




# the case for digital degrowth

radically rethinking our digital futures

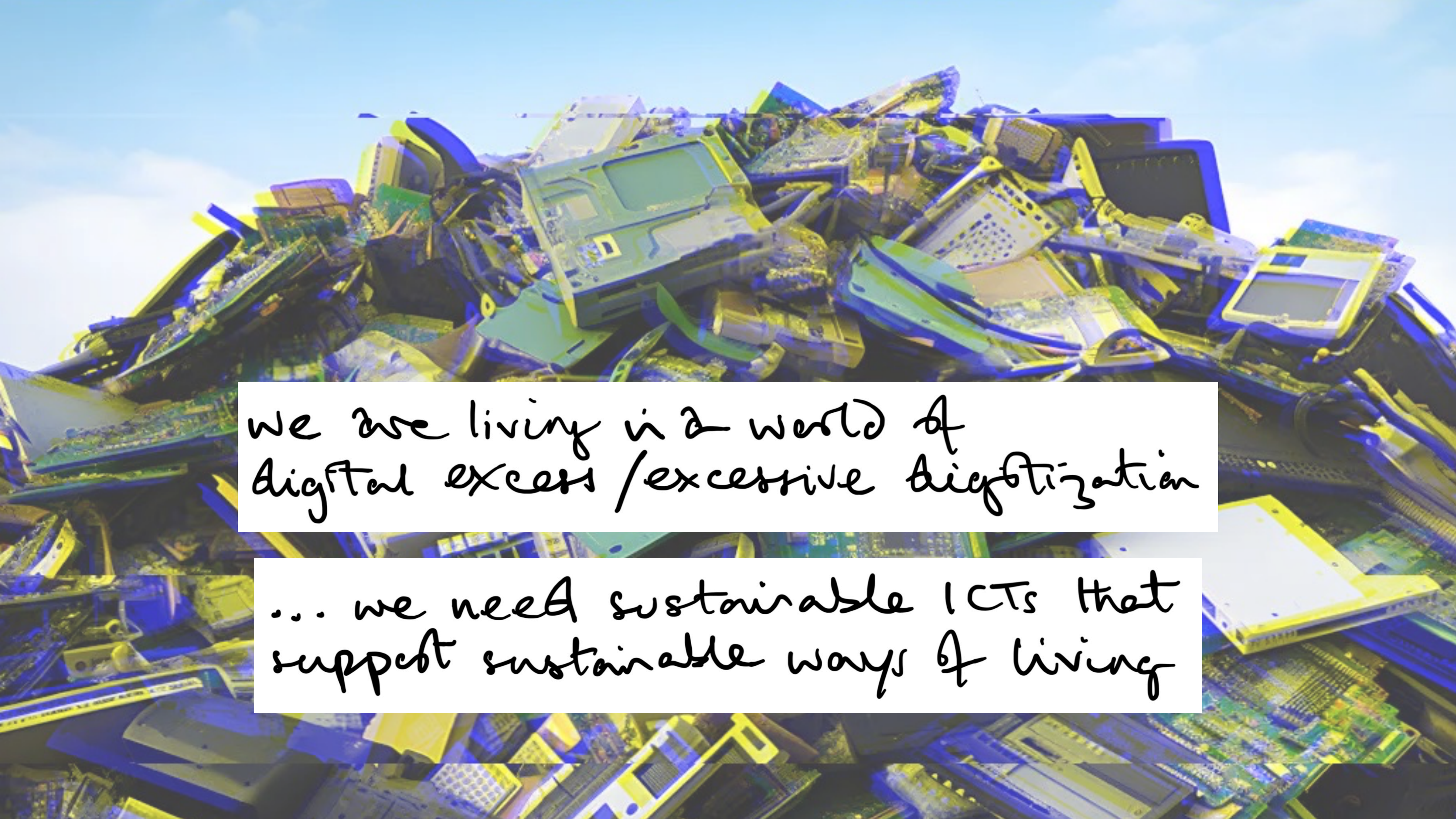
NEIL SELWYN ICT4S 25.06.24





How can we have ICT that is better for people, better for communities, and better for the planet?



A large pile of discarded electronic devices, including smartphones, tablets, and laptops, under a blue sky. The devices are broken and scattered, representing digital waste.

We are living in a world of  
digital excess / excessive digitalization

... we need sustainable ICTs that  
support sustainable ways of living



**TECH**

**Green Tech Industry Thrives with \$70.1 Billion Investment in 2022, Poised for Continued Growth in 2023.**



**Akshat Rathi**

*"An important read for anyone in need  
of optimism about a clean energy future"*

