

MAKING E-GOVERNMENT WORK IN A SMART SOCIETY

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Abstract: This study employed a bibliometric approach to examine the evolution of e-government research in the context of a smart society in Asia and Europe. E-government is essential for transforming public services; however, it faces obstacles, including the digital divide, data security, and challenges related to citizen engagement. This study used bibliometric analysis of the SCOPUS database to identify research trends, conceptual interrelationships, and thematic developments in e-government and smart society research from 2002 to 2025. The results demonstrated that incorporating smart city principles into e-government has expanded research to encompass governmental openness, civic engagement, and digital innovation. Nonetheless, a substantial disparity persists in the accessibility of digital services, especially for those with limited digital literacy. Moreover, significant disparities in e-government deployment are evident between industrialized and developing nations, shaped by legislation, infrastructural preparedness, and socio-economic conditions. This study offers insights into prospective research avenues and policy recommendations to improve the efficacy of e-government in fostering an inclusive and sustainable smart society.

Keywords: E-Government, Public Service, Smart City, Smart Society, Digital Innovation

Abstrak: Penelitian ini menggunakan metodologi bibliometrik untuk mengkaji evolusi riset e-government dalam konteks smart society di Asia dan Eropa. E-government memiliki peran penting dalam mentransformasi layanan publik; namun, implementasinya menghadapi berbagai tantangan seperti kesenjangan digital, keamanan data, dan keterlibatan warga negara. Studi ini menggunakan analisis bibliometrik melalui basis data SCOPUS untuk mengidentifikasi tren riset, keterkaitan konseptual, dan perkembangan tema dalam kajian e-government dan smart society dari tahun 2002 hingga 2025. Hasil penelitian menunjukkan bahwa

penggabungan prinsip smart city ke dalam e-government telah memperluas ruang lingkup riset mencakup keterbukaan pemerintah, partisipasi warga, dan inovasi digital. Meskipun demikian, masih terdapat kesenjangan besar dalam aksesibilitas layanan digital, terutama bagi mereka yang memiliki literasi digital rendah. Selain itu, terdapat perbedaan signifikan dalam penerapan e-government antara negara maju dan berkembang, yang dipengaruhi oleh regulasi, kesiapan infrastruktur, dan kondisi sosial ekonomi. Studi ini memberikan wawasan mengenai arah riset di masa depan serta rekomendasi kebijakan untuk meningkatkan efektivitas e-government dalam mewujudkan smart society yang inklusif dan berkelanjutan.

Kata Kunci: E-Government, Pelayanan Publik, Kota Pintar, Masyarakat Pintar, Inovasi Digital

Introduction

The digital divide and limited access to technology significantly affect public service innovation in a smart society. The digital divide refers to the gap between individuals, households, businesses, and geographic areas across socio-economic levels in their access to information and communication technologies (ICT).¹ This divide can manifest in various forms, including access to devices, internet connectivity, and digital literacy.² The digital divide is not just about access but also about the ability to use technology effectively. It includes the skills to leverage ICT to improve the quality of life and participate in socio-economic activities.³ ICT is crucial for transforming public services, making them

more efficient and accessible, such as education, healthcare, and e-government.⁴ Smart city initiatives often rely on ICT to enhance civic participation and improve service delivery.⁵ Smart city construction significantly improves public service levels.⁶ For instance, smart city initiatives in China have improved the quality of education and medical services by approximately 5.18% and the level of social life security by 4.04%. Smart city initiatives emphasize a shift from smart public services for citizens to smart public services by citizens. It involves ICT-enabled coproduction, where citizens actively participate in the public service value chain.⁷ Although cities strive to implement smart city projects that emphasize community

¹ Gede Agus Kurniawan, I Gede, and Agus Kurniawan, "Digitalization of Business Law: Urgency and Orientation of the Industrial Revolution 4.0 and Society 5.0," *Volksgeist: Jurnal Ilmu Hukum Dan Konstitusi* 5, no. 2 (December 2022): 253–65.

² Tanvir C Turin *et al.*, "Identifying Challenges, Enabling Practices, and Reviewing Existing Policies Regarding Digital Equity and Digital Divide Toward Smart and Healthy Cities: Protocol for an Integrative Review," *JMIR Research Protocols* 11, no. 12 (December 8, 2022).

³ Sabarudin Ahmad, Novita Anggraeni, and Andrian Kukuh Pambudi, "A. Djazuli's Thinking Regarding Hifzu Al-Ummah: Dismissing the Entangled Bureaucracy to Commemorate the Era of Society 5.0," *De Jure: Jurnal Hukum Dan Syar'iah* 12, no. 1 (June 2020): 86–101.

⁴ Prabhat Mittal and Suruchi Gautam, "Logistic Regression and Predictive Analysis in Public Services of AI Strategies," *TEM Journal*, May 29, 2023, 751–56, <https://doi.org/10.18421/TEM122-19>;

⁵ Manuela Fortes Lorenzo and Luiz Antonio Joia, "Smart City for Civic Participation: A Conceptual Framework," 2024, 353–67.

⁶ Qimeng Cai and Chuanyong Zhang, "Does the Smart City Improve Public Service Delivery? A Quasi-Natural Experiment Based on a Smart City Pilot Program in China," *Public Performance & Management Review* 46, no. 3 (May 4, 2023): 752–69, <https://doi.org/10.1080/15309576.2023.2166087>.

⁷ A. Paula Rodriguez Müller, "Making Smart Cities 'Smarter' Through ICT-Enabled Citizen Coproduction," in *Handbook of Smart Cities* (Cham: Springer International Publishing, 2021), 539–59, https://doi.org/10.1007/978-3-030-69698-6_63.

participation, most initiatives have not achieved direct citizen involvement.⁸ Engaging citizens in the co-creation of public services not only improves service delivery but also fosters a sense of community and shared responsibility. This participation is facilitated through digital platforms and open data initiatives that connect citizens with city services.⁹ Citizen participation is a crucial factor in the success of open data initiatives. Effective use of open data is significantly enhanced by hands-on activities, greater responsibility, improved communication, and stronger relationships between citizens and the open data portal development team. The digitization of public services has significantly improved the efficiency and accessibility of essential services, but it also poses substantial risks of personal data leakage. The rapid development of online public services has not been matched by the adoption of international security standards and best practices, leaving significant vulnerabilities. This situation risks citizens and services across various regions and income levels.¹⁰ Data leaks can occur accidentally and intentionally, with significant consequences for individuals and organizations. These leaks can result from application flaws, security bottlenecks, and improper data handling.¹¹ Furthermore, the

readiness of human resources to adapt to digital transformation is another critical gap. In the South African public sector, outdated human resource management (HRM) processes and a lack of digital skills development hinder the effective implementation of digital transformation initiatives.¹² Similarly, resistance to digital HRM, political interference, and inadequate infrastructure in the Nigerian public sector are significant barriers.¹³ In Saudi Arabia, cybersecurity concerns, trustworthiness, usage experience, and awareness are critical barriers to digital transformation. These factors need to be addressed to improve the readiness of human resources for digital transformation.¹⁴ Issues in Vietnamese enterprises include challenges related to digital skills among human resources, resulting in low digital transformation readiness. There is a reciprocal relationship between digital skills and the digital divide, emphasizing the need for policies to enhance digital skills to bridge this gap.¹⁵ Several studies bridged the gap between adaptive policy and regulation in public service innovation for a smart society, including the non-neutrality of technology, the need for regulatory learning in systems contexts, and the evolving role of government as a learning actor in a globalized context.¹⁶ However,

⁸ Emzaed et al., "Restriction of Islamic Civil Society Participation: Genealogy of Zakat Legal Politics and Its Centralized Management in Indonesia."

