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Technology for Social Change: Unpacking the Impact of GovTech Solutions on the Achievement of SDGs

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ABSTRACT

Sustainable Development Goals (SDGs) are unlikely to be achieved without the active role of governments and the effective utilization of modern technologies by public administration. However, the alignment between government technology (GovTech) and SDGs is not well established in academic literature. Accordingly, the objective of this paper is to conduct a literature review of the current state of the art related to the impact of GovTech on achieving SDGs. Following the literature review methodology, the search returned over 140 publications, of which 17 were selected as relevant. Upon further research of the selected publications, several results were discovered. One result is that the existing literature employs different methods and establishes the link between GovTech and SDGs in different ways, sometimes very briefly and sometimes more in depth. There is also unevenness in the research that covers the connection between GovTech and various SDGs. Moreover, a list of the most mentioned technologies that correspond with assorted SDGs has been drafted. The outcomes of the literature review help highlight research gaps and serve as a guideline for public administrators and entrepreneurs regarding what technologies can be incentivized for greater use.

Keywords: GovTech, Government technology, Sustainable development goals, SDGs

INTRODUCTION

The achievement of goals set by the 2030 Sustainable Development Agenda requires joint efforts from individuals, businesses, and governments. Despite the intention to make SDGs collaborative among multiple actors, the actual implementation often takes place at the national level (Baumgart et al., 2021). Digitalization initiatives related to the government are perceived as a potential tool to align with various parts of sustainable development (UN e-Government survey, 2020).

The role that technology is expected to play in achieving SDGs cannot be understated (Assey, 2020,; Adenle et al., 2020). Considering the important role of the government, combined with the potential impact of technology, it is essential to understand the role of GovTech solutions in the achievement of SDGs.

The SDGs are split into 169 targets and 231 indicators, which are expected to ensure the clarity of the desired results and an easier understanding of what actions can be taken toward sustainability. However, the inherent interlinkage between SDGs and the multiplicity of targets and indicators makes prioritization unavoidable. The connections between goals are uneven (McGowan et al., 2019). The interconnectedness and mutual impact of SDGs and targets have been studied by Nilsson, Griggs, and Visbeck (2016); Le Blanc (2015); and Bennich, Weitz, and Carlsen (2020). Clearly, it is impossible to complete 169 targets and 231 indicators simultaneously.

GovTech initiatives can contribute to the achievement of the SDGs not only by delivering value for the SDGs but also by generating new data and evidence for SDG monitoring and policy making (CAF Development Bank of Latin America, 2024) Continued collaboration across all sectors, including governments, is essential for leveraging technology to create impact and systemic change at scale for the wider community (World Economic Forum, 2021).

The research contributes to the academic literature by using the literature review methodology to answer the following questions:

- What digital government technologies contribute to achieving SDGs?
- How is the potential impact of digital government technologies distributed across SDGs?

BACKGROUND

To establish a cohesive approach to the research objective, the definition of *GovTech* must be clearly defined. The definition of *GovTech* is still debatable, with two main approaches:

- *GovTech* is a whole-of-government approach to public sector modernization that promotes simple, efficient, and transparent government with citizens at the center of reforms (Dener et al., 2021).
- *GovTech* represents socio-technical solutions—developed and operated by private organizations—are intertwined with public sector components for facilitation (Bharosa, 2022).

Other existing definitions of GovTech are similar to Bharosa's approach and tend to highlight the role of the private sector in solving challenges inherent to the public sector (GovTech Sweden, n.d.; Bennett Institute for Public Policy, 2022; Accenture and Public, 2018; Kuziemski et al., 2022).

For the purposes of this study the authors use a broader approach to the definition of GovTech, meaning that the research is not limited only to the contributions of private enterprises that develop solutions intertwined with public sector components. Exploring GovTech in the sense suggested by Dener et al. (2021) as the most recent phase of digital transformation in the public sector also implies the interchangeable use of e-governance, e-government, digital government and GovTech in our research.

The existing scientific literature does not provide insight into the role of GovTech in achieving SDGs; rather, it focuses on the role of information and communication technologies in general. Technology is expected

to enable many SDGs (Assey, 2020). Indeed, 48 out of 169 SDG targets are connected to science, technology, and innovation, while many remaining SDG targets can be somewhat impacted by technology (Adenle et al., 2020). Artificial intelligence (AI) is estimated to positively impact 79% of SDG targets (Vinuesa et al., 2020). Delving into GovTech specifically gives a more nuanced understanding of how technology combined with governance frameworks can contribute to achieving SDGs.

