Lessons learned on leveraging digital transformations to meet the SDGs

Joint submission by Future Earth Canada & Sustainability in the Digital Age

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Abstract

Achieving global sustainability requires transformations to current governance systems. The ongoing digital transformation can support sustainability efforts, but without concerted action, the digital age may instead exacerbate inequalities and environmental degradation. We highlight key actions, identified through expert consultations and peer-reviewed publications, to leverage digital innovations in an inclusive, safe, and sustainable manner to accelerate transformations towards sustainability at the science-policy-society interface: 1) Fail forward and share lessons learned, 2) Convene disconnected actors to enable co-learning and build trust, 3) Test, de-risk, and co-develop digital solutions, and 4) Enable integration with local contexts, self-sustaining, and clear communication of digital solutions.

Introduction

Meeting the Sustainable Development Goals (SDGs) by 2030 will require unprecedented transformations to the way we govern society. By increasing transparency, connectivity, and access to data, digital technologies have the potential to transform current governance systems and catalyze transformations towards the SDGs (Luers et al., 2020; Del Río Castro et al., 2021). However, without appropriate governance systems in place, these innovations can instead exacerbate current environmental and social sustainability challenges, such as increasing energy consumption and widening inequalities (Galaz et al., 2021; Anderson et al., 2021). To navigate this complex intersection, Sustainability in the Digital Age (SDA) and Future Earth Canada, together with our partners, advance research and innovation, identify best practices and guidelines, and build networks for training and education to leverage digital transformations at the science-policy-society interface.

This policy brief explores the challenges and opportunities at the intersection of digital innovation and sustainability governance and presents key findings from the Re-imagining Climate Governance in the Digital Age project. Developed with input from nearly 100 experts around the world, these findings point to concrete actions and processes that governments, technology innovators, philanthropists, investors, and others can adopt to help ensure the safe and inclusive use of digital technologies to support the implementation of the SDGs at all levels.

An overview of the digital sustainability landscape

Digital technologies have the potential to transform climate and sustainability governance systems through four key strategies: (1) mobilizing data, (2) optimizing existing governance strategies, (3) incentivizing or automating changes in behavior, and (4) empowering citizen participation (Chuard et al., 2022).

For example, Digital Green leverages mobile applications to mobilize data and expertise with farmers to increase agricultural productivity and food security and encourage sustainable practices. Applications such as DAO IPCI leverage blockchain to optimize carbon markets by increasing transparency and reliability of data and transactions. WattTime leverages artificial intelligence (AI) to detect energy saving opportunities and nudge or automate behavioural changes in energy consumption. The Rainforest Alert equips local forest protectors with remote sensing tools that allow them to actively record and report illegal activities, empowering them to better protect their lands and biodiversity (for more examples visit the Digital Climate Projects Database).

Catalyzed by the rapid pace of technological change, societal transformations are already underway (Andersen et al., 2021; Luers et al., 2020). In 2021, it was estimated that there were nearly 5 billion internet users worldwide, a 17% increase from 2019 (ITU, 2021). A recent survey by our team, which explored, inter alia, digital surveillance as a particular governance tool, revealed that nearly 50% of 2,944 individuals (surveyed over three phases of an international survey) supported the use of digital surveillance to more effectively tackle the climate crisis (Figure 1) (Garard et al., 2022).

However, direct and indirect impacts of the digital age cause rebound effects, potentially negating its positive impacts. For example, digital technologies such as AI have the potential to support achieving approximately 80% of the SDGs, but depending on how technologies are deployed, they can also negatively impact progress towards 35% of the targets (Vinuesa et al., 2020). Rebound effects of the digital age include, but are not limited to, increased greenhouse gas emissions in the manufacturing of digital devices, accelerated resource extraction for raw materials, production of e-waste, and overall increases in consumption and production due to easy access provided by digital platforms (Creutzig et al., 2022; CODES, 2022).

