

Digitalisation and the Anthropocene *

Scenarios Forum, June 2022

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* this talk is based on a paper (currently under review) involving a large co-author team led by Felix Creutzig, and including (in alphabetical order): Daron Acemoglu, Xuemei Bai, Paul N. Edwards, Marie Josefine Hintz, Lynn H. Kaack, Siir Kilgis, Stefanie Kunkel, Amy Luers, Nikola Milojevic-Dupont, Dave Rejeski, Jürgen Renn, David Rolnick, Christoph Rosol, Daniela Russ, Thomas Turnbull, Elena Verdolini, Felix Wagner, Aicha Zekar, and Marius Zumwald.

Digitalisation and climate change are two 'megatrends' that will shape life in the Anthropocene.

EXECUTIVE SUMMARY

Report of the UN Economist Network for the UN 75th Anniversary Shaping the Trends of Our Time

SEPTEMBER 2020



Digital technology and the planet

Harnessing computing
to achieve net zero

THE
ROYAL
SOCIETY



WBGU
German Advisory Council on Global Change

Flagship Report

Towards Our Common Digital Future



Digitalisation = collecting, exchanging, storing, analysing **data** through widespread use of devices, software and infrastructure

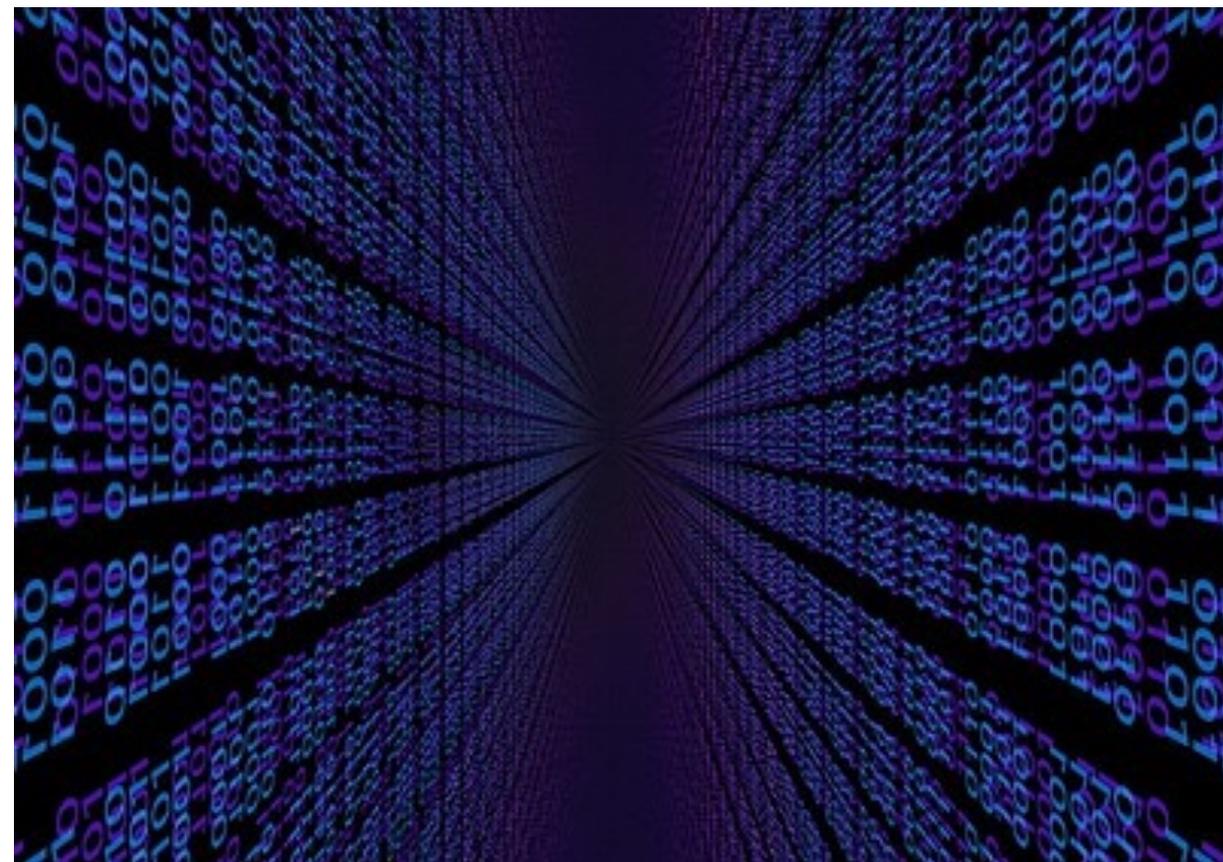


Image: Chambre des Deptues @Flickr. CC BY-ND 2.0.



Photo: Marvin Meyer @Unsplash.

From a historical perspective, digitalisation is 'just' the latest generation of information system.

Cuneiform script, Sumer ~2600 BC



Image: Marie-Lan Nguyen @Wikipedia.

Differential analyser, MIT 1920s



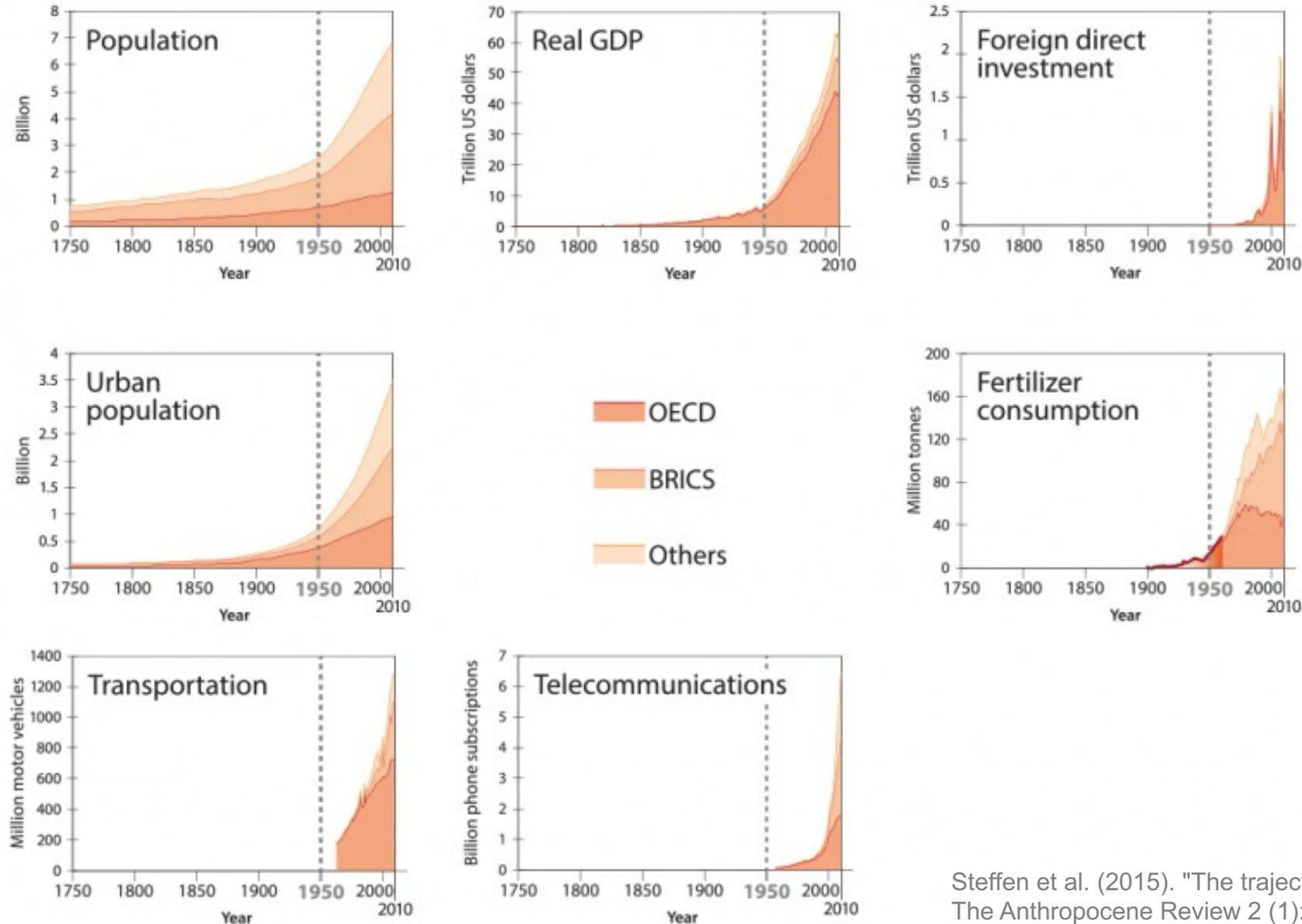
Image: <http://museum.ipsj.or.jp/en//heritage/bibun.html>