⁹ Fajar Sukma and Zulheldi, "Government Policies in Economic Empowerment of Muslim Communities in the Digital Economy Era," *El-Mashlahah* 11, no. 2 (December 2021): 146–63.

¹⁰ João Marco Silva et al., "A Worldwide Overview on the Information Security Posture of Online Public Services," *SSRN Electronic Journal*, 2023, <https://doi.org/10.2139/ssrn.4577703>.

¹¹ Asaf Shabtai, Yuval Elovici, and Lior Rokach, "Data Leakage," 2012, 5–10.

¹² Vumani Mbatha, Andrisha Beharry Ramraj, and Idris Olayiwola Ganiyu, "Revolutionizing Public Sector Human Resources," 2024, 193–210, <https://doi.org/10.4018/979-8-3693-2889-7.ch010>.

¹³ Oluwaseun Temitope Ojogwa and Sibongile Ruth Nhari, "Embracing Transformative Digital Human

Resource Management in the Nigerian Public Sector," 2024, 135–50.

¹⁴ Mohd Norhusairi et al., "Local Wisdom and Gender Equality in Joint Property Division: An Islamic Legal Perspective from Malaysia," *De Jure: Jurnal Hukum Dan Syar'iah* 17, no. 2 (August 2025): 394–416.

¹⁵ Thi Thanh Hong Pham et al., "Digital Skills of Human Resources: Exploratory Research of Innovations in Enterprises," *HighTech and Innovation Journal* 5, no. 3 (September 1, 2024): 730–42, <https://doi.org/10.28991/HIJ-2024-05-03-013>.

¹⁶ Mary Lee Rhodes et al., *Public Management and Complexity Theory* (Routledge, 2010), <https://doi.org/10.4324/9780203841600>; Eva Sørensen and Jacob Torfing, "Enhancing Public Innovation through Collaboration, Leadership and New Public Governance," in *New Frontiers in Social*

initiatives to accelerate regulatory measures in alignment with technological progress face numerous challenges, including the complexity of the ecosystem and the need for stable regulatory frameworks that can withstand rapid technological change.¹⁷ Adaptive regulation addresses these challenges by identifying stable structures within the system to facilitate sustainable policy development. Regulatory policies can significantly influence innovation, either by reducing or hindering it. Non-technological regulatory effects can serve as inputs for innovation policy, highlighting the need for complementary approaches between regulation and innovation policy to achieve desired outcomes.¹⁸ Current e-government research frequently emphasizes capabilities and interactions, neglecting the broader policy and value distribution implications. There remain challenges in e-government, including interoperability and openness, which can be addressed by establishing frameworks for data and service interoperability, transparency, and replicability.¹⁹ There is a need for increased interdisciplinary research that integrates core principles of public administration with

information systems. The integration of e-government into smart cities is a significant research topic in Europe. Studies highlight the need for a holistic approach that integrates economics, information technology, and the social sciences to improve e-government services in smart cities.²⁰ A significant gap persists in the accessibility of e-government services, particularly for citizens with limited digital skills or limited internet access. Although numerous studies have examined e-government development, the existing literature remains fragmented. It reveals a clear research gap in understanding how e-government operates within the broader concept of a smart society across both Asia and Europe. In Europe, the literature predominantly focuses on advanced topics such as smart governance, digital identity systems, interoperability standards, and open-data ecosystems.^{21 22} Meanwhile, studies from Asia highlight more foundational challenges, including digital literacy, human resource readiness, infrastructural limitations, and uneven e-participation.^{23 24 25} The research gap consists of two main issues: (1) the absence of a cross-

Innovation Research (London: Palgrave Macmillan UK, 2015), 145–69.

¹⁷ David D. Clark and K.C. Claffy, "Anchoring Policy Development around Stable Points: An Approach to Regulating the Co-Evolving ICT Ecosystem," *Telecommunications Policy* 39, no. 10 (November 2015): 848–60.

¹⁸ Evita Paraskevopoulou, "Non-Technological Regulatory Effects: Implications for Innovation and Innovation Policy," *Research Policy* 41, no. 6 (July 2012): 1058–71.

¹⁹ 25Lytras, Miltiadis D., and Andreea Claudia Serban. "E-Government Insights to Smart Cities Research: European Union (EU) Study and the Role of Regulations." *IEEE Access* 8 (2020): 65313–26. <https://doi.org/10.1109/ACCESS.2020.2982737>.

²⁰ 62Yera, Ainhoa, Olatz Arbelaitz, Oier Jauregui, and Javier Muguerza. "Characterization of E-Government Adoption in Europe." Edited by Renuka Sane. *PLOS ONE* 15, no. 4 (April 17, 2020): e0231585. <https://doi.org/10.1371/journal.pone.0231585>.

²¹ Miltiadis D. Lytras and Andreea Claudia Serban, "E-Government Insights to Smart Cities Research: European Union (EU) Study and the Role of Regulations," *IEEE Access* 8 (2020): 65313–26, <https://doi.org/10.1109/ACCESS.2020.2982737>.

²² Ainhoa Yera et al., "Characterization of E-Government Adoption in Europe," ed. Renuka Sane, *PLOS ONE* 15, no. 4 (April 17, 2020): e0231585, <https://doi.org/10.1371/journal.pone.0231585>.

²³ Thi Thanh Hong Pham et al., "Digital Skills of Human Resources: Exploratory Research of Innovations in Enterprises," *HighTech and Innovation Journal* 5, no. 3 (September 1, 2024): 730–42, <https://doi.org/10.28991/HIJ-2024-05-03-013>.

²⁴ Abebe Rorissa, Dawit Demissie, and Mohammed Gharawi, "A Descriptive Analysis of Contents of Asian E-Government Websites," in *E-Government Website Development* (IGI Global, n.d.), 102–16, <https://doi.org/10.4018/978-1-61692-018-0.ch007>.

²⁵ Siqi Xie, Ning Luo, and Masaru Yarime, "Data Governance for Smart Cities in China: The Case of

continental comparison and (2) the lack of comprehensive studies on related topics. Limited conceptual mapping of smart society-related e-government research, and (3) the insufficient scholarly attention to how disparities in digital readiness influence the evolution of smart governance research across Asia and Europe. Several studies demonstrate that e-government has historically been dominated by contributions from industrialized nations, particularly those in Europe, North America, and technologically advanced Asian economies. For instance, Year et al. explain that the European countries, especially Estonia, Denmark, Finland, and the United Kingdom, account for a substantial share of empirical e-government publications due to their high levels of digital readiness and mature institutional infrastructure.²⁶ Dias also shows that smart city-related e-government research is disproportionately concentrated in Western Europe, where digital governance ecosystems are more advanced and widely documented.¹⁴²⁷ In contrast, studies focusing on emerging economies remain limited in number, narrower in scope, and often centred on foundational issues such as ICT readiness, digital literacy, internet penetration, or human resource capability.²⁸ ²⁹ Song et al.'s mapping further confirms the geographic imbalance by showing that research output clusters are heavily skewed toward developed regions. In contrast, publications from Southeast Asia, South Asia, and Africa constitute only a minor share of the global e-government literature.³⁰ The novelty of this study lies in its comprehensive examination of how e-government functions within the

emerging innovative society paradigm, comparing governance logics, institutional arrangements, citizen participation models, and technological enablers across Asia and Europe. This study differs from existing research, which generally focuses on discrete aspects such as technology adoption, innovative city initiatives, or digital service quality. It synthesizes conceptual, institutional, and contextual elements to elucidate the reasons for the variation in e-government outcomes across regions characterized by diverse socio-economic frameworks, regulatory capabilities, and levels of digital maturity. The study introduces a new analytical perspective by linking e-government performance with characteristics of a smart society, such as data governance, digital inclusion, participatory innovation, and policy adaptability, thereby offering a more holistic understanding of how digital public services operate within complex governance ecosystems. This comprehensive, cross-regional explanatory framework has not been systematically delineated in previous literature. The comparative examination of Asia and Europe offers analytical clarity by revealing how differences in regulatory strength, socio-economic structures, digital inclusion, and institutional readiness produce divergent patterns of e-government performance within innovative society ecosystems. This expanded perspective addresses a gap, as earlier studies rarely integrate these multi-layered factors into a single comparative framework. This research aims to analyze how e-government functions within the emerging innovative society paradigm by

Shenzhen," *Policy Design and Practice* 7, no. 1 (2024): 66–86.

