# DIGITAL PUBLIC SERVICE: MULTI-SCALAR APPROACH TO INCLUSIVE PLANNING FOR SUSTAINABLE DEVELOPMENT.

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## Abstracts

Technology has impacted almost every aspect of human life, including building, health, agriculture, education, and urban planning. In recent years, people have become more interested in how technology and goals for sustainable development affect each other. By supporting and hastening the accomplishment of each of the 17 Sustainable Development Goals (SDGs), including ending extreme poverty, lowering maternal and infant mortality, fostering sustainable and inclusive governance, and achieving universal literacy, technology can aid in accelerating progress on all the SDGs. Recent research by the World Economic Forum and Price water house Coopers (PwC) suggest that new technology could help us reach two-thirds of the 169 Sustainable Development Goals [1].

Additionally, technological advancements can contribute to more open and accountable service delivery in both the public and private sectors. This can encourage sustainable resilience and assist in achieving sustainable and inclusive governance at all levels. A potent instrument for supporting inclusive planning at all scales, from the local to the global, the potential of technology in service delivery to people, also known as digital public service, has emerged in recent years. This study focuses on case studies from some of the greatest global practices, such as New York, Singapore, and Estonia, to analyse the design and implementation of digital public service initiatives in supporting inclusive planning across various scales of urban morphology. The study seeks to answer the question of "what are some policy strategies and examples of digital public service initiatives designed and implemented to promote inclusive sustainable planning at multiple scales".

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[1] What are the challenges in making tech more sustainable? [cited 2023 06/04]; Available from: https://www.weforum.org/agenda/2020/09/what-are-the-challenges-in-making-newtechnology-more-sustainable/

Using a case study method, the study looks at how digital public services were set up and how they affected planning in the chosen cities to make it more inclusive and sustainable. The review data came from scholarly publications, papers, and online resources. The most significant themes and patterns in the data gathered about digital public service and inclusive planning are found using thematic analysis. A conceptual framework was created to assess these results. The study identifies inclusive planning, a multi-scale strategy, and digital public service as the most crucial variable. And tries to quantify these variables through a meticulous and open data-gathering and analysis procedure. The results show that digital public services have the potential to be a useful tool for encouraging inclusive planning at all levels. However, they need to be carefully planned and implemented to make sure they meet the needs and interests of all stakeholders.

By emphasizing the significance of a multi-scalar approach to designing and implementing digital public service initiatives for promoting inclusive planning through the case studies, the research not only adds to larger academic and policy discussions about the role of technology in determining the future of cities and regions and the necessity of ensuring that these technologies are used in ways that promote equity and social inclusion, but it also provides insights and recommendations for policymakers, planners, and practitioners.

### Keywords
Digital Public Service, Multi-scalar Approach, Inclusive Planning, sustainable development.

### INTRODUCTION

The rise in the world's population has greatly affected almost every part of human life, especially how cities are run. Between 2.5 and 3 billion people will live in cities globally by 2050[2]. This necessitates the use of preventative measures in the design of future cities. One of these techniques is utilizing technology to address the multifaceted, multidimensional, and transnational issues that arise with urban growth. Virtually every element of human life has changed significantly due to technological advancements, including patterns in urban planning, manufacturing, health, and agriculture [3] [4]. Additionally, improvements in digital technology could lead to the delivery of public services that are more transparent, accountable, and legitimate in both the public and private sectors. This could increase citizen involvement, transparency, and accountability in planning processes and improve access to public services and information.[5] [6] [7] Digital public service, often known as e-government, is this sort of technological leveraging where public services are delivered with the aid of technology, with

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[2] Habitat, U., Tracking Progress Towards Inclusive, Safe, Resilient and Sustainable Cities and Human Settlements. SDG 11 Synthesis Report-High Level Political Forum 2018. 2018

[3] Martin, A., Digital Literacy and the "Digital. Digital literacies: Concepts, policies and practices, 2008. 30(151): p. 1029-1055.

