

STG Policy Papers

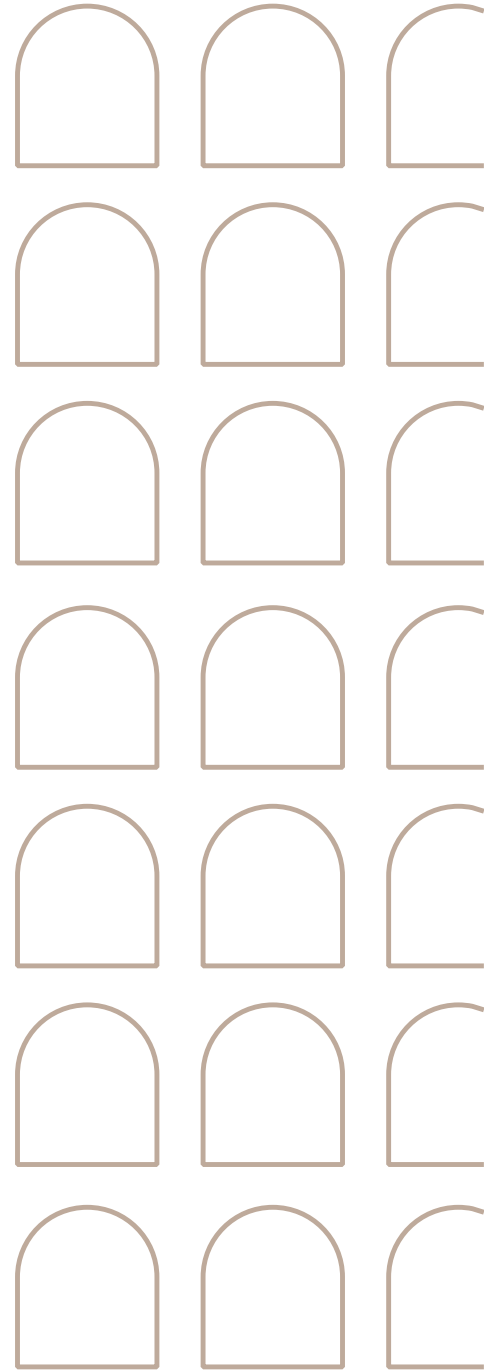
# POLICY BRIEF

## ONE WORLD, ONE HEALTH: HARNESSING THE DIGITAL ECONOMY FOR GLOBAL HEALTH

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## EXECUTIVE SUMMARY

This policy brief proposes a transformative approach to global health based on the One Health (OH) concept, which recognizes the interconnectedness of human, animal, and environmental health. The policy brief advocates leveraging digital tools under the concept of One Digital Health (ODH), arguing for a paradigm shift beyond traditional healthcare. However, challenges such as the digital divide, risks from datafication, and environmental impacts of frontier technologies pose obstacles. The policy brief introduces One Digital Health One World (ODHOW), a global framework that promotes digital infrastructure collaboration, communication, responsible data sharing, and digital technology deployment. ODH's potential lies in its ability to activate intersectoral collaboration to tackle current challenges, but concerted efforts are needed to bridge the digital divide, address ethical risks, and ensure sustainable digital transformation. The policy brief recommends collaboration through multistakeholder ecosystem partnerships as a promising path to sustainable digital transformation for people, animals, and the planet.

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## 1. INTRODUCTION

Human health is inextricably linked to the well-being of animals, plants, and the environment we share. Originating from the animal context, the One Health (OH) approach has evolved into a comprehensive framework that underscores these entangled linkages between human and animal health outcomes and the broader environment.

The interconnectedness defines OH, which has evolved into a holistic framework that emphasizes the relations between human, animal, and environmental health and, ultimately, provides a pathway to sustainable development (CDC, 2021).