²⁶ Yera et al., "Characterization of E-Government Adoption in Europe."

²⁷ Gonçalo Paiva Dias, "Assessing the Impact of Smart Cities on Local E-Government Research: A Bibliometric Study," *Journal of Information Systems Engineering & Management* 4, no. 2 (August 29, 2019), <https://doi.org/10.29333/jisem/5897>.

²⁸.

²⁹ Rorissa, Demissie, and Gharawi, "A Descriptive Analysis of Contents of Asian E-Government Websites."

³⁰ Yifan Song, Takashi Natori, and Xintao Yu, "Tracing the Evolution of E-Government: A Visual Bibliometric Analysis from 2000 to 2023," *Administrative Sciences* 14, no. 7 (2024), <https://doi.org/10.3390/admsci14070133>.

examining the institutional, technological, and participatory challenges mentioned earlier, including digital inequality, data governance gaps, interoperability issues, limited citizen engagement, and uneven regulatory capacity. By linking these problems to cross-regional differences in Asia and Europe, the study seeks to clarify how these structural and contextual conditions shape the development of e-government practices, the emergence of key thematic priorities, and the direction of future research necessary to strengthen inclusive, adaptive, and effective digital governance.

Methods

Bibliometric Analysis is a research method used to identify, classify, and analyze literature within a research topic.³¹ In academic studies, bibliometric analysis evaluates research trends, authors' contributions, and citation patterns associated with a particular discipline.³² This technique can produce analyses of citations, co-citations, and co-words. Furthermore, bibliometric analysis can facilitate researchers' understanding of developments in theory and methodology, as well as the relationships among concepts in the literature.³³ The researchers used VOSviewer with the SCOPUS database. Comprehensive visualization can generate deep insights. Metadata can help to understand the development of patterns and structures in research on a specific topic. The bibliometric analysis method certainly has limitations in its search process. These limitations may reflect a tendency to emphasize topics or

research clusters that are more frequently cited, even though they do not necessarily reflect the discipline's actual impact. Differences in publication rates can affect citation patterns. Some articles may increase their relevance to specific topics by connecting to current conditions or emerging phenomena. Meanwhile, some other initially stable articles can increase substantially depending on the study's relevance to phenomena developing in society.³⁴ The contribution of this article is to bridge the research on e-government and its relationship to a smart society. Several steps can be taken to conduct a bibliometric analysis. The first step is to select the data source; in this case, the researcher relies exclusively on the SCOPUS database due to its accuracy and strong relevance to the study. Then, it is necessary to construct Boolean operators such as (AND, OR, NOT) to ensure that the scope of the discussion remains specific. Researchers must filter certain inclusion and exclusion criteria, such as language, year, keywords, title, and abstract. It requires meticulous attention to identify the most relevant and impactful prior research articles to inform future research.

1. Search Strategy

This study uses the SCOPUS database to identify and analyze research on e-government and smart society. Selecting this database is essential because it ensures the scope, relevance, and quality of the articles included in the review. To guide the literature selection process, the study adopts the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)

³¹ Marvin Hanisch *et al.*, "Digital Governance: A Conceptual Framework and Research Agenda," *Journal of Business Research* 162 (July 2023): 113777, <https://doi.org/10.1016/j.jbusres.2023.113777>.

³² Yifan Song, Takashi Natori, and Xintao Yu, "Tracing the Evolution of E-Government: A Visual Bibliometric Analysis from 2000 to 2023," *Administrative Sciences* 14, no. 7 (2024), <https://doi.org/10.3390/admsci14070133>.

³³ Andry Pratama Saputra, Heru Kurnianto Tjahjono, and Udin, "Bibliometric Analysis of Leadership Implementation in MSMEs," *Multidisciplinary Reviews* (Malque Publishing, April 1, 2024), <https://doi.org/10.31893/multirev.2024080>.

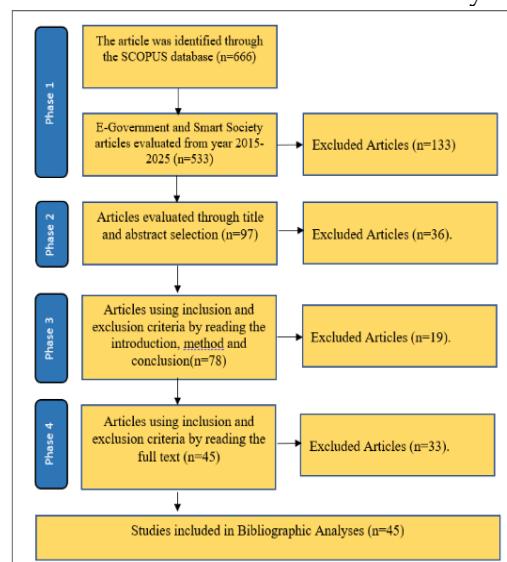
³⁴ Ilan Alon, Indri Dwi Apriliyanti, and Massiel Carolina Henríquez Parodi, "A Systematic Review of International Franchising," *Multinational Business Review* 29, no. 1 (2021): 43–69, <https://doi.org/10.1108/MBR-01-2020-0019>.

framework, which helps researchers clarify their research focus and track the field's development over a specific period. The systematic search was conducted manually in SCOPUS using the following keywords ("Electronic Government" OR "E-Government" OR "E-Gov") AND ("Smart City" OR "Smart Cities" OR "Smart Society").

2. Inclusion and Exclusion Criteria

Inclusion and exclusion criteria optimise the search and align with the research needs, particularly in the areas of e-government and smart society. In the inclusion criteria, articles identified in the SCOPUS database must contain several elements, such as 1) Articles published between 2002 and 2025, 2) Articles in their final stage, 3) Articles in English, 4) Articles containing the main keywords E-Government and Smart Society, and 5) Articles that are fully accessible (all open access). Based on an initial search using the keywords E-Government and Smart Society, 666 articles were identified in SCOPUS; however, most were not relevant to the study's objectives. The researchers then limited the search to 2015-2025, yielding 533 articles. In the second stage, the articles were re-evaluated and selected based on the relevance of their titles and research abstracts, yielding 97 articles. In the third stage, the researchers conducted a re-identification to identify studies related to e-government and smart society based on the introduction, methods, and conclusions, yielding 78 articles. In the final stage, the researchers reviewed all articles and selected those relevant to the study of e-government and its relationship to smart cities, yielding 45 articles.

