, all of which improve quality of life. The government of Bangladesh envisions its smart citizens leveraging technological advancements to solve local issues and actively participate in civic decision-making, improving their lives, communities, and nation (A2I 2024). Consequently, the country focuses on education, updating its curriculum to include technological knowledge and enhancing technical and vocational education and IT skill development programs for its smart citizens.

### 3.2. Smart government

"Smart Government" initiatives aim to augment services through technological integration within governmental domains. Bangladesh is advancing toward creating paperless offices, implementing smart grids, and enhancing data security, alongside introducing the Internet of Things (IoT) and artificial intelligence (AI) to improve transparency, efficiency, and effectiveness in service delivery. Moreover, smart government employs advanced information and communication technologies to enhance governance at all levels, offering a unified platform for multiple solutions (A2I 2024). These improvements can be realized through smart technology, collaboration, and strategic management, which optimize public service delivery and enable data-driven decision-making. The adoption of smart tools by government agencies in Bangladesh, such as e-passport distribution, various smart apps for public services, several hotline numbers for public services and emergencies, such as 999 for emergency helpline, digital land mutations, e-Nothi (a digital filing system), and the Integrated Budget and Accounting System (iBAS + +) for managing government salaries, have been significantly contributing to the progress toward achieving Smart Bangladesh.

### 3.3. Smart Economy

Developing a "Smart Economy" that underpins competitiveness and sustainability. Bangladesh has set a goal for Vision 2041 to create a smart economy that melds technological advancements with innovative entrepreneurial initiatives and sustainable practices

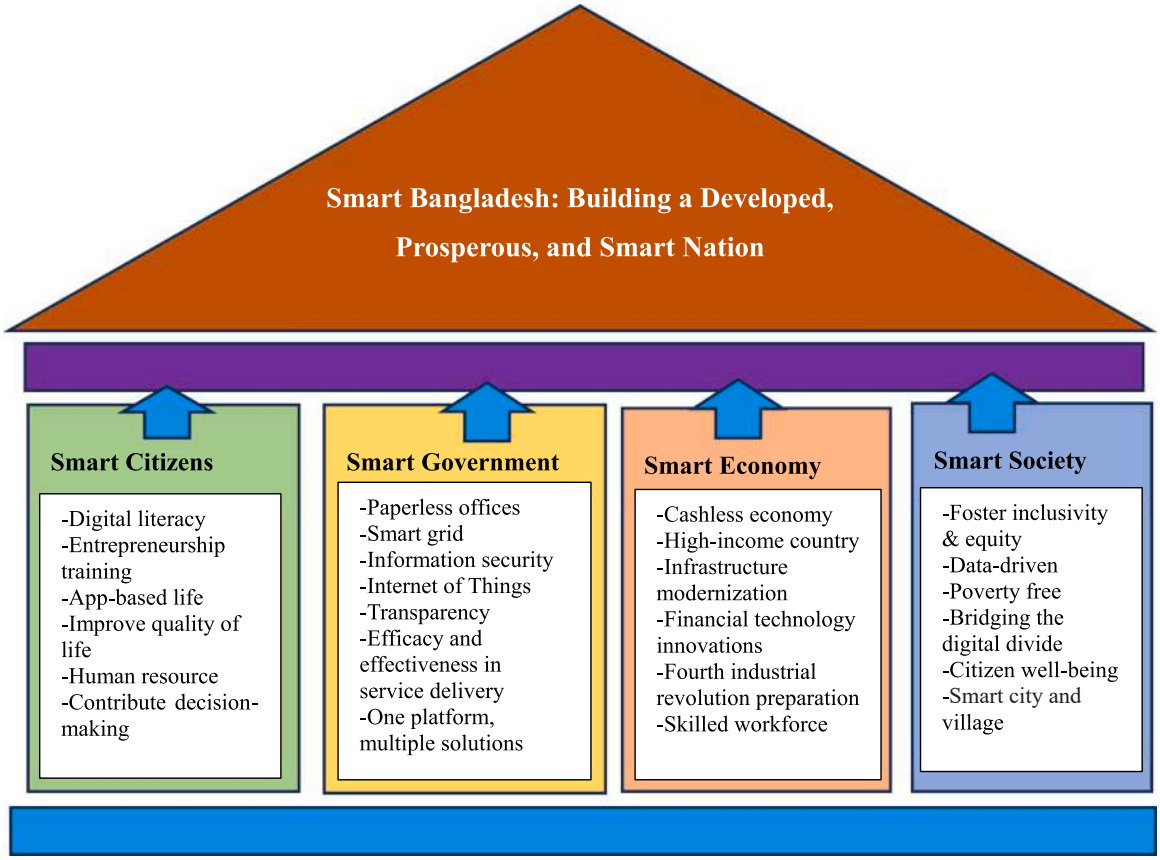


**Fig. 3.** Four main pillars of vision Smart Bangladesh.

to enhance social well-being, productivity, and competitiveness. Bangladesh is presently developing the Ninth Five-Year Plan with the primary focus on achieving Smart Bangladesh status, attaining the United Nations' Sustainable Development Goals (SDGs), and reaching high-income country status by 2041. The primary vision encompasses establishing a cashless economy, modernization of infrastructure, and advancements in financial technology. To achieve this economic objective, it is necessary to encourage innovation and adaptability in the job market, enhance the business environment, and support the community and economic stability through deliberate growth and the cultivation of a skilled workforce. Various mega projects such as the Padma Bridge 6.15 km (3.82 mi), Dhaka Metro Rail, double-lane rail across the country, and expansion of four and six-lane highways nationwide have been contributing significantly to achieving its economic vision.

### *3.4. Smart society*

The development of a "Smart Society" centers around tackling urgent social challenges, such as poverty and gender inequality, in accordance with SDG 1, which focuses on ending poverty, and SDG 5, which focuses on gender equality. Bangladesh government's *Ashrayan Project* has effectively rehabilitated 5,55,617 families without land or homes. Its objective is to promote inclusive development by providing shelter for every landless or homeless family. The smart society's vision is to utilize sophisticated digital technologies to merge data from various sectors and provide innovative resolutions to challenges such as urbanization, transportation, and public health, thus promoting inclusiveness and fairness. The objective of this data-centric approach is to establish a society devoid of poverty, narrow the gap in access to digital resources, and enhance the overall standard of living. The government has commenced initiatives to convert villages into smart villages and cities into smart cities, utilizing artificial intelligence and big data to dismantle barriers between sectors and improve overall societal well-being and quality of life.

Despite challenges such as constrained resources and a scarcity of skilled professionals, the initiative holds the potential for significant enhancements. The blueprint for success rests on a fourfold foundation: smart government, smart citizens, smart economy, and smart society. With a spotlight on digital literacy and ethical tech use, the vision for a smart society is to harness technology to improve living conditions. An ICT-driven smart economy is deemed essential for economic proliferation. Smart Bangladesh is on a quest to forge a developed, enlightened, and tech-savvy populace, thereby stimulating innovation and entrepreneurship for a flourishing and secure society. Particularly, the government requires involving multi-level stakeholders in their vision for earlier recognition of the challenges and overcoming strategies.