The World Health Organization (WHO) has linked OH to the Sustainable Development Goals (SDGs) and particularly to the targets relating to ensuring good health and well-being for all, at all ages (SDG3). Moreover, it is strongly linked to ecosystem health, animal health, wildlife diversity, and population distribution (Osterhaus et al., 2020); thus, it highlights the importance of managing environmental degradation and biodiversity loss (SDG14 and SDG15). Integrating a OH approach requires assessing and monitoring the environmental impacts and the potential risks of public health, biodiversity, and food security to healthcare systems (Osterhaus, 2019; Ashleigh, 2019). Beyond the negative environmental impacts of climate change—both humans and animals are often displaced as a consequence of various factors, such as habitat loss, natural disasters, and human-wildlife conflict (Abrahms, et., al, 2023).

These issues give rise to another challenge: disease management in the aftermath of pandemic emergencies, which necessitates real-time human and animal data exchange. Indeed, the bulk of human infectious

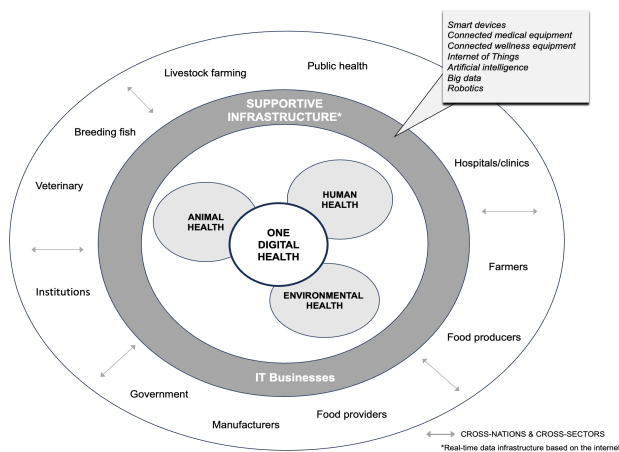
diseases begin in animals, and zoonotic spillover, in which pathogens transfer from animals to humans, is prevalent, accounting for 60-75% of developing human infectious diseases. HIV, Ebola, SARS, MERS, and COVID-19 are all examples of pathogen transfer from animals to people, emphasizing the importance of studying zoonotic illnesses for improved prevention and control (Elwanger & Chies, 2021). An integrated approach and cross-sector collaboration will be needed to address these challenges.

## 2. DIGITALIZATION OF ONE HEALTH

In the dynamic landscape of 21st-century healthcare, integrating digital technologies has emerged as a transformative force with the potential to revolutionize the global delivery of health service (Deloitte, 2023). The integration of digital technologies into the OH approach can create unprecedented opportunities to address healthcare challenges and promote sustainable development (Toni & Mattia, 2022).

**The One Digital Health (ODH) framework is built on two key factors (One Health and digitalisation), three perspectives (individual health and well-being, population and society, and the ecosystem), and five dimensions (citizens' engagement, education, environment, human and veterinary health care, and the Healthcare Industry 4.0) (Toni & Mattia, 2022), through a collaborative, multisectoral, and transdisciplinary approach towards the SDGs (Ho, 2022).**

**Figure 1: ODH Framework illustrates a human, animal, and environmental health embedding cross-sectoral digitalisation.**



Source: Authors' Own

A ODH approach encompasses a wide range of digital technologies and innovations that have great potential to contribute significantly to sustainable development by enhancing healthcare provision, efficient resource allocation, and ultimately advancing socioeconomic growth (Ho, 2022). It is enabled by building a reactive evidence-based system for managing high-quality, machine-readable data (HQMRD), which are crucial elements to spur the digital transformation of human, animal, and environmental health (i.e., nature conservation in biodiversity, wildlife conservation, food security, antimicrobial resistance, and climate change) (Tamburis and Benis, 2022). These data can be collected through technologies such as smart devices, connected medical equipment, or connected wellness equipment and by exploiting data-based systems (DS) such as the Internet of Things (IOT), artificial intelligence (AI), and robotics (Chute & French, 2019; Karpathakis et al., 2024).

However, access and use of critical digital infrastructure (CDI)<sup>1</sup> such as internet remains a global challenge; there are usage and coverage issues in many countries across

the world, meaningful connectivity<sup>2</sup> remains a significant challenge to reaping the potential of digitalisation within and between countries (ITU, 2022). Approximately 5.4 billion people—or 67% of the world’s population—used the internet in 2023, an increase of 45 per cent since 2018, with 1.7 billion people estimated to have come online during that period, but 2.6 billion people still remain offline (ITU, 2022).

