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Can we bring digitalisation and the environment together?

Agenda and coalitions beyond techno-fix illusions

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Bonn, 13 February 2024. Digitalisation and the environment must be brought together in a systematic approach. Otherwise, environmental footprints will continue to outweigh benefits.

Digitalisation has the potential to benefit sustainable development across the ecological, economic, and social dimension – in parallel. But today, benefits resulting from digitalisation come at a high environmental price. To ensure that addressing the ecological crisis and digital transformation are brought together, environmental effects of digital tools and infrastructure must be acknowledged, and environmental benefits prioritised in digital advancement. Collaborative international efforts spanning sectors and nations can pave the way.

Digital technologies have the potential for both positive and negative impacts on the environment. On the positive side, they can facilitate decision-making and the "hands-on" implementation of policy goals based on an improved understanding of environmental requirements. Enhanced precision in measuring and the collection and analysis of data support targeted interventions in energy, agriculture and mobility. Digitalisation optimises industrial processes through smart grids and virtual models (digital twins), promoting energy efficiency and the integration of renewable sources. Circular economy principles benefit from digital technologies in redesign, repair, recycling, and distribution, reducing resource consumption and waste. Precision farming optimises fertiliser and water use in agriculture, and smart city and mobility concepts reduce traffic congestion and emissions, just as remote work opportunities.

Until today, however, the advent of digital tools has not led to a substantial shift toward sustainable alternatives: industries and consumer goods are incorporating information and communications technology (ICT), but mostly without reducing, often by even increasing the environmental impact. Digitalisation's negative consequences encompass energy consumption, greenhouse gas emissions, electronic waste, and resource depletion. Rebound effects play an important role here. They occur when the positive effects of digitalisation, typically related to efficiency gains, result in lower prices or increased convenience of a product or service, thereby increasing its attractiveness and, consequently, demand. The ensuing increase in sales and use can eat up initial savings.

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Energy consumption in the production – and to a lesser extent operation – of digital infrastructure, services and devices remains a key problem. Sensors, servers, data centres, training of Artificial Intelligence (AI) models, online streaming, and wi-fi routers – all this comes with an enormous carbon footprint as long as energy stems from non-renewable sources. A lot of the hardware relies on rare earth materials, the mining of which can cause habitat destruction, soil and water pollution. Lithium is a case in point. The element is crucial for batteries and therefore e-mobility transition, but its extraction is threatening the desert ecosystems. The extraction of materials needed for digital devices often occurs in developing countries leading to exploitation of both natural resources and local communities. The same is true for the disposal of discarded electronics and batteries. E-waste belongs to the fastest growing waste streams, exacerbated by online platform practices such as the destruction of returned goods. Even in the EU, the region with by far the highest rate in the world, recycling takes place for less than 40 %. And water is a big problem: Keeping data farms cool involves significant water usage and can worsen existing water conflicts. Google’s hyperscale data centres, which support its cloud regions and products like Gmail, Google Drive, and YouTube, use 2.1 million litres of water – daily.

Digitalisation and the environment must now be brought together in a systematic approach. This requires being honest about illusions for techno-fixes, and applying digital solutions where they really benefit the environment. It starts with measuring and making transparent the ecological costs of products and services during production, use, and disposal. Policies can target efficiency gains of digital technologies across energy, manufacturing, mobility, and building sector. Multi-stakholder coalitions including public bodies, research, tech communities and environmental advocacy are crucial to align such objectives and messaging. New EU Green Deal initiatives for eco-design and digital product passports, information for consumers, and repair of goods can reduce negative life cycle impacts of products, if they consider implications outside the EU, including developing countries. Consequently, also in international processes the environmental dimension of digitalisation must be prioritised, in the UN Global Digital Compact, the G20, bilateral Trade and Technology Councils and digital dialogues. In this way it is possible to organise digitalisation in a more environmentally friendly way, and employ its solutions for environmental sustainability at the same time.

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