[4] Reis, J., et al., Digital transformation: a literature review and guidelines for future research. Trends and Advances in Information Systems and Technologies: Volume 1 6, 2018: p. 411-421.

[5] Commission, European. Digital Economy and Society Index (Desi) 2022. European Commission (2022). https://digital-strategy.ec.europa.eu/en/library/digital-economy-and-society-index□desi-2022.

[6] Lynn, Theo, Pierangelo Rosati, Edel Conway, Declan Curran, Grace Fox, and Colm O'Gorman. Digital Towns: Accelerating and Measuring the Digital Transformation of Rural Societies and Economies. Springer Nature, 2022

[7] Palmia, Francesco. "Enabling Meaningful Public Participation in Spatial Planning Processes." United Nations Human Settlements Programme (UN-Habitat) (2023 2023). https://unhabitat.org/enabling-meaningful-public-participation-in-spatial-planningprocesse

an IT system acting as the intermediary in between.[8] Everyone must be included in constructing a city under a governing system; however, so many marginalized and disadvantaged groups are frequently excluded, sometimes because of access and coverage issues or corruption. This results in a tendency for powerful agencies and individuals to dominate city buildings rather than involve diverse inhabitants.[9] The role of digital public service is to solve such issues.

In recent years, digital public service has become a potent tool for advancing inclusive planning for sustainable development at all scales, from the local to the global. Without a doubt, COVID-19 has brought this potential to light because, during the shutdown, most of the governmental and private service delivery had to be done online. Digital public service initiatives can also help multiple stakeholders collaborate and work together, such as governments, communities, and private sector actors.[10] However, there are questions about how digital public services may affect social inclusion and equity, the core of sustainable development, because the potential advantages are not equally dispersed.[11] For instance, it is predicted that 3 billion people may not have access to digital technologies or the knowledge necessary to utilize them efficiently, while others may encounter difficulties participating in digital public service programs because of linguistic or cultural obstacles.[12] Therefore, if digital public service initiatives are not planned and executed in a way that includes and incorporates everyone, they risk exacerbating power disparities and excluding underprivileged groups.

The case studies were carefully chosen so that we could acquire a variety of global perspectives and nuanced viewpoints on the subject. In this research, two crucial and urgent fields of inquiry were integrated. Effective digital public services that can serve various populations are becoming increasingly necessary, and inclusive planning for sustainable development is becoming acknowledged as a key strategy for developing sustainable, liveable, and equitable cities and regions.

## CONCEPTS REVIEW AND THE INTERSECTIONS

To gain insights into the design and implementation of digital public service initiatives that promote inclusive, sustainable planning and development, it is important to examine case studies from global practices. Notable cities such as New York, Singapore, and Estonia have implemented digital public service initiatives that can serve as valuable examples. To consolidate this concept into a meaningful discussion and lead us to the various case studies, it is important to understand the intersection of technology with Sustainable Development Goals (SDGs), inclusive planning, and public service initiatives.

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[8] Jansen, Arild, and Svein Ølnes. "The Nature of Public E-Services and Their Quality Dimensions." Government Information Quarterly 33, no. 4 (2016): 647-57.

[9] Madanipour, Ali. ""Introduction,""the Changing Nature of Public Space in City Centres," and "Whose Public Space?": From Whose Public Space?: International Case Studies in Urban Design and Development (2010)." In The Urban Design Reader, 443-58: Routledge, 2013.

[10] Ni, Minqing. "Digital Participation for Inclusive Growth: A Case Study of Singapore's Collaborative Digital Governance Model." In Design for Vulnerable Communities, 323-37: Springer, 2022.

[11] Deganis, Isabelle, Pegah Zohouri Haghian, Makiko Tagashira, and Adriana Alberti. "Leveraging Digital Technologies for Social Inclusion." Policy Brief 92 (2021).

[12] Van Dijk, Jan. The Digital Divide. John Wiley & Sons, 2020.