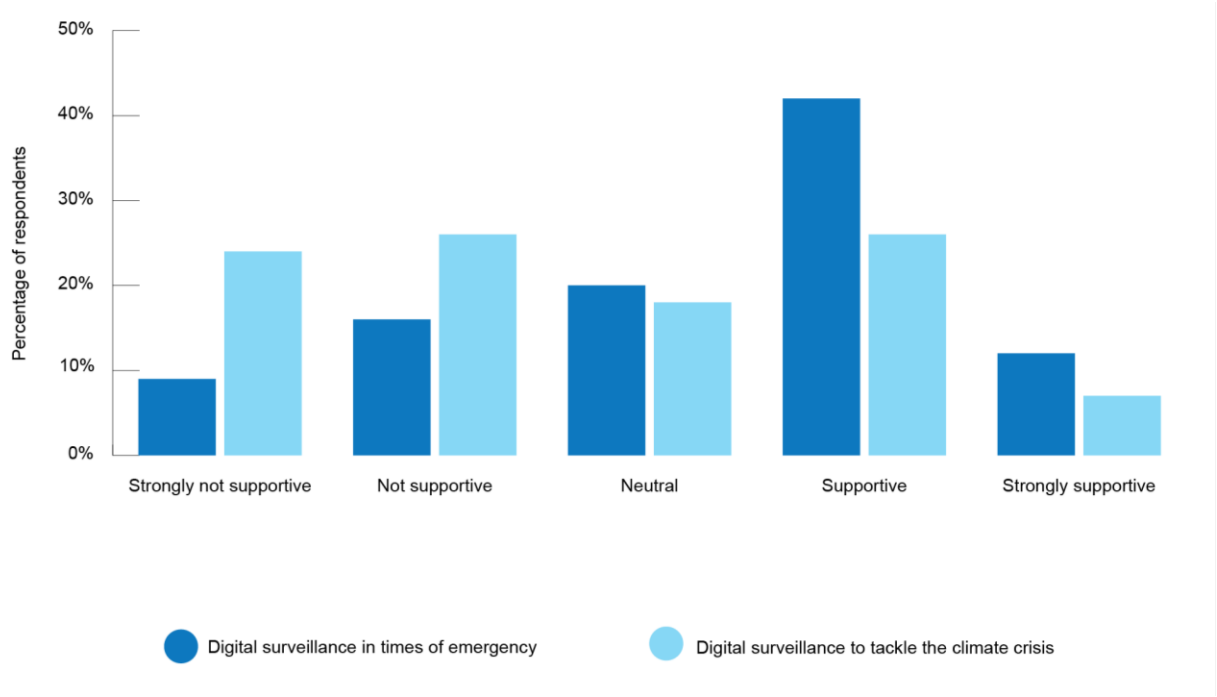

Figure 1. Survey results showing respondent's level of support along a 5-point Likert scale for the use of digital surveillance in times of emergency, where the prime example given was the COVID-19 pandemic (dark blue bars) and to address the climate crisis (light blue bars) (n=2,944, Garard et al., 2022).

In addition, there are critical concerns around the lack of governance frameworks related to privacy, data ownership, and security (Garard et al., 2022). The deployment of digital technologies can also exacerbate current inequalities, including in particular the digital divide, as digital development remains unequal and lower income countries are experiencing slower rates of digitalization (Creutzig et al., 2022).

Gaps and needs in digital sustainability

Digitalization and sustainability must be aligned (Creutzig et al., 2022; CODES, 2022) by addressing existing gaps and needs in order to avoid or minimize rebound effects and other negative impacts while also capitalizing on the potential of digital innovations to support transformations towards sustainability. Currently, key actors working at this intersection are disconnected and operate in silos (Luers, 2021; Creutzig et al., 2022; SDA et al., 2022), and have insufficient understanding of digital technologies and associated sustainability challenges (Palomares et al., 2021; Del Río Castro et al., 2021). This disconnect between actors also inhibits wide sharing of knowledge, including failures and lessons learned - a continued stigma particularly in the space of philanthropy and investment (Shah, 2021). Learning from failures is critical to avoid repeating mistakes and wasting resources and can also potentially increase the success rate of future projects in the digital space (Westoby et al., 2020). Furthermore, disconnections between key actor groups have led to a lack of trust. Building trust in actors, technology, and governance processes is crucial to reach the transformative potential at the intersection of digital and sustainability (Luers, 2021; Chuard et al., 2022; SDA et al., 2022; Schulz & Feist, 2021).

Recent findings from the Digital Climate Projects database also demonstrate that only a small percentage of work focuses on the engagement and empowerment of local communities (Chuard et al., 2022), actions that are key to transforming climate governance systems (Meadows, 1999; SDA et al., 2022). Furthermore, the database also sheds light on the gap in Global South leaders in digital sustainability (Chuard et al., 2022).

These gaps at the intersection of digital innovation and sustainability, among others, impact the ability to design and deploy digital technologies in a safe, sustainable, and inclusive manner. There remains a need for further research and deep and diverse dialogues and collaborations to navigate this complex intersection (Andersen et al., 2021; IPCC, 2022; CODES, 2022).

To help address these gaps and move towards sustainable transformative action, the Re-Imagining Climate Governance in the Digital Age project convened diverse experts, including researchers in climate, sustainability, and social sciences, investors, philanthropists, and technology innovators through a series of workshops and consultations. Nearly 100

experts, from 14 countries across 5 continents, were engaged to identify opportunities, challenges, and lessons learned at the intersection of digital innovation and climate and sustainability action. The Framework for Supporting Transformative Climate Governance in the Digital Age (Figure 2) was developed in a collaborative and iterative process. Key interventions for sustainable, inclusive, and transformative digital solutions were identified (SDA et al., 2022) that are summarized in the section below.