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ICTs historically and digitalisation impact natural and human systems by:

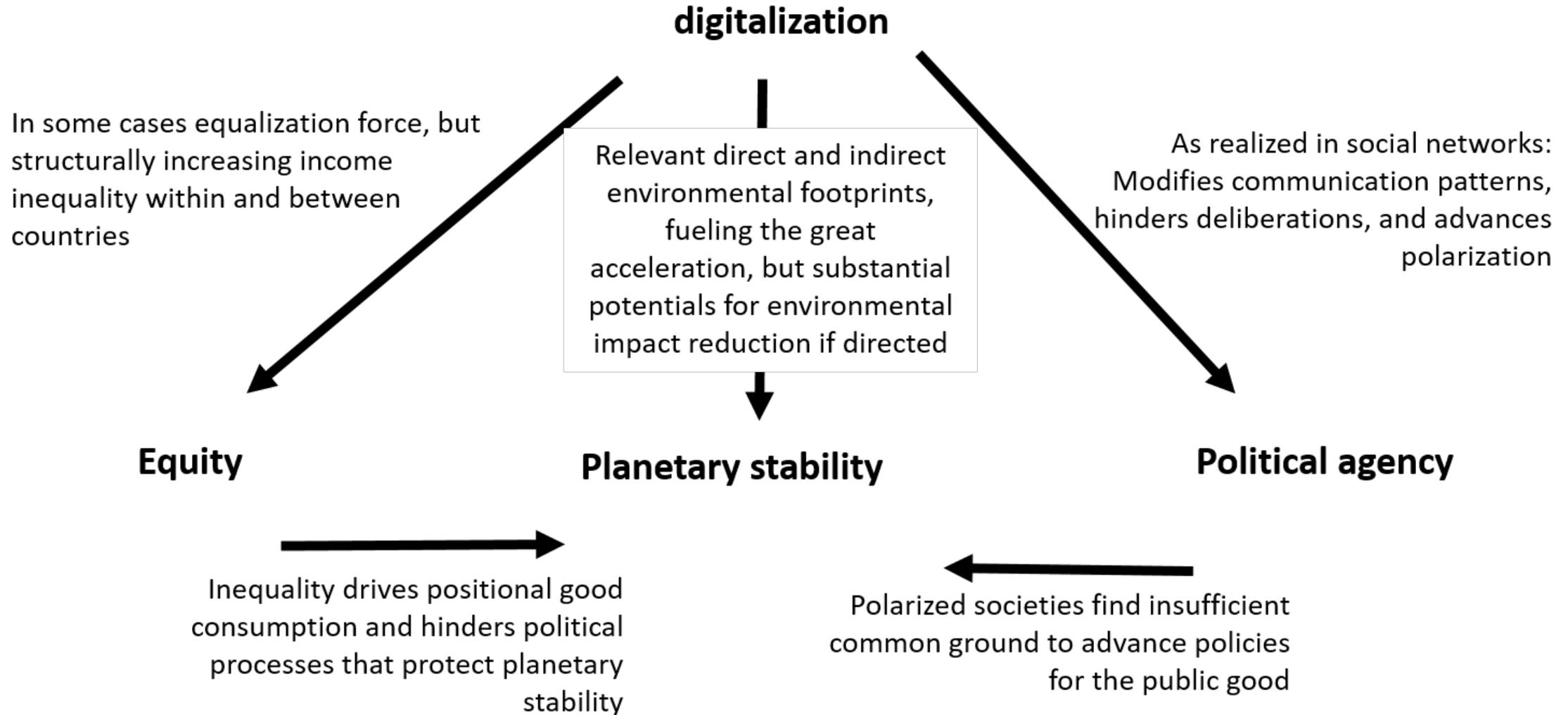
- i) increasing **efficiencies** in processes and systems;
- ii) enabling **new forms of consumption** and growth that increase resource use;
- iii) expanding **political or economic control** in time and space;
- iv) influencing **social interaction and cohesion** with risks of polarisation.