**Sustainable Development Goals (SDGs) and Technology**

Sustainable development encompasses the pursuit of economic growth, social inclusion, and environmental protection to meet the needs of present and future generations.[13] The United Nations' Sustainable Development Goals (SDGs), adopted in 2015, provide a comprehensive framework to address global challenges and achieve sustainable development.[14] An emerging area of interest is the exploration of the role of technology in advancing the SDGs. Technology has the potential to act as a catalyst and an enabler, accelerating progress toward global goals and fostering innovative solutions to complex societal issues. Technology is pivotal in achieving sustainable development by offering tools, innovations, and solutions to various challenges. It can transform societies, economies, and environments, contributing to the realization of the SDGs. Technological advancements, such as digitalization, artificial intelligence, renewable energy, biotechnology, and communication technologies, have the capacity to drive progress and create positive impacts in diverse sectors.[15] [16] [17]

**Technology and Inclusive Planning**

Inclusive planning recognizes the importance of addressing the needs and interests of marginalized and vulnerable populations, including women, children, elderly individuals, persons with disabilities, and minority groups. Inclusive planning seeks to create equitable and sustainable communities by fostering social cohesion, reducing inequalities, and promoting access to opportunities and resources for all residents. Technology is pivotal in advancing inclusive and sustainable planning and development by offering tools and strategies that enhance participatory processes, improve data collection and analysis, and facilitate communication and collaboration among stakeholders. By leveraging technology in inclusive planning processes, cities and regions can create spaces that prioritize the needs and aspirations of all residents, foster social inclusion, and promote sustainable development.[18] [19] [20]

**Digital Public Service Initiatives**

Digital public service refers to the use of technology, digital platforms, and online channels to deliver public services and engage with citizens. It encompasses various initiatives and strategies to leverage technology to improve service delivery, enhance accessibility, and foster citizen engagement in the public sector. Digital public service initiatives encompass many

[13] Emina, Kemi Anthony. "Sustainable Development and the Future Generations." Social Sciences, Humanities and Education Journal (SHE Journal) 2, no. 1 (2021): 57-71

[14] Saxena, Anurag, Meghna Ramaswamy, Jon Beale, Darcy Marciniuk, and Preston Smith. "Striving for the United Nations (Un) Sustainable Development Goals (Sdgs): What Will It Take?". Discover Sustainability 2 (2021): 1-14.

[15]Bryan, Brett A, Michalis Hadjikakou, and Enayat A Moallemi. "Rapid Sdg Progress Possible." Nature Sustainability 2, no. 11 (2019): 999-1000.

[16] Sankaran, Gopal. "Chapter 12: Leveraging Technology for Attaining Sustainable Development Goal 3: The Road Ahead." Technology and Global Public Health (2020): 195-202.

[17] Vivanco, David Font, and Tamar Makov. "The Role of Technology and Rebound Effects in the Success of the Sustainable Development Goals Framework." Science, Technology, and Innovation for Sustainable Development Goals: Insights from Agriculture, Health, Environment, and Energy (2020): 192.

[18] Harrison, Katherine, Ahmet Börütecene, Jonas Löwgren, Desirée Enlund, Rasmus Ringdahl, and Vangelis Angelakis. "Sustainability Means Inclusivity: Engaging Citizens in Early-Stage Smart City Development." IEEE Technology and Society Magazine 40, no. 3 (2021): 60-65.

[19] Managi, Shunsuke, Robert Lindner, and Casey C Stevens. "Technology Policy for the Sustainable Development Goals: From the Global to the Local Level." 120410Elsevier, 2021.