**BILL GATES**

**CLIMATE  
CAPITALISM**

**Winning the Race to  
Zero Emissions and Solving  
the Crisis of Our Age**

*"Truly essential"* Margaret Atwood, TED23

**Not the End  
of the World**

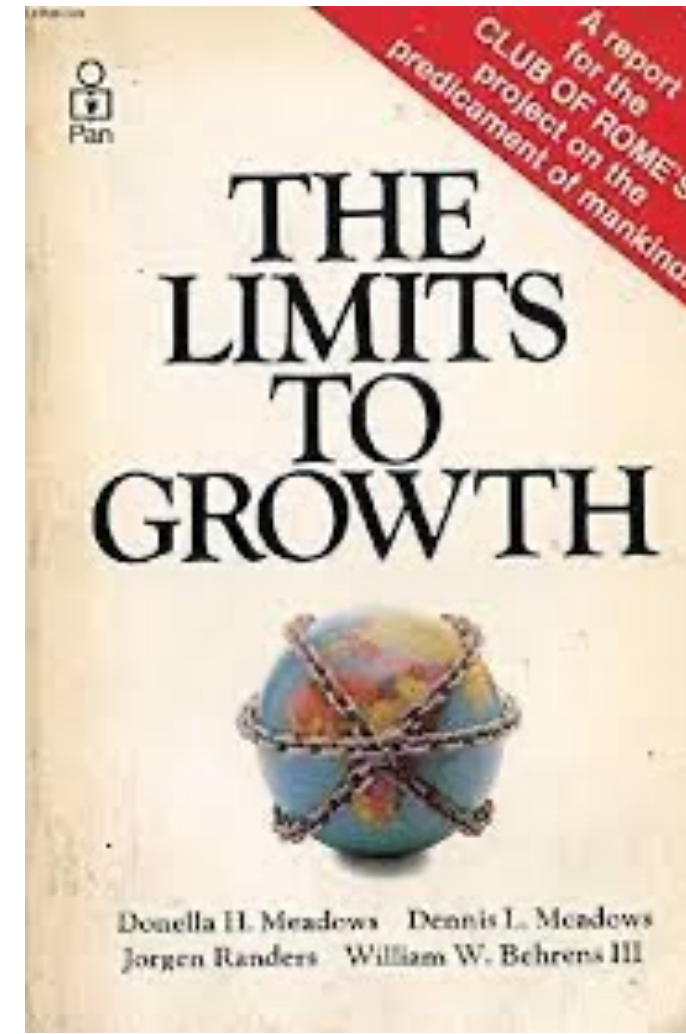
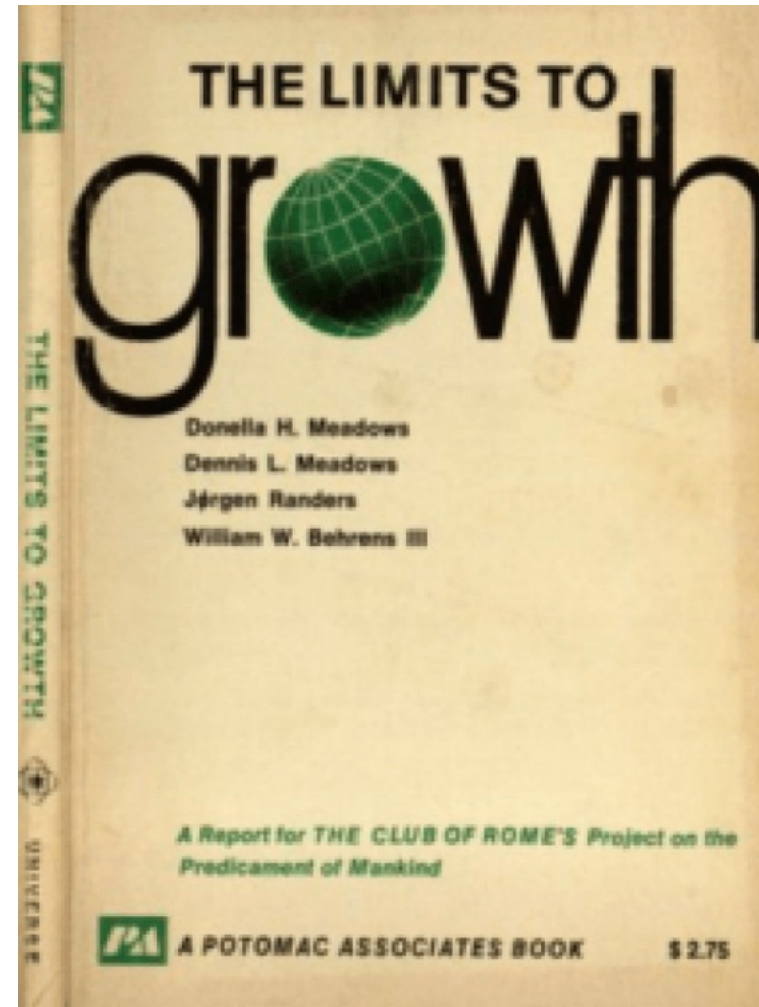
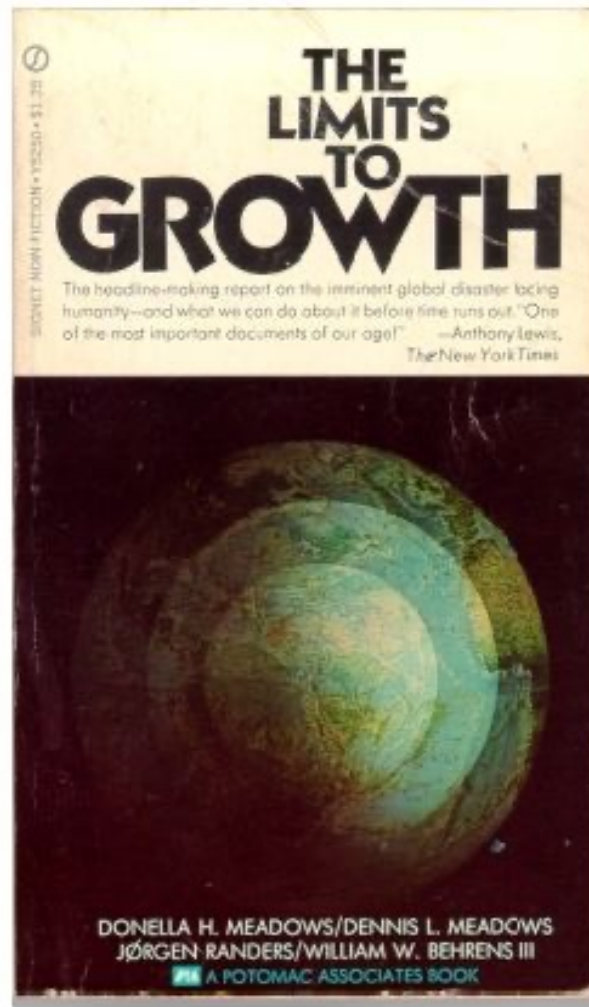


