

Introduction to the special section on digital government and sustainable development goals: SDGs as a key challenge for digital government research

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More than two decades of research and policy on the use of Information and Communication Technologies (ICTs) in the public sector have solidified an understanding of the potential benefits of digital government that can now be considered canonical. These potential benefits include efficiency gains and increased productivity in public organizations, improvements in service provision, and the support to better public decision-making, as well as facilitating citizens access to information and engagement in democratic participation.

The rapidly evolving landscape of digital government naturally brings this policy and research area to be associated with the urgency and opportunity of tackling the key global challenge of sustainability. The 17 Sustainable Development Goals (SDGs), formulated as part of the United Nations 2030 Agenda for Sustainable Development (United Nations, 2015a, 2015b), link separate goals of sustainable development across different areas, into a unitary vision. These goals cut across key policy issues related to poverty, inequality, health, discrimination, inclusion, climate change, environmental degradation, peace, and justice.

The exponential surge of technological innovation opens for new possibilities to pursue sustainable development goals in previously unforeseen ways and in an unprecedented manner. For instance, the latest wave of Artificial Intelligence (AI) technologies have introduced new application scenarios geared towards sustainability (Pan & Nishant, 2023; Zhang et al., 2022). Generative AI (GenAI) applications, including Large Language Models (LLM), are beginning to be showcased in relation to goals of sustainable development. For example, in the area of education (SDG 4), GeoAI features the potential to provide scalable and personalized interactive learning, both from the side of educators, by supporting the creation of educational material, like designing course syllabuses (Pettinato Oltz, 2023), and from the side of learners, for example by generating prompts for formative assessment and ongoing feedback (Baidoo-Anu & Owusu Ansah, 2023). The scalability of these educational benefits can be used to bridge societal divides and reach underserved parts of the population. In the area of public healthcare (SDG 3), GenAI is

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beginning to be applied for the discovery and development of new drugs, as in clinical trials for cancer therapies that have been developed utilizing expansive generative and predictive engines encompassing biological, chemical, and textual data (Lorenzet et al., 2023). Other technological developments that introduce new possibilities for tackling sustainable development goals include: the pervasive development of Internet of Things (IoT) ecosystems to support better services to citizens in smart cities environments (Chatterjee et al., 2018); and distributed ledger technologies (DLT)/blockchain, applied to diverse areas of policy, from protecting refugees and supporting their integration in society, to financial inclusion and fighting corruption among public servants (UN World Food Programme, 2023). Emerging technologies that can be expected to affect the sustainability discourse include also the Metaverse (Dwivedi et al., 2022), and quantum computing (Kong et al., 2024).

This technology surge occurs amidst essential demographic, environmental, and public health challenges, where the public sector plays a pivotal role in facilitating sustainable development (Misuraca et al., 2020). For example, the recent COVID-19 pandemic has highlighted potential benefits but also challenges for digital government in tackling public health goals and managing crisis situations (Meijer & Webster, 2019; Pan & Zhang, 2020; UNDESA, 2020). Digital government policies, applications, and research can thus become instrumental in facilitating sustainability, equity, and social inclusion (Estevez & Janowski, 2013; Janowski, 2016). Digital government does not only link to SDG 16, related to building peaceful and inclusive societies for sustainable development, ensuring access to justice for all, and establish in effective, accountable, and inclusive institutions at all levels; but it can also play a key role at the intersection of various SDGs at both sectoral and horizontal levels (Misuraca et al., 2021).

Digital government infrastructure investments can bridge divides between digital “haves” and “have-nots” (Reggi & Gil-Garcia, 2020), in line with SDG 10 (Reduced inequalities); public online participation initiatives can tackle environmental challenges, such as sustainable transportation policies (Ju et al., 2019) in line with SDG 9 (Industry innovation and infrastructure). An increasing number of countries are actively involved in the creation of smart cities, offering a variety of public services related to intelligent environmental management. These services encompass smart municipal solid waste management, smart grids and metering, smart buildings, optimized public lighting, intelligent traffic and bus services, as well as advanced water management covering distribution and sanitation (Axelsson & Granath, 2018; Corbett & Mellouli, 2017; Tomor et al., 2019; Webster & Leleux, 2019), in line with SDG 11 (Sustainable cities and communities), just to mention few examples.