[20] Weinberger, Nora, Silvia Woll, Christopher Conrad Maximillian Kyba, and Nona Schulte-Römer. "The Value of Citizen Participation in Technology Assessment, Responsible Research and Innovation, and Sustainable Development." Sustainability 13, no. 21 (2021): 11613.

areas, including e-governance, online service portals, digital platforms for public participation, and the digitalization of government processes. Digital public service initiatives play a crucial role in supporting inclusive planning by facilitating citizen engagement, promoting transparency and accountability, and enhancing the efficiency and effectiveness of public service delivery.[21] [22] Through the careful design and implementation of digital public service initiatives, inclusive planning can be enhanced, ensuring that the needs and interests of all stakeholders are considered. However, it is crucial to recognize the challenges related to access, digital literacy, and data privacy and address them to ensure equitable outcomes and maximize the benefits of these initiatives for all communities.[23] [24]

## METHODOLOGY

The methodology employed for this paper involved a case study approach to investigate the establishment and impact of digital public services on inclusive and sustainable planning in selected cities; published literature, including journals, policy briefs, government reports, and online sources discussing digital public services and their relation to sustainable development and inclusive urban planning, was consulted. The data were analysed using content and thematic analysis, utilizing the conceptual framework.

### Conceptual Framework

To learn more about how multi-scale inclusive planning and digital public service approaches can be successfully combined in many contexts and to identify best practices and suggestions for practitioners and policymakers. The study employed a conceptual framework. the basis for all scientific inquiry.[25] It was used to organize the ideas and focus on the important variables that needed to be examined by the research. making it easier to pinpoint the complex elements that have affected this approach's efficacy and impact at various scales in the contexts of New York, Singapore, and Estonia. These key variables and concepts were operationalized using established frameworks and indices, such as the United Nations EGovernment Development Index (EGDI), the Digital Economy and Society Index (DESI), and other pertinent indices that assess the degree of digitalization or maturity of public services in various situations.[26] [27] also a set of criteria that captures the different levels or scales of planning involved in the digitalization of public services. For example, defining planning scales as national, regional, and local and developing criteria or indicators for each scale These criteria or indicators for

[21] Finocchiaro, Giusella. "Transparency of Digital Providers and Digital Divide." Privacy and Data Protection in Software Services (2022): 3-13.

[22] Iyamu, Ihoghosa, Alice XT Xu, Oralia Gómez-Ramírez, Aidan Ablona, Hsiu-Ju Chang, Geoff Mckee, and Mark Gilbert. "Defining Digital Public Health and the Role of Digitization, Digitalization, and Digital Transformation: Scoping Review." JMIR public health and surveillance 7, no. 11 (2021): e30399.

[23] Agostino, Deborah, Iris Saliterer, and Ileana Steccolini. "Digitalization, Accounting and Accountability: A Literature Review and Reflections on Future Research in Public Services." Financial Accountability & Management 38, no. 2 (2022): 152-76

[24] Safarov, Nuriiar. "Personal Experiences of Digital Public Services Access and Use: Older Migrants' Digital Choices." Technology in Society 66 (2021): 101627

[25] Edwards, David JA. "Types of Case Study Work: A Conceptual Framework for Case-Based Research." Journal of humanistic psychology 38, no. 3 (1998): 36-70.

[26] Commission, European. Digital Economy and Society Index (Desi) 2022. European Commission (2022). https://digital-strategy.ec.europa.eu/en/library/digital-economy-and-society-index□desi-20

[27] E-Government Development Index (Egdi)." 2022, accessed 11, April, 2023, https://publicadministration.un.org/egovkb/en-us/About/Overview/-E-Government Development-Index