**How We  
Can Be the First  
Generation to  
Build a  
Sustainable  
Planet**

**Hannah Ritchie**

Deputy Editor and Lead Researcher at Our World in Data





Serge Latouche

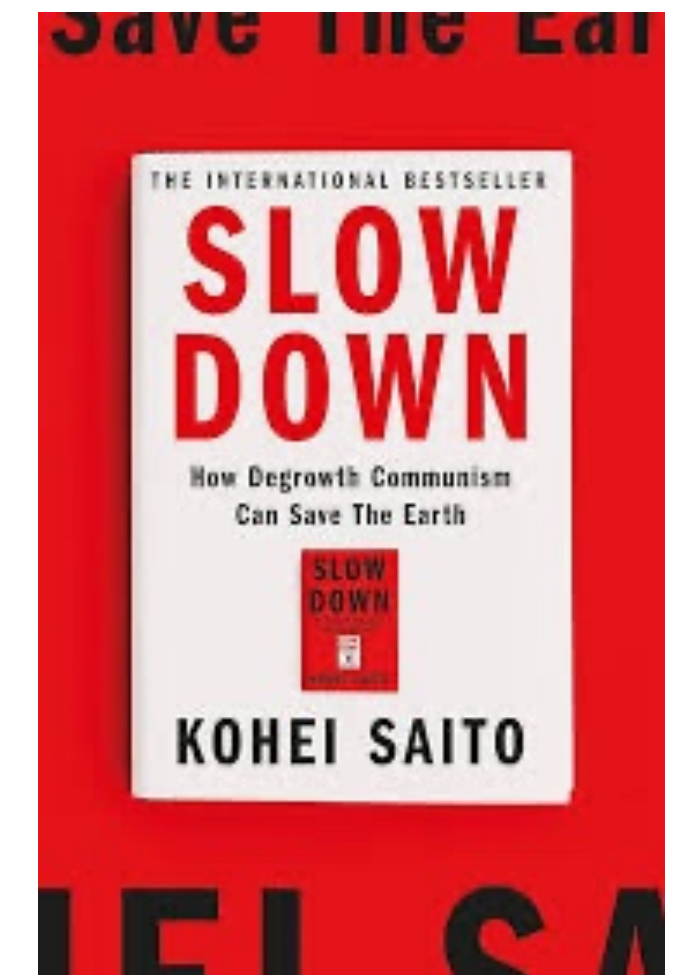