The interconnected nature of governments, governance, and technology platforms, especially those utilized in the management, implementation, and governing of public sector functions clearly will have an impact on the SDGs though what that will be has yet to be determined.

METHODOLOGY

This research utilizes Kitchenham's systematic literature methodology (2009). The primary objective of this research is to gain an understanding of the current literature related to the use of GovTech in various initiatives related to SDGs. The research questions were designed broadly to provide an overview of the existing literature without excluding any topics. To achieve this, the research mapped SDGs with corresponding technological solutions using keywords to represent the intersection of SDGs and technologies and then honed the number of articles based on relevance and quality. From the remaining articles, insights were analyzed and presented.

Keywords and Search Process

The researchers used the SCOPUS database to gain a broad understanding of the research available on the topic in an interdisciplinary fashion. The keywords were chosen to target the specific intersection of the topics of SDGs and their attainment with technologies in government. The specific keyword set utilized is as follows: (TITLE-ABS-KEY ["Sustainable Development" OR "Sustainable Development Goals" OR "Sustainable Development Agenda" OR "SDG"] AND TITLE-ABS-KEY ["target" OR "indicator" OR "measurement" OR "attain" OR "achieve"] AND TITLE-ABS-KEY ["GovTech" OR "government technology" OR "public sector technology" OR "egovernance" OR "egovernment" OR "e-Government" OR "e-governance" OR "digital government"]).The initial search returned 147 documents.

Inclusion and Exclusion Criteria

The inclusion and exclusion criteria were chosen to obtain an idea of all kinds of technologies and solutions used in the public sector to achieve any of the 17 SDGs. From the initial 147 documents, a title and abstract reading was used to apply the inclusion and exclusion criteria, with articles marked as "yes," "no," or "maybe."

Entries in which the title and abstract were judged as "maybe" were brought into the full read step, after which their inclusion was determined.

Inclusion Criteria

- Literature explicitly discussing the alignment of GovTech with specific SDGs or providing evidence of contributions to SDGs.
- Studies with diverse research methods, including qualitative and quantitative approaches, case studies, and impact assessments. This ensures a comprehensive understanding of GovTech's contributions.
- Publications from 2015 (the year of adoption of the Sustainable Development Agenda) to ensure the relevance of information.

Exclusion Criteria

- Publications that do not specifically address GovTech and their contributions to SDGs.
- Publications that use the word *sustainable* to mean *continual* or *feasible*.
- Publications that use the words *sustainable* and *sustainability* incidentally.
- Publications that state the importance of technologies for the public sector in achieving SDGs without further explanation and reasoning for that statement.
- Publications that primarily focus on comparison of indices.
- Publications that describe the contributions of ICTs in general to the achievement of SDGs.

Data Collection and Analysis

The papers that fit the inclusion and exclusion criteria based on the abstracts read, in addition to those considered not clearly determined, were fully read. The further determination of unclear articles was defined on the full paper read. The author conducted a quality check. However, no papers were disqualified from inclusion in this review due to quality concerns and the exploratory nature of the research questions. The author then qualitatively coded the accepted literature for the review to find the references and topic matter regarding SDGs and the specific technologies included.

RESULTS

Search Results

As stated above, the search yielded 17 articles, which were found from 147 records after the initial application of the timeliness criteria. After the title and abstract review, n = 31. Upon a further review and quality check, the number was 17. The list of publications selected for the study is presented in Table 1.

Table 1. Publications selected for the study (author).