Picture 1.
PRISMA for Bibliometric Analysis on E-Government and Smart Society



Result and Discussion

Result

Integrating innovative city concepts into e-government research has significantly broadened the scope of topics covered. It encompasses quality of life, economic growth, sustainability, and participatory governance, which have traditionally been outside the purview of local e-government research.³⁵ The study concludes that the significance of smart cities in local e-government research has increased to approximately 20% of the annual publications in the field, hence expanding the scope of topics addressed in this area.³⁶ Furthermore, there is a discernible trend toward investigating new research domains concerning the benefits and, more broadly, the implications of the development of smart societies for local-level service provision and governance. The focus of e-government research has shifted from basic technological implementations to more complex issues,

³⁵ Dyah Mutiarin and Herman Lawelai, "Optimizing the Role of ICT and Citizen Participation: Analysis of Smart City Governance Implementation in Jakarta, Indonesia and Kuala Lumpur, Malaysia," *E3S Web of Conferences* 440 (2023): 1-8, <https://doi.org/10.1051/e3sconf/202344003027>.

³⁶ Gonçalo Paiva Dias, "Assessing the Impact of Smart Cities on Local E-Government Research: A Bibliometric Study," *Journal of Information Systems Engineering & Management* 4, no. 2 (August 29, 2019).

including government transparency, corruption, and innovation in smart cities.³⁷

1. The Annual Volume of Paper Publication

The development of the e-Government sector is categorized into four distinct phases: 1) the budding phase (2002-2004), 2) the bottleneck phase (2004-2014), 3) the development phase (2015-2018), and 4) the growth phase (2019-2025), each characterized by specific thematic transitions and technological advancements. The research findings indicated a shift in research emphasis over time, beginning with an initial focus on technological methods and the electronic transformation of governmental services, progressing to more complex topics such as e-government adoption, government transparency, corruption, and culminating in the present focus on innovation and smart cities.

In this research, the author employs various keywords, including 'e-government' or 'electronic government' or 'e-gov' and 'smart' or 'society' or 'smart society', from 2002-2025,

yielding 666 documents. Although conference papers are pivotal in the e-government literature, the influence of articles greatly surpasses that of conference papers. The University at Albany has contributed significantly to e-government research regarding output and influence. The study identified several countries poised to significantly influence e-government research and issues likely to attract increased attention in the near future. The growth phase (2019-2023) was characterized by increased term diversity and frequency. The emphasis shifted significantly toward 'smart city' and 'innovation'. These developing keywords indicate a tendency to integrate e-government into innovative urban development and explore novel technologies and strategies. It reflects an interest in optimizing public services and enhancing urban management and sustainability, with recurring themes such as technology and trust. This period signifies an intensified focus on the function of e-government in urban innovation and growth.

Picture 2. The Annual Volume of Papers Publication with the e-Government and Smart Society Keyword



It differs from the annual volume of publications on e-government. The early years (2002-2012) saw minimal publication, beginning with approximately three documents in 2002 and declining to nearly zero for several years. This period represents

the nascent stage, during which these concepts emerged in academic discourse, with only occasional publications. A significant growth period began around 2014, when publications increased to approximately 9 per year. Between 2014 and

³⁷ Ekawati Marlina and Armita Widyasuri, "Exploring the Evolution of Data Management in E-Government: Bibliometric Analysis," in 2024

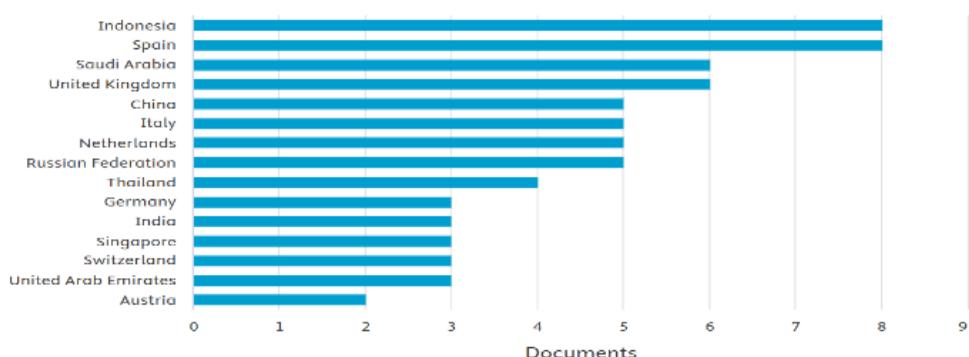
International Conference on Computer, Control, Informatics and Its Applications (IC3INA) (IEEE, 2024), 7-12.

2018, research output was moderate, with occasional fluctuations, indicating a consistent yet not overwhelming interest in these subjects as digital governance concepts gained increased attention. The most significant time was between 2018 and 2020, when publication volume grew markedly. Research output increased from approximately 11 documents in 2019 to approximately 21 papers in 2020, indicating the highest level of academic interest. A distinct decrease is observed from 2021 to 2025 following this peak. Publication

numbers decreased to approximately 16 documents in 2021, continued to decline to around six documents by 2023-2024, and then fell to about two papers in 2025. This trend indicates a decline in research interest, reflecting market saturation or academic transition toward innovative concepts beyond conventional e-government frameworks.

2. Global Distribution of the Literature of e-Government in Smart Society

Picture 3. Global Distribution of the Literature of e-Government in a Smart Society



Based on picture 3, while research volume in Asia (Indonesia: 10 documents; Saudi Arabia: 6 documents) rivals or exceeds that of some European countries, such as Italy (5 papers), the research focus shows fundamental distinctions. Asian studies, exemplified by Indonesia, concentrate on foundational challenges such as building integrated information systems and prioritizing digital infrastructure (Data Centers and Analytics) for municipalities³⁸. Meanwhile, research in the GCC countries highlights internal impediments, such as organizational culture and risk aversion, whereby managers view data as a strategic resource that impedes the adoption of the Open Government Data (OGD) initiative³⁹. Conversely, European

research emphasizes advanced governance and system optimization, utilizing value-based governance frameworks. For instance, studies in Belgium employ the Analytic Hierarchy Process (AHP) to prioritize public values, such as safety, in the governance of innovative mobility. Across the European Union (EU), macro-analytic tools such as the E-Government Development Index (EGDI) are applied to assess e-government maturity, revealing that digital services are less accessible to citizens with low overall digital skills.⁴⁰ A prominent European focus is managing complex data privacy and security issues in smart cities (as seen in Switzerland

³⁸ Asniati Bahari et al., "Integrated Information System Modeling for Municipalities in Indonesia Toward Smart Cities Integrated Information System Modeling for Municipalities in Indonesia Toward Smart Cities" 11, no. 4 (2024): 3307-15.

³⁹ Mirte Brouwers, Dorottya Varga, and Ruben D Hauwers, "Prioritizing Values in Smart Mobility

Governance: A Stakeholder-Based Analysis .," *Journal of Urban Management* 14, no. 3 (2025): 627-41, <https://doi.org/10.1016/j.jum.2025.03.003>.

⁴⁰ Lytras and Serban, "E-Government Insights to Smart Cities Research: European Union (EU) Study and the Role of Regulations."