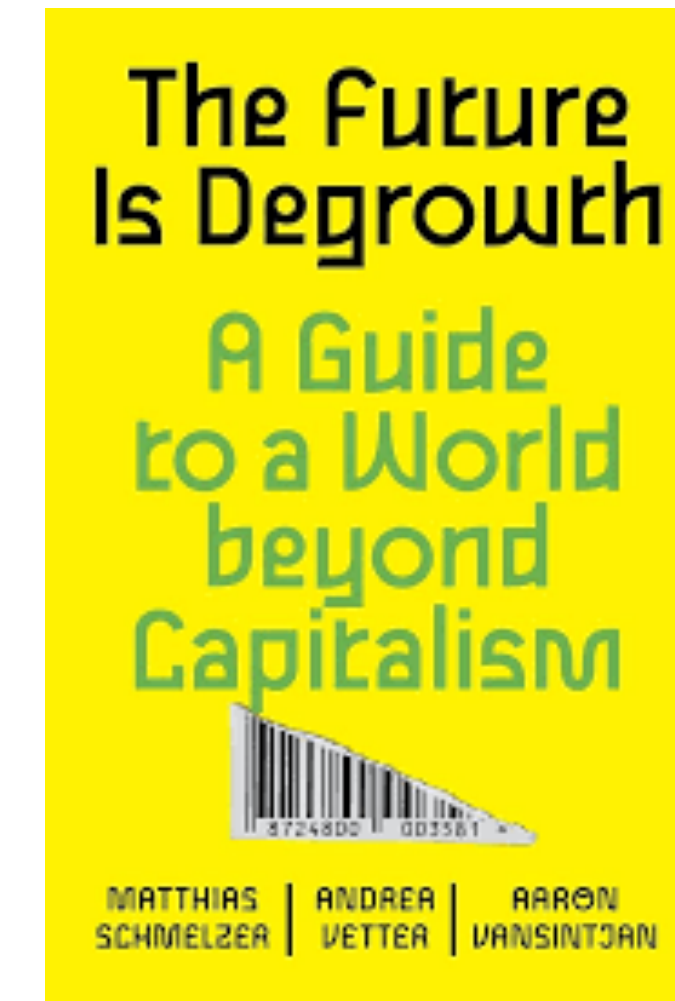
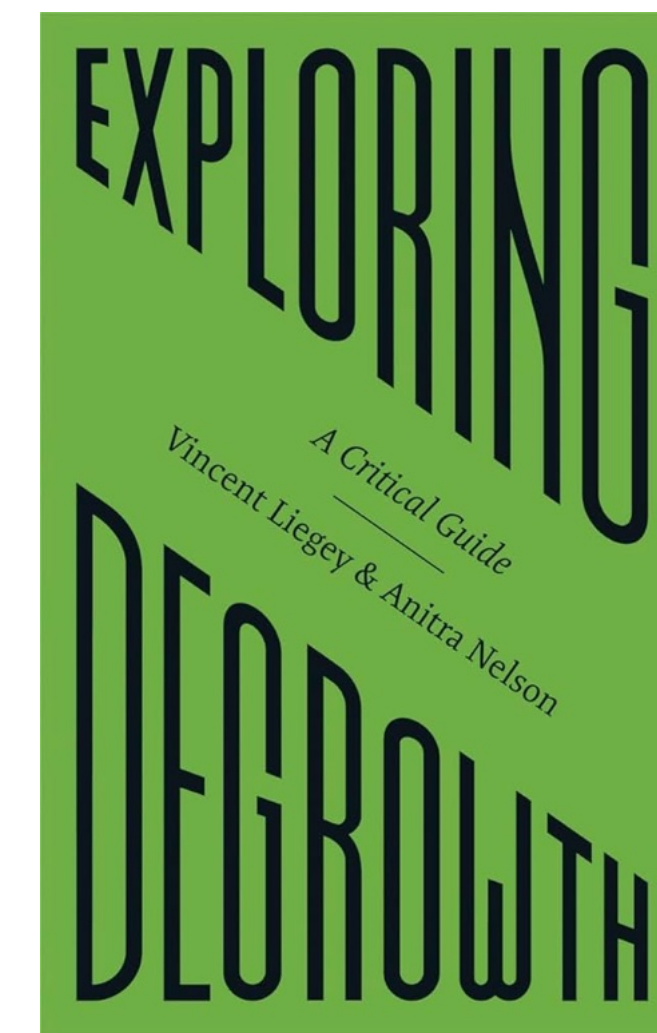
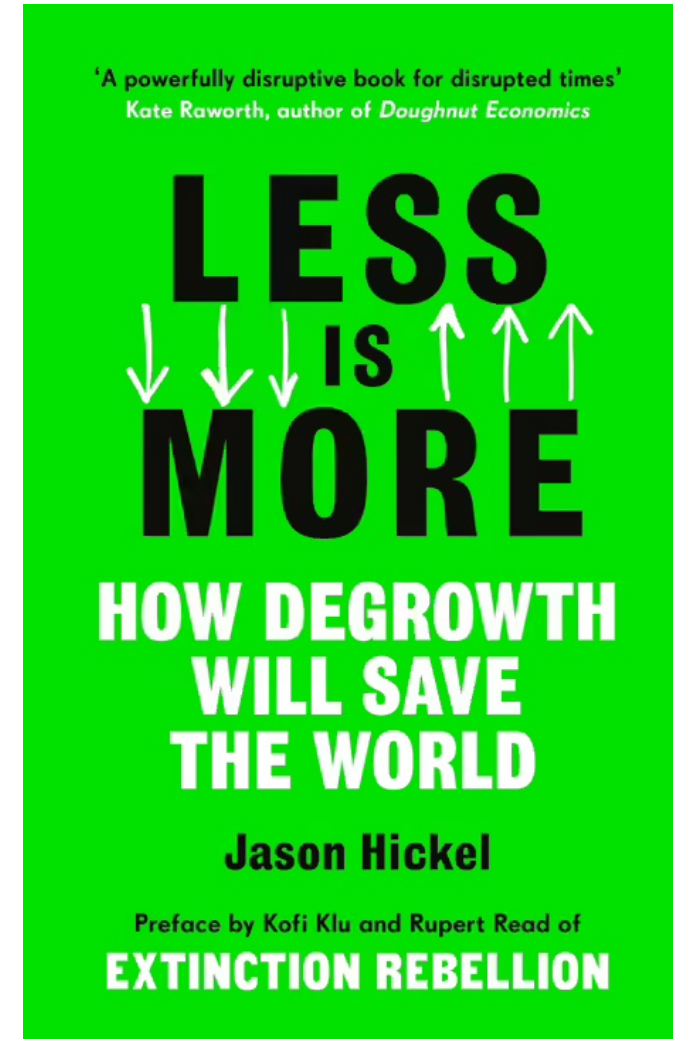
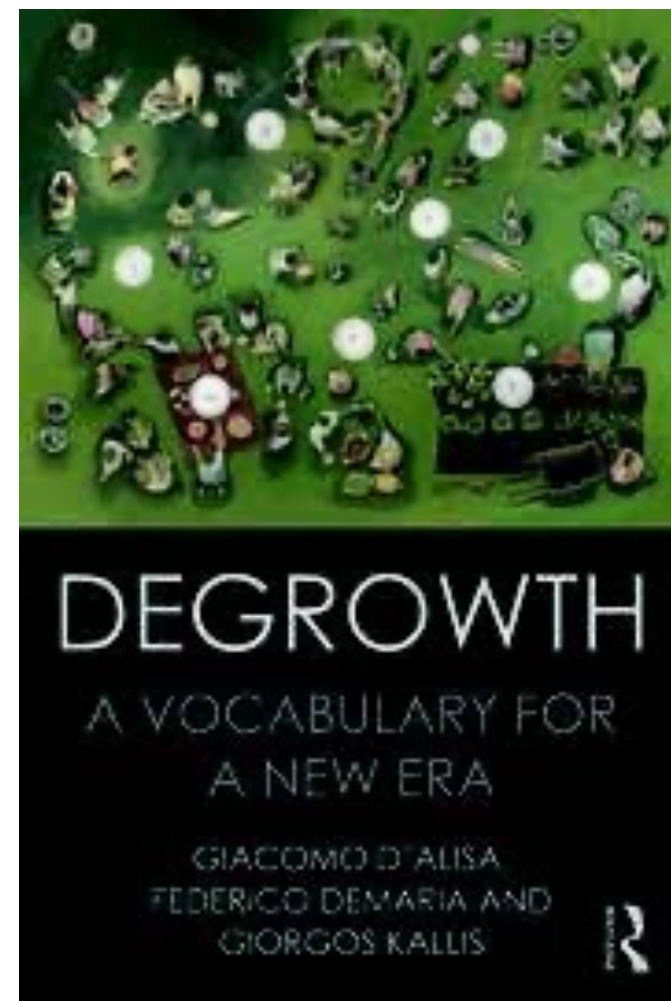
**LE PARI DE LA DÉCROISSANCE**