Sarker, M.N.I., Wu, M., Liu, R. and Ma, C. (2019)	Challenges and Opportunities for Information Resource Management for E-Governance in Bangladesh
Aniscenko, Z., Robalino-López, A., Rodríguez, T.E. and Pérez, B.E. (2017)	Regional Cooperation in Dealing with Environmental Protection. E-Government and Sustainable Development in Andean Countries

(Continued)

Table 1. Continued

Misra, H. (2020)	Managing Poverty Fad Toward Sustainable Development: Will Rural E-Governance Help?
Choi, H., Park, M.J. and Rho, J.J. (2017)	Two-dimensional Approach to Governmental Excellence for Human Development in Developing Countries: Combining Policies and Institutions with e-Government
Miskiewicz, R. (2022)	Clean and Affordable Energy Within Sustainable Development Goals: The Role of Governance Digitalization
Ramadan, I.M.M. and Abdel-Fattah, M.A. (2022)	A Proposed Model for Enhancing E-Government Services to Achieve the Sustainable Development Goals in Egypt: Case Study
Choi, H.-S. and Lee, G.-S. (2016)	Planning Support Systems (PSS)-Based Spatial Plan Alternatives and Environmental Assessment
Lyulyov, O., Pimonenko, T., Saura, J.R. and Barbosa, B. (2024)	How Do e-Governance and e-Business Drive Sustainable Development Goals?
Malhotra, C., Anand, R. and Singh, S. (2018)	Applying Big Data Analytics in Governance to Achieve Sustainable Development Goals (SDGs) in India
Paptsov, A.G. and Popova, K.Y. (2021)	Management of the Quality of Water Resources for Sustainable Development Based on Industrial and Manufacturing Engineering
Castro, C. and Lopes, I.C. (2023)	E-Government as a Tool in Controlling Corruption
Dalela, P.K., Basu, S., Majumdar, S., Sachdev, S., Kushwaha, N.K., Yadav, A. and Tyagi, V. (2020)	Constraint-Driven IoT-Based Smart Agriculture for Better e-Governance
Mahlaba, J., Mishra, A.K., Puthal, D. and Sharma, P.K. (2022)	Blockchain-Based Sensitive Document Storage to Mitigate Corruptions
Castro, C. and Lopes, C. (2022)	Digital Government and Sustainable Development
Levinskaya, E.V. and Shirkin, A.A. (2021)	State Administration of Sustainable Development Through Big Data: Current Opportunities and Future Perspectives
Neuwirth, B., Novotna, V., Skapa, S (2017).	E-Government and Corruption in East European Countries
Lin, R. (2022)	Recommender System for Government Service in Smart Cities

Answers to Research Questions

As stated earlier, the aim of this study was to understand what government technologies can contribute to achieving SDGs and what SDGs are affected by these technologies.

Regarding the technologies mentioned in the publications, the most mentioned is e-governance or e-government in general, followed by big data and blockchain (see Figure 1).

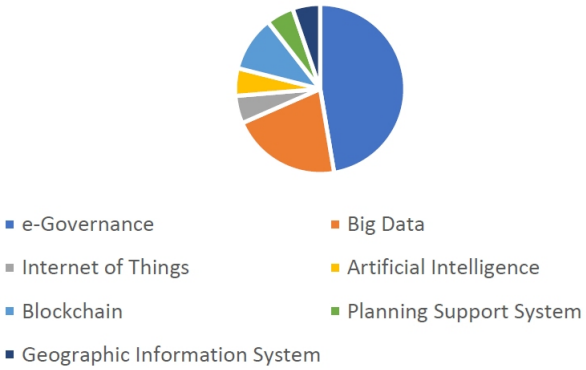

Figure 1: Technologies mentioned in the literature (authors).

The most-mentioned SDG across publications was predictably SDG 16 (Peace, Justice, and Strong Institutions), followed by mentioning SDGs in general and SDG 11 (Sustainable Cities and Communities) See Figure 2.

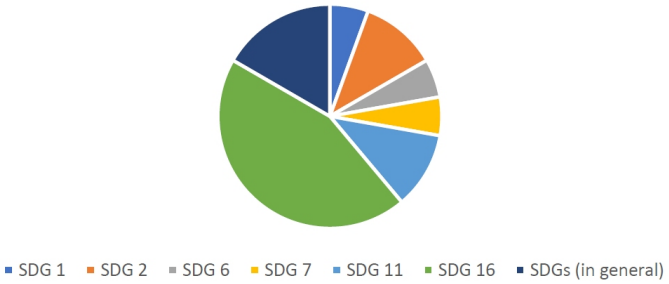

Figure 2: SDGs mentioned in the literature (authors).

Figure 3 illustrates the uneven coverage of technologies and SDGs in academic literature at the intersection of digital government and the Sustainable Development Agenda.