The digital and computer revolution from the 1950s coincides with the beginning of the Anthropocene.



Steffen et al. (2015). "The trajectory of the Anthropocene: The Great Acceleration." *The Anthropocene Review* 2 (1):81-98. doi.org/10.1177/2053019614564785.

Digitalisation creates risks for three aspects of the Anthropocene: planetary boundaries, equity, human agency and governance.



Implications of digitalisation for **equity** are seen in uneven access, labor markets (automation, wage polarisation), mining & pollution.



Photo Credit: Ondřej Martin Mach via Wikimedia Commons licensed under CC BY-SA 3.0.
From: <https://www.nhm.ac.uk/discover/what-is-ewaste-and-what-can-we-do-about-it.html>



The 'ICT Development Index' shows uneven access to digital infrastructure and services globally.

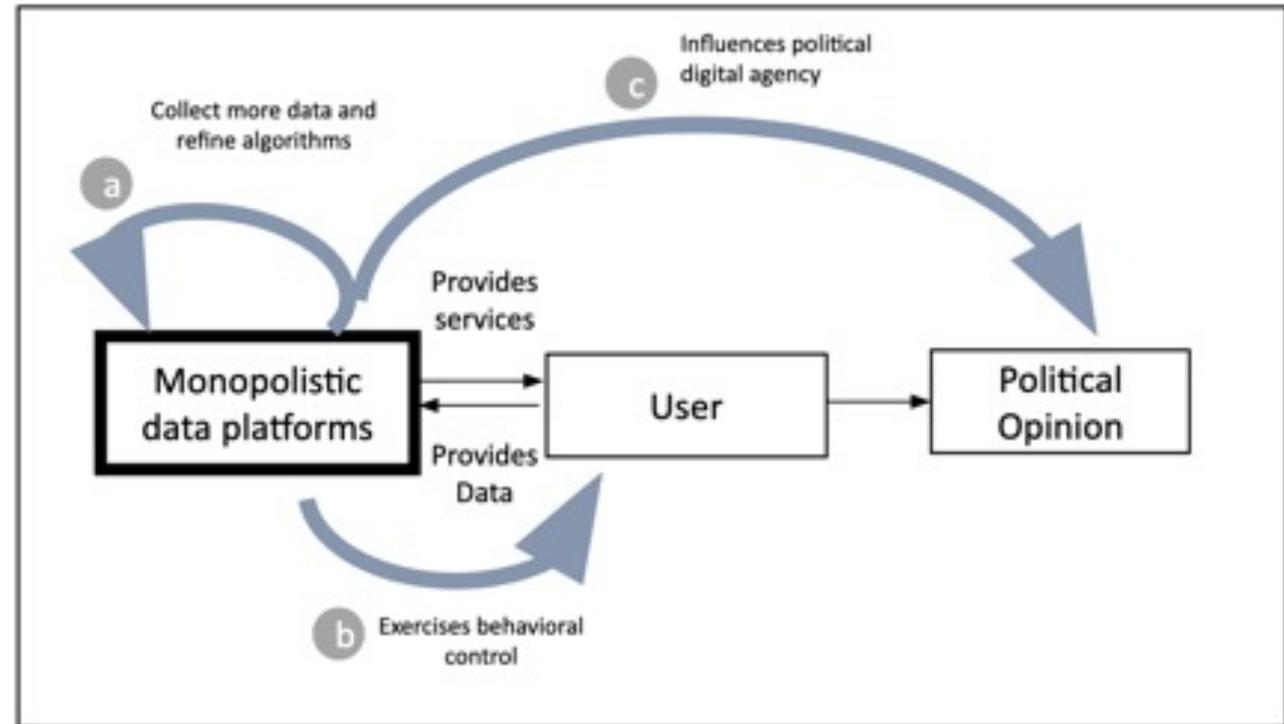
Source: ITU ICT Development Index 2017. The index is based on ten indicators: Fixed-telephone subscriptions, international internet bandwidth, households with a computer, households with internet access, individuals using the internet, fixed-broadband subscriptions, active mobile-broadband subscriptions, mean years of schooling, secondary gross enrolment and tertiary gross enrolment.