An under-researched field

Despite the acknowledged relevance of digital government in relation to sustainability, research on this relationship so far has been both underwhelming and fragmented. Only a small fraction of the body of research on digital government focuses on sustainability and sustainable development (Medaglia et al., 2021; Sapraz & Han, 2019).

Some of the existing empirical studies on digital government and sustainability tend to emphasize the role of specific technologies. Digital technologies are seen as solutions for implementing digital government services aimed at strategically planning comprehensive digital transformations addressing environmental concerns for diverse stakeholders, be they organizations or citizens. For instance, blockchain is highlighted in relation to its application by local governments to mitigate the risk of corruption in the distribution of poverty alleviation assistance in rural areas (Ning et al., 2019). The Internet of Things (IoT) is recognized as a tool for governmental agencies to monitor electricity consumption (Branco et al., 2020).

Existing studies, however, predominantly concentrate on governmental strategies and policy-making (Sapraz & Han, 2019). For example, digital government initiatives play a key role in promoting the reuse, repair and recycle of manufactured products in the supply chains of relevant industries, following the model of the Circular Economy (Medaglia et al., forthcoming), in line with SDG 12 (Ensure sustainable consumption and production patterns).

In addition, the comprehension of theoretical aspects related to digital government's role in promoting environmental sustainability is presently limited. The existing body of research largely lacks significant contributions to theory development (Medaglia et al., 2021; Sapraz & Han, 2019).

A call for research

To tackle these shortcomings, a renewed focus on the relationship between digital government and sustainable development goals is necessary. In particular, three directions for future research can represent fruitful pathways to advance this research area.

1) Exploring the links between digital government and each of the 17 SDGs

The framework developed by the United Nations that identifies 17 Sustainable Development Goals can represent a useful tool to drive future research on the role of digital government in sustainability. The well-established framework of the UN Agenda 2030 allows to easily compare areas of digital government impact. Moreover, the familiarity of key digital government stakeholders (public agencies, businesses, and citizens) with the SDG framework represents an additional point of strength in its appropriateness.

Examples of how to potentially adopt the SDG framework in studying digital government initiatives have already started appearing. These include the analysis of information provision in governmental websites (Meschede, 2019), and the investigation of how government indicators contribute to the measurement of SDGs (Marcovecchio et al., 2019).

The UN SDG framework can also be used as a device to generate research questions on the topic of digital government and sustainability, and to assess research foci and gaps. In doing so, a future-oriented perspective should be adopted, linking this field of research to the policy developments and the international cooperation agenda, such as the Global Digital Compact proposed by the UN Secretary General (United Nations, 2023), which recognizes the cross-cutting impact of digital government on all policy areas addressed by the SDGs.

2) Expanding the theoretical depth of studies on digital government in relation to sustainability

The lack of theory application and of theory development in existing empirical research on digital government and sustainability needs to be tackled in future research. Atheoretical studies can often dominate the early stages of exploration of a new topic area. However, in the long run the absence of theoretical depth is detrimental to the development of an established stream of empirical research. Theoretical depth is necessary not only to build cumulative knowledge, but also to move beyond empirical case description, and engage in unfolding the mechanisms behind observed phenomena related to digital government and sustainability.

The multidisciplinary nature of the link between digital government and sustainability can be leveraged to enhance theory application in future empirical studies. As the topic area lies at the intersection of multiple disciplines, including public administration, management, Information Systems (IS), and Science

and Technology Studies (STS), this constitutes an opportunity to adopt existing theoretical frameworks to formulate relevant research questions, interpret empirical findings, and gain theoretical insights. Moreover, inductive approaches to a topic area as rich as the one relating digital government with sustainability can provide invaluable inputs for theory development.