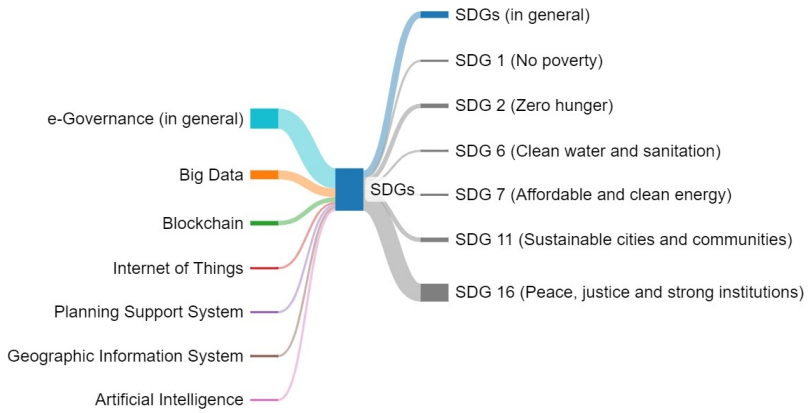

Figure 3: Quantitative interrelation between technologies and SDGs mentioned in the literature (authors).

A noteworthy observation is the "generalization" tendency in the existing literature. Most papers mention *e-governance, e-government* or *digital government* as broad terms, which imply the usage of an unlimited and unspecified set of technologies. Mentioning the impact of technologies on SDGs in general instead of specifying concrete SDGs is also common. This result confirms that the area of GovTech impact on SDGs is being underresearched and lacking an in-depth understanding of the connection between more concrete e-governance technologies and specific SDGs, to say nothing about specific SDG targets.

The broader mention of *e-governance*, *e-government* or *digital government* in the literature compared to listing specific technologies can be explained by several reasons. Researchers may use the terms broadly in order 1) to encompass a holistic approach to leveraging technology for governance across sectors, 2) to capture the interconnectedness of these technologies in contributing to SDGs, 3) to cover a wide range of technological advancements, 4) to highlight the overarching impact rather than delving into specific technologies in each sector.

Another remark should be made about the fact that 44% of the papers that investigate the contribution of e-governance to sustainable development focus on SDG 16 (Peace, Justice, and Strong Institutions). Four other SDGs were mentioned as being influenced by e-governance as a general term (SDG 1, SDG 2, SDG 7, and SDG 11). Although this disproportion is, to some extent, a predictable and understandable result, it highlights the ignorance of the potential impact e-governance could have on other SDGs among researchers.

Among the papers that aim to explore the connection between e-governance and SDGs, an outstanding work is Misra (2020), who explains the link between each SDG and what the author calls *rural e-governance*. Another study of particular interest in our context is Malhotra's exploration of the connection between big data and its contribution to each of the SDGs, in which the author also maps SDGs with the so-called "mission-mode projects" of the Digital India program (2018). Both papers are country specific (India) and can set an example for similar studies in other countries or regions.

DISCUSSION AND CONCLUSION

Much of the literature uses key terms, such as *e-governance*. This is a general term that encompasses many technologies without specifying them. This can be ICT in general. Approximately half of papers contribute to SDG 16 (Peace, Justice, and Strong Institutions). However, this makes it seem that all these technologies are meant to improve the government only; the ignoring of many other SDGs is also a concern. The UN highlights the role of e-governance in achieving SDGs, so one would think that it would have a longer track record in the academic literature of the SDGs other than number 16. This result may serve as an inspiration for further research and as an indication that more work must be done.

The result of technologies can indicate the hype cycle or fashion of specific technologies. Although the research did not find many papers related to AI in the achievement of the SDGs, this could be more of an indicator of the long publishing cycle related to academic works and the relative recency of the explosion of AI papers rather than the non-existence of such works.

Because the authors focused on keywords related to the specific SDGs in general, there may have been different results than if one were to have input the entire list of targets and indicators. Because so few SDGs and specific technologies were mentioned, the network diagram of specific technologies mapped to specific SDGs was not a tenable solution, even though the hypotheses of the authors originally indicated that this would be an insightful analysis. Future work could include a further definition of GovTech or a more complete mapping of technologies to specific SDGs.

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