Implications of digitalisation for **human agency** are both enabling and empowering, but also undermining and polarising.

digital platforms and services **enable**:

- access to finance, health, education
- livelihoods
- formation of social & political organisations
- communities of identity
- local networks
- rapid information diffusion (peer effects)
- training resources for AI

digital platforms and services **risk**:



Implications of digitalisation for **environment, energy and climate** are large but uncertain.

direct effects

- manufacture and use of devices and servers
- + efficiencies, circular economy

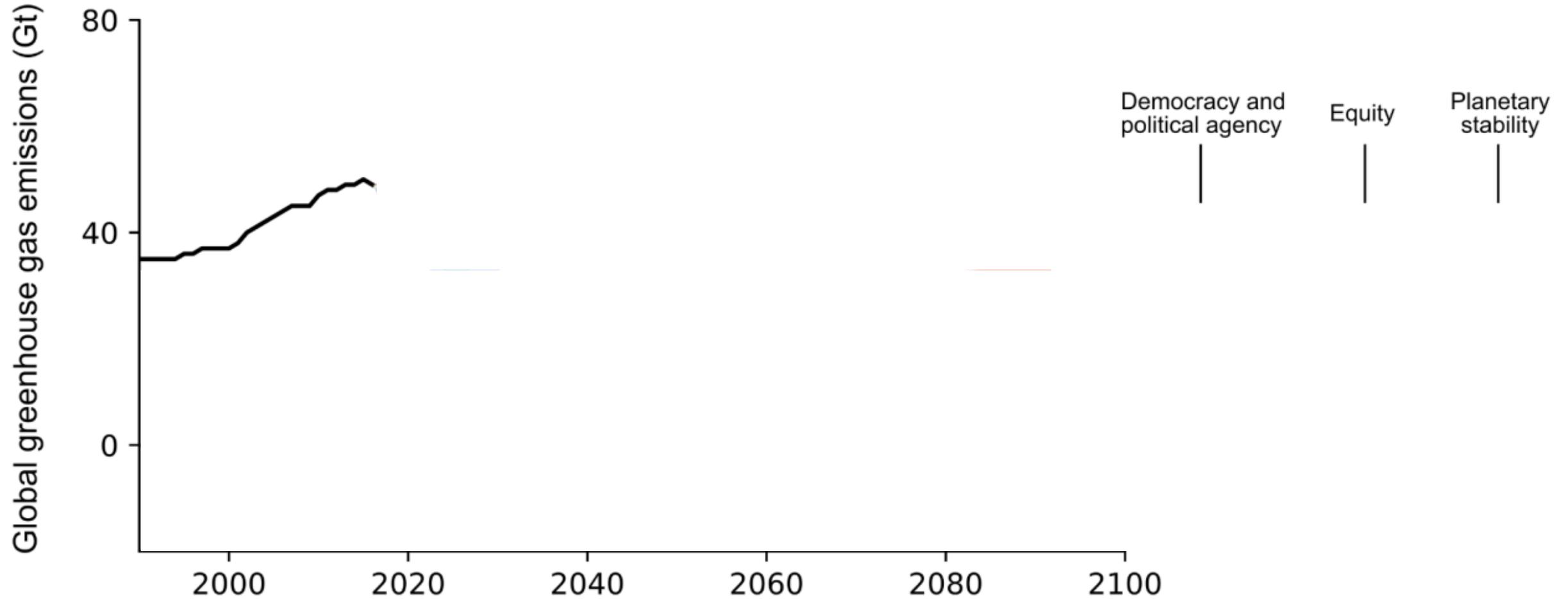
indirect effects

- rebound, intensification, 'long-tail' effects
- substitution, coordination, optimisation