3) Developing benchmarking indicators of sustainability for digital government initiatives

Evaluating the effects of digital technologies on sustainable development poses a considerable challenge, often yielding unsuccessful outcomes (Nishant et al., 2020). Since the same can be said for digital government initiatives, specifically, it is imperative for policymakers and citizens to have a clear understanding of the impact of digital government strategies against established sustainability objectives.

Measurement and benchmarking tools offer analytical capabilities and serve as incentives for policy initiatives. The UN E-government Development Index (EGDI), for instance, has played a pivotal role for over a decade in steering global attention towards digital government initiatives (Misuraca et al., 2021). However, current benchmarking tools for digital government largely neglect sustainable development impacts. There is a pressing need for global and region-specific assessment tools to gauge the impacts of digital government on sustainable development goals.

Future studies should focus on developing assessment frameworks that not only hold descriptive potential but have also a normative aspect, facilitating benchmarking, incentivizing action, and informing policy decisions related to initiatives in digital government for sustainable development globally.

Contributing perspectives

The call for papers for this special section of Information Polity on digital government and sustainable development goals invited studies on the design, management and evaluation of policies and implementation of digital government strategies in relation to the UN SDGs at global, national, and local level, and encouraged multidisciplinary submissions from different social science perspectives.

The two papers selected for this special section provide contributions to start tackling the urgent need for in-depth studies in this topic area. The article “Perspectives on the twin transition: Instrumental and institutional linkages between the digital and sustainability transitions” by Albert Meijer provides a conceptual analysis that aims to broaden the prevailing focus on the digital and sustainable transitions and to encompass destructive connections, specifically the environmental impacts of e-government, and introduces an institutional perspective on e-governance. This approach for developing diverse perspectives on the twin transition aims to counterbalance the unquestioning belief in the power of technology for sustainable development. The article also proposes a research agenda that underscores the importance of investigating three key issues: (1) green e-governance as mitigating the environmental costs of e-governance, (2) e-governance as a barrier for the sustainability transition, and (3) the ecology logic as a basis for shaping the twin transition.

The article “Digital skills within the public sector: a missing link to achieve the Sustainable Development Goals (SDGs)” by Antonio Cordella, Francesco Gualdi, and Mindel van de Laar highlights a previously overlooked aspect: the digital literacy of individuals shaping policies mediated by ICTs geared towards sustainable development. Introducing a fresh conceptualization, the study defines digital skills as the proficiency to comprehend the socio-technical configurations that arise in social contexts following the implementation of ICT-mediated policies. Through an examination of the United Kingdom’s Government Digital Service as a case study, the article posits that equipping public administrators and

civil servants with these digital skills is crucial for the effective design, implementation, and management of ICT-mediated policies striving to achieve Sustainable Development Goals.

Approaching the milestone of the United Nations' 2030 Agenda for Sustainable Development, we are just starting to comprehend the research ramifications of digital government initiatives in the pursuit of sustainable development. With the global focus intensifying on the sustainability agenda, there is an unprecedented demand for innovative, well-founded, and theoretically informed research on the ways in which digital government can either facilitate or impede progress toward the Sustainable Development Goals. We trust that the articles in this special section of Information Polity on this topic constitute relevant contributions to advance the progress towards this objective.