While this work was commissioned by and for philanthropy, the multi-perspective design and resulting insights are relevant beyond the initial target audience. Actors such as innovators, policy-makers, researchers, and entrepreneurs can leverage the below insights to help transition towards more transformative sustainability governance. A review of recent literature on the governance of digital innovation for sustainable development also reflects the key findings of the framework, further validating these recommendations for action (Chuard et al., *under review*; SDA et al., 2022).

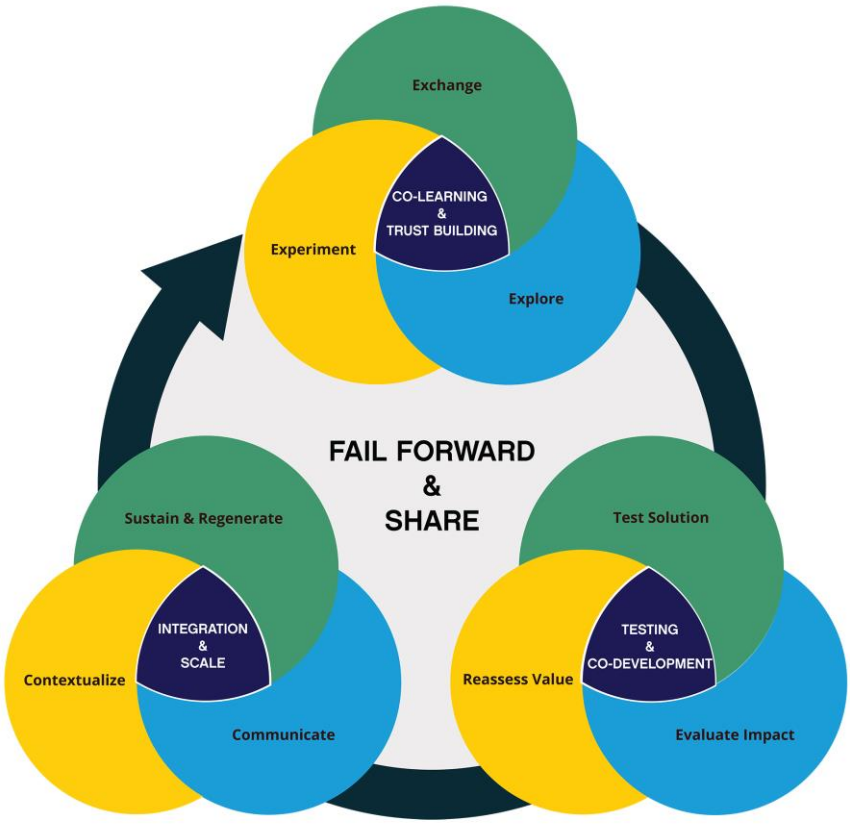

Figure 2. Strategic framework depicting key entry points for transformative climate governance (SDA, 2022).

Recommendations to strengthen the science-policy-society interface for transformative action in the digital age

1. **Failing forward**

Destigmatize and encourage sharing of failures in reporting practices by recognizing the critical but underappreciated importance of failure, learning, and agility in all aspects of developing digital strategies for climate governance.

2. **Co-learning and trust building**

Bridge disconnected actors from sustainability, policy-making, finance, civil society, and digital innovation to facilitate co-learning and exchange of information. This can help increase literacy and awareness and the design of more inclusive and technologies suited to addressing specific needs.

Organize pre-competitive spaces to empower diverse actors to build trusted collaborations based on common values and to explore and experiment with digital solutions built on collective foresight and intelligence.

3. **Testing and co-development**

   De-risk investments in digital solutions, for example by providing funds that cover initial costs of early failures (taken as learning opportunities) or funds with longer and more flexible timelines that allow for iterative *testing of solutions* with end users and sustainability experts.

   Evaluate impact through inclusive and just criteria that prioritize the involvement and leadership of local actors, ensure easy accessibility and equitable ownership of data, enable wide distribution of benefits (beyond investors), and provide transparency of methodologies. These criteria will also help *reassess the value* of digital solutions and better align them with the values of sustainability.

4. **Integration and scaling**

   Adopt regenerative models that are self-sustaining so that digital sustainability solutions can avoid long-term reliance on donor funds and resources.

   Decomplexify and communicate digital solutions in diverse and engaging manners in order to (1) increase acceptance and uptake by decision makers and end-users, (2) ensure understanding and useability of data generated, and (3) enable better integration and scaling of the solution across wider regions.

   Contextualize the digital solution to the target audience, for example by tailoring communication methods and targeting sustainability needs and gaps at the local level.

These actions and recommendations help break down boundaries, support the creation of more inclusive and trusted collaborations across different sectors, and enable more cohesive and accountable transformations towards sustainability. They will help form a more agile and decentralized governance framework that is crucial to the implementation of the SDGs by 2030.

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