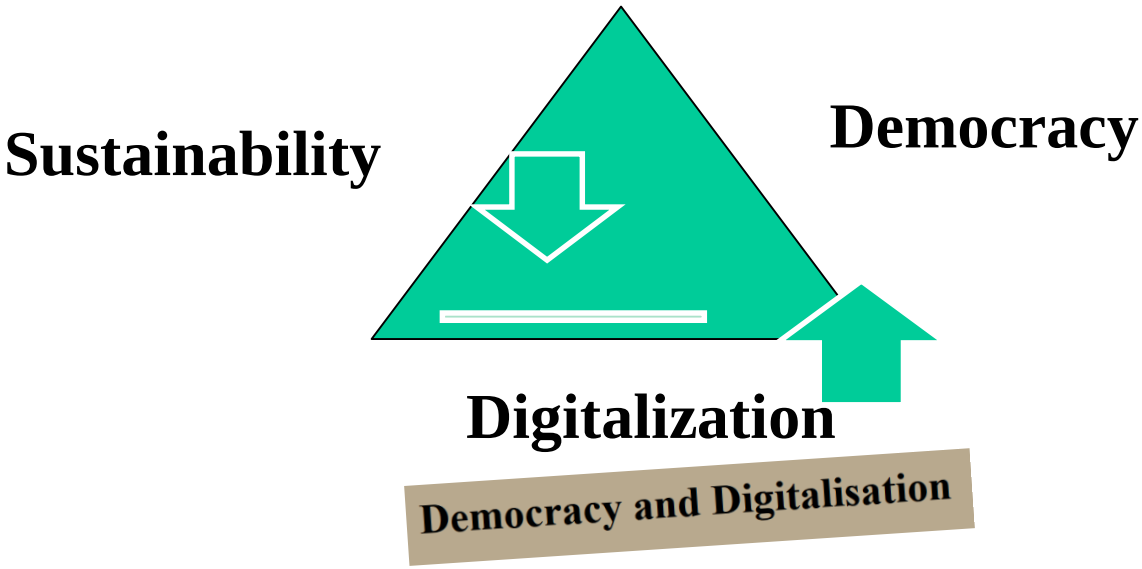
The Triangle of Digitalization
– Sustainability and Democracy within Digital Collaboration



Christoph Bals, Policy Director, Germanwatch e.V.

CS3 2021, January 25

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Poll:

- Have you heard about Sustainable Development Goals (SDG)
- Do you consider them as relevant?
- The EU has agreed on a binding decision to be greenhouse gas neutral by 2020. Do you expect that this will be implemented?

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Germanwatch - in a Nutshell

Non-profit organisation

Aims

- Protection of the planetary boundaries as a basis for sustainable future;
- Implementing full package of human rights;
- Improve national and global equity

Working methods

- Think tank
- Advocacy
- Public Discourse
- Campaigning
- Education for Sustainable Development

Budget:

- Total: app. 5.5 Mio EUR
- donations app. 1 Mio EUR

Members:
ca. 800 experts, multipliers, committed citizens

Funders: approx. 50% foundations and 50% public sector; approx. 30-50 donors

Staff:

ca. 70 staff members

in Bonn and Berlin

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› Nature. 2019 Nov;575(7784):592-595. doi: 10.1038/d41586-019-03595-0.

Climate tipping points – too risky to bet against

Timothy M Lenton, Johan Rockström, Owen Gaffney, Stefan Rahmstorf, Katherine Richardson, Will Steffen, Hans Joachim Schellnhuber

PMID: 31776487 DOI: 10.1038/d41586-019-03595-0

Donald Trump's Cambridge Analytica scandal just exploded

Bill Palmer | 1:13 pm EDT September 28, 2020

Palmer Report » Analysis

First thesis:

How we design this triangle (digitalization, sustainability, democracy) will determine to a large extent the quality of our livelihoods and of our democracy.

The question is not whether digitalization plays a crucial role, but *how* it will play out regarding sustainability and democracy.