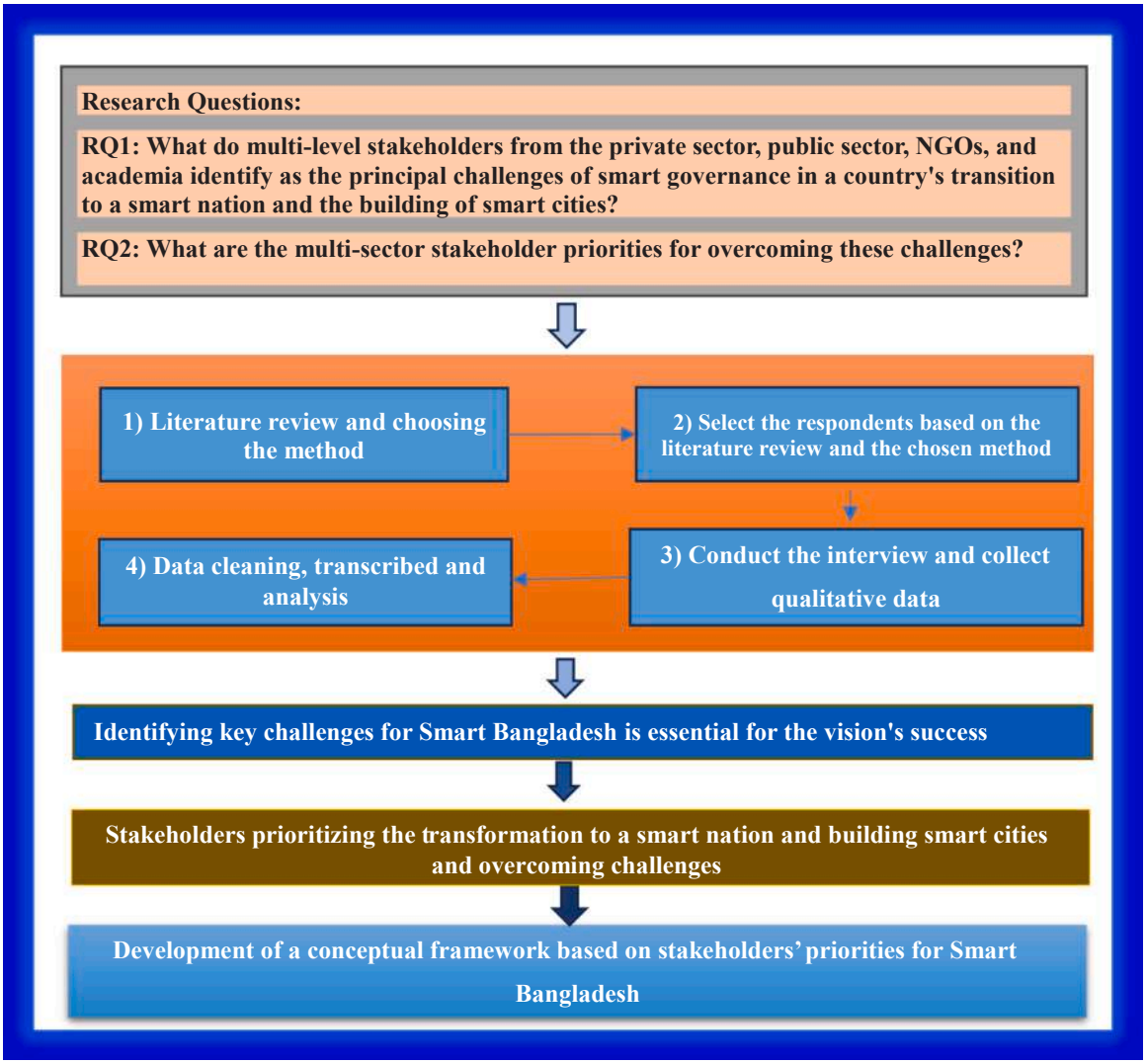


**Fig. 4.** Research process flow.

## 4. Method and materials

A qualitative approach employing an in-depth interview methodology is used to answer the selected research questions. The study employed a qualitative methodology because enabling the collection of rich and contextual data from research participants. This included thorough and detailed descriptions of their experiences, insights, emotions, and convictions (Aspers and Corte, 2019). Additionally, this approach facilitated the elucidation of implicit information, making it more explicit (Lune and Berg, 2017). The research process flow is provided in Fig. 4. To initiate the process, a thorough examination of existing literature is conducted to gather relevant information and insights on the chosen topic (Van Wee and Banister, 2023). This search helps to establish a foundation of knowledge and identify gaps in current research, informing subsequent steps in the study. The findings are then described as a conceptual framework for smart governance issues and their associated solutions. This qualitative research approach incorporates systematic interviews at an individual level with a limited number of respondents to determine their opinions on a given scenario. In-depth interviews are deemed worthwhile when full information on the ideas and views of the subject is necessary, or there is a wish to study unique problems in detail (Leech, 2002). Respondents included stakeholders, public sector officials and representatives, academics like university professors, smart governance researchers, private sectors such as ICT specialists, businessmen, journalists, and non-profit sectors such as policy analysts and civil society members. Stakeholders were defined as those related to or interested in smart governance and Smart Bangladesh. Initial interviewees were identified through researcher contacts and a review of organizational websites and documents. The snowball sampling method was then employed to recruit additional participants from the networks of initial interviewees. This method continued until theoretical saturation was achieved, meaning no new information was gained from further interviews. This technique, known for its relatively efficient and cost-effective, is widely used in various qualitative research studies. The study included a total of thirty-eight interviewees. Table 1 provides a summary of the demographic information of these interviewees.

**Table 1**
Demographic information of the interviewees.

| Stakeholder Group | Number | Percentage | Cumulative percentage |
|---|---|---|---|
| Private sector stakeholder | *12* | *32* | |
| *ICT Expert* | 6 | 16 | 16 |
| *Businessman* | 3 | 8 | 24 |
| *Journalist* | 3 | 8 | 32 |
| Public sector stakeholder | *10* | *26* | |
| *Elected representatives* | 3 | 8 | 39 |
| *Government officials* | 7 | 18 | 58 |
| Academic stakeholder | *10* | *26* | |
| *Smart city researchers* | 2 | 5 | 63 |
| *University professor (Policy, Science and Engineering depts)* | 8 | 21 | 84 |
| Nonprofit stakeholder | *6* | *16* | |
| *Policy activists* | 3 | 8 | 92 |
| *Civil society organization* | 3 | 8 | 100 |
| **Education** | | | |
| Doctoral degree | 8 | 21 | 21 |
| Graduate degree | 15 | 39 | 61 |
| Bachelor's degree | 7 | 18 | 79 |
| Other | 6 | 16 | 95 |
| Preferred not to answer | 2 | 5 | 100 |
| **Work Experience** | | | |
| 1–4 years | 8 | 21 | 21 |
| 5–9 years | 10 | 26 | 47 |
| 10 years or more | 16 | 42 | 89 |
| Preferred not to answer | 4 | 11 | 100 |

### 4.1. In-depth interviews

Purposive and snowball sampling were used to choose respondents to interview. The interview was conducted with the help of the researcher's vast network of government officials, university academics, IT professionals, civil society groups, and politicians, as well as from the review of existing literature. To identify respondents, forty-six stakeholders from the fields specified above were contacted; however, only thirty-eight were ready to participate. According to Bryman (2016), the ideal number of interviewees for an in-depth study is between ten and forty. After getting the interviewee's permission, the reason for the interview is restated, and the consent form is collected. In-depth interviews with thirty-eight respondents were performed between February 2023 and June 2023 to collect extensive primary data on smart governance for transforming the country into a Smart Bangladesh. The study carried out the interviews in settings that were comfortable for the participants, which included their offices, places of employment, homes, or remotely through phone calls or Zoom sessions. The interviews were carried out using a semi-structured methodology. The interview instrument was formulated using the semi-structured interview guidelines proposed by Adams (2015) and Kallio et al. (2016). These guidelines effectively capture stakeholders' explicit and implicit perceptions through inquiries about their desires, aspirations, preferences, and concerns toward others. To tailor the instrument for this study, the definition of smart governance was expanded beyond the physical infrastructure to also include the broader social, economic, and environmental aspects that are related to the idea of a Smart Bangladesh. The interview instrument consisted of five sections, each addressing distinct facets of smart governance and the development of a Smart Bangladesh. These sections include background information such as profession, education, and work experience and their role in smart governance and Smart Bangladesh; general perception regarding Smart Bangladesh; perception regarding success and failure of Vision 2021 digital Bangladesh; concerns or key challenges about smart governance and Smart Bangladesh implementation, suggestions for overcoming smart governance limitations. Respondents' identities were withheld to protect their privacy. Their comments are cited when applicable, and their thoughts are utilized for thematic analysis. During data collection and analysis, the study adhered to all the ethical guidelines for research (Van Thiel, 2014). Multiple rigorous methodologies were utilized to address bias in this qualitative study. Every interviewer received extensive training to ensure consistent delivery of questions and impartial handling of responses, promoting uniformity throughout the interviews. Before each interview, the objectives of the study were explained, and the anonymity of all interviewees was guaranteed. Researchers practiced reflexivity by consciously examining their biases and assessing their potential impact on the research process. To enhance reliability, data were coded independently by multiple researchers, and the consistency of the coding was evaluated to measure inter-coder reliability. These steps collectively enhance the integrity and reliability of the research findings.

### 4.2. Data analysis

The data collected in the field was cleaned, edited, and organized before being analyzed. Field notes and data were rigorously edited, proofread, and simplified, and interviews were recorded and transcribed in the respondents' original language. After the data was translated into English, NVivo 14 qualitative data analysis software was used to organize the transcripts into a taxonomy of coded categories and their subcategories. NVivo 14 is a software designed to analyze various data types such as text, audio, video, and images, encompassing interviews, focus groups, surveys, and literature (Phillips and Lu, 2018). The research aimed to find a connection between the respondents' feelings and

the wider socioeconomic context in which they were expressed by studying the transcripts. The study's aim was explained clearly and lucidly using thematic analysis to discover recurring themes, patterns, and trends in improving and deteriorating the nation's governance. Finally, the research examined the qualitative data's recurrent themes, insights, and interpretations. There have been thirty-eight interviews, each utilizing the same five-key question format relevant to the smart governance component. 1) Setting: What were the most important challenges of implementing Smart Bangladesh? 2) Difficulties—What are the most significant limitations of Bangladesh's existing governance? 3) Determining which important adjustments must be made to implement the vision; 4) Evaluation and assessment of previous Vision 2021 Digital Bangladesh; 5) What are the key solutions to overcome the current limitation and challenge of smart governance in Bangladesh for Smart Bangladesh? The utilization of NVivo's robust features, such as query functions and visualizations, played a crucial role in analyzing the connections between themes and visually representing data relationships. Additionally, to understand the stakeholders' identification of smart governance challenges for smart nations and cities, the study conducted a quantitative analysis of qualitative interview data. This involved converting the qualitative data into numerical values or percentages (Halevi Hochwald et al. (2023)). However, the study faced challenges in obtaining a diverse sample and was limited by the inherent constraints of qualitative research, which restricted the ability to generalize findings. Additionally, translating from the native language to English presented further difficulties.

## 5. Findings and analysis

The analysis rigorously evaluates the challenges hindering Bangladesh's ambition of evolving into a smarter nation and building smart cities. By scrutinizing the current governmental landscape and potential future capabilities, it delves into the dynamics of smart governance and its models. The study strategically aligns these challenges with the vision of a Smart Bangladesh, accentuating the nexus between existing hurdles and the smart governance paradigm. In response to these intricacies, it proposes a meticulously crafted policy framework tailored to the priorities of key stakeholders. This framework aims to pave the way for smart governance, which is integral to realizing the aspirations of a Smart Bangladesh.

### *5.1. Challenges of smart governance in the development of smart cities and nations*

This section thoroughly analyzes the challenges of implementing smart governance for a 'Smart Bangladesh' and building smart cities, utilizing insights obtained from in-depth interviews. The research identifies fourteen major challenges to achieving the vision of a Smart Bangladesh and developing smart cities. Fig. 5 displays a percentage table that effectively demonstrates the frequency of each challenge, providing a clear comprehension of these issues from the perspective of the stakeholders.