Penser et consommer autrement pour une révolution culturelle



Pluriel

Nouvelle édition





“Degrowth makes the case that we have to produce and consume differently, and also less. That we have to share more and distribute more fairly, while the pie shrinks. To do so in ways that support pleasurable and meaningful lives in resilient societies and environments requires values and institutions that produce different kinds of persons and relations”

**(Kallis *et al* 2020, p.5)**

post-capitalist  
low impact  
slowing down  
& scaling back

voluntary simplicity  
rebalancing  
collective  
deliberation

local  
self-  
determination  
cooperation



IVAN  
ILLICH

Tools for  
Conviviality



*"The most powerful articulation to date of the dream  
which obsesses [Ivan Illich], possesses him, and allows him no rest."  
New York Times Book Review*

CONVIVIALITY

AUTONOMY

COMMONS

CARE





WHAT ARE THE  
ICT EQUIVALENTS  
OF THE BICYCLE?



## Comment



Policies that support degrowth include the provision of high-quality, affordable public housing, such as that in Vienna.

## Degrowth can work – here’s how science can help

Jason Hickel, Giorgos Kallis, Tim Jackson, Daniel W. O’Neill, Juliet B. Schor, Julia K. Steinberger, Peter A. Victor & Diana Ürge-Vorsatz

Wealthy countries can create prosperity while using less materials and energy if they abandon economic growth as an objective.

**T**he global economy is structured around growth – the idea that firms, industries and nations must increase production every year, regardless of whether it is needed. This dynamic is driving climate change and ecological breakdown. High-income economies, and the corporations and wealthy classes that dominate them, are mainly responsible for this problem and consume energy and materials at unsustainable rates<sup>1,2</sup>.

Yet many industrialized countries are now struggling to grow their economies, given economic convulsions caused by the COVID-19

pandemic, Russia’s invasion of Ukraine, resource scarcities and stagnating productivity improvements. Governments face a difficult situation. Their attempts to stimulate growth clash with objectives to improve human well-being and reduce environmental damage.