While CDI represents an essential factor of ODH, robust data governance is essential to: improve data quality to power DS, encourage interoperability, and ensure efficient and trustworthy development and data sharing to accelerate the potential of DS and mitigate their associated risks (Ahmed, 2023; Mittermaier et al., 2023; Silcox et al., 2024).

Furthermore, given the increasing concerns to scrutinise the underlying technologies that drive the digital world, it is crucial to understand how these digital) are designed, governed and impact society (Ahmed, 2023). These concerns are beyond the scope of this policy brief and require further research as these technologies increasingly mediate human interactions and use of sensitive data, which warrant interrogation of the ethical, legal and societal implications of their development and deployment (Kirschlaeger, 2021).

### 3. A MULTISTAKEHOLDER APPROACH TO ODH

ODH has applications that extend far beyond the healthcare sector, and a multistakeholder approach involving diverse stakeholders and leveraging digital

<sup>1</sup> <https://pacscenter.stanford.edu/research/digital-civil-society-lab/mapping-policy-infrastructure-2/>

<sup>2</sup> <https://a4ai.org/meaningful-connectivity/>

technologies is crucial to the successful implementation and operationalization of the OH concept. A collaborative, cross-sectoral effort is necessary to address the complex, interconnected challenges at the intersection of human, animal, and environmental health (Ho, 2022).

As indicated in Figure 1, all the stakeholders that contribute to ODH are represented: public health, hospitals/clinics, farmers, food producers, food providers (small retailers and large distribution), veterinary practitioners, fish breeding, livestock farming, manufacturers (who produce human and animal pharmaceuticals, agrochemicals, fertilizers, etc.), governments, institutions. All these stakeholders are relevant to the system as they provide support through the monitoring, tracing, and communication of real-time information with the aim of preserving global health from the emerging risks that can arise from human, animal, and environmental interactions.

The ubiquity of smart devices and their ability to track and monitor data paves the way for new forms of collaboration with governments and institutions (Benis et al., 2021; Moen, 2018). On this strength, digital literacy deserves particular attention if people are to engage in the ODH system. The COVID-19 pandemic highlighted the urgency of addressing digital literacy using an ecosystem approach that integrates apps and initiatives from various organizations, promoting cross-collaboration and sharing of insights, to benefit all stakeholders and facilitate easy communication and access to health information. Ecosystem creation forces behavioural change and acceptance, requiring leadership and ownership from the private sector, governments, academia, or civil society organisations (CSOs) (Pappas, et al., 2023).

Furthermore, an ecosystem approach involving various stakeholders is crucial for the successful implementation of ODH;

different ecosystem stakeholders, including the private sector, governments, academia, and civil society, play essential roles in driving the digital transformation of healthcare systems and their impact on human health, animal health, and environmental management (Benis et al., 2021; Constantinides, 2023).

### **Role of Ecosystem Stakeholders**

Governments, academic institutions, civil society organizations, and businesses are all crucial in integrating digital technologies in healthcare. Governments create policies, academic institutions research and innovate, civil society organizations advocate for ethical practices, and businesses provide technological solutions for cross-sectoral collaboration.

## **4. EMERGING OPERATIONALIZATION OF ODH**

The following are some examples and best practices of information and communication technologies (ICT) implementation seen in different sectors of the ODH:

- The FAO has published a study on blockchain traceability projects in the seafood industry, highlighting the use of blockchain technology for data exchange throughout the entire value chain. An example is the IBM Food Trust blockchain initiative, which offers a collaborative network of stakeholders—for instance, growers, processors, wholesalers, distributors, manufacturers, and retailers—to enhance accountability across the food supply chain. In order to avoid waste, mislabelled food, and overfishing, and to monitor food security, this initiative empowers collaboration, trust, and transparency throughout the global seafood ecosystem by implementing blockchain.