### *5.2. Technical and infrastructural challenges*

#### *5.2.1. Deficiencies in smart infrastructure development*

Fig. 5 illustrates that 95 % of stakeholders acknowledge the significant obstacle of creating smart infrastructure in Bangladesh's pursuit of becoming a smart nation. Optimizing resource utilization through advanced ICT is crucial for smart infrastructure to meet the demands of citizens. The main obstacles include restricted technology availability, inadequate network infrastructure, insufficient ICT assistance, and unreliable internet connectivity. Stakeholders highlight that in Bangladesh, akin to many developing nations, challenges such as scarce smart device availability, restricted bandwidth, slow internet speeds, insufficient digital literacy, and high access costs are major impediments to progress. Moreover, the country's e-government index ranking is poor compared to other countries. Therefore, a robust, comprehensive ICT infrastructure, seamlessly integrating smart devices, is indispensable for the functionality of a smart country. An IT expert astutely notes, "*The dearth of infrastructure and resources is a formidable barrier to smart governance in Bangladesh, especially in rural areas devoid of modern amenities like electricity and high-speed internet. This exacerbates the digital divide and complicates the implementation of technology-driven governance and service delivery.*"

#### *5.2.2. Challenges in ensuring uninterrupted electricity and smart grid implementation*

The consensus among stakeholders is that a consistent electricity supply is pivotal for Bangladesh's ambition to evolve into a smart country and build smart cities, a goal currently hampered by frequent power outages due to limited capacity, fuel scarcity, and outdated equipment (Fig. 5). An academic respondent stresses, "*Load shedding, resulting from inadequate power capacity and antiquated machinery, critically impedes progress. Addressing these issues is crucial for Bangladesh's transformation into a smart nation; the vision is unattainable without stable power.*" Additionally, respondents stress that developing a smart grid and integrating advanced circuit technology is essential for meeting community demands and optimizing power distribution. This grid, facilitating bidirectional communication and energy flow, would enable real-time monitoring and the integration of renewable energy sources. However, an IT expert highlights, "*An advanced, smart energy grid is imperative for realizing the country's smart nation vision, as the absence of an uninterrupted power supply and a smart grid makes transformation unfeasible.*" Implementing such a grid in Bangladesh, grappling with basic electricity provision, presents a formidable, almost utopian challenge. While a smart grid system offers benefits to power companies and consumers, the transition faces significant hurdles in a nation still striving to provide an uninterrupted electricity supply. Hence, stakeholders unanimously agree that a reliable electricity supply is essential to effectively implement smart governance in Bangladesh.

#### *5.2.3. Insufficient smart mobility solutions*

Fig. 5 reveals that about two-thirds of stakeholders acknowledge the challenges in developing smart urban transportation, a vital component of smart city-based nations. Stakeholders stress that this entails crafting advanced transportation technologies to enhance road safety,

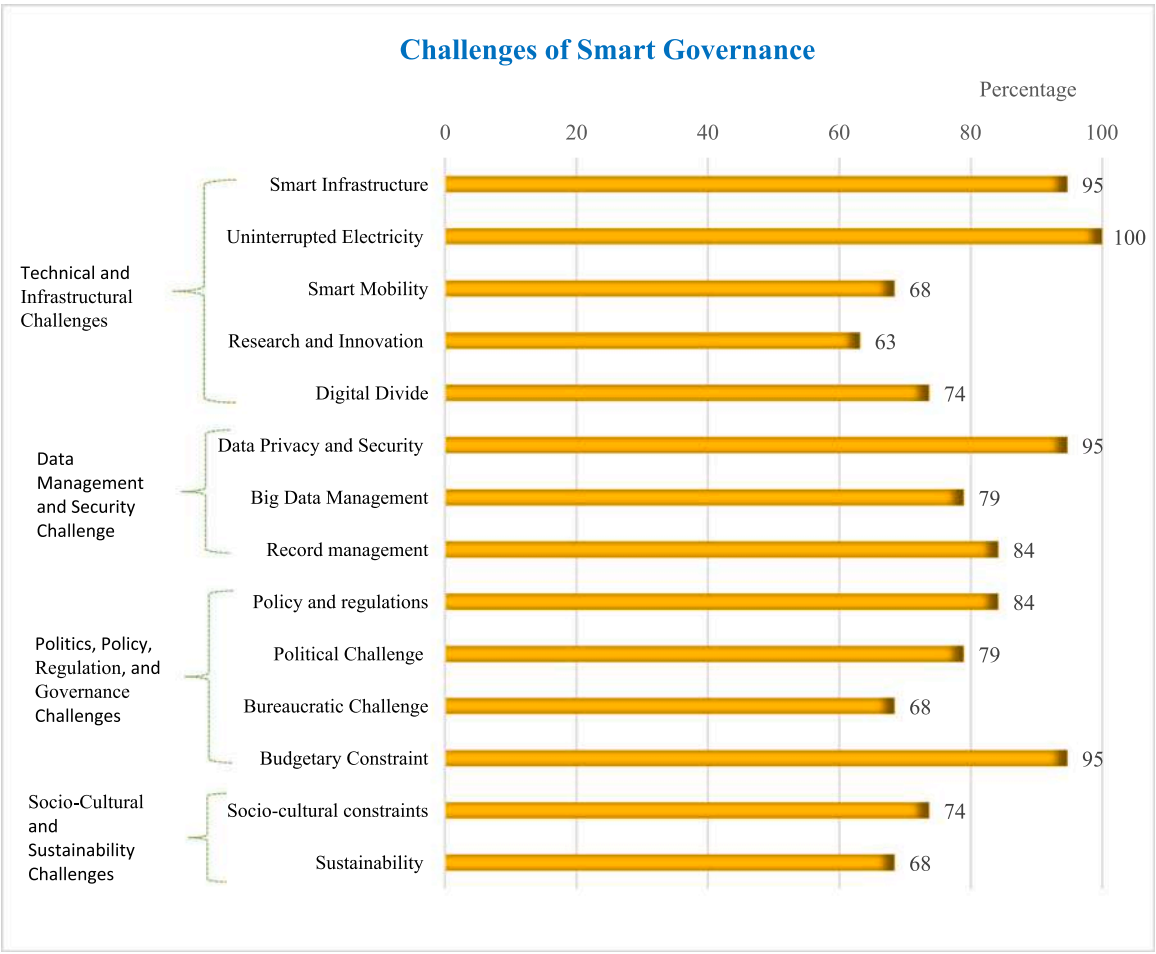


**Fig. 5.** The stakeholders identified challenges of smart governance.

streamline parking, and manage traffic efficiently. The consensus is that Bangladesh ensures the seamless integration of technology into urban mobility. This approach addresses present challenges and anticipates future needs, fostering a more efficient, safe, and sustainable urban governance and management essential for a smart nation and city. Consequently, smart mobility emerges as a crucial facet of smart governance, instrumental in alleviating severe traffic congestion in various cities and bolstering the economy.

### *5.2.4. Shortfall in research and innovation*

Technological innovation, a continuous and integral process for Smart Bangladesh and smart cities, is currently hindered by the government's minimal funding and logistic support, resulting in subpar research and innovation capabilities. In Fig. 5, over 60 % of stakeholders identify enhancing research and innovation as a crucial challenge in Bangladesh's journey towards becoming a smart nation and developing smart cities. As many respondents from the academic and non-profit sectors indicate, the existing infrastructure for research and innovation is insufficient to support this ambitious transformation. Bangladesh's heavy reliance on foreign technical support and devices underscores this gap. For instance, most of the technology and software used in government sectors are developed by foreign-based companies. To address this, it is imperative that the government significantly increase investment and allocate a dedicated budget for these sectors, promoting the development of technological institutions and human capital. A politician asserts, "*The government should extend its funding to research universities and research institutions for innovation. These strategic steps are vital for steering Bangladesh towards its goal of becoming a smart country, anchored in technological advancement and innovative thinking using ICT, the Internet of Things (IoT), and artificial intelligence (AI)*."

### *5.2.5. Digital divide*

Fig. 5 shows that nearly three-quarters of respondents are concerned about the digital divide. Smart governance involves e-governance systems, investment in digital infrastructure, promotion of computer literacy, and encouraging public participation through digital platforms. Given that a large segment of Bangladesh's population is illiterate and lacks proficiency with smart devices, bridging the digital divide and transforming them into smart citizens within the expected timeframe is challenging. As noted by most respondents, "*The general public's limited computer literacy impedes the transition to a smart nation, mirroring the widespread digital divide*

*experienced during the Digital Bangladesh initiative.*" Additionally, the digital unfamiliarity among the elderly and the struggles of public servants in facilitating digital adoption are noteworthy. The influx of citizens in offices seeking online services further underscores the need for comprehensive digital literacy and access initiatives.

### *5.3. Data management and security challenges*

#### *5.3.1. Insufficient data privacy and security*

An overwhelming 95 % of stakeholders consider data privacy and security crucial challenges in developing smart cities in Bangladesh, as highlighted in Fig. 5. Respondent mentioned that while efficient, the centralization of technology platforms increases vulnerability to cyber threats, emphasizing the need for robust cybersecurity measures to protect individual privacy and safety. In the realm of a smart nation, it is imperative to understand cyber threats and implement strategies for mitigating attacks, protecting privacy, and enhancing security. One of the stakeholders emphasizes that, "*Despite progress towards a Smart Bangladesh, significant gaps remain in cybersecurity, lacking comprehensive policies, architectures, and technical solutions*." Stakeholders also expressed concerns over the increasing integration of ICTs, which amplifies the risk of cyberattacks, as highlighted by a recent major security breach in a government website, compromising millions of personal data records. This incident underscores the urgent need for effective cybersecurity measures and government action to address these vulnerabilities. Continuous training and heightened awareness are key to combating emerging threats, maintaining citizen trust, and safeguarding the nation's digital security and reputation.