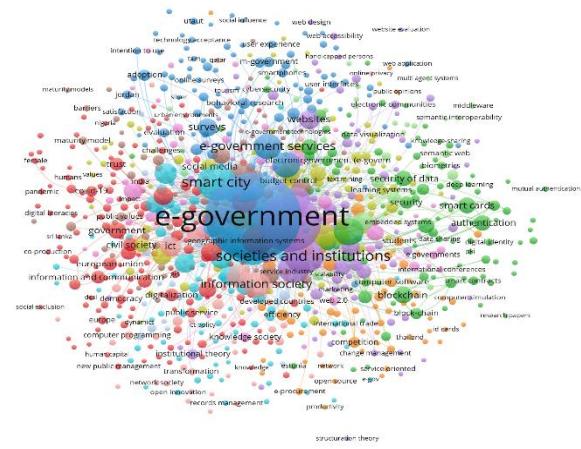
and Italy)⁴¹ and driving administrative efficiency, demonstrated by Serbia's Interconnected Government Services (IGSI) model, which uses weighted digraphs to prove a significant reduction in the time

required to collect documents, while safeguarding identity through a User Code Number (UCN).⁴²

3. The Network of Keywords Co-Occurrence

Picture 4.

Keyword co-occurrence e-Government and Smart Society Period 2002-2025



Picture 4 presents a bibliometric network visualization of the e-government research landscape. The primary node is "e-government," shown in green. The visualization depicts numerous clusters interconnected, illustrating how different research areas in this field are related. The main e-government cluster is closely linked to key concepts such as "smart city," "smart government," and "smart society." The prominence of technology terms such as "smart city," "digital transformation," "interoperability," "security of data," and "smart cards" as medium to large-sized nodes near the central node reflects patterns well supported by empirical and conceptual investigations. Previous studies have shown

that smart-city efforts and urban digital infrastructures increasingly shape the evolution of e-government and the transformation of local public services, suggesting a structural convergence between urban innovation systems and digital public governance. Research on digital transformation indicates that e-government efficacy is significantly influenced by ICT integration, interoperability frameworks, and the government's capacity to manage intricate technical ecosystems.^{43 44 45 46} The grouping of nodes related to data security and privacy is also consistent with recent studies suggesting that information governance, cybersecurity readiness, and data protection policies are important for

⁴¹ Brian F.G. Fabrègue and Andrea Bogoni, "Privacy and Security Concerns in the Smart City," *Smart Cities* 6, no. 1 (2023): 586–613.

⁴² Zivko Bojovic et al., "Interconnected Government Services: An Approach toward Smart Government," *Applied Science* 13, no. 1062 (2023).

⁴³ Awad Saleh Alharbi, "Challenges in Digital Transformation in Saudi Arabia: Obstacles in Paradigm Shift in Saudi Arabia," *IEEE Proceedings*, no. 1287-1291 (2019).

⁴⁴ Marvin Hanisch et al., "Digital Governance: A Conceptual Framework and Research Agenda,"

Journal of Business Research 162 (July 2023): 113777, <https://doi.org/10.1016/j.jbusres.2023.113777>.

⁴⁵ José L. Hernández et al., "Interoperable Open Specifications Framework for the Implementation of Standardized Urban Platforms," *Sensors* 20, no. 8 (April 23, 2020): 2402.

⁴⁶ Hyeon Jo and Hyun Yong Ahn, "Understanding Digital Engagement: Factors Influencing Awareness and Satisfaction of Digital Transformation," *Discover Computing* 27, no. 1 (2024).

evaluating online public services.^{47 48 49} The network also shows how close citizen-participation ideas are to technical clusters. This aligns with studies showing that ICT infrastructures and participatory governance are increasingly interdependent. Research on smart communities and co-production underscores that digital participation is increasingly integrated into e-government outcomes.^{50 51 52} These pieces of evidence collectively support the finding that the network topology of the e-government domain has shifted away from concerns with administration and service delivery toward governance frameworks grounded in technology and ecosystems.^{53 54} The linkages in the visualization indicate that e-government research is moving toward more unified, technology-based modes of governance. The "smart society" cluster (in green) is strongly associated with concepts such as "institutional theory," "e-participation," and "smart governance." This shows that this area focuses on theoretical and participatory frameworks in technology governance. The simultaneous presence of ideas such as "institutional theory," "citizen participation," "smart city," and "digital

transformation" indicates that modern e-government research is increasingly integrating institutional and participatory perspectives with technological issues. Previous studies have shown that governance theory, socio-technical systems, and citizen-centered methods have been used in digital governance research, supporting this pattern.^{55 56 57 58} In addition to the main technological and institutional issues, several other groups present distinct yet related perspectives on the study. For example, "government data processing" (red), "information services" (blue), and "e-governance" (yellow). Their interconnections indicate an interdisciplinary methodology in which scholars integrate institutional analysis, socio-technical frameworks, and participatory governance to understand both the implementation of e-government initiatives and their broader implications. The literature also shows that institutional and governance-based frameworks are often used to explain policy change and digital transformation.^{59 60 61} Studies on smart cities and socio-technical systems focus on how ICT infrastructures, interoperability mechanisms, and urban

⁴⁷ Fabrègue and Bogoni, "Privacy and Security Concerns in the Smart City."

⁴⁸ João Marco Silva et al., "A Worldwide Overview on the Information Security Posture of Online Public Services," *SSRN Electronic Journal*, 2023.

⁴⁹ Xie, Luo, and Yarime, "Data Governance for Smart Cities in China: The Case of Shenzhen."

⁵⁰ Benoit Granier and Hiroko Kudo, "How Are Citizens Involved in Smart Cities? Analysing Citizen Participation in Japanese 'Smart Communities,'" ed. Hans Jochen Scholl, *Information Polity* 21, no. 1 (February 15, 2016): 61–76, <https://doi.org/10.3233/IP-150367>.

⁵¹ Julien Hivon and Ryad Titah, "Conceptualizing Citizen Participation in Open Data Use at the City Level," *Transforming Government: People, Process and Policy* 11, no. 1 (March 20, 2017): 99–118, <https://doi.org/10.1108/TG-12-2015-0053>.

⁵² Mary Lee Rhodes et al., *Public Management and Complexity Theory* (Routledge, 2010).

⁵³ Albert Meijer, "E-Governance Innovation: Barriers and Strategies," *Government Information Quarterly* 32, no. 2 (2015): 198–206.

⁵⁴ Yera et al., "Characterization of E-Government Adoption in Europe."

⁵⁵ Giliberto Capano, "Understanding Policy Change as an Epistemological and Theoretical Problem," *Journal of Comparative Policy Analysis: Research and Practice* 11, no. 1 (2009): 7–31.

⁵⁶ Dias, "Assessing the Impact of Smart Cities on Local E-Government Research: A Bibliometric Study."

⁵⁷ Granier and Kudo, "How Are Citizens Involved in Smart Cities? Analysing Citizen Participation in Japanese 'Smart Communities'."

⁵⁸ Hivon and Titah, "Conceptualizing Citizen Participation in Open Data Use at the City Level."

⁵⁹ Capano, "Understanding Policy Change as an Epistemological and Theoretical Problem."

⁶⁰ Meijer, "E-Governance Innovation: Barriers and Strategies."