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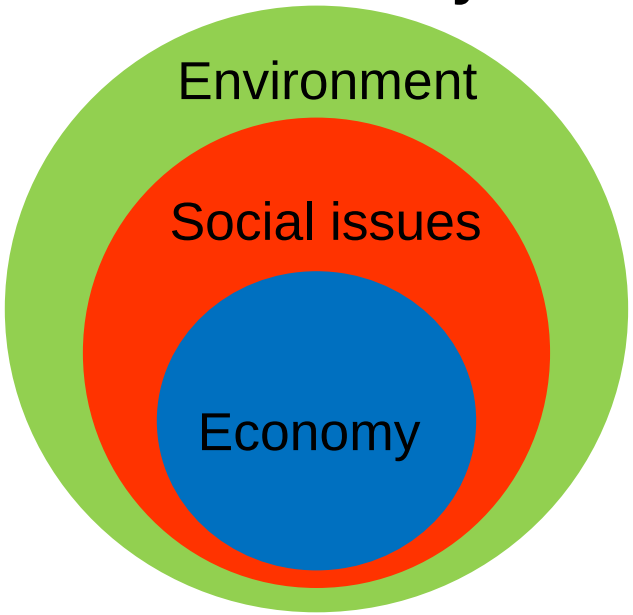
Sustainability



„Sustainability: living well today while taking care of your social environment, the ecolgocial environment and posterity.“
(Oliver Parodi. Institut für Technikfolgenabschätzung und Systemanalyse (ITAS), Karlsruhe

Digitalisation

„The **conversion** of analog values into digital formats
and their **processing** or **storage** in a digital technical system.“
(Wikipedia)

Quelle: https://pixabay.com/de/photos/bin%C3%A4r-code-datenschutz-frau-3706708/

Challenge: Embedding economy in society (human rights, SDG) - and society in ecological co-world hard boundaries: climate, biodiversity (SDG); .

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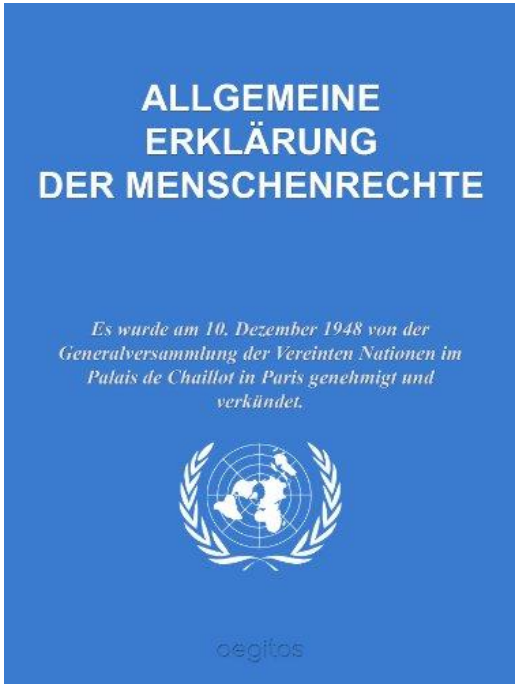
Global Framework for Sustainability (2015)



PARIS2015
CONFÉRENCE DES NATIONS UNIES SUR LES CHANGEMENTS CLIMATIQUES
COP21·CMP11

2015-2019: Three fundamentally important targets, where we don't even move in the right direction: climate (13), biodiversity (14/15), gap between rich and poor within nations (10).