#### *5.3.2. Insufficient big data management capacity*

Effective big data management in Bangladesh demands a mix of contractual and relational governance, enhanced analytics, knowledge exchange, collaboration, integrated processes, flexible infrastructure, and quality data sources. Fig. 5 shows that nearly 80 % of stakeholders recognize the challenge of inadequate big data management capacity in Bangladesh's pursuit of the Smart Bangladesh vision. Moreover, stakeholders emphasized the need for synergy between big data providers, analysts, and decision-makers to address fragmentation in data-driven decision-making. Additionally, decision-makers need to interpret big data analytics effectively and comprehend their implications. Overcoming managerial challenges, such as leadership focus, talent development, technology management, and organizational culture, is critical and often more pivotal than technical challenges. The Bangladeshi government must undertake a comprehensive effort, focusing on human and technological resources and cultural adaptation, to harness the full benefits of big data.

#### *5.3.3. Scarcity of smart record management*

Fig. 5 reveals that 84 % of respondents in this study identified digital record management as a significant challenge in Bangladesh. Stakeholders highlight that effective and efficient smart record management, crucial for ensuring transparency, is plagued by substantial issues. There is an urgent need to update the country's outdated and flawed records and archive administration laws to improve information accessibility, openness, and accountability. A notable deficiency in many public administrations is the lack of professional records managers, who are essential for devising policies that guarantee public access to and accountability for government information. A university professor points out, "*Public administrations in Bangladesh are inadequately pushing for enhanced records management regulations, resulting in limited openness and heightened corruption risk.*" A non-profit stakeholder stresses that "*The current legal framework inadequately addresses key aspects of digital records management. Legislators urgently need to update the archives and records management law to reflect modern values of openness, accountability, and public access, thus aligning record management practices with contemporary governance and public service demands.*" Another stakeholder emphasized, "*The government must prioritize the safety and privacy of record management, especially in smart nation policies, to protect national and citizen records*."

### *5.4. Politics, policy, regulation, and governance challenges*

#### *5.4.1. Policy and regulations challenges*

84 % of stakeholders view adherence to policy and regulations as a key challenge in Bangladesh's ambitious journey to become a smart country (Fig. 5). This aspiration demands a comprehensive and realistic master plan, not merely a declaration. The country's current lack of robust regulatory frameworks and specific policies for smart nation development, especially optimally utilizing limited resources, is a major concern. Additionally, the privacy and security of digital services require a strong legal framework to protect personal data and prevent hacking and data breaches. The controversial Digital Security Act, introduced during the Digital Bangladesh vision, underscored the need for policies that balance citizens' rights and security. Effective smart governance hinges on a solid policy framework, but historical trends reveal the government's past shortcomings in developing comprehensive policies. Thus, crafting a timely, feasible, and forward-looking digital transformation policy represents a formidable challenge for Bangladesh. One government sector stakeholder highlighted the necessity for a detailed year-wise plan and an evaluation system to track progress, suggesting that "*The Bangladesh government needs to modify its Smart Bangladesh policy based on evaluation reports, ensuring that the country reaches its destination within the estimated time.*"

#### *5.4.2. Political challenge*

As highlighted in Fig. 5, nearly 80 % of stakeholders in Bangladesh identify political challenges as a significant impediment to digital transformation. The interviewee stated that success in this arena hinges on political leaders' commitment, necessitating a visionary approach and substantial investment in high-quality infrastructure to enhance public services and reduce costs. However, political unrest and a tendency to disregard opposition parties' beneficial plans present major obstacles. The continuity of government projects like Smart Bangladesh is threatened by changes in administration, which is compounded by a lack of trust between the government and citizens, which critically hinders smart city developments. A private sector stakeholder notes, "*The development of*

*'Smart Bangladesh' cannot prosper amidst political instability and distrust among political parties in Bangladesh. A smarter approach in politics, including continuing the works of previous governments and mutual appreciation, is essential.*" Moreover, the interviewee highlights that the volatile political environment intensifies the difficulty, as new leaders have the potential to modify project objectives, policies, or staff, thereby disrupting the essential consistency required for long-term projects. The tumultuous political history, characterized by frequent shifts in leadership and intense disagreements, contributes to the intricacy of government initiatives and poses a monumental obstacle in the transition towards a technologically advanced Bangladesh.

#### *5.4.3. Bureaucratic limitations*

Fig. 5 indicates that more than two-thirds of stakeholders acknowledge bureaucratic procedures as a substantial obstacle to the transformation of Bangladesh's traditional government into a smart government system. Non-profit and academic stakeholders focus on the fact that the inflexibility of the current bureaucracy poses a significant obstacle, particularly due to the insufficient expertise of government officials in smart technology, which is essential for the development of a smart country. In addition, the bureaucracy's reluctance to release government documents publicly hinders progress toward a more transparent, accountable, and efficient governance system. A journalist stated that, *Modernizing the current service delivery in Bangladesh's conservative bureaucratic context is a complex undertaking, with the goal of making it simpler, accountable, and transparent. This highlights the need for significant reforms in the bureaucratic system to align with smart governance, ensuring efficient, transparent, and technologically advanced public administration*.

#### *5.4.4. Budgetary constraint*

The study illustrated in Fig. 5 demonstrates that an impressive 95 % of participants recognize budgetary limitations as a crucial hindrance to Bangladesh's transformation into a smart nation. Respondents indicate that significant investments in ICT in the financial sector are required to transition towards a smart economy, technologically advanced transaction systems, and a cashless smart society. This involves setting up and maintaining advanced technological infrastructure across all economic sectors. However, Bangladesh faces financial challenges due to existing budget deficits, hindering the acquisition of state-of-the-art technology and tools. Unlike developed countries that often use public-private partnerships, Bangladesh relies predominantly on government funding to finance large-scale projects. This reliance poses challenges in obtaining the necessary resources for ambitious initiatives. Therefore, transformative technology-based innovative financing strategies are crucial to facilitate the nation's transition into a smart economy and technologically advanced cash-less prosperous society.

### *5.5. Socio-cultural and sustainability challenges*

#### *5.5.1. Socio-cultural constraints*

Based on Fig. 5, most respondents, precisely 74 %, believe that sociocultural constraints pose a significant challenge in Bangladesh's journey toward building a smart society. The digital transformation, particularly in public administration, is complex and far-reaching, unlike traditional practices. One of the respondents stated that, "*The transition in Bangladesh encompasses a vast number of individuals and local government bodies, adding to the complexity of the country's democratic structure, which is influenced by varied political alliances, cultural customs, and historical legacies. The implementation of digital government initiatives has highlighted divisions among citizens, influenced by socio-cultural and political factors.*" Stakeholders utter that the public administration system, which is influenced by an intricate network of viewpoints and convictions stemming from historical, socio-political, and cultural disparities, experiences diverse effects from digital transformation in different geographical areas, cultural contexts, sectors, and individuals. This situation is delicate and has the potential to cause disagreements. Hence, it is imperative for all regions and communities in Bangladesh to collectively adopt this digital transition, surmounting socio-cultural obstacles in order to navigate the transformation effectively.

#### *5.5.2. Missing sustainability principles*

Respondents explicitly criticize the current approach for its insufficient emphasis on sustainability, particularly UN sustainable development agenda, highlighting the government's inadequate attention to SDGs. They also highlight that failure to address this issue could result in significant sustainability problems, negatively affecting both the environment and public health and potentially canceling out the advantages of smart initiatives. According to Fig. 5, a significant majority of stakeholders, specifically 68 %, consider sustainability a crucial challenge in the Smart Bangladesh initiative. Moreover, they contend that the absence of sustainability-focused strategies poses a threat to both the environment and public health and undermines the overall efficacy of the program. It emphasizes the importance of integrating sustainability-oriented strategies into the fundamental structure of Smart Bangladesh to build a sustainable smart society and communities in the future.

### *5.6. A comparison of smart governance challenges identified by different stakeholder groups*

Fig. 6 shows the comparison of stakeholders from four distinct groups—academia, the private sector, nonprofit organizations, and the public sector—who have identified smart governance challenges for Smart Bangladesh and the development of smart cities. Academia stakeholders prioritize addressing challenges related to smart infrastructure, uninterrupted electricity supply, data privacy, policy changes, and political affairs. Private sector stakeholders prioritize providing uninterrupted electricity, ensuring data privacy, managing records, and adhering to budgetary limitations. Nonprofit organizations primarily focus on promoting smart infrastructure, ensuring uninterrupted electricity supply, data privacy and security, record management, financial limitations, and environmental sustainability. Meanwhile, stakeholders in the public sector emphasize the importance of power supply, socio-cultural limitations, policy difficulties, and big data management.