⁶¹ Eva Sørensen and Jacob Torfing, "Enhancing Public Innovation through Collaboration, Leadership and New Public Governance," in *New Frontiers in Social Innovation Research* (London: Palgrave Macmillan UK, 2015), 145–69.

innovation systems interact.⁶² ⁶³ ⁶⁴ Participatory approaches, encompassing co-production, public participation, and open-data practices, are fundamental to the analysis of the social impacts of e-government.⁶⁵ ⁶⁶ ⁶⁷ The interdisciplinary interpretation of relationships among clusters is supported by robust empirical and theoretical evidence rather than being derived solely from visualization. The visualization also shows that e-government research examines both technological infrastructure and social dimensions. Nodes such as "blockchain," "interoperability," and "cloud computing" exhibit technological characteristics, whereas nodes such as "social media," "information dissemination," and "public policy" exhibit societal implications. Terms such as "digital transformation," "developing nations," and "innovation" indicate that e-government research is moving in new directions worldwide. Recent research indicates the growing adoption of digital governance as a strategic response to

global public-sector concerns, including rapid urbanization, data governance, sustainability, cybersecurity risks, and digital engagement.¹⁵ ³⁶ ⁶⁰ Studies on smart-city governance also reveal that e-government is linked to broader issues such as access to services, digital inequality, and the capacity for innovation, all of which are affected by the use of integrated ICT infrastructures and platforms.⁶⁸ ⁶⁹ ⁷⁰ Cross-national studies demonstrate that elements such as citizen trust, digital proficiency, regulatory standards, and institutional preparedness significantly influence the efficacy of e-government systems.⁷¹ ⁷² ⁷³ This information confirms the broader topic coverage observed in the keyword network. It shows that modern e-government research is increasingly focusing on global governance issues beyond local administrative change. The visualization illustrates the breadth of the field, encompassing computer science, public administration, information systems, and the social sciences.

⁶² Antonio Cordella and Niccolò Tempini, "E-Government and Organizational Change: Reappraising the Role of ICT and Bureaucracy in Public Service Delivery," *Government Information Quarterly* 32, no. 3 (2015): 279–86.

⁶³ Oliveira, Oliver, and Ramalhinho, "Challenges for Connecting Citizens and Smart Cities: ICT, e-Governance and Blockchain."

⁶⁴ Yang, "The Smart City of Changsha, China."

⁶⁵ Granier and Kudo, "How Are Citizens Involved in Smart Cities? Analysing Citizen Participation in Japanese 'Smart Communities'."

⁶⁶ Hivon and Titah, "Conceptualizing Citizen Participation in Open Data Use at the City Level."

⁶⁷ A. Paula Rodriguez Müller, "Making Smart Cities 'Smarter' Through ICT-Enabled Citizen Coproduction," in *Handbook of Smart Cities* (Cham: Springer International Publishing, 2021), 539–59.

⁶⁸ Cai and Zhang, "Does the Smart City Improve Public Service Delivery? A Quasi-Natural Experiment Based on a Smart City Pilot Program in China."

⁶⁹ Dias, "Assessing the Impact of Smart Cities on Local E-Government Research: A Bibliometric Study."

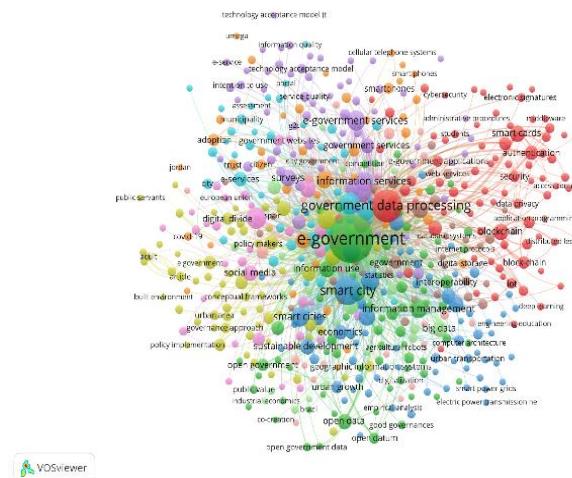
⁷⁰ Natalia V. Plotichkina, Elena V. Morozova, and Inna V. Miroshnichenko, "Digital Technologies: Policy for Improving Accessibility and Usage Skills Development in Europe and Russia," *World Economy and International Relations* 64, no. 4 (2020): 70–83.

⁷¹ Armenia Androniceanu and Irina Georgescu, "Hierarchical Clustering of the European Countries from the Perspective of E-Government, E-Participation, and Human Development," *NISPAcee Journal of Public Administration and Policy* 16, no. 2 (December 1, 2023): 1–29, <https://doi.org/10.2478/nispa-2023-0011>.

⁷² Trang Thi Uyen Nguyen et al., "Investigating the Impact of Citizen Relationship Quality and the Moderating Effects of Citizen Involvement on E-Government Adoption," *Journal of Open Innovation: Technology, Market, and Complexity* 10, no. 3 (2024): 100372.

⁷³ Yera et al., "Characterization of E-Government Adoption in Europe."

Picture 5.

Keyword co-occurrence e-Government, Smart Society, Community, Learning, Security
Period 2022-2025

Picture 5 further supports these points. The blue "e-government" node is the most critical part and has strong connections to other subject areas. Its strong link to the "smart city" cluster (red) indicates that recent literature has focused extensively on the governance of technology in cities. "Smart society" is a small node (yellow) adjacent to "institutional theory" and "digital transformation." This suggests that it is more of an emerging analytical lens than a primary research stream. On the right side of the visualization, there is a strong cluster of security-related terms, such as "security,"

"network security," "cyber security," and "mobile security." These terms are strongly related to "authentication," "smart cards," and "digital identity." These connections indicate the extent to which research focuses on protecting digital infrastructure and ensuring safe access to digital services. The educational and analytical components, represented by nodes such as "machine learning" (green) and their connections to "artificial intelligence" (orange), indicate continued interest in using computers to improve e-government services.

Table 1.

e-Government Development Index in Europe and Asia Region Period 2003 – 2024

Region name/year	e-Government Development Index											
	2024	2022	2020	2018	2016	2014	2012	2010	2008	2005	2004	2003
Europe	0.8493	0.8305	0.8170	0.7727	0.7241	0.6936	0.7188	0.5937	0.6188	0.5872	0.5730	0.5450
Asia	0.6990	0.6493	0.6373	0.5779	0.5132	0.4950	0.4992	0.4330	0.4372	0.4110	0.3838	0.3533

Table 1 provides additional evidence by showing the growth of e-government in Europe and Asia from 2003 to 2024. European countries consistently rank highly on the EGDI because they have strong digital infrastructure, robust economic conditions, and sound policy frameworks. Countries such as Denmark, Finland, Estonia, Malta, Austria, and Portugal have strong digital governance systems and have often scored well on EGDI assessments. Countries such as Singapore, Malaysia, and Brunei in Asia have

made substantial progress and are now leaders in e-government services, digital infrastructure, and e-participation in the region. At the same time, Cambodia, Laos, and Myanmar continue to face challenges due to limited internet access and inadequate digital infrastructure. In general, Asia has different levels of e-government development. Some countries have made substantial progress, while others face significant challenges. These differences demonstrate the importance of institutional

capability, policy commitment, and technology readiness in determining the success of e-government. Countries such as Singapore, Malaysia, and Brunei have made considerable progress in their EGDI scores, positioning themselves at the forefront of the region in terms of advanced e-government services, digital infrastructure, and e-participation.⁷⁴ Nevertheless, nations such as Cambodia, Laos, and Myanmar are hindered by limited internet connectivity and inadequate digital infrastructure. The overarching trend in Asia reveals a disparate degree of e-government advancement, with certain nations achieving considerable success while others encounter notable obstacles. European countries have demonstrated significant progress in e-government, with numerous countries achieving higher EGDI scores. Multiple factors, including economic conditions, digital infrastructure, and government policy, have shaped the advancement of e-government in Europe.⁷⁵ Countries such as Denmark, Finland, Estonia, Malta, and Portugal are recognised for their effective e-government systems, frequently achieving high EGDI rankings. Austria and Portugal, for example, are frontrunners in the EU in terms of the comprehensive online accessibility of public services and digital competence.