Researchers in ecological economics call for a different approach – degrowth<sup>3</sup>. Wealthy economies should abandon growth of gross domestic product (GDP) as a goal, scale down destructive and unnecessary forms of production to reduce energy and material use, and focus economic activity around securing

- **Degrowth welcomes tech that is “empirically feasible, ecologically coherent and socially just”**
- **Degrowth pushes for the reduction of all technologies that are clearly destructive and/or less necessary to the wellbeing of people & planet**
- **Degrowth pushes for the revitalisation of technologies that might add to the wellbeing of people & planet**
- **Degrowth pushes for innovating novel technological approaches**



# COMPUTING WITHIN LIMITS

# PERMACOMPUTING

# DIGITAL SUFFICIENCY

## review articles



DOI:10.1145/3183582

**The future of computing research relies on addressing an array of limitations on a planetary scale.**

BY BONNIE NARDI, BILL TOMLINSON, DONALD J. PATTERSON, JAY CHEN, DANIEL PARGMAN, BARATH RAGHAVAN, AND BIRGIT PENZENSTADLER

## Computing within Limits

COMPUTING RESEARCHERS AND practitioners are often seen as inventing the future. As such, we are implicitly also in the business of predicting the future. We plot trajectories for the future in the problems we select, the assumptions we make about technology and societal trends, and the ways we evaluate research.

However, a great deal of computing research focuses on one particular type of future, one very much like the present, only more so. This vision of the future assumes that current trajectories of ever-increasing production and consumption will continue. This focus is perhaps not surprising, since computing machinery as we know it has existed for only 80 years, in a period of remarkable industrial and technological expansion. But humanity is rapidly approaching, or has already exceeded, a variety of planet-scale limits related to the global climate system, fossil fuels, raw materials, and biocapacity.<sup>28,32,38</sup>

It is understandable that in computing we would not focus on limits. While planetary limits are obvious in areas such as extractive capacity in mining or fishing,

or the amount of pollution an ecosystem can bear, limits are less obvious in computing. Many believe the only limit worth considering is human ingenuity, and that we can surpass any and all other limits if we, as a global community, pool our creative resources. But we collectively face new global conditions that warrant our attention.

In this article we explore the relationship between these potential futures and computing research. What hidden assumptions about the future are embedded in most computing research? What possible or even probable futures are we ignoring? What work should we be doing to respond to fundamental planetary limits, and to the ecological and energy constraints that global society faces over the coming years and decades? Confronting such limits is likely to present challenges that we—humanity—have never before faced.

Given that computing underlies virtually all the infrastructure of global society—in commerce, communication, transportation, agriculture, manufacturing, education, science, healthcare, and governance—computing has an enormous role to play in responding to global limits and in shaping a society that meaningfully adapts to them. We contend that the root of much of computing research has been driven predominantly by growth-oriented visions

### » key insights

- Most computing work is premised on industrial civilization's default worldview in which ongoing economic growth is both achievable and desirable.
- This growth-focused worldview, however, is at odds with findings from many other scientific fields, which see growth as deeply problematic for ecological and social reasons.
- We proposed that the computing field transition toward "computing within limits," exploring ways that new forms of computing supported well-being while enabling human civilizations to live within global ecological and material limits.
- Computing underlies virtually all the infrastructure of global society, and will therefore be critical in shaping a society that meaningfully adapts to global limits.

## permacomputing

[Edit](#) [RecentChanges](#) [Preferences](#) [Discussion](#)

Welcome to the Permacomputing wiki!



Permacomputing is both a concept and a community of practice oriented around issues of resilience and regenerativity in computer and network technology inspired by permaculture. 020C\*☆ -☆:\*'

There are huge environmental and societal issues in today's computing, and permacomputing specifically wants to challenge them in the same way as permaculture has challenged industrial agriculture. With that said, permacomputing is an anti-capitalist political project. It is driven by several strands of anarchism, decoloniality, intersectional feminism, post-marxism, degrowth, ecologism.

Permacomputing is also a utopian ideal that needs a lot of rethinking, rebuilding and technical design work to put in practice. This is why a lot of material on this wiki is highly technical.

Most importantly, there is no permacomputing kit to buy. See permacomputing as invitation to collectively and radically rethink computational culture. It is not a tech solution searching for a problem.

Annals of Telecommunications (2023) 78:277–295  
<https://doi.org/10.1007/s12243-022-00914-x>



## Digital sufficiency: conceptual considerations for ICTs on a finite planet

Tilman Santarius<sup>1,2,3</sup> · Jan C. T. Bieser<sup>4,5</sup> · Vivian Frick<sup>2</sup> · Mattias Höjer<sup>5</sup> · Maike Gossen<sup>1,3</sup> · Lorenz M. Hilty<sup>4,6</sup> · Eva Kern<sup>7</sup> · Johanna Pohl<sup>1</sup> · Friederike Rohde<sup>1,2</sup> · Steffen Lange<sup>1,8</sup>