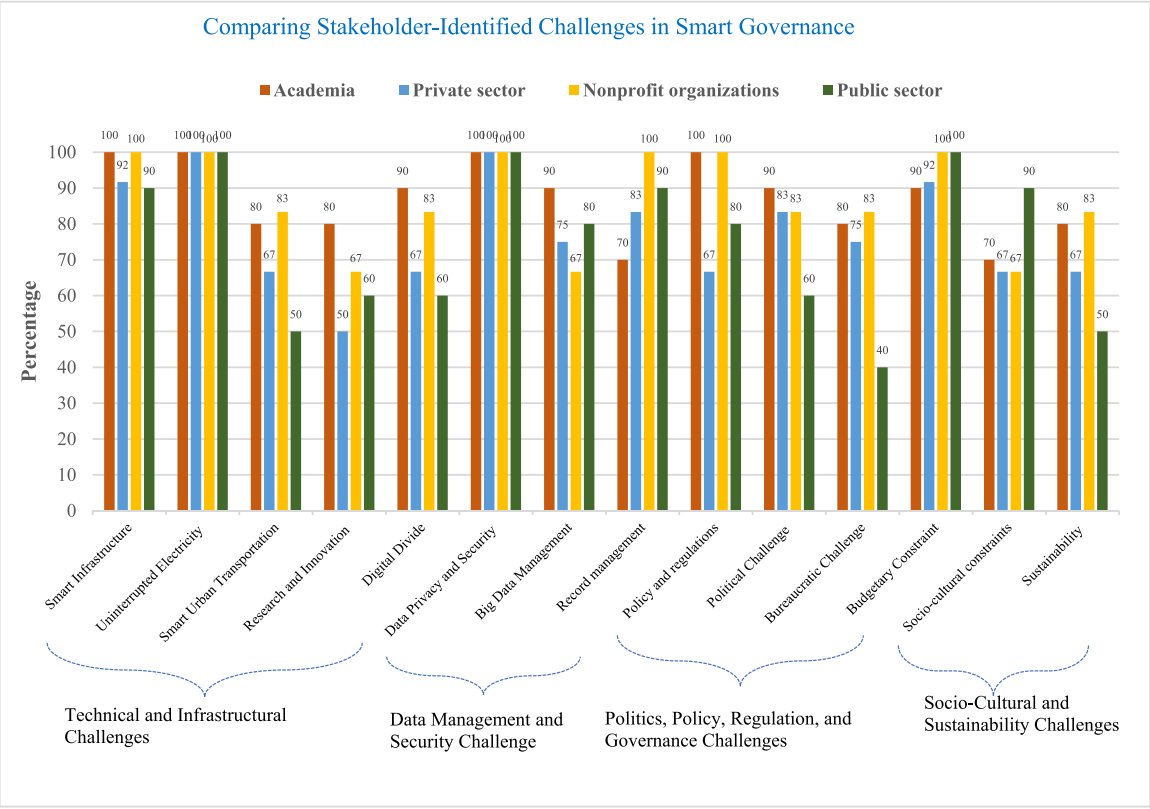


**Fig. 6.** Comparison of stakeholders-identified challenges of Smart Governance.

## 6. Discussion

This study conducted comprehensive stakeholder interviews to identify obstacles in the implementation of 'Smart Bangladesh' and building smart cities. It also highlights the complex stumbling blocks that arise in the transition towards a 'Smart Nation,' especially in focusing on smart governance. The findings of the study are pivotal for contributing to governance theory and the practical implementation of smart cities and nation vision. The research identifies multiple challenges, including political, policy, and governance issues, infrastructural barriers, data management, security concerns, and socio-cultural limitations. It also utilizes a strong smart governance framework to provide practical policy implications for smart cities and nations.

The findings emphasize the significance of viewing smart nation transformation as a holistic organizational approach that extends beyond merely digitizing public service delivery. This transformation is characterized by its ongoing and evolving nature, and it is influenced by external factors such as the implementation of advanced technology, management of big data, the efficient allocation of substantial financial resources, and public administration reform. The study is supported by literature (Van Dinh et al., 2020; Farmanbar et al., 2019; Tay et al., 2018; Kaiser, 2020; Kim et al., 2022) and identifies political mutualization as crucial, especially in developing countries context. Stakeholders recognize the potential of smart transformation but often struggle to articulate its transformative impact. Contrasting traditional e-government initiatives, smart transformation necessitates continuous adaptation to meet external demands, enhancing public administration-stakeholder relationships and citizen satisfaction and fostering a shift in bureaucratic and organizational culture. Moreover, the study reveals the underrepresentation of sustainability in the 'Smart Bangladesh' concept, a significant concern for Bangladesh (Kaiser, 2023b), indicating the need for a comprehensive strategic plan to address these multifaceted challenges effectively.

In line with global scholarly perspectives (Lee and Trimi, 2018; Mayer-Schönberger and Cukier, 2013), the study reaffirms smart governance's critical role in smart nation development. Additionally, the findings correspond with research on cybersecurity (Ma, 2021), big data management (Mayer-Schönberger and Cukier, 2013), artificial intelligence (Mehr, 2017), smart grids (Kourgiozou et al., 2021), and smart policing (Hassan et al., 2021), reflecting these study findings. This study identifies fiscal limitations as a key challenge for attaining a Smart Bangladesh, particularly a smart economy, aligning with the findings of Momen and Kaiser (2019) and Vu and Hartley (2018). It also echoes Hashem et al. (2016) focus on the necessity of prudent fiscal management for deploying ICT infrastructure.

Several case studies and empirical research also corroborate and support the viewpoints, expanding on the interpretation of this study's findings, particularly in relation to the challenges identified by the multi-stakeholders. For instance, Kamal and Kaiser (2015) demonstrated that Bangladesh's hostile political environment deviates from the principles of stable government, which are essential for smart governance. As the local government has significantly contributed to building smart cities and nations, empirical research has found that socio-cultural political divisions, political participation discrimination, and inequality are prevalent in Bangladesh's

local government (Kaiser and Nabila, 2024). The implications of smart governance require substantial contributions from bureaucratic efficiency; however, research by Zafarullah and Siddiquee (2023) and Kaiser (2015) found that conservative bureaucracy and flawed civil service requirements align with the findings of this study on bureaucratic constraints for implementing smart government. Bhuiyan's (2011) case studies of e-governance in Bangladesh's public administration found similar results to those of this study, indicating that the country faces several challenges in implementing e-governance initiatives. Regarding the international context of the smart nation, research by Ho (2017) and Bhati et al. (2017) discussed the Singapore Smart Nation vision, highlighting several challenges and opportunities. Many challenges identified by the stakeholders in this research are echoed in their findings.

This research provides comprehensive and novel guidelines for the transformation into a smart country, emphasizing the pivotal role of smart governance. Innovations and research, echoing Lee and Trimi (2018), are identified as critical components for the development of a smart nation. Moreover, the expansion of citizen engagement channels, as noted by Algebri et al. (2017) and Chourabi et al. (2012), along with the technological challenges in emerging smart cities highlighted by Javed et al. (2022), are corroborated by this study findings. By evaluating Smart Bangladesh based on the smart governance model discussed in Fig. 2, it is evident that Bangladesh is still in the very initial stages of the model. Therefore, the country needs to focus on and work through the tasks outlined in the smart governance model step by step to address the challenges identified by stakeholders, along with the several priorities mentioned in the study. These aspects underscore the necessity of strategic approaches in the evolution of a smart nation and city. Significantly, the study contributes to governance theory, enriches smart city and urban management literature, and delineates the pathway for a country's transformation into a smart nation.

## 7. Policy implications and framework for smart governance in the development of smart cities and nations

Based on stakeholders' priorities and policy implications, conceptual frameworks have been developed to address the challenges identified in implementing Smart Bangladesh, particularly focusing on smart governance. Fig. 7 presents a framework that serves as a strategic roadmap for overcoming the obstacles to developing a smart nation and smart cities.

### *7.1. Enabling smart administration and timely reform*

Eighty-four percent of stakeholders recognize the crucial role of modernizing administrative processes with smart technologies for the country's transformation into a smart nation and building smart cities. This significant overhaul necessitates a well-defined policy vision, comprehensive digital infrastructure—including high-speed internet, data centers, cloud computing, and interoperability—and improved public officials' digital literacy. Stakeholders noted that notable components of efficient governance include public involvement via digital platforms, strong data security measures, effective big data management, compliance with data protection standards, and strong cybersecurity. To achieve these, the government requires significant administrative reform, frequent policy updates to incorporate advancements and societal transformation, and ongoing involvement of stakeholders in the governance process. The interviewees also emphasize that smart administration seeks to improve the quality and efficiency of government services by utilizing technologies like cloud computing, big data analytics, the Internet of Things (IoT), and artificial intelligence (AI). Its core focus is on delivering services, promoting transparency, and engaging citizens. This approach aims to rectify inefficiencies and combat corruption, with a specific focus on meeting the needs of marginalized groups while simultaneously enhancing user experiences. By embracing digital adoption in governance, Bangladesh can streamline transactions and position itself as a smart nation ready for progress and prosperity in the digital era.

### *7.2. Public-private partnership ventures*

79 % of stakeholders emphasize the crucial role of strong public-private partnerships (PPPs) in developing Bangladesh as a smart and prosperous country and building smart cities, highlighting it as a fundamental aspect of smart governance. They also suggest that to address budget constraints and improve urban efficiency and intelligence, it is recommended that the government prioritize collaboration with private entities in the pursuit of smart transformation. The government can offer a range of incentives, including tax advantages, policy modifications, and land allocation, to encourage private sectors to invest in Smart Bangladesh projects. This will attract finance and bring momentum to the projects. One private sector stakeholder emphasizes that, *"The PPP authority can include multiple Smart Bangladesh and smart cities projects to support the government in accomplishing its vision through significant investments from the private sector, locally and internationally."* Stakeholders also highlight that the scale of smart village and city projects demands joint efforts and diverse financial support. This includes adept and transparent management of financial resources, prioritizing impactful projects, and innovatively exploring PPPs for funding. While the government allocates funds for infrastructure, private sector contributions through technology funding schemes are pivotal. This synergy of government initiatives and private sector support is key to surmounting financial challenges and advancing Bangladesh towards a smarter, sustainable future.