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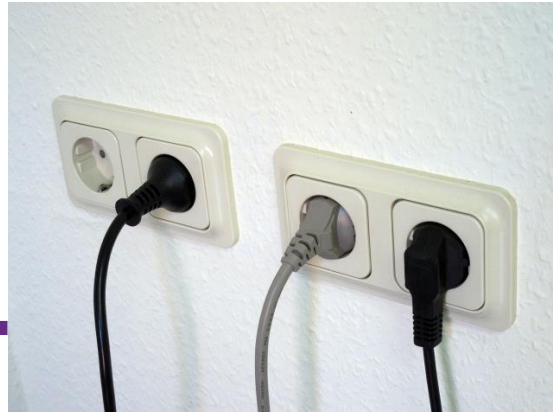
Second thesis:

Digitalization has the potential to be a driving force for the needed transformation of the energy, transportation, building, industry, agriculture and housing sectors on the path towards greenhouse gas neutrality and circular economy (e.g. European Green Deal: until 2050).

But so far D is often more a driver for increased emissions and the use of resources than a limiting factor.

Example energy transition: Digitization for sustainability

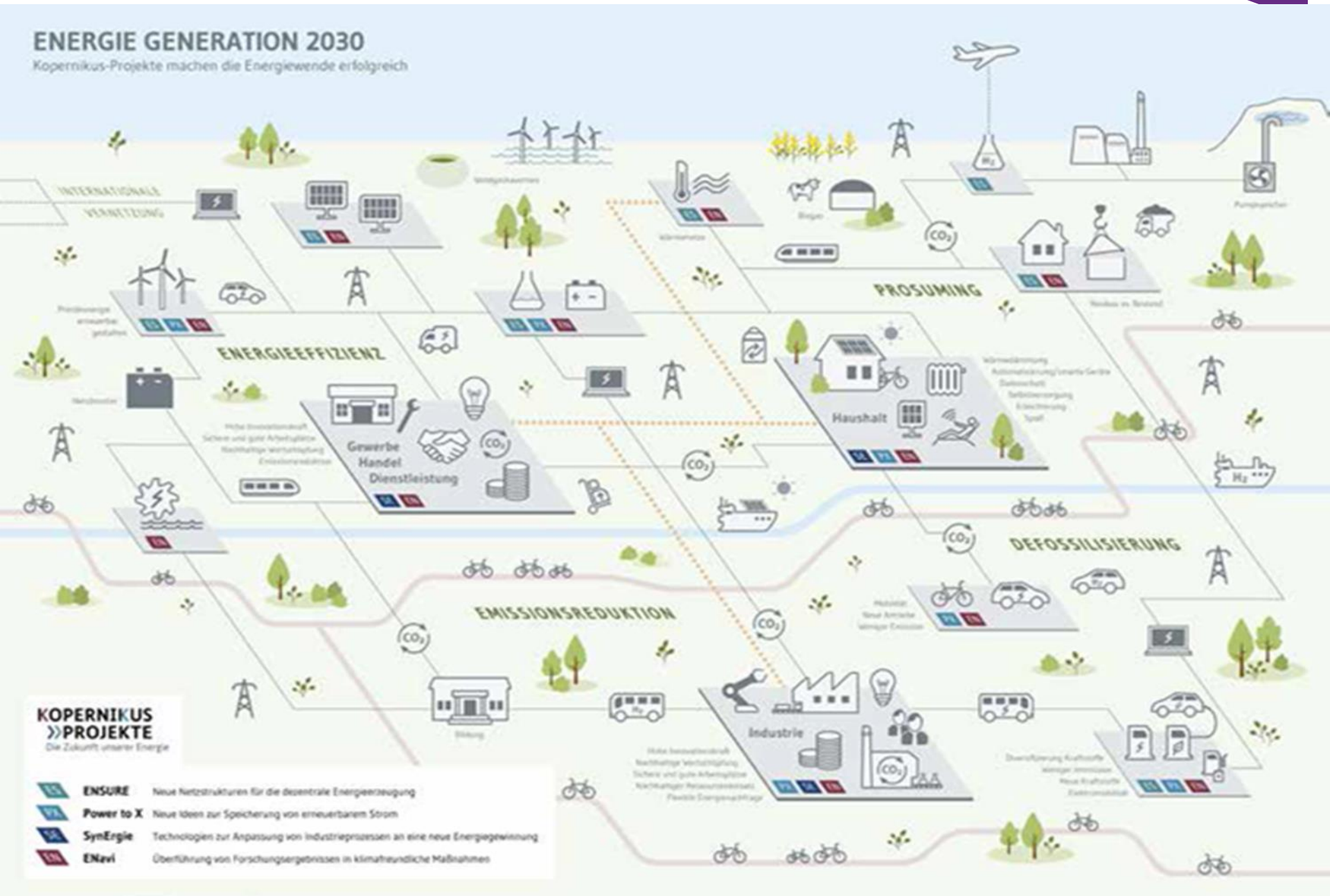
Digital tools



connect, measure, control

Bildquellen: Pixabay.com

Example Energy Transition: Digitization for Sustainability



Example energy transition: Digitization for sustainability

Sustainability criteria (selection):

- Emissions reduction
- Energy efficiency
- Grid stability
- Cost efficiency

requires:

- **Co-ordination**
- **Sector integration**
- **Flexibilization**

Digital tools (selection)**:**

- Sensors & Actuators
- Digital twin
- Blockchain