⁷⁴ Dyah Mutiarin et al., "Bridging the Digital Divide through Digital Infrastructure," *Journal of Infrastructure, Policy and Development* 8, no. 8 (August 30, 2024): 6817.

⁷⁵ Renata Machova and Martin Lnenicka, "Modelling E-Government Development through the Years Using Cluster Analysis," *JeDEM - Ejournal of EDemocracy and Open Government* 8, no. 1 (July 28, 2016): 62–83.

⁷⁶ Satish Krishnan and Anupriya Khan, *Theorizing the Relationship of Corruption in National Institutions with E-Government Maturity, IFIP Advances in Information and Communication Technology*, vol. 533 (Springer International Publishing, 2019).

⁷⁷ Elena Rytova et al., "Assessing the Maturity Level of Saint Petersburg's Digital Government,"

Discussion

1. The Evolution of E-Government Research Focus within the Smart Society Framework

The evolution of e-government research within the framework of a smart society has shifted the focus beyond the provision of basic technology-based services toward integrated, data-driven governance transformation. The initial development of e-government is defined as the use of ICT to improve government operations and services, to enhance G2C, G2B, and G2G interactions. In the initial stages, the focus tends to be more on technical and infrastructure aspects.⁷⁶ However, this trend has shifted, and current research focuses on smart government, which seeks to leverage innovative technologies and innovation to enhance stakeholder participation, decision-making, and overall government operations.⁷⁷ This evolution is becoming an essential component of the development of a smart society, a sustainable socio-economic system supported by advanced digital technologies.^{78 79} A fundamental shift in research focus is evident in the transition from passive to proactive governance models and from information-driven to data-driven approaches.⁸⁰ Digital government, a continuation of e-government, emphasizes that public services are shifting from mere administration to information and data-based

International Journal of Technology 11, no. 6 (2020): 1081–90.

⁷⁸ Bojovic et al., "Interconnected Government Services: An Approach toward Smart Government."

⁷⁹ More Ickson Manda and Judy Backhouse, "Towards a 'Smart Society' through a Connected and Smart Citizenry in South Africa: A Review of the National Broadband Strategy and Policy," *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)* 9820 LNCS (2016): 228–40, https://doi.org/10.1007/978-3-319-44421-5_18.

⁸⁰ Fernanda Tasso Salmoria et al., *Public Value in the Perception of Citizens from the Perspective of Smart Cities, BAR - Brazilian Administration Review*, vol. 18, 2021.

services. Therefore, in practice, smart government requires cross-institutional collaboration and interconnected government services. This service improvement is highly dependent on the availability of big data and open data as strategic resources for creating public value.⁸¹ Within the framework of a smart society, research increasingly focuses on inclusion, participation, and trust-building, which are the main pillars of smart government.⁸² A smart society strongly supports the empowerment of inclusive citizens to access social and economic opportunities in the digital age.⁸³ In this context, e-democracy and e-participation are considered key indicators of public interaction with the government. However, with the rise of digital services, challenges related to information security and data privacy have also become a significant concern in the literature, as these vulnerabilities can erode public trust.⁸⁴ Therefore, to achieve more inclusive governance, the public service system must be dynamic and inclusive (especially usable for vulnerable groups), while simultaneously minimizing the digital divide.⁸⁵ Evolution is also supported by the adoption of emerging technologies such as the Internet of Things

(IoT), Artificial Intelligence (AI), and Blockchain.⁸⁶ Blockchain is also a focus of research due to its potential to enhance transparency, reduce public-sector costs, and enable secure systems in a smart society.⁸⁷ Meanwhile, IoT, through its widespread sensing capabilities, can support precision services and real-time data collection for rapid decision-making.⁸⁸ ⁸⁹ Therefore, e-government research has moved beyond its initial focus on ICT-based administrative reform. This evolution aims toward a comprehensive socio-technical transformation to create adaptive and human-centered governance. The success of e-government in a smart society depends not only on the technology itself, but also on effective integration, strong leadership, and trust among stakeholders.

2. Trajectories of E-Government Differences in Smart Societies in Asia and Europe

Research on e-government in Asia and Europe has revealed differences in governance and implementation contexts, often shaped by the maturity of institutional and technological infrastructure in each region. While European countries have

⁸¹ Bojovic et al., "Interconnected Government Services: An Approach toward Smart Government."

⁸² More Ickson Manda, "Leadership and Trust as Key Pillars in 'Smart Governance' for Inclusive Growth in the 4th Industrial Revolution (4IR): Evidence from South Africa," *ACM International Conference Proceeding Series*, 2021, 308-15, <https://doi.org/10.1145/3494193.3494235>.

⁸³ Orlova Nataliia et al., "A Scientific-Methodical Approach To the Evaluation of Electronic Government in the Regions of Ukraine," *Public Policy and Administration* 21, no. 4 (2022): 407-22, <https://doi.org/10.13165/VPA-22-21-4-05>.

⁸⁴ Manda and Backhouse, "Towards a 'Smart Society' through a Connected and Smart Citizenry in South Africa: A Review of the National Broadband Strategy and Policy."

⁸⁵ Yushi Chen et al., "Proactive and Adaptive Elderly-Centered Governance Framework through Synergistic Integration of the Internet of Things and

Multi-Agent Systems," *Sensors and Materials* 37, no. 6 (2025): 2431-46, <https://doi.org/10.18494/SAM5741>.

⁸⁶ Bojovic et al., "Interconnected Government Services: An Approach toward Smart Government."

⁸⁷ Euber Chaia Cotta E. Silva and Rodrigo Moreno Marques, "Blockchain in the Public Sector: A Systematic Literature Review," *AtoZ* 10, no. 3 (2021): 1-11.

⁸⁸ Chen et al., "Proactive and Adaptive Elderly-Centered Governance Framework through Synergistic Integration of the Internet of Things and Multi-Agent Systems."

⁸⁹ Jamal Raiyn and Jugoslav Jokovic, *The Application of Advanced IoT in Cyberparks, Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, vol. 11380 LNCS (Springer International Publishing, 2019).

prioritized optimizing advanced systems and value-based governance, Asian countries (especially developing ones) continue to face challenges related to infrastructure and digital readiness, despite a strong push toward innovative society initiatives.⁹⁰ In Europe, research and practice in e-government are dominated by countries with mature infrastructure and stable institutional frameworks.⁹¹ For example, Russia, despite being at the crossroads of continents, demonstrates that program initiatives such as "electronic Russia" during its early e-government transition were quite successful. However, they fell short of achieving adequate socio-economic impact. Meanwhile, the strategies of Western and Central European countries (e.g., Austria and Hungary) tend toward advanced governance, including system interoperability, secure digital standards, and centralized services for citizens and businesses.⁹² In Asia, particularly in developing countries such as Indonesia, the challenges are more fundamental and concern the provision of basic services and the bridging of the digital divide across regions.⁹³ In Indonesia, the primary focus is on the adoption and effectiveness of mandatory information systems to enhance government accountability and transparency and to support the sustainable development of an information society. Research in Asia often faces socioeconomic barriers, such as limited digital literacy and access, so research efforts are directed toward how technology can contribute to economic growth and the

SDGs, as well as how to build public trust in governments that implement technology.^{94 95} This difference in trajectory is also reflected in policy priorities. In Asian countries, developing digital infrastructure is often a top priority to address significant connectivity disparities. Despite the vision of a smart society, the implementation of national broadband initiatives is hindered by high connectivity costs, infrastructure gaps between urban and rural areas, and socioeconomic issues, including poverty.⁹⁶ Therefore, in summary, the research trajectory in Europe focuses on internal transformation and optimization to achieve final-stage maturity in smart government implementation through advanced data integration and security. In contrast, Asia exhibits a dual trajectory: building infrastructure and improving accessibility while simultaneously addressing fundamental governance issues, such as transparency and accountability.