### *7.3. Big data management*

In Bangladesh's quest to become a "Smart Bangladesh," big data management is pivotal, especially in smart governance and decision-making, as recognized by approximately 84 % of stakeholders. The effective management of big data, velocity, and variety is key to enabling data-driven policymaking and enhancing government services. This undertaking necessitates the presence of technological infrastructure and a significant emphasis on training and developing the skills of individuals within the public administration. Interviewee emphasizes that proficiency in analyzing and utilizing big data is crucial for leadership in the public sector. This skill enables informed decision-making, which is essential for ensuring efficient, transparent, and responsive governance. The key to

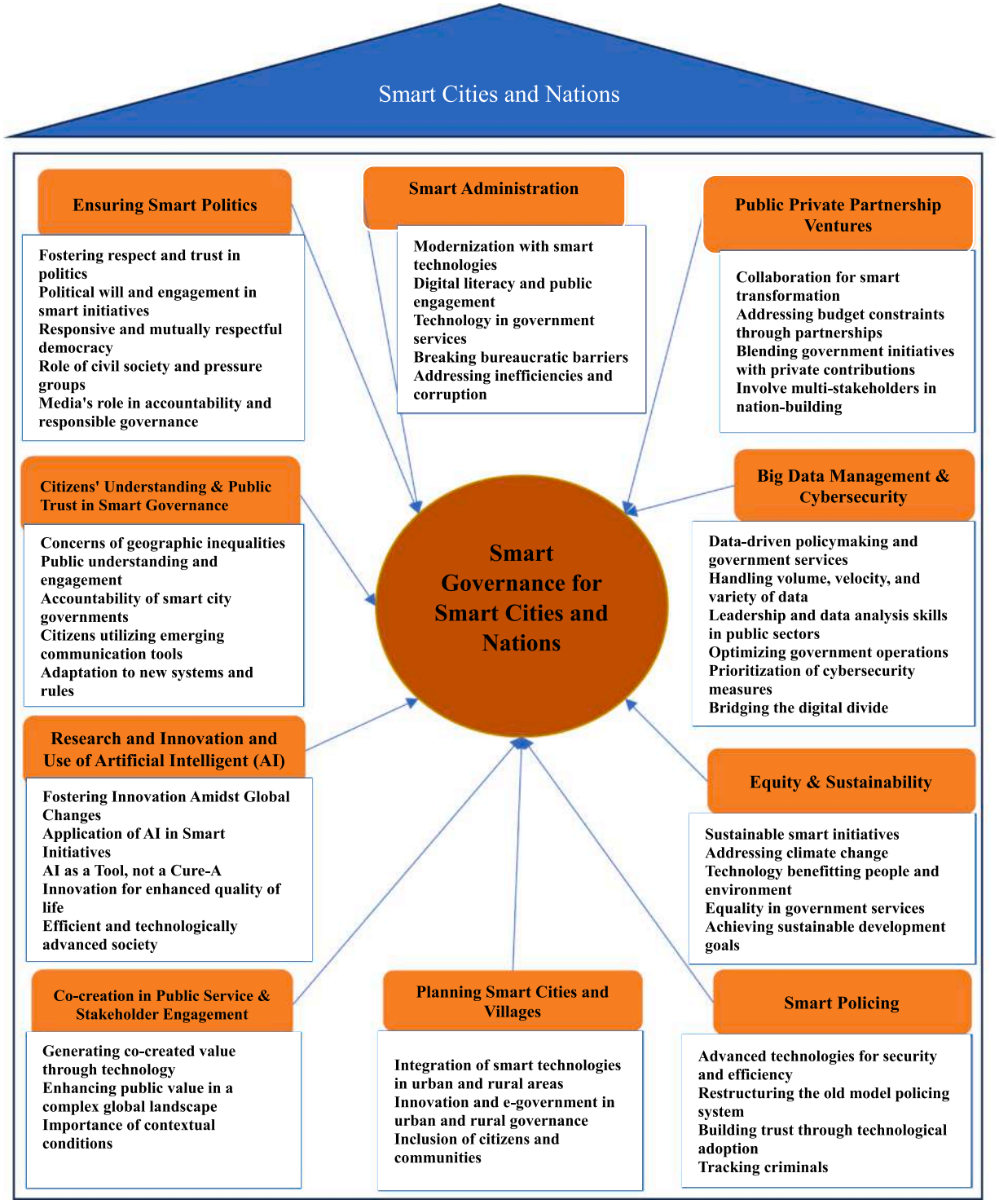


**Fig. 7.** A framework for smart governance for smart cities and nations.

transforming into a smart country lies in the optimization of government operations using big data management. This helps align government operations more closely with the needs of citizens and broader developmental objectives.

### *7.4. Smart policing*

Respondents prioritize smart policing measures such as using police body cameras, utilizing advanced technology to track criminals and crime hotspots, upgrading emergency services to minimize response times, implementing smart case filing, and providing updates on

case statuses. Particularly, emulating practices in developed countries, where communication with the police in emergencies is streamlined, could offer cost-effective alternatives to expensive video-based surveillance systems. Such advancements are crucial for bolstering security and fostering a more efficient and trustworthy policing system. One non-profit stakeholder states that, "*Given the current challenges of an outdated policing model and a lack of public trust, integrating advanced technologies into the policing system is essential for aligning with the Smart Bangladesh concept and rebuilding confidence in law enforcement."* A total of 79 % of stakeholders acknowledge the necessity of implementing a smart policing system, a key element in Smart Bangladesh enhancing security, safety, and transparency.

### *7.5. Ensuring smart and mutually respectful politics*

Bangladesh has had a turbulent political past, marked by a long period of military governance spanning sixteen years. Therefore, it is crucial to prioritize mutual respect and trust within the political sphere to achieve progress. Stakeholders believe that smart and respectful politics are essential for Bangladesh's smart transformation, with 89 % of them emphasizing this importance. They also contend that for effective governance, it is necessary to have a responsive and mutually respectful democracy. Civil society, pressure groups, and the media also have a crucial role in ensuring that parties are held responsible and promoting responsible governance. One government stakeholder stated that, "*To overcome challenges, progress towards more smart governance, and implement administrative reforms for a Smart Bangladesh, a collaborative and respectful political environment is necessary*."

### *7.6. Planning and building smart cities and villages*

Seventy-four percent of stakeholders emphasize the importance of planning and implementing smart technologies in both urban and rural areas, underscoring the need for comprehensive strategies for transforming a developing country into a prosperous smart country. A city is considered "smart" when it effectively uses ICT to enhance attractiveness, livability, sustainability, and competitiveness. Recent research combining innovation studies and e-government focuses on both urban and rural governance, developing new methods to advance the nation's smart capabilities. This approach is geared towards meeting the needs of citizens and communities, thereby contributing to the overarching objective of creating a smart, inclusive, and efficiently managed environment across urban and rural settings.

### *7.7. Prioritizing equity and sustainability*

The current Smart Bangladesh vision proposes greener, healthier, and more equitable communities. However, stakeholders have pointed out that there is insufficient implementation of projects regarding sustainability and equity in the policy. According to 68 % of the stakeholders, equity and sustainability are critical factors in Bangladesh's smart initiatives. These stakeholders emphasize the importance of long-term planning and resource management to achieve these goals. Non-profit stakeholders emphasize that "*To address Bangladesh's vulnerability to climate change, it is essential to update educational curricula for sustainable smart governance. This will ensure that technology benefits both people and the environment, not just for the present but also for future generations."* Additionally, ensuring equality in government services is crucial, as its absence can reduce public participation in smart initiatives. Therefore, the government must develop policies that promote economic and social equity to ensure the country's long-term prosperity and alignment with sustainable development goals (SDGs).

### *7.8. Ensure cybersecurity and bridge the digital divide*

91 % of stakeholders agree that it is crucial to prioritize cybersecurity and bridge the digital divide to transform Bangladesh into a technologically advanced and prosperous smart nation. One academic stated that*, "In today's innovative world, where smart technology is prevalent, it is essential to focus on cybersecurity to safeguard personal privacy and protect government data."* Interviewees suggest that along with cybersecurity, bridging the digital divide requires comprehensive strategies encompassing technological, societal, economic, and cultural dimensions. These strategies aim to ensure fair and equal access to technology, enhance proficiency in digital tools, and leverage digital platforms to promote socio-economic progress. Implementing inclusive strategies is essential for integrating diverse societal segments into the digital realm, promoting national development, and harnessing transformative technology for societal empowerment and cohesion.

### *7.9. Co-creation in public service and stakeholder engagement*

This paper emphasizes that over sixty percent of stakeholders highlight the importance of enhancing public services through smart solutions, focusing on the implications for public management and the potential for co-creating value by integrating big data and moving towards smarter governments. The study explores the opportunities and challenges presented by smart technologies in public management, contributing to the discourse on generating public value through these innovations. It underscores the significance of contextual conditions and the application of emerging technologies such as blockchain, IoT, advanced computing, and AI. Furthermore, the respondents highlight the growing collaboration between government and stakeholders, which is vital for fostering smarter governments and augmenting public value in an increasingly complex global context. This collaboration is essential as different stakeholders' knowledge, experience, values, and expertise are crucial for the government to understand its challenges and identify the best alternative solutions.

### *7.10. Research, innovation, and the use of artificial intelligence*

All stakeholder groups emphasize that innovation, essential for survival and prosperity, seeks to create a future that improves the quality of life and tackles societal challenges. This objective requires a comprehensive investigation encompassing concrete and abstract aspects, such as social and cultural factors. 68 % of stakeholders acknowledge the significance of promoting innovation and implementing artificial intelligence (AI) in smart initiatives, particularly in the current swiftly evolving global and technological environment. They added that although AI is not a panacea for governmental challenges, its implementation in citizen services can serve as a model for embracing transformative technologies in the public sector. Governments can foster public acceptance by initially implementing low-risk AI applications and integrating citizen feedback. This gradual process allows for the alignment of public services with the advanced technology already utilized in individuals' personal lives, ultimately leading to a more efficient and technologically sophisticated society.