- Artificial Intellegence (AI)
- Internet of Things (IoT)
- 3D printing

Data (selection, each temporal and spatial):

- **Technical**: generation, grids, storage, P2X plants/conversion, flexibility options, production processes, emissions
- **Natural**: weather, temperature
- **Applications**: industrial, commercial, retail, services, residential, mobility
- **Energy forms**: electricity, heating, cooling, gas, fuels
- **Markets**: electricity (OTC, stock market, spot market, forward market, flexibility, balancing power, PPA), heating, cooling, gas, end products / services
- **Behaviour**: consumption, generation, storage, flexibility, mobility

… and the **intersection** and mutual condition of almost all these fields!

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Example Transport Transition: Digitization for Sustainability

-Reducing forced mobility
-Improving quality of sustainable mobility
-Connecting sustainable mobility forms

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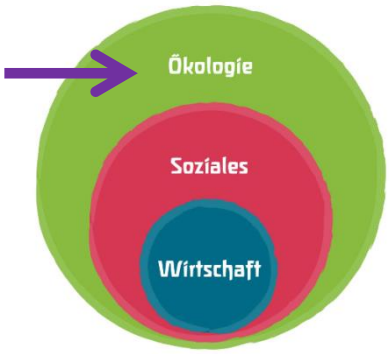
Bildquellen: Pixabay.com