References

- Axelsson, K., & Granath, M. (2018). Stakeholders' stake and relation to smartness in smart city development: Insights from a Swedish city planning project. *Government Information Quarterly*, 35(4), 693-702. doi: 10.1016/j.giq.2018.09.001.
- Baidoo-Anu, D., & Owusu Ansah, L. (2023). *Education in the Era of Generative Artificial Intelligence (AI): Understanding the Potential Benefits of ChatGPT in Promoting Teaching and Learning* (SSRN Scholarly Paper 4337484). doi: 10.2139/ssrn.4337484.
- Branco, T.T., Kawashita, I.M., de Sá-Soares, F., & Monteiro, C.N. (2020). An IoT application case study to optimize electricity consumption in the government sector. In Y. Charalabidis, M.A. Cunha, & D. Sarantis (Eds.), *Proceedings of the 13th International Conference on Theory and Practice of Electronic Governance* (pp. 70–81). Association for Computing Machinery. doi: 10.1145/3428502.3428511.
- Chatterjee, S., Kar, A. K., & Gupta, M. P. (2018). Success of IoT in Smart Cities of India: An empirical analysis. *Government Information Quarterly*, 35(3), 349-361. doi: 10.1016/j.giq.2018.05.002.
- Corbett, J., & Mellouli, S. (2017). Winning the SDG battle in cities: How an integrated information ecosystem can contribute to the achievement of the 2030 sustainable development goals. *Information Systems Journal*, 27(4), 427-461. doi: 10.1111/isj.12138.
- Dwivedi, Y. K., Hughes, L., Baabdullah, A. M., Ribeiro-Navarrete, S., Giannakis, M., Al-Debei, M. M., Dennehy, D., Metri, B., Buhalis, D., Cheung, C. M. K., Conboy, K., Doyle, R., Dubey, R., Dutot, V., Felix, R., Goyal, D. P., Gustafsson, A., Hinsch, C., Jebabli, I., . . . Wamba, S. F. (2022). Metaverse beyond the hype: Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management*, 66, 102542-102542. doi: 10.1016/j.ijinfomgt.2022.102542.
- Estevez, E., & Janowski, T. (2013). Electronic Governance for Sustainable Development – Conceptual framework and state of research. *Government Information Quarterly*, 30(Supplement 1), S94–S109.
- Janowski, T. (2016). Implementing Sustainable Development Goals with Digital Government – Aspiration-capacity gap. *Government Information Quarterly*, 33(4), 603-613. doi: 10.1016/j.giq.2016.12.001.
- Ju, J., Liu, L., & Feng, Y. (2019). Public and private value in citizen participation in E-governance: Evidence from a government-sponsored green commuting platform. *Government Information Quarterly*, 36(4), 101400-101400. doi: 10.1016/j.giq.2019.101400.
- Kong, I., Janssen, M., & Bharosa, N. (2024). Realizing quantum-safe information sharing: Implementation and adoption challenges and policy recommendations for quantum-safe transitions. *Government Information Quarterly*, 41(1), 101884-101884. doi: 10.1016/j.giq.2023.101884.
- Lorenz, P., Perset, K., & Berryhill, J. (2023). *Initial policy considerations for generative artificial intelligence* (OECD Artificial Intelligence Papers). OECD Publishing. doi: 10.1787/fae2d1e6-en.
- Marcovecchio, I., Thinyane, M., Estevez, E., & Janowski, T. (2019). Digital government as implementation means for sustainable development goals. *International Journal of Public Administration in the Digital Age*, 6(3), 1-22. doi: 10.4018/IJ-PADA.2019070101.
- Meijer, A., & Webster, C. (2020). The COVID-19-crisis and the Information Polity: An Overview of Responses and Discussions in Twenty-one Countries from Six Continents. *Information Polity*, 25(3), 243–274. doi: 10.3233/IP-200006.
- Medaglia, R., Misuraca, G., & Aquaro, V. (2021). Digital Government and the United Nations' Sustainable Development Goals: Towards an analytical framework. *DG.O2021: The 22nd Annual International Conference on Digital Government Research*, 473–478. doi: 10.1145/3463677.3463736.
- Medaglia, R., Rukanova, B., & Zhang, Z. (forthcoming). Digital government and the circular economy transition: An analytical framework and a research agenda. *Government Information Quarterly*.
- Meschede, C. (2019). Information dissemination related to the Sustainable Development Goals on German local governmental websites. *Aslib Journal of Information Management*, 71(3), 440–455. doi: 10.1108/AJIM-08-2018-0195.

