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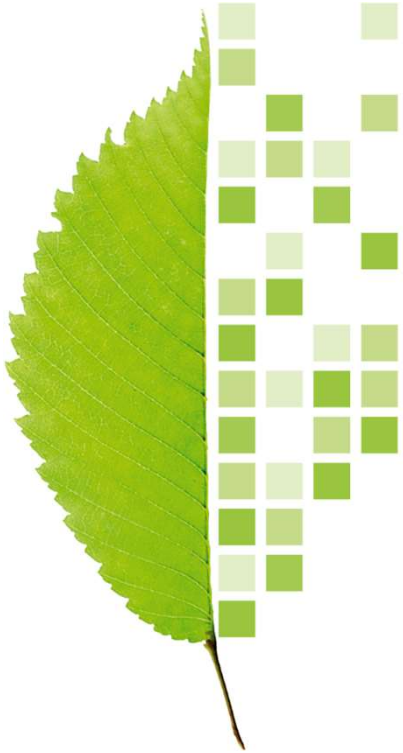

The concept of Digital Sufficiency

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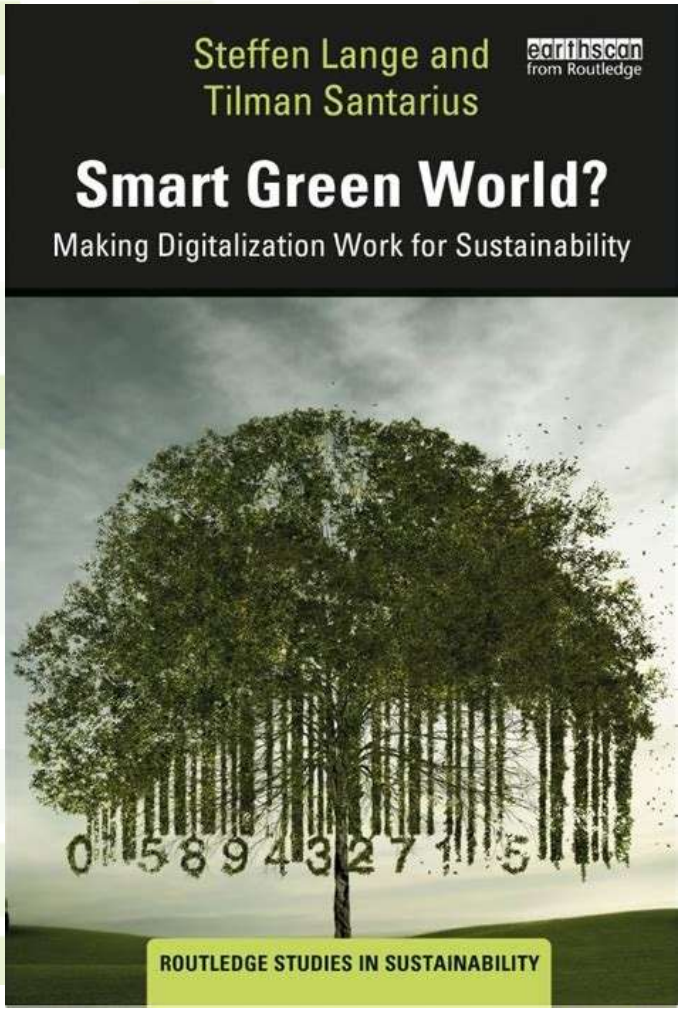
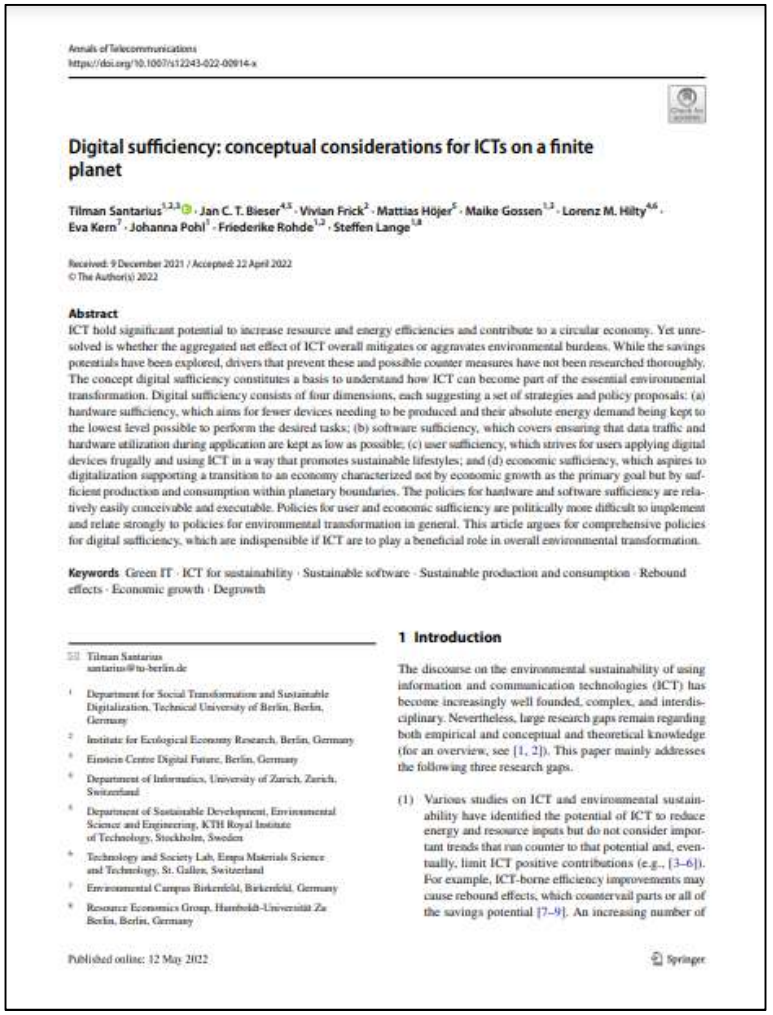
Publications on Digital Sufficiency