3. Main Clusters in E-Government Literature within Smart Society

Based on a bibliometric analysis of the literature, three main clusters were identified regarding e-government and smart society, reflecting the multidimensional challenges and priorities governments face in the transition toward a data-driven, integrated society. The clusters are: 1) Data governance and privacy; 2) Citizen engagement and digital participation; and 3) Policy options

⁹⁰ Rytova *et al.*, "Assessing the Maturity Level of Saint Petersburg's Digital Government."

⁹¹ Tobias Mettler, "The Road to Digital and Smart Government in Switzerland," *Governance and Public Management*, 2019, 175–86..

⁹² Andrea Kö and Bálint Molnár, "Improving the Security Levels of E-Government Processes within Public Administration through the Establishment of Improved Security Systems," *Journal of Computing and Information Technology* 17, no. 2 (2009): 141–55.

⁹³ Dodik Ariyanto *et al.*, "The Success of Information Systems and Sustainable Information Society:

Measuring the Implementation of a Village Financial System," *Sustainability (Switzerland)* 14, no. 7 (2022), <https://doi.org/10.3390/su14073851>.

⁹⁴ Ariyanto *et al.*

⁹⁵ Awang Anwaruddin, "E-Leadership for e-Government in Indonesia," in *Millennium Development Goals and Community Initiatives in the Asia Pacific* (India: Springer India, 2013), 177–87, https://doi.org/10.1007/978-81-322-0760-3_14.

⁹⁶ Reuben Ng, "Cloud Computing in Singapore: Key Drivers and Recommendations for a Smart Nation," *Politics and Governance* 6, no. 4 (2018): 39–47, <https://doi.org/10.17645/pag.v6i4.1757>.

and e-government implementation (not just technology, but also institutional and socio-political). The shift in research focus from basic technology implementation toward integrated and value-based governance indicates that the success of a smart society depends on the balance between technological innovation, institutional legitimacy, and public acceptance.⁹⁷ The Data Governance and Privacy cluster has become extremely central within the innovative society framework because current technological capabilities for collecting, responding to, and processing data are unprecedented. Data can be collected in real-time, embedded in urban infrastructure, and in various public spaces.⁹⁸ This cluster interprets the tense relationship between data-driven governance and public trust. On the one hand, data support evidence-based policymaking; on the other, the potential for data misuse and privacy violations can erode public trust. Therefore, a framework is needed to ensure that the security and confidentiality of personal data within the data governance system are taken seriously.⁹⁹

¹⁰⁰ The citizen engagement and digital participation cluster indicates a paradigm shift from a passive service-oriented approach toward co-production.¹⁰¹ Citizens are now viewed not just as recipients or customers, but as partners and co-creators of public services and policies. The role of

digital platforms is becoming increasingly important in this mechanism, enabling e-democracy and e-participation through two-way communication channels that encourage public input into the policy cycle.¹⁰² A transparent and inclusively managed platform can strengthen accountability and trust; however, if data failures or misuse occur, they can undermine participation and create social tensions.¹⁰³ Digital access inequality remains a significant challenge in this cluster, especially if exacerbated by limited digital literacy among vulnerable groups. The policy adoption and e-government implementation cluster discusses why achieving higher levels of e-government maturity is often hindered.¹⁰⁴ This cluster underscores that successful e-government requires adaptive policies and adequate organizational capacity, necessitating institutional and legal transformations that extend beyond the implementation of ICT.¹⁰⁵ The high number of failed e-government projects is due to various non-technical barriers, including a lack of integrated reform strategies across all levels of government and poor inter-agency coordination. Failure can also be caused by slow internal restructuring, insufficient staff competence, and low adoption of adaptive policies among policymakers. Failure can also result from corruption or rent-seeking, which can impede the maturity of e-government by

⁹⁷ Krishnan and Khan, *Theorizing the Relationship of Corruption in National Institutions with E-Government Maturity*.

⁹⁸ Fabrègue and Bogoni, "Privacy and Security Concerns in the Smart City."

⁹⁹ Devin Diran and Anne Fleur van Veenstra, *Towards Data-Driven Policymaking for the Urban Heat Transition in The Netherlands: Barriers to the Collection and Use of Data, Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, vol. 12219 LNCS (Springer International Publishing, 2020), https://doi.org/10.1007/978-3-030-57599-1_27.

¹⁰⁰ Bojovic et al., "Interconnected Government Services: An Approach toward Smart Government."

¹⁰¹ Salmoria et al., *Public Value in the Perception of Citizens from the Perspective of Smart Cities*.

¹⁰² Nataliia et al., "A Scientific-Methodical Approach To the Evaluation of Electronic Government in the Regions of Ukraine."

¹⁰³ Vladislav A. Belyi and Andrei V. Chugunov, "E-Government Services Introduction Effects in the Covid-19 Pandemic: 2020-2021 Surveys Results," *CEUR Workshop Proceedings* 3066 (2021): 147-55, <https://doi.org/10.20948/abram-2021-3s-ceur>.

¹⁰⁴ Krishnan and Khan, *Theorizing the Relationship of Corruption in National Institutions with E-Government Maturity*.

¹⁰⁵ Rytova et al., "Assessing the Maturity Level of Saint Petersburg's Digital Government."

misusing resources and creating inefficiencies.¹⁰⁶

These three major clusters indicate that the transformation toward a smart society is a complex, interdependent socio-technical system. The data governance cluster ensures a secure and trustworthy technical foundation, which is a prerequisite for the Citizen Engagement Cluster. Both, in turn, must be channeled through the Policy Adoption Cluster to ensure that technology and participation are transformed into effective administrative and governance reforms.

4. Future Research Directions

Future research should focus on an in-depth comparison between centralized and decentralized digital governance models across various regions in Europe and Asia. Furthermore, given the significant emphasis on trust and data security in the development of e-government and smart societies, future research should examine the functionality of digital services and the overall public trust they engender. Another research area requiring further study is the integration of e-government and sustainable business models within the context of a smart society. Therefore, future research should explore new business models, such as the sharing economy, the circular economy, and digital platforms, to promote sustainable resource sharing in smart societies in Asia and Europe. As a smart society becomes increasingly reliant on data-driven and algorithmic decision-making, there is an urgent need to research algorithmic ethics in public services. This requires a comparative study of Asian and European regions and an understanding

of how e-government practices influence citizen autonomy and public space.

Conclusions

Research on e-government and smart society has created significant opportunities to study digital transformation in governance and public services. However, several challenges remain, including infrastructure constraints, the digital divide, and limited citizen participation in the implementation of digitalization policies. Improving efficiency through e-government is a positive development that should be maintained, but an approach that overemphasizes technology can minimize sociocultural impacts, underscoring the importance of balance. Policymakers need to develop a more holistic study of e-government and smart society. The study's approach should not only focus on technology development but also consider how digital technology can be integrated, responsive, inclusive, and sustainable. Digital transformation is one form of policy change that will inevitably occur incrementally or radically. By combining policy-based, social, and technological approaches, the government can manage policy changes more optimally and create an inclusive digital environment for all layers of society.

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¹⁰⁶ Bojovic *et al.*, "Interconnected Government Services: An Approach toward Smart Government."

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