- Misuraca, G., Barcevičius, E., & Codagnone, C. (2020). *Exploring Digital Government Transformation in the EU – Understanding public sector innovation in a data-driven society*. Publications Office of the European Union. <https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/exploring-digital-government-transformation-eu-understanding-public-sector-innovation-data>.
- Misuraca, G., Medaglia, R., & Aquaro, V. (2021). Re-designing the UN e-Government Survey in light of the 2030 Agenda for Sustainable Development: Towards a post-COVID digital society. *14th International Conference on Theory and Practice of Electronic Governance*, 198–202. doi: 10.1145/3494193.3494221.
- Ning, X., Ramirez, R., & Khuntia, J. (2019). Technology to Shape Social Policy: Blockchain for Targeted Poverty Alleviation in China. *Proceedings of the 25th Americas Conference on Information Systems (AMCIS 2019)*, [1-10]. https://aisel.aisnet.org/amcis2019/global_dev/global_dev/12.
- Pan, S. L., & Nishant, R. (2023). Artificial intelligence for digital sustainability: An insight into domain-specific research and future directions. *International Journal of Information Management*, 72, 102668-102668. doi: 10.1016/j.ijinfomgt.2023.102668.
- Pan, S. L., & Zhang, S. (2020). From fighting COVID-19 pandemic to tackling sustainable development goals: An opportunity for responsible information systems research. *International Journal of Information Management*, 55, 102196-102196. doi: 10.1016/j.ijinfomgt.2020.102196
- Pettinato Oltz, T. (2023). *ChatGPT, Professor of Law* (SSRN Scholarly Paper 4347630). doi: 10.2139/ssrn.4347630.
- Reggi, L., & Gil-Garcia, J. R. (2020). Addressing territorial digital divides through ICT strategies: Are investment decisions consistent with local needs? *Government Information Quarterly*, 101562. doi: 10.1016/j.giq.2020.101562.
- Sapraz, M., & Han, S. (2019). A Review of Electronic Government for Environmental Sustainability. In D. Xu, J. Jiang, & H.-W. Kim (Eds.), *PACIS 2019 Proceedings* (p. 155[-168]). Association for Information Systems, AIS Electronic Library (AISeL). <https://aisel.aisnet.org/pacis2019/155>.
- Tomor, Z., Meijer, A., Michels, A., & Geertman, S. (2019). Smart Governance For Sustainable Cities: Findings from a Systematic Literature Review. *Journal of Urban Technology*, 26(4), 3-27. doi: 10.1080/10630732.2019.1651178.
- UN World Food Programme. (2023). *Building Blocks: Blockchain Network for Humanitarian Assistance*. <https://innovation.wfp.org/project/building-blocks>.
- UNDESA. (2020). *COVID-19: Embracing digital government during the pandemic and beyond*. United Nations Department of Economic and Social Affairs. <https://www.un.org/development/desa/dpad/publication/un-desa-policy-brief-61-covid-19-embracing-digital-government-during-the-pandemic-and-beyond/>.
- United Nations. (2015a). *Transforming our world: The 2030 Agenda for Sustainable Development*. United Nations. <https://sustainabledevelopment.un.org/post2015/transformingourworld>.
- United Nations. (2023). *A Global Digital Compact – An Open, Free and Secure Digital Future for All* (UN Executive Office of the Secretary-General (EOSG) Policy Briefs and Papers) [UN Executive Office of the Secretary-General (EOSG) Policy Briefs and Papers]. doi: 10.18356/27082245-28.
- United Nations. (2015b). *About the Sustainable Development Goals*. United Nations Sustainable Development. <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>.
- Webster, C. & Leleux, C. (2019). Searching for the Real Sustainable Smart City? *Information Polity*, 24(3), 229–244. doi: 10.3233/IP-190132.
- Zhang, D., Pee, L. G., Pan, S. L., & Liu, W. (2022). Orchestrating artificial intelligence for urban sustainability. *Government Information Quarterly*, 39(4), 101720-101720. doi: 10.1016/j.giq.2022.101720.