- Amadori<sup>3</sup>, a leading Italian agri-food company, offers a variety of protein-based specialties. Its Integrated Supply Chain allows for control over all production phases, from raw material acquisition to product distribution. Amadori has reduced antibiotic consumption by 97% in chicken and 89% in turkey supply chains and now has three supply chains using animals raised without antibiotics. Its partnership with Cubit's Next Generation Cloud Pioneers ensures secure storage infrastructure, end-to-end encryption, zero-knowledge privacy, disaster recovery, and business continuity. This allows Amadori to offer controlled, traceable, and certified products.

- The Too Good To Go app<sup>4</sup> is the largest digital marketplace for surplus food, operating in 17 European and North American countries. It connects over 85 million registered users with unsold food from the industry, reducing food waste. Since 2016, the app has saved over 300 million meals. In 2023, Too Good To Go supported policymakers and governments in making food systems more sustainable and transparent. In Austria, the government introduced reporting obligations for retailers and wholesalers.

- Embrapa, established in 1973, is the Brazilian Agricultural Research Corporation that has adopted the One Health approach to implement technological solutions in agriculture and animal farming. 35 startups in Brazil developed digital solutions for milk production using Embrapa Digital Agriculture Application Programming Interface (API) tools, including Cow Med, which uses collars to monitor cow rumination, activity, and idleness, and sends alerts and early warnings about health problems and diet changes.

- Doctor On Demand is a video telemedicine company that aims to connect patients to physicians quickly and to prescribe medication directly at pharmacies. It offers on-demand visits via smartphone, tablet, or computer, connecting patients with physicians based on location using the Google Maps Platform. It also helps to identify nearby pharmacies for convenient prescription collection.

- M-TIBA is a digital initiative aiming to solve the issue of poverty that is the result of unexpected healthcare expenses to make healthcare accessible and affordable. M-TIBA is a Kenyan mobile health wallet launched by CarePay, combining mobile technology with savings for future hospital expenses. It serves as a digital connector for healthcare stakeholders, ensuring transparency and reducing costs by handling information and transactions in real-time in the cloud, reducing manual processing.

The implementation of ODH can fully sustain the system to reach the Sustainable Development Goals (SDGs) as shown in Table 1 below:

**Table 1: Potential contribution of ODH to the achievement of SDGs**

Sustainable Development Goal	Potential contribution of ODH
SDG2 (Zero Hunger)	By building a reliable monitoring system (note, this goal also deals with food security)

<sup>3</sup> <https://www.amadori.com/en/supply-chain/the-commitment-to-breeding>

<sup>4</sup> <https://www.toogoodtogo.com/en-gb/download/2023-impact-report>



SDG3 (Good Health and well-being)	By providing equal access to health services and real-time information
SDG6 (Clean Water and Sanitation)	By real-time monitoring of natural resources for drinking water, sanitation, and hygiene
SDG9 (Industry, Innovation, and Infrastructure)	By building efficient and reactive infrastructures for tracing, monitoring, and preventing risks
SDG10 (Reduced Inequalities)	By ensuring equal access to internet and technological solutions (filling the digital divide)
SDG12 (Responsible Production and Consumption)	By raising awareness for sustainable consumption and production practices
SDG13 (Climate Action)	By monitoring climate change impacts and mitigating risks through real-time information sharing
SDG14 (Life below Water)	By improving management of pollution and unsustainable extraction of marine resources
SDG15 (Life on Land)	By preserving terrestrial ecosystems through risk

	identification and combating land degradation
SDG17 (Partnership for the Goals)	By strengthening collaboration between stakeholders through a robust infrastructure

## 5. CONCLUSION

Sustainable digital transformation necessitates an ecosystem approach, involving diverse stakeholders and fostering collaboration across sectors. This approach benefits all stakeholders, though further research is needed to address emerging risks associated with DS, security, privacy, and data governance in digital infrastructures, which are crucial for societal functioning, individual life, and interaction with animals and the environment.