### *7.11. Citizens' understanding and public trust in the smart concept*

Enhancing public understanding and building public trust in smart as well as "Smart Bangladesh" concepts is a top priority for 63 % of stakeholders, as it plays a crucial role in promoting informed and participatory citizen engagement. They also added that the efficacy of smart governance relies on citizens' understanding and trust in its function amidst apprehensions regarding the escalating geographical disparities propelled by the smart city and village phenomenon. In metropolitan areas, where no single organization can handle all administrative aspects, collaborative governance is essential due to challenges such as disputes over institutional ownership. Ensuring that smart city governments are accountable to residents, who are the primary beneficiaries of technological advancements, is of utmost importance. Stakeholders stressed that as the e-government infrastructure progresses to match the rapid advancements in mobile and digital technologies, it is crucial for citizens to gain a comprehensive understanding of smart governance. This will allow them to effectively utilize emerging communication tools like mobile apps, social media, and big data analytics. By doing so, citizens will be able to adapt to new systems and regulations, which contribute to building public trust in government.

## 8. Conclusion

This paper greatly enhances the understanding of smart governance by providing a thorough and meticulous analysis of the challenges encountered in building a smart nation and cities. Particularly, this text explores the concerns and priorities of stakeholders from various sectors in achieving the status of Smart Bangladesh and developing smart cities. The study has identified fourteen primary obstacles to smart governance that hinder progress toward becoming a smart country. These obstacles include technological and infrastructural problems, political policy and regulatory frameworks, security concerns, data management issues, and socio-cultural constraints. The challenges were identified through interviews with multi-stakeholders representing the public and private sectors, non-profit sector, and academia. Assessing these challenges utilizes a systematic approach that combines quantitative analysis with qualitative data. Stakeholders have identified the most significant challenges as being an uninterrupted power supply, comprehensive policy and regulation, robust cybersecurity, efficient record management, a mutually respectful democratic environment, and sustainability. To overcome these obstacles, the study proposed a comprehensive framework. Important strategies involve smart administration, maximizing public and private collaboration, bridging the digital divide, and an ICT-skilled workforce. This research contributes substantially to the theoretical comprehension of smart governance and the advancement of sustainable smart cities. It provides valuable insights for Bangladesh and other developing countries that share similar characteristics and aspirations of becoming smart nations. Specifically, the research's unique findings significantly enhance the body of knowledge on smart governance, open government, and the development of smart cities. Moreover, the research findings stress the importance of considering social and cultural constraints in the implementation of smart governance. Emphasizing PPP involvement for expertise, knowledge, and finance, prioritizing sustainable development, stakeholder involvement, citizens' understanding of smart governance, value and co-creation in public service, and stakeholder engagement are unique contributions of this research. The significance of this paper lies in three main points: (1) it takes a multi-stakeholder perspective on smart governance for smart cities and nations, (2) it identifies several key challenges that hinder implementing smart governance, and (3) its priorities for smart governance and links it with building smart cities and nations, thereby contributing to the literature on both smart city and nation, and governance.

The paper puts forward a range of policy recommendations and practical guidance, backed by empirical research, to assist in becoming a smart nation and developing smart cities. First, it is pivotal for the government to address the challenges identified in this study to achieve its vision of a Smart Bangladesh and build smart cities nationwide, with a focus on smart governance. The study of multiple stakeholders has also provided several sector-wise recommendations based on these challenges. Furthermore, the execution of this immense undertaking necessitates cooperation with multiple stakeholders. By carefully considering experts' guidance and then taking action based on it, the best approaches to achieve the objective can be effectively determined. Moreover, to convert cities into smart cities, the government must carry out pilot initiatives in various areas, evaluate the results, and apply successful policies to more cities. India and Indonesia, developing nations with similar economic conditions to Bangladesh, have already successfully implemented several smart city initiatives that the government can carefully consider. A comprehensive plan and measurement criteria are crucial for the government to evaluate its progress. Political willingness and prioritization by all parties are essential. Preparing citizens for smart cities is also foremost, as Bangladesh's current e-government index is very poor, indicating a need for more focus on digital literacy and e-participation. The government should emphasize cybersecurity and big data management, reduce the digital divide, and recognize the significant opportunities ahead. Singapore's successful smart nation initiatives can also be considered for achieving smart nation status.

This study has several limitations that warrant further research. First, although interviews are effective for gaining a comprehensive and in-depth understanding of the challenges and priorities in Smart Bangladesh, the quality of the data depends on the interviewer's skill. Interviewers' abilities to gather accurate data can vary. Additionally, the distribution of respondents across four major fields with unequal representation of themes could influence the findings. Notably, the highest number of responses came from the private sector and the fewest from the non-profit sector. However, the researchers have attempted to mitigate this limitation by rigorously adhering to the interview protocol. Second, the study's sample size is confined to a select number of qualified respondents within the field of smart nation development in Bangladesh, which may limit the generalizability of the results. Additionally, potential biases are minimized as the study carefully selects responses and establishes clear objectives. Third, the study relies on purposive and snowball sampling methods, which can impact the generalizability of the results and introduce potential biases. These limitations suggest opportunities for further work. A future survey using questionnaires is recommended to collect public opinion on the development of Smart Bangladesh. Treating Bangladesh as a focal case study and expanding the scope of this research to include other nations could enhance the consistency of the findings and yield more broadly applicable results. Finally, the research findings revealed that smart governance is still in its early stages and faces several challenges in Bangladesh. However, visionary initiatives like Smart Bangladesh could lead to future improvements in technology and services if they overcome the challenges identified by the study.

## Declaration of Competing Interest

The author declares that no known competing financial interests or personal relationships could have influenced the work reported in this paper and that there are no conflicts of interest regarding the publication of this study.

## Ethics statement

The protocol for this study was thoroughly evaluated to ensure compliance with the ethical standards and guidelines established by the University of Chittagong. The study, which includes interviews and focus group discussions, adheres to ethical principles such as voluntary participation, informed consent, confidentiality, and the right for participants to withdraw at any point.

The Departmental Ethics Committee determined that ethical approval was necessary, and after careful review, has granted permission for the study to proceed in accordance with the university's guidelines and regulations.

## References


A2I., 2024. Smart Bangladesh Vision 2041, Aspire to Innovate, Government of Bangladesh. 〈https://a2i.gov.bd/a2i-missions/smart-bangladesh-vision-2041/〉 (accessed 11 July 2024).

Adams, W.C., 2015. Conducting semi-structured interviews. Handb. Pract. Program Eval. 492–505.

Ahad, M.A., Paiva, S., Tripathi, G., Feroz, N., 2020. Enabling technologies and sustainable smart cities. Sustain. Cities Soc. *61*.

Ahvenniemi, H., Huovila, A., Pinto-Seppä, I., Airaksinen, M., 2017. What are the differences between sustainable and smart cities? Cities *60*, 234–245. https://doi.org/10.1016/j.cities.2016.09.009

Albino, V., Berardi, U., Dangelico, R.M., 2015. Smart cities: Definitions, dimensions, performance, and initiatives. J. Urban Technol. *22* (1), 3–21. https://doi.org/10.1080/10630732.2014.942092

Algebri, H.K., Husin, Z., Abdulhussin, A.M., Yaakob, N., 2017. Why move toward the smart government. 2017 International Symposium on Computer Science and Intelligent Controls (ISCSIC). IEEE, pp. 167–171. https://doi.org/10.1109/ISCSIC.2017.34

Aspers, P., Corte, U., 2019. What is Qualitative in Qualitative Research. Qual. Sociol. *42* (2), 139–160. https://doi.org/10.1007/s11133-019-9413-7

Bhati, A., Hansen, M., Chan, C.M., 2017. Energy conservation through smart homes in a smart city: A lesson for Singapore households. Energy Policy *104*, 230–239.

Bhuiyan, S.H., 2011. Modernizing Bangladesh public administration through e-governance: Benefits and challenges. Gov. Inf. Q. *28* (1), 54–65.

Bibri, S.E., 2021. Data-driven smart sustainable cities of the future: An evidence synthesis approach to a comprehensive state-of-the-art literature review. Sustain. Futures *3*, 100047.

Bifulco, F., Tregua, M., Amitrano, C.C., D'Auria, A., 2016. ICT and sustainability in smart cities management. Int. J. Public Sect. Manag. *29* (2), 132–147.

Bolívar, M.P.R., Meijer, A.J., 2016. Smart governance: Using a literature review and empirical analysis to build a research model. Soc. Sci. Comput. Rev. *34* (6), 673–692.

Bryman, A., 2016. Social research methods. Oxford University Press.

Chourabi, H., Nam, T., Walker, S., Gil-Garcia, J.R., Mellouli, S., Nahon, K., et al., 2012. Understanding smart cities: An integrative framework. System science (HICSS). 2012 45th Hawaii International Conference on. IEEE, pp. 2289–2297.

Chowdhury, A., 2023. What is Smart Bangladesh really? Aspire to Innovate, Government of Bangladesh. 〈https://a2i.gov.bd/what-is-smart-bangladesh-really/〉 (accessed 11 July 2024).

Dameri, R.P., 2017. Using ICT in smart city. Smart City implementation. Springer, Cham, pp. 45–65.

Denney, A.S., Tewksbury, R., 2013. How to write a literature review. J. Crim. Justice Educ. *24* (2), 218–234.

Estevez, E., Janowski, T., 2013. Electronic Governance for Sustainable Development Conceptual framework and state of research. Gov. Inf. Q. 30, S94–S109. https://doi.org/10.1016/j.giq.2012.11.001

Farmanbar, M., Parham, K., Arild, Ø., Rong, C., 2019. A widespread review of smart grids towards smart cities. Energies *12* (23), 4484.