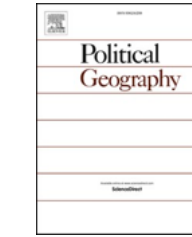
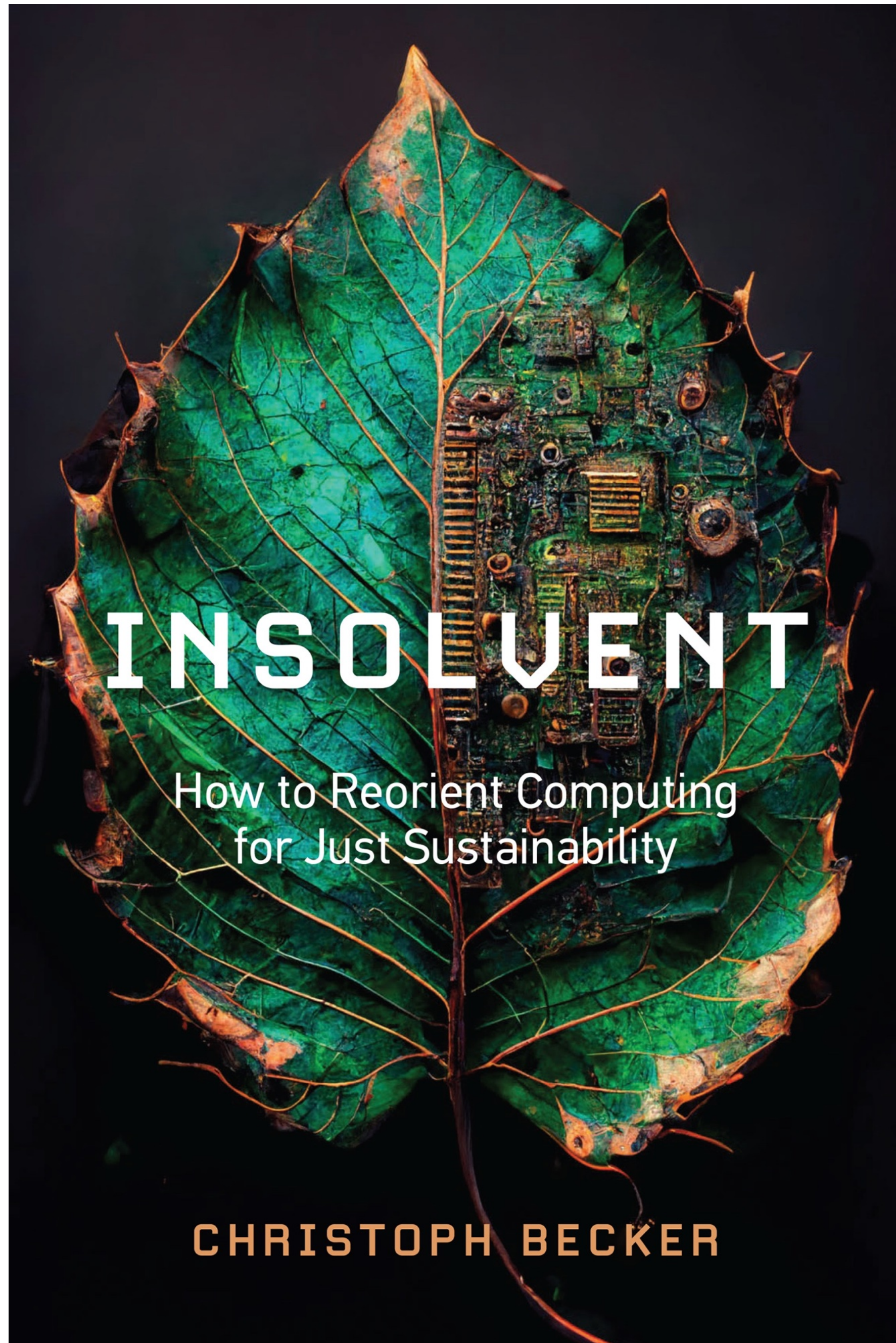
Received: 9 December 2021 / Accepted: 22 April 2022 / Published online: 12 May 2022  
© The Author(s) 2022

### Abstract

ICT hold significant potential to increase resource and energy efficiencies and contribute to a circular economy. Yet unresolved is whether the aggregated net effect of ICT overall mitigates or aggravates environmental burdens. While the savings potentials have been explored, drivers that prevent these and possible counter measures have not been researched thoroughly. The concept digital sufficiency constitutes a basis to understand how ICT can become part of the essential environmental transformation. Digital sufficiency consists of four dimensions, each suggesting a set of strategies and policy proposals: (a) hardware sufficiency, which aims for fewer devices needing to be produced and their absolute energy demand being kept to the lowest level possible to perform the desired tasks; (b) software sufficiency, which covers ensuring that data traffic and hardware utilization during application are kept as low as possible; (c) user sufficiency, which strives for users applying digital devices frugally and using ICT in a way that promotes sustainable lifestyles; and (d) economic sufficiency, which aspires to digitalization supporting a transition to an economy characterized not by economic growth as the primary goal but by sufficient production and consumption within planetary boundaries. The policies for hardware and software sufficiency are relatively easily conceivable and executable. Policies for user and economic sufficiency are politically more difficult to implement and relate strongly to policies for environmental transformation in general. This article argues for comprehensive policies for digital sufficiency, which are indispensable if ICT are to play a beneficial role in overall environmental transformation.