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Digital sufficiency: conceptual considerations for ICTs on a finite planet

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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 indispensible 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

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1 Introduction

The discourse on the environmental sustainability of using information and communication technologies (ICT) has become increasingly well founded, complex, and interdisciplinary. Nevertheless, large research gaps remain regarding both empirical and conceptual and theoretical knowledge (for an overview, see [1, 2]). This paper mainly addresses the following three research gaps.

(1) Various studies on ICT and environmental sustainability have identified the potential of ICT to reduce energy and resource inputs but do not consider important trends that run counter to that potential and, eventually, limit ICT positive contributions (e.g., [3–6]). For example, ICT-borne efficiency improvements may cause rebound effects, which countervail parts or all of the savings potential [7–9]. An increasing number of

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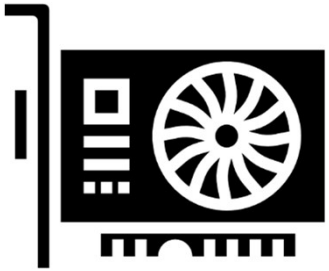
Digital Sufficiency



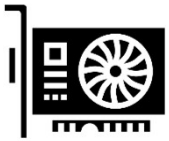
Hardware Sufficiency

Software Sufficiency

User Sufficiency

Economic Sufficiency

Icons: https://de.freepik.com/



Hardware Sufficiency

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- aims at extending the product life of devices
- by a) producing fewer devices, b) designing long-lasting and energy-saving devices, and c) improving recovery

Software Sufficiency

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- aims at reducing data volume, traffic, and demand for computing power
- by a) designing sustainable software, b) minimizing the amount of collected data, c) adapting hardware capacities to the required demand

User Sufficiency

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- aims at applying devices frugally and using ICT that enable sufficiency-oriented lifestyles
- by a) questioning the use of devices, b) purchasing fewer devices and prolonging lifetimes, and c) applying ICT to live less resource-intense

Economic Sufficiency

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- aims at a transition to a post-growth economy supported by digitalization
- by a) using labor productivity to reduce working hours, b) fostering circular economies, and b) scaling up digital non-profit organizations and platform cooperatives

Policy approaches for Digital Sufficiency

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Design standards for reparability, upgradability, and compatibility

Introduce incentives for redistribution and re-furbishment by producers

Extend EU Ecodesign Directive to software products

Introduce data center policies

Enhance communication and education campaigns to change the existing consumption culture

Introduce selective advertising ban

Adapt competition law to address power asymmetries in digital markets

Introduce taxes, subsidies, infrastructures, public funding

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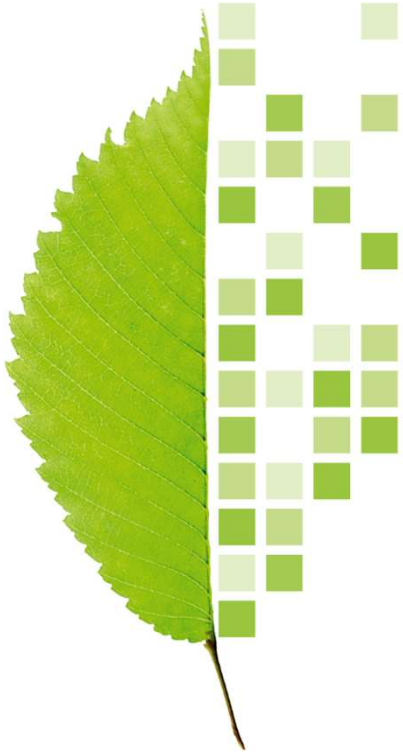

Thank you!

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