Sustainability

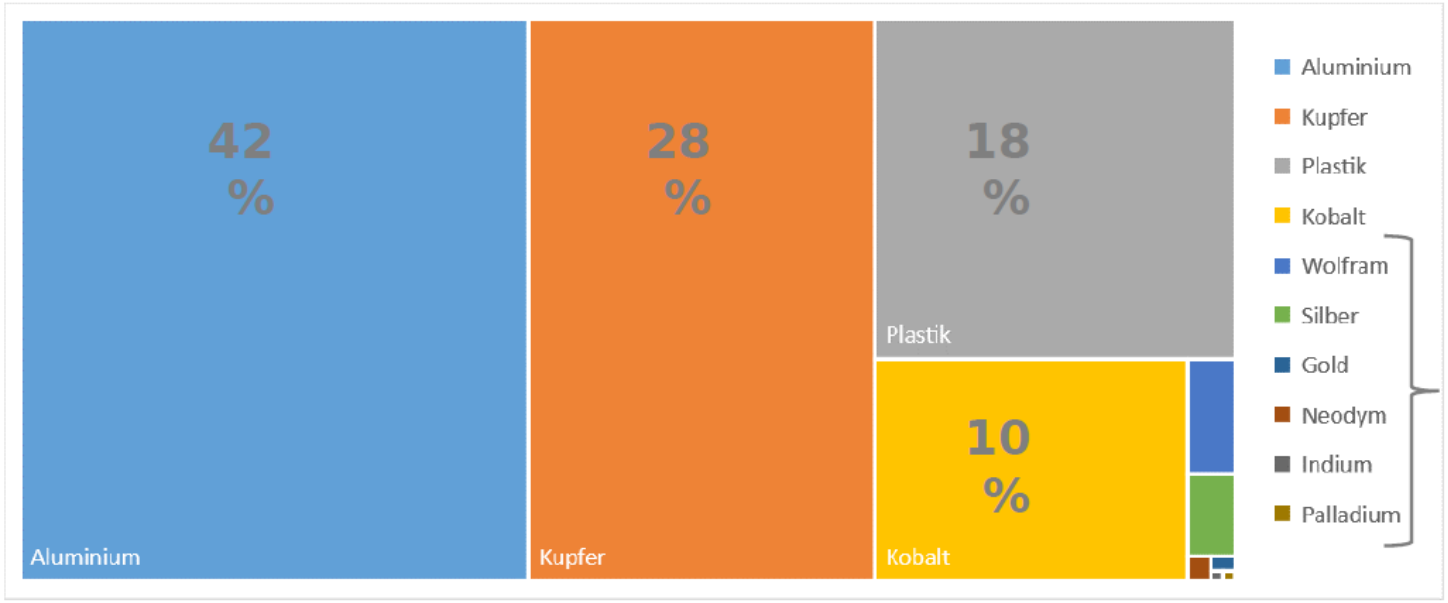


Resources /Example Smartphone:

Aluminium	42%
Copper	28%
Plastic	18%
Cobalt	10%
Wolfram, silver, gold, neodymium, indium,padium together	< 2%

Data traffic to smartphones, incl. over Wi-Fi networks: Forecast 2021vs. 2016 in % of overall Internet traffic: Smartphone 39/17%, PC 28/56%,

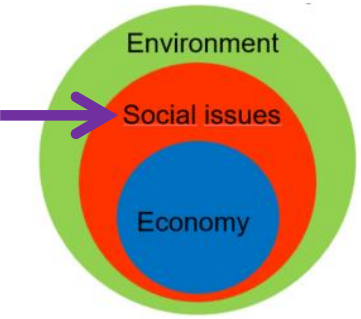
(data: Manhart, 2017)



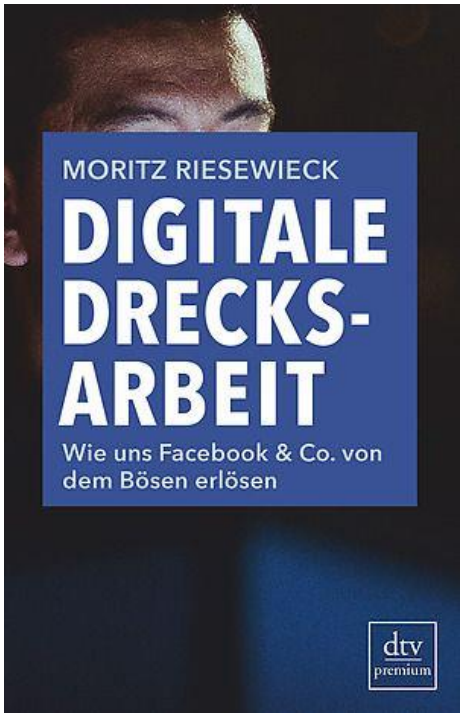
Reducing Use of Resources /Circular Economy

- Support Persistence:
  - repair possibilities; delivery guarantee of replacement parts or open source construction plans for them (3D-Printer)
  - exchange options for standardised components
  - extent of guarantee time
  - standardisation of interface between hardware, operating systems and software
  - minimise planned obsolescences
- Support reuse - e.g. via platforms
- Recyclabiltiy of all components
- Supply chain: Implement human rights and reduce energy demand / 100% renewables

Sustainable application of digital tools: social issues



Global South



Agbogbloshie,Ghana. CCO, Wikipedia: https://de.wikipedia.org/wiki/Elektronikschrott