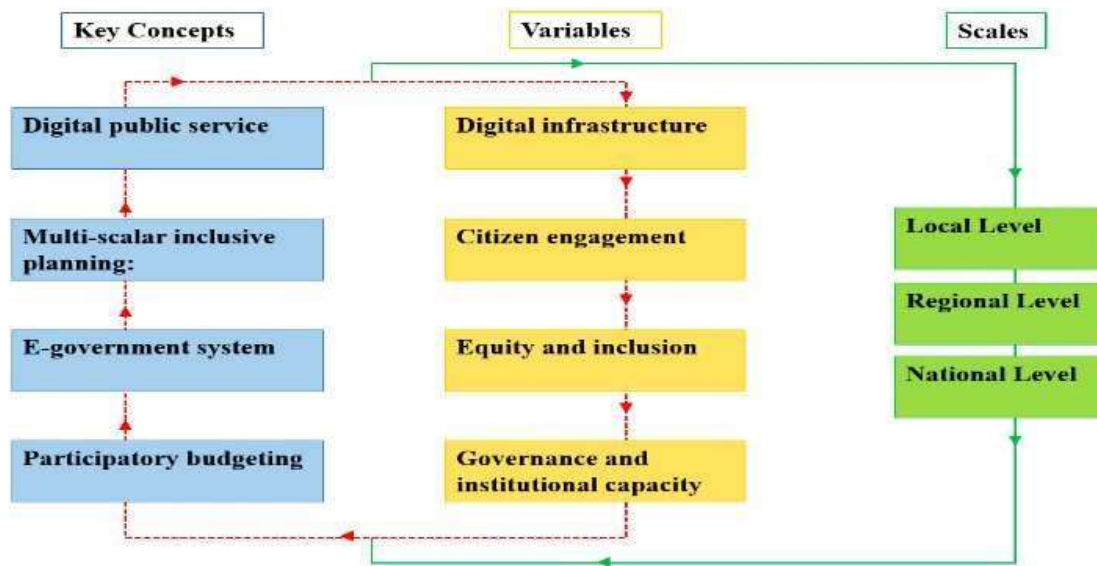inclusiveness include stakeholder participation, representation of marginalized groups, accessibility, and equity.



Figure 1: Conceptual Framework, Source: Researcher

**Synopsis**

The study's results and thematic analysis show how digital public service initiatives change the way planning and development are done on different scales while using data-driven decision-making processes. These initiatives have demonstrated their effectiveness in enhancing service delivery efficiency, promoting citizen engagement, and fostering transparency and accountability. However, it is essential to acknowledge the challenges and limitations associated with digital public service initiatives. The digital divide, concerns about data privacy and security, and the need for inclusive design are critical considerations that must be addressed to ensure that these initiatives truly benefit all residents and communities. The discussion revolves around the role and significance of digital public service initiatives in promoting inclusive, sustainable planning and development. The findings from the case studies and literature review provide a basis for discussing the following key points:

Digital public service initiatives have the potential to empower citizens by providing them with tools and platforms to actively participate in planning processes. By enabling residents to access services, provide feedback, and contribute to decision-making, these initiatives enhance citizen engagement and promote a sense of ownership and responsibility towards their communities. Again, digitizing public services helps streamline administrative processes, reduce bureaucratic hurdles, and improve service delivery efficiency. Through online platforms and mobile applications, residents can access services more conveniently, leading to faster response times and improved overall service quality. Furthermore, digital public service initiatives contribute to transparency and accountability by making information and data accessible to the public. This fosters trust between citizens and government agencies, as residents can track the progress of their service requests, hold authorities accountable, and participate in monitoring and evaluation processes. Lastly, the vast amount of data generated by digital public service initiatives can serve as a valuable resource for data-driven decision-making in planning processes. By analysing the data, policymakers, and planners can gain insights into community needs, identify trends, and make informed decisions that align with the principles of inclusivity and sustainability.

### Opportunities and Challenges

Fostering inclusive, sustainable planning and development through digital public service, with opportunities including, greater citizen engagement to enhanced access and equity to collaborative planning, is challenging, as seen from our case study and literature review. These challenges cut across factors such as the digital divide, data privacy and security, and inclusive design challenges, which are crucial in realizing this concept's benefits.

### Policy Implications and Recommendations

Based on the findings and discussion, the literature review presents policy implications and recommendations for policymakers, planners, and practitioners.