## 6. RECOMMENDATIONS

This policy brief highlights the importance of systems thinking to implement the ODH framework to guarantee equal access to CDI with the following recommendations for governments, private companies, and international organizations, to leverage digital tools under the ODH framework:

**Foster stakeholder collaboration to develop data governance mechanisms that promote responsible data sharing and protect individual rights.**

- To bridge the digital divide and promote inclusive access to critical digital infrastructure, concerted efforts are needed to pool resources and scale investments. Efficient allocation of resources and collaboration between stakeholders can improve internet access

and coverage globally, leveraging digital technologies effectively in healthcare, education, climate mitigation, and economic development. Robust governance frameworks are also needed for data privacy, security, and ethical use.

- Stakeholders need to collaborate to ensure access and use of high-quality machine-readable data for various use cases, such as food supply chain safety and traceability, pandemic anticipation, and environmental impact measurement. Adopting transnational technical standards for just data value creation can enhance data quality, interoperability, and transparency, promoting effective traceability and risk management in ecosystems.

### **Include and support all stakeholders in the transition towards a globally connected system.**

- ODH has the potential to evolve into One Digital Health One World (ODHOW), a global digital framework that promotes real-time, responsible data sharing for global health and wellbeing. ODHOW aims to overcome infrastructure, communication, data sharing, and ICT accessibility fragmentation, enabling real-time disease surveillance across human, animal, and environmental sectors. It aims to empower healthcare professionals globally to share best practices and tackle emerging threats, promoting preventative and collaborative health management for humans, animals, and the planet.
- ODHOW is a promising approach to global health challenges and SDGs through data sharing and intersectoral collaboration. However, stakeholders need digital literacy skills to harness digital technologies effectively. Governments need to prioritize digital literacy initiatives, support capacity

building in academia, healthcare, and public sectors, and promote a culture of innovation in global health practices.

- By implementing these recommendations, stakeholders can unlock the potential of One Digital Health One World (ODHOW) and harness the digital economy for global health, paving the way for a more interconnected, sustainable, and resilient healthcare ecosystem for people, animals, and the planet.



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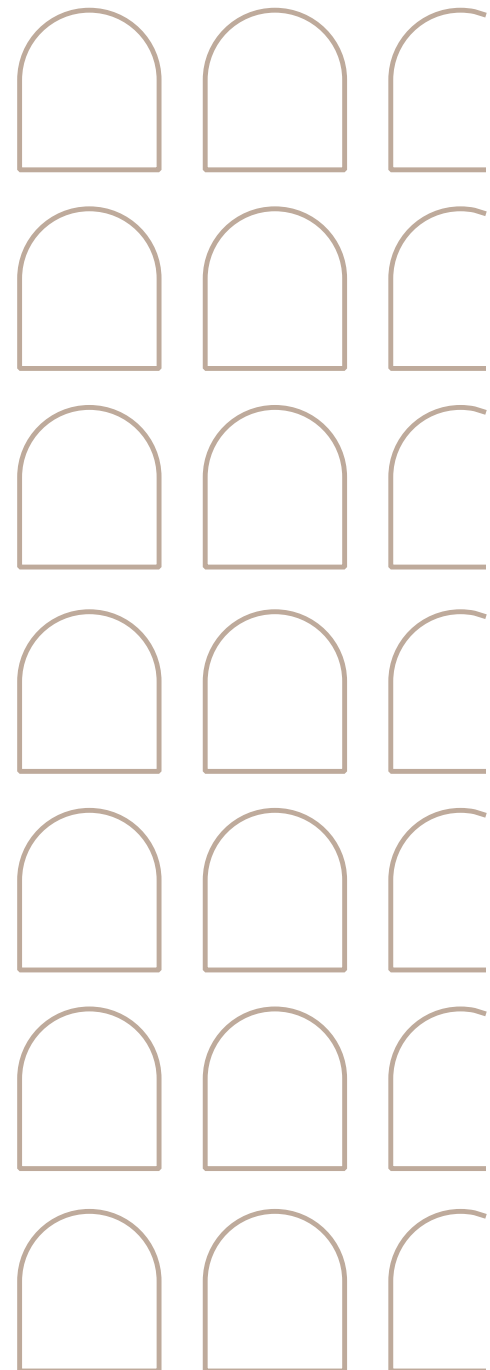
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