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Dynamic EU- Development Internet Services 2018-2020 (big jump 2020/21 expected)

	EU	
	DESI 2018	DESI 2020
3a1 People who have never used the internet % individuals	**13%** 2017	**9%** 2019
3a2 Internet users % individuals	**81%** 2017	**85%** 2019
3b1 News % internet users	**72%** 2017	**72%** 2019
3b2 Music, videos and games % internet users	**78%** 2016	**81%** 2018
3b3 Video on demand % internet users	**21%** 2016	**31%** 2018
3b4 Video calls % internet users	**46%** 2017	**60%** 2019
3b5 Social networks % internet users	**65%** 2017	**65%** 2019
3b6 Doing an online course % internet users	**9%** 2017	**11%** 2019
3c1 Banking % internet users	**61%** 2017	**66%** 2019
3c2 Shopping % internet users	**68%** 2017	**71%** 2019
3c3 Selling online % internet users	**22%** 2017	**23%** 2019

Source: DESI 2020, European Commission.

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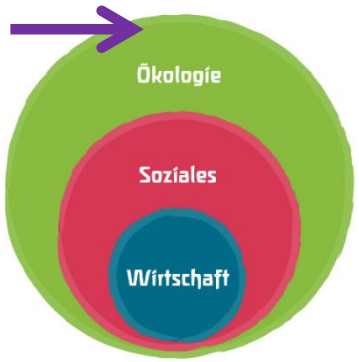
Research Results give Reason for Concern



- Internet connectivity fosters **new, or more energy-intensive, forms of demand** that counterbalance energy savings. (Røpke)
- **Smart home** technologies may drive energy consumption, **directly and indirectly** lighting or heating [9], [10].
- **Little evidence** of anticipated positive effect of D on **travel patterns**, with more complex and debated effects emerging over time [11], [12]. Post-Corona effect?
- Current estimates suggest that **networks and data centres** consume more than computers (e.g. Van Heddeghem et al.) and represent the **largest share of energy consumption over the lifetime** of tablets and smartphones: accounting for at least 90% of the total energy use including manufacture and charging [34].
- Some (e.g. Andrae and Edler [30]) anticipate a compound rate of growth of 7% per year, calculating that the production and operation of ICT will rise to 21% of global electricity consumption by 2030:

Challenge of Exploding Traffic Flows?

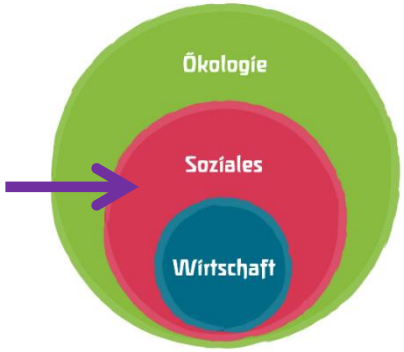
- 2002: 100 GB per second, 2016: 26,600 GB per second;
- 70% growth in total global mobile data traffic between 2016 and 2017 Ericsson [46]: forecast for an 8-fold increase compared to 2022. One (but only one) reason: take-up of broadband subscriptions;
- **How to react?**
- **Data efficiency of digital services** (the same services but with less data.)
- Research: How do **production and consumption practices inter-relate** to shape the design of services? What **role do governments and other institutions** play in these processes of escalation?
- Result: Conceptualize and experiment with ‘transitions’ **towards more sustainable product service systems** (e.g. [57])

Third thesis (a):

The legitimization of democracy is based on two pillars: representation and deliberation.

Digitalization has a huge potential to improve both representation (without people even being physically present) and deliberation.

However, currently it rarely improves representation and it rapidly undermines deliberation in society.



Digitalization can Support Democracy

Digital Representation

Digital Deliberation

Deliberative Processes involve careful thought - all relevant arguments on the table - and discussions to improve the chance that the better arguments win.

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Bildquelle: Pixabay.com

Digitalization: Supporting or undermining fair and informed deliberation / participation ?