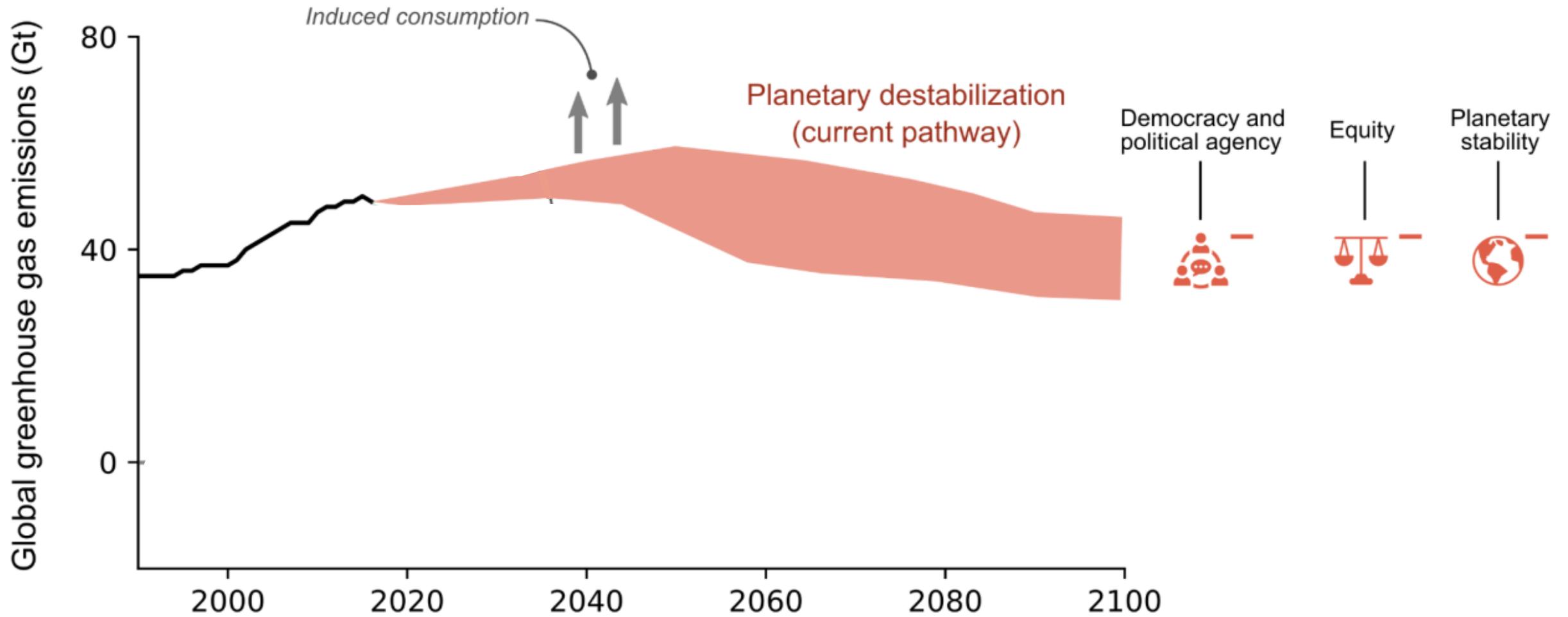
systemic effects

- scale, growth
- AI for good, digital twins, renewable grids

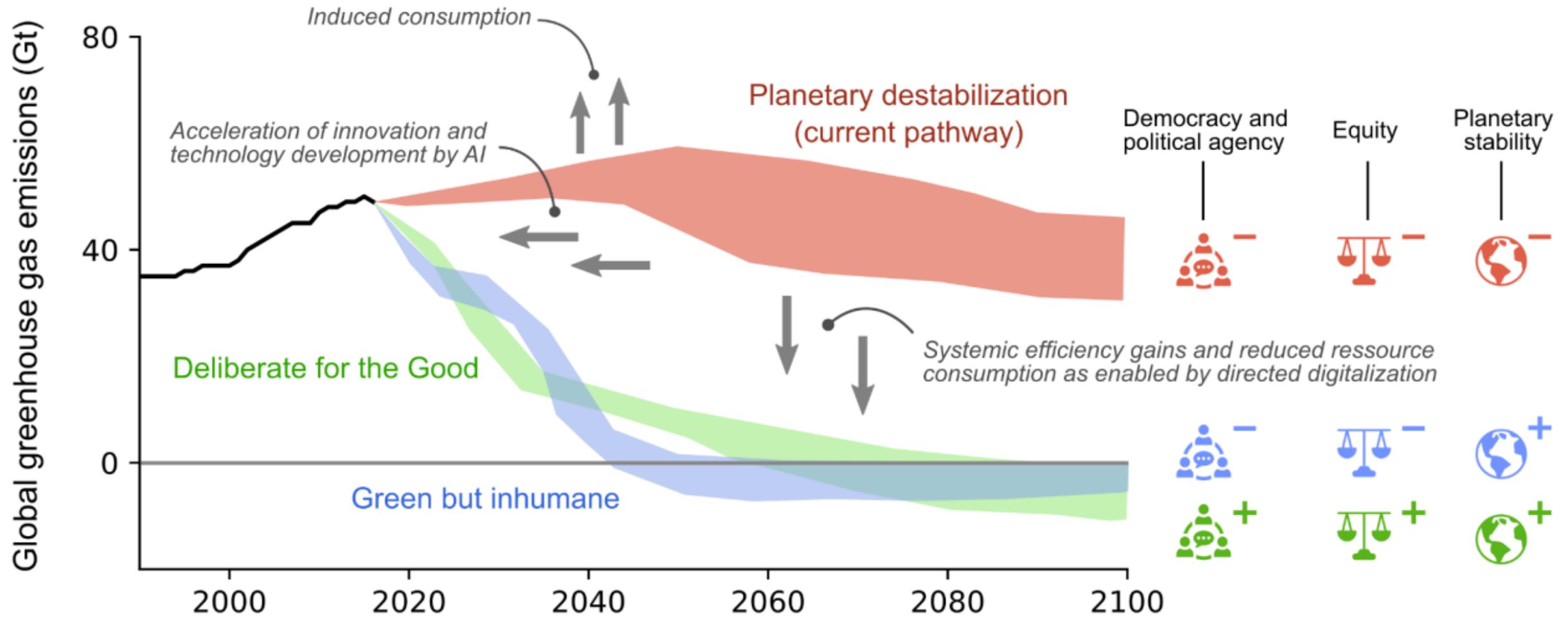
So ... what does the future hold? Illustrative pathways for digitalisation in the Anthropocene.



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Making the 'Deliberate for the Good' scenario a reality: directed digitalisation for public purpose.

planetary boundaries

- circular economy to reduce pressure on natural resources
- energy proportionality test on new applications
- open data commitments to manage rebound
- carbon accounting, labelling, 'feebate' policies

human agency

- empowerment of digital subjects
- digital capabilities and governance

equity

- regulation of data-based monopolies
- mandated private-to-public data sharing
- investments in digital infrastructure

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