**Keywords** Green IT · ICT for sustainability · Sustainable software · Sustainable production and consumption · Rebound effects · Economic growth · Degrowth





## Viewpoint

## Digital degrowth innovation: Less growth, more play

Peter Howson<sup>a,\*</sup>, Jillian Crandall<sup>b</sup>, Xavier Balaguer Rasillo<sup>c</sup><sup>a</sup> Department of Social Sciences, Northumbria University, Lipman Building, Newcastle Upon Tyne, NE1 8SB, UK<sup>b</sup> School of Architecture, Rensselaer Polytechnic Institute, 110 8th Street, Troy, NY, 12180, USA<sup>c</sup> University of Zurich, Winterthurerstrasse 190, 8057, Zurich, Switzerland

In the article that launched this forum, Robbins (2020) describes a dairy farm in rural Wisconsin where human labor—farmers waking at 3 a.m. to milk cows in the freezing cold—has been replaced by a highly-efficient milk production system run by robots. Robbins's intention is to explore how labor-saving technologies, often associated with capitalist growth, might have a role in creating more livable and sustainable futures. While seeking compromise, Robbins's example seems to offer a binary choice: large-scale technological socialism, or the romance of green, technophobic local projects. Subsequent contributions to this forum further highlight the tensions that remain between primitivist and techno-optimist views in degrowth debates. Our research suggests many alternatives to this binary. Focusing on digital innovation, our aim in this contribution is to find common ground among degrowth factions, and between degrowth and socialist eco/modernist

(2020) have argued, advocates of socialist eco/modernism tend to oversimplify the degrowth position on technology, falsely implying that degrowthers uniformly reject 'modern' technology and digital innovation. However, puritan-primitivist cliques that are either agnostic or hostile towards innovation do have a presence in the degrowth movement. Even in the more techno-optimist branches of the degrowth movement, technology appears as something to be tolerated rather than actively embraced or pursued. Much of the recent degrowth literature repeats critiques of technology articulated by earlier thinkers like Charbonneau (1980), who understood that growth-motivated innovation destroys both Nature and human freedom. While physical infrastructure takes its toll on Nature, our 'smart' devices, for many degrowthers, have become synonymous with 'data-colonialism' and 'surveillance capitalism' (Zuboff, 2019)—the digital destroyers of

Sustainability Science (2023) 18:2309–2322  
<https://doi.org/10.1007/s11625-023-01378-1>

## ORIGINAL ARTICLE



## Beyond global versus local: illuminating a cosmological framework for convivial technology development

Vasilis Kostakis<sup>1,2</sup> · Vasilis Niaros<sup>3</sup>  · Chris Giotitsas<sup>1</sup>Received: 18 December 2022 / Accepted: 13 June 2023 / Published online: 30 June 2023  
© The Author(s) 2023

## Abstract

A reconceptualisation of technology, as a vital component of modern society cutting across all its other aspects, is required to achieve social and environmental sustainability. This paper presents a convivial technology development framework using the concept of “cosmolocal” production. The latter captures the dynamic of dispersed technology initiatives, which exhibit conceptualisations of living, working and making around the commons. It is a structural framework for organising production by prioritising socio-ecological well-being over corporate profits, over-production and excess consumption. From the vantage point of Tzoumakers, a cosmological initiative in which the authors participate, this paper offers an empirical account of its conception and evolution. We further examine its relation and cooperation with various similar interconnected places in urban and rural settings.

**Keywords** Political ecology · Degrowth · Environmental justice · Ecological economics



# **#1. Working out which digital technologies need to “destroyed for good” (Sadowski 2025)**

- \* Influencing public opinion and political thinking**
- \* Making the digital technology a focus of deliberative democracy**
- \* Organising protest and resistance**
- \* Harnessing the efforts of tech workers**
- \* Encouraging the ‘redesigning’ and ‘undesigning’ of technologies**



## **#2. Digital technologies that “should be taken apart, to be rebuilt for new purposes” (Sadowski 2025)**

- \* Digital public goods and the digital commons**
- \* Building our own computers**
- \* Right to digital repair**
- \* Modular devices**
- \* Communal and shared resources**
- \* Collectively run infrastructure**



## **#3. Radical future forms of resilient computing**

- \* Salvage computing**
- \* Frugal computing**
- \* Software sufficiency**
- \* Improvised devices**
- \* Collapse O/S**
- \* Solar-powered websites**



## **#3. Radical future forms of nature-based computing**

- \* Nature-powered computing**
- \* Intermittent computing**
- \* Biodegradable computing**
- \* Fungal computing and other forms of 'wetware'**



# Why Degrowth Is the Worst Idea on the Planet

Despite still growing over the last 50 years, we already figured out how to reduce our impact on Earth. So let's do that.



## The Techno-Optimist Manifesto

Marc Andreessen

We believe technology opens the space of what it can mean to be human.

### The Enemy

We have enemies.

Our enemies are not bad people – but rather bad ideas.

Our present society has been subjected to a mass demoralization campaign for six decades – against technology and against life – under varying names like “existential risk”, “sustainability”, “ESG”, “Sustainable Development Goals”, “social responsibility”, “stakeholder capitalism”, “Precautionary Principle”, “trust and safety”, “tech ethics”, “risk management”, “de-growth”, “the limits of growth”.



How can we have ICT that is better for people, better for communities, and better for the planet?

"BEGIN TO BUILD THE NEW  
WORLDS WITHIN THE SHELL  
OF THE OLD" (Samuel Alexander)



# **The challenges of radically changing ICT**

- \* Convincing ourselves this is possible**
- \* Dealing with vested interests**
- \* Building support and solidarity**
- \* Starting local ... but moving beyond the local**