Despite the efforts of the governments in our case study to promote digital public services, for example, in Singapore, we could see how they have created a digital divide within thei processes.[28] [29] Therefore, efforts should be made to bridge the digital divide and ensure equitable access to technology and digital public services. This includes providing infrastructure, technology training, and support to marginalized communities and individuals. Secondly, designing digital public service initiatives with inclusive design principles will ensure accessibility and usability for all users. Consideration should be given to diverse needs, language barriers, and disabilities to ensure equal access and participation. The third point to consider for policymakers is strengthening data protection measures. Data security and privacy should be prioritized in designing and implementing digital public service initiatives. This includes robust data protection measures, transparent data practices, and compliance with privacy regulations. Fourthly, the need to foster collaboration and partnership. Collaboration between government agencies, community organizations, and residents is crucial for the success of digital public service initiatives. Building blocks and engaging stakeholders in the design and implementation process will ensure that initiatives meet the specific needs of communities. Finally, continuous evaluation and monitoring of digital public service initiatives are essential to assess their impact, identify areas for improvement, and incorporate lessons learned. Regular feedback from users should be solicited to refine and enhance these initiatives over time.

### CONCLUSION

This study has examined the role of technology, specifically digital public service initiatives, in promoting inclusive and sustainable planning and development. Several key conclusions can be drawn through the analysis of case studies, thematic analysis of the literature, and discussion of findings. Digital public service initiatives have demonstrated their potential to empower citizens, enhance service delivery efficiency, foster transparency, and accountability, and enable data-driven decision-making. These initiatives have transformed planning processes by leveraging technology to facilitate citizen engagement, improve access to services, and promote collaborative approaches to urban development.

The case studies of New York City, Singapore, and Estonia have provided valuable insights into digital public service initiatives' design, implementation, and impact. These case studies highlight the importance of inclusive planning, multi-scale approaches, and data-driven

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[28] Baum, Scott, and Arun Mahizhnan. "Government-with-You: E-Government in Singapore." In Public Affairs and Administration: Concepts, Methodologies, Tools, and Applications, 711-25: IGI Global, 2015.
[29] "Public Participation in E-Government: Some Questions About Social Inclusion in the Singapore Model." In Handbook of Research on E-Planning: Icts for Urban Development and Monitoring, 324-39: IGI Global, 2010.

decision-making in achieving inclusive and sustainable outcomes. However, challenges such as the digital divide, data privacy and security concerns, and inclusive design considerations must be addressed to ensure that digital public service initiatives truly benefit all residents and communities. Bridging the digital divide, implementing robust data protection measures, and prioritizing inclusive design principles are crucial to creating equitable and accessible digital public service initiatives.

The literature review also emphasizes the need for continuous evaluation, improvement, and collaboration in implementing digital public service initiatives. Ongoing monitoring, user feedback, and partnerships between government agencies, community organizations, and residents are essential to refine these initiatives, address emerging challenges, and align them with the evolving needs of communities. Digital public service initiatives hold immense promise for promoting inclusive and sustainable planning and development. By harnessing technology effectively, incorporating inclusive design principles, and ensuring equitable access, these initiatives can empower citizens, improve service delivery, foster transparency, and enable data-driven decision-making. Policymakers, planners, and practitioners play a crucial role in creating an enabling environment, implementing appropriate policies, and fostering collaboration to maximize the benefits of digital public service initiatives for inclusive and sustainable urban development.

The insights from this study contribute to broader academic and policy discussions on the role of technology in shaping the future of cities and regions. This review is a valuable resource for guiding future research, informing policy development, and promoting equitable and participatory urban transformation by highlighting the importance of inclusive and sustainable planning and development and providing recommendations for policymakers, planners, and practitioners. Finally, the effective utilization of digital public service initiatives can pave the way for inclusive and sustainable planning practices that prioritize the needs and aspirations of diverse communities. By leveraging technology, fostering collaboration, and addressing key challenges, policymakers, and planners can drive positive change and create cities that are equitable, resilient, and responsive to the needs of all residents.

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