Relevant examples / ideas to complement representative democracy, e.g.:

-digital town hall meetings,

-citizens' conventions,

-citizens' budgets (as in Porto Alegre),

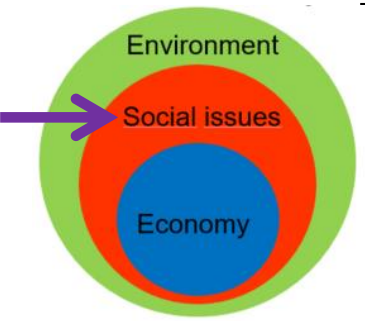
-wiki-democracies

But social media at the moment undermine (to a large extent) deliberation :

- echo chambers ("alternative facts")

- pictures (you can't argue with a picture)

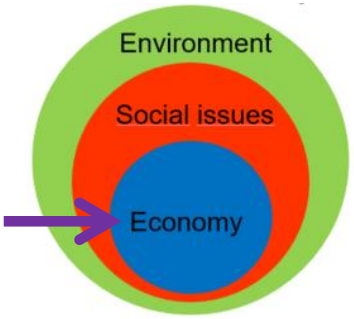
-algorithms that support blaming, not arguments



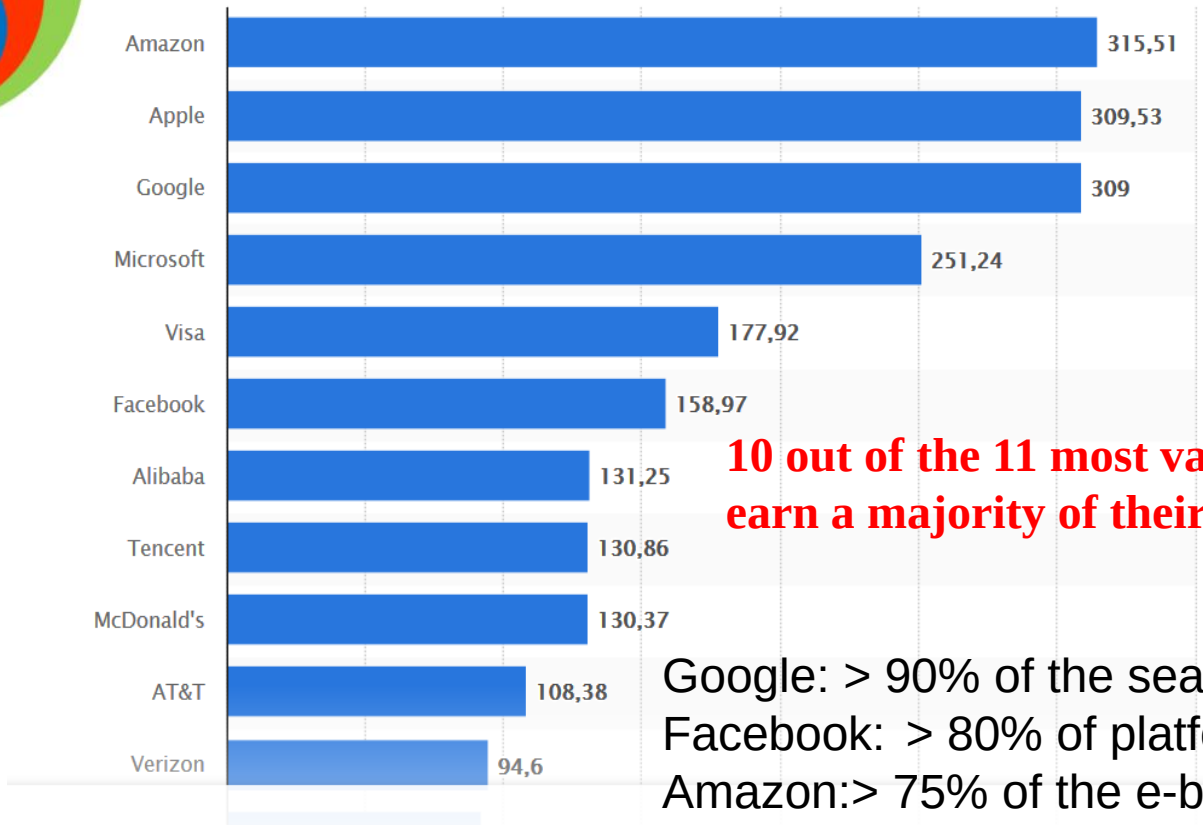
The Way Forward: Some Suggestions

1. Free and open-source software.
- Citizens can understand how algorithmic decisions are made.
- Citizens can be active participants and gain back control (security issues, right to privacy, computation intensity etc.; privacy-by-design; hardware/equipment that minimizes the tracing back to users);
2. Implement rules of professional conduct for software engineers (as for doctors, architects, lawyers, teachers, nurses;)
3. "Agency-by-design" - platforms must implement responsible decisions through their design;

Sustainable application of digital tools: economy



Most valuable brands in the world by market value in 2019 (source: statista):



10 out of the 11 most valuable companies earn a majority of their money with data.

Google: > 90% of the search engine market
Facebook: > 80% of platform market
Amazon:> 75% of the e-book market
(data from 2017)
Monopolization increases!

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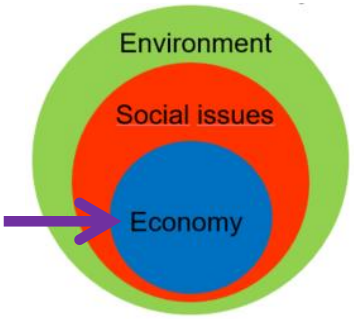
Higher Risk of Monopoly

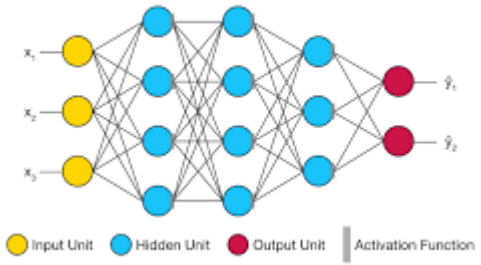


How digital big 10 use their economical power:

- Disadvantage competitors directly (distort search results)
- Preventing creative destruction (Schumpeter)

Quantity (Ford)

Quality (Mercedes)



AI: quantity → quality

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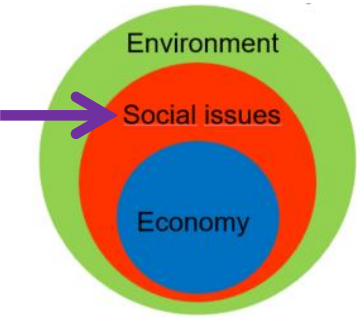
How to Earn Money with Free Services?

- Most of the services these companies offer are free of charge for their users. They earn their money with our behavioral data. Why are behavioral data so valuable? .
- The **prime goal is to categorize our psychological behavior**. If you use Google, the chances are high that the company makes better predictions about your behavior than your partner or parents.
- Targeted advertising. Make others businesses dependent on them. Or even: Manipulating - as a company or politically.
- On a vast scale, Cambridge Analytica manipulated electors n favor of Brexit and Trump (2016) - Based mainly on data extracted from Facebook.
- E.g. China is using data /AI in building up a huge authoritarian experiment to control / motivate people.



Deliberation, Participation - Control, Manipulation

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Bildquellen: Pixabay.com, Wirtschaftswoche, Bayerischer Rundfunk

Poll

Do you agree that the way digitalization will be implemented shapes relevant path dependencies for the future of our planet and of democracy?

a) I think it's not a big problem

b) It's a major challenge of our time

c) It's not our job, but the role of politicians to deal with it

d) I see potential ways to contribute or cooperate in addressing this challenge

- Thank you for your interest!
- Christoph Bals, bals@germanwatch.org

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