Frederickson, H.G., Smith, K.B., Larimer, C.W., Licari, M.J., 2015. The public administration theory primer. Westview Press.

Halevi Hochwald, I., Green, G., Sela, Y., Radomyslsky, Z., Nissanholtz-Gannot, R., Hochwald, O., 2023. Converting qualitative data into quantitative values using a matched mixed-methods design: A new methodological approach. J. Adv. Nurs. *79* (11), 4398–4410.

Hashem, I.A.T., Chang, V., Anuar, N.B., Adewole, K., Yaqoob, I., Gani, A., Chiroma, H., 2016. The role of big data in smart city. Int. J. Inf. Manag. *36* (5), 748–758.

Hassan, S.U., Shabbir, M., Iqbal, S., Said, A., Kamiran, F., Nawaz, R., Saif, U., 2021. Leveraging deep learning and SNA approaches for smart city policing in the developing world. Int. J. Inf. Manag. *56*, 102045.

Ho, E., 2017. Smart subjects for a Smart Nation? Governing (smart) mentalities in Singapore. Urban Stud. *54* (13), 3101–3118.

Hoe, S.L., 2016. Defining a smart nation: The case of Singapore. J. Inf., Commun. Ethics Soc. *14* (4), 323–333.

Javed, A.R., Shahzad, F., Rehman, S.U., Zikria, Y.B., Razzak, I., Jalil, Z., Xu, G., 2022. Future smart cities: Requirements, emerging technologies, applications, challenges, and future aspects. Cities 129, 103794.

Jiang, H., 2021. Smart urban governance in the 'smart' era: Why is it urgently needed? Cities *111*, 103004.

Rosenzweig, C., Solecki, W.D., Romero-Lankao, P., Mehrotra, S., Dhakal, S., Ibrahim, S.A. (Eds.), 2018. Climate change and cities: Second assessment report of the urban climate change research network. Cambridge University Press.

Kaiser, Z.R.M.A., 2015. Bangladesh Civil Service (BCS) Examination: A Critical Review. Public Aff. Gov. *3* (*2*), 140–158. https://doi.org/10.5958/2321-2136.2015.00012.0
Kaiser, Z.R.M.A., 2020. Civil Society, Political Stability and Peace-building in Bangladesh and Sri Lanka: A Comparative Study. In: Momen, M.N. (Ed.), *Building Sustainable Community: Civil Society Response in Asia*, Singapore: Palgrave Macmillan. Springer, pp. 547–569. https://doi.org/10.1007/978-981-15-2393-9_27
Kaiser, Z.R.M.A., 2023b. Analysis of the Livelihood and Health of Internally Displaced Persons due to Riverbank Erosion in Bangladesh. J. Migr. Health 7 (100157), 1–10. https://doi.org/10.1016/j.jmh.2023.100157
Kaiser, Z.R.M.A., 2023a. Failing to Attain Sustainable Development in Bangladesh: A Potential Comprehensive Strategy for Sustainability. Sustain. Dev. 31 (4), 3086–3101. https://doi.org/10.1002/sd.2571
Kaiser, Z.R.M.A., Nabila, M.C., 2024. Assessing Gender Discrimination and Inequality in Local Government in Bangladesh. In: Baikady, R. (Ed.), The Palgrave Handbook of Global Social Problems. Palgrave Macmillan, Cham, pp. 1–12. https://doi.org/10.1007/978-3-030-68127-2_309-1
Kallio, H., Pietilä, A.M., Johnson, M., Kangasniemi, M., 2016. Systematic methodological review: developing a framework for a qualitative semi-structured interview guide. J. Adv. Nurs. *72* (12), 2954–2965.
Kamal, R.D., Kaiser, Z.R.M.A., 2015. RMG in Bangladesh: A Study into the Effects of Pre-election (2014) Political Turmoil. Foreign Trade Rev. 50 (2), 135–147 https://doi.org/10.1177%2F0015732515572060.
Kim, S., Andersen, K.N., Lee, J., 2022. Platform government in the era of smart technology. Public Adm. Rev. *82* (2), 362–368.
Kourgiozou, V., Commin, A., Dowson, M., Rovas, D., Mumovic, D., 2021. Scalable pathways to net zero carbon in the UK higher education sector: A systematic review of smart energy systems in university campuses. Renew. Sustain. Energy Rev. *147*, 111234.
Kylili, A., Fokaides, P.A., 2015. European smart cities: The role of zero energy buildings. Sustain. Cities Soc. *15*, 86–95.
Lee, S.M., Trimi, S., 2018. Innovation for creating a smart future. J. Innov. Knowl. *3* (1), 1–8.
Charalabidis, Y., Koussouris, S. (Eds.), 2012. Empowering open and collaborative governance: Technologies and methods for online citizen engagement in public policy making. Springer Science & Business Media.
Leech, B.L., 2002. Asking questions: Techniques for semistructured interviews. PS: Political Sci. Polit. *35* (4), 665–668.
Liang, J., Liu, L., Wang, X.H., 2023. Innovation efficiency and firm competition. J. Econ. Technol. *1*, 16–28.
Liu, D., Huang, R., Wosinski, M., 2017. Smart learning in smart cities. Springer, pp. 18–19.
Lune, H., Berg, B.L., 2017. Qualitative research methods for the social sciences. Pearson, New York.
Ma, C., 2021. Smart city and cyber-security; technologies used, leading challenges and future recommendations. Energy Rep. *7*, 7999–8012.
MacLean, D., Titah, R., 2022. A systematic literature review of empirical research on the impacts of e-government: a public value perspective. Public Adm. Rev. *82* (1), 23–38.
Mayer-Schönberger, V., Cukier, K., 2013. Big data: A revolution that will transform how we live, work, and think. Houghton Mifflin Harcourt.
Mehr, H., 2017. Artificial intelligence for citizen services and government. Ash Center for Democratic Governance and Innovation. Harvard Kennedy School.
Meijer, A., Bolívar, M.P.R., 2016. Governing the smart city: a review of the literature on smart urban governance. Int. Rev. Adm. Sci. *82* (2), 392–408.
Mergel, I., Edelmann, N., Haug, N., 2019. Defining digital transformation: Results from expert interviews. Gov. Inf. Q. *36* (4), 101385. https://doi.org/10.1016/j.giq.2019.06.002
Momen, M.N., Kaiser, Z.R.M.A., 2019. Budgeting and Finance. In: Ali, Farazmand (Ed.), Global Encyclopedia of Public Administration, Public Policy, and Governance. Springer Nature, Switzerland. https://doi.org/10.1007/978-3-319-31816-5_3834-1
Palumbo, R., Casprini, E., Manesh, M.F., 2023. Unleashing open innovation in the public sector: a bibliometric and interpretive literature review. Manag. Decis. *61* (13), 103–171.
Pansera, M., Marsh, A., Owen, R., Flores López, J.A., De Alba Ulloa, J.L., 2022. Exploring citizen participation in smart city development in Mexico City: An institutional logics approach. Organ. Stud. https://doi.org/10.1177/01708406221094194
Phillips, M., Lu, J., 2018. A quick look at NVivo. J. Electron. Resour. Librariansh. *30* (2), 104–106.
Popova, Y., Popovs, S., 2023. Effects and Externalities of Smart Governance. *Smart.* Cities *6* (2), 1109–1131.
Przeybilovicz, E., Cunha, M.A., Geertman, S., Meijer, A., 2022. Citizen participation in the smart city: findings from an international comparative study. Local Gov. Stud. *48* (1), 23–47. https://doi.org/10.1080/03003930.2020.1851204
Ranchordás, S., 2020. Nudging citizens through technology in smart cities. Int. Rev. Law, Comput. Technol. *34* (3), 254–276.
Scholl, H.J., AlAwadhi, S., 2016. Creating Smart Governance: The key to radical ICT overhaul at the City of Munich. Inf. Polity 21 (1), 21–42.
Tay, K.C., Supangkat, S.H., Cornelius, G., Arman, A.A., 2018. The SMART Initiative and the Garuda Smart City Framework for the Development of Smart Cities. 2018 Int. Conf. ICT Smart Soc. (ICISS). https://doi.org/10.1109/ictss.2018.8549961
Toh, C.K., 2022. Smart city indexes, criteria, indicators and rankings: An in-depth investigation and analysis. IET Smart Cities *4* (3), 211–228. https://doi.org/10.1049/smc2.12036
Valle-Cruz, D., Criado, J.I., Sandoval-Almazán, R., Ruvalcaba-Gomez, E.A., 2020. Assessing the public policy-cycle framework in the age of artificial intelligence: From agenda-setting to policy evaluation. Gov. Inf. Q. *37* (4), 101509.
Van Dinh, D., Yoon, B.N., Le, H.N., Nguyen, U.Q., Phan, K.D., Pham, L.D., 2020. ICT enabling technologies for smart cities. 2020 22nd International Conference on Advanced Communication Technology (ICACT). IEEE, pp. 1180–1192.
Van Thiel, S., 2014. Research methods in public administration and public management: An introduction. Routledge.
Van Wee, B., Banister, D., 2023. Literature review papers: the search and selection process. J. Decis. Syst. 1–7.
Vu, K., Hartley, K., 2018. Promoting smart cities in developing countries: Policy insights from Vietnam. Telecommun. Policy *42* (10), 845–859.
Yang, L., Elisa, N., Eliot, N., 2019. Privacy and security aspects of E-government in smart cities. In: Rawat, D.B., Ghafoor, K.Z. (Eds.), Smart cities cybersecurity and privacy. Elsevier, pp. 89–102.
Zafarullah, H., Siddiquee, N.A., 2023. Open Government and Freedom of Information. Springer Nature.