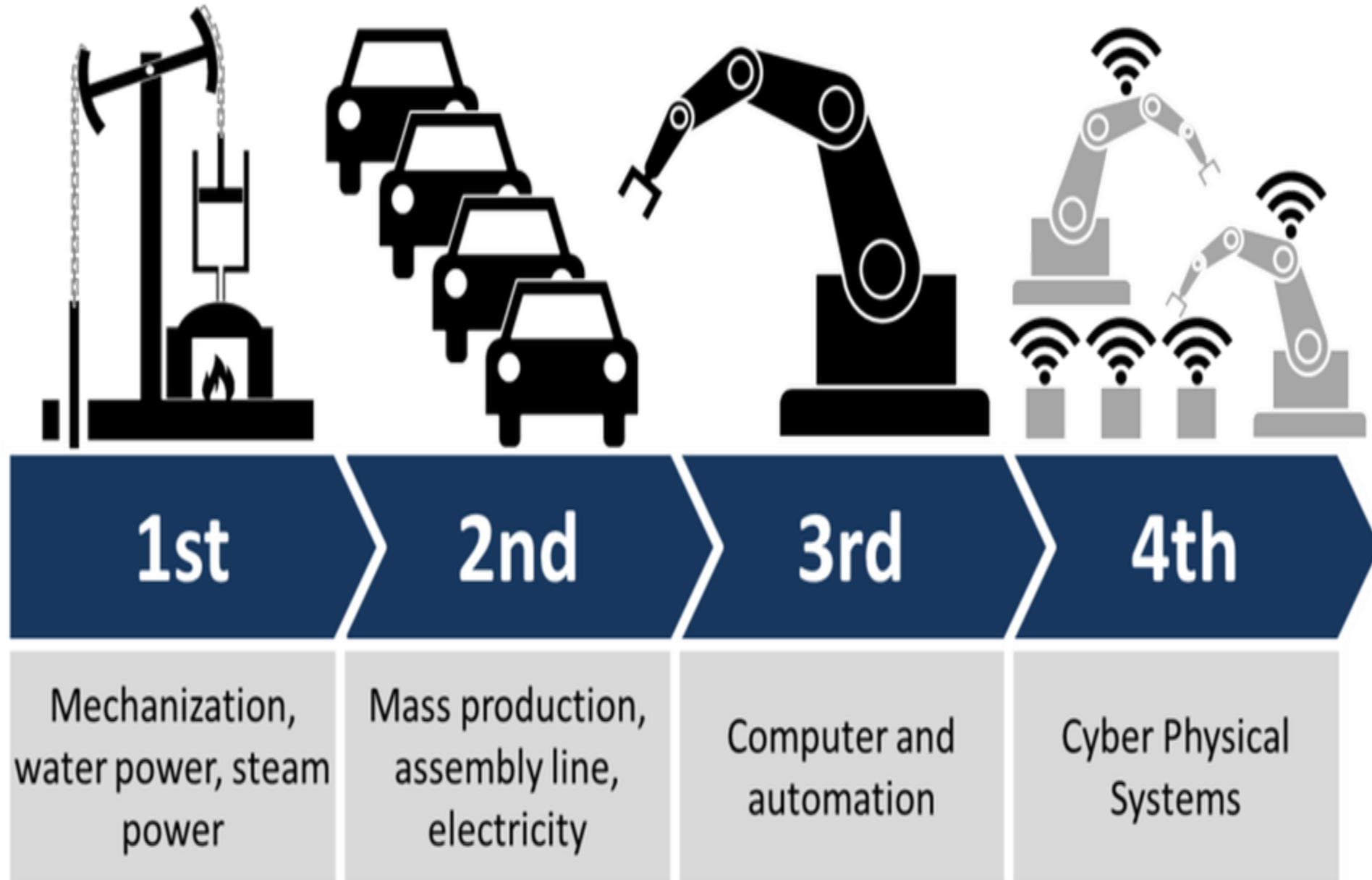


The 4IR – Key-Issues in the Post-pandemic era



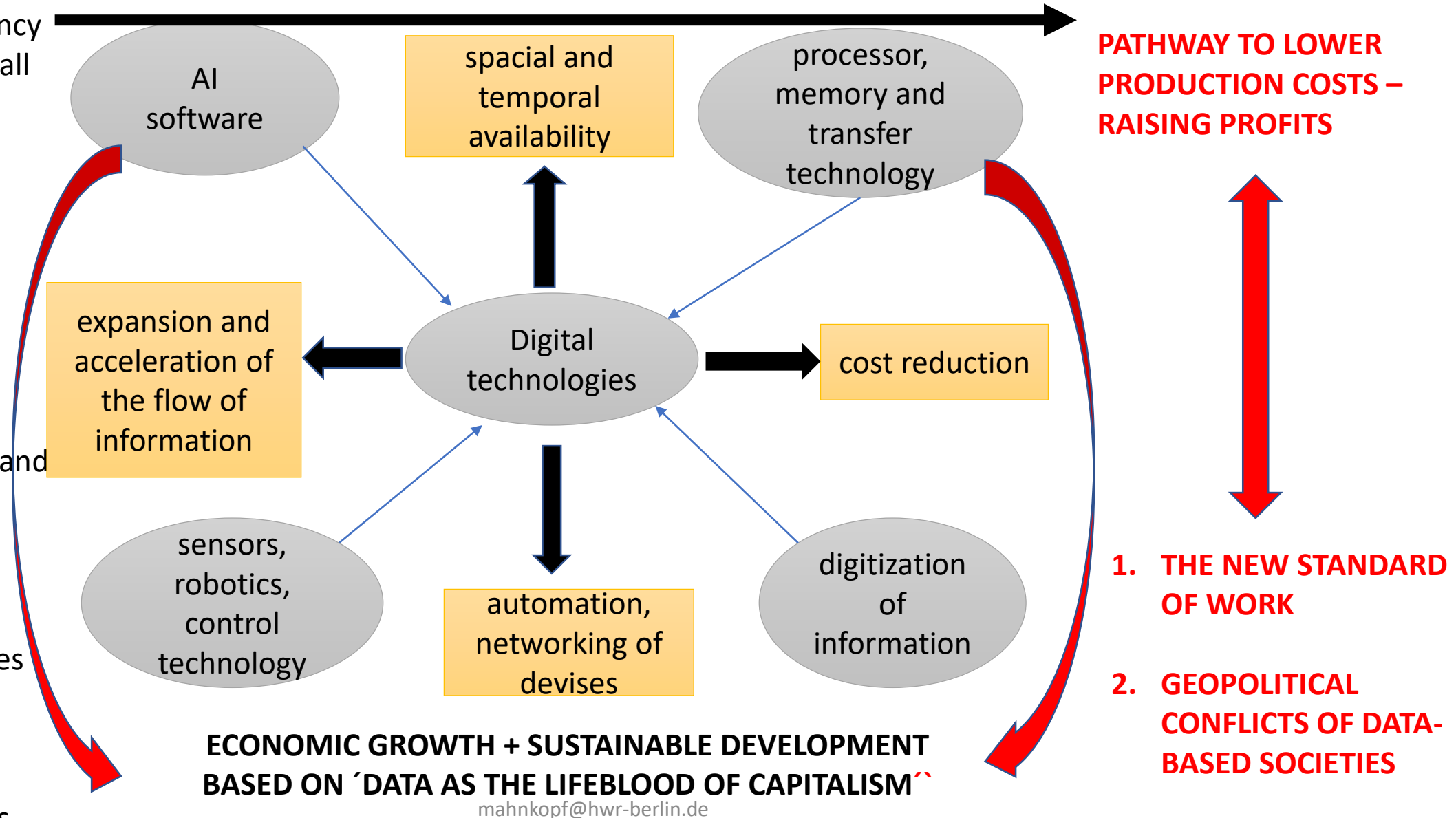
Dr. Birgit Mahnkopf
retired Professor of European
Politics
Berlin School of Economics and
Law
Athens, 8th July 2021



The digitalization hype – a new wave of automation based on algorithms and digital technologies

SOME PROMISES:

- increased efficiency and flexibility of all processes
- more efficient energy use
- protection of ecosystems in agriculture
- 'smart' mobility and housing systems and consumer goods
- new opportunities for SMCs via 3D printer
- upgrading of jobs



Measures for digitilization: production/sale of robots (paired with AI, controlled by algorithms), 3D printers, use of smart-platforms, digital products



- use of robots only in a small group of countries
- production costs don't shrink – while investment costs are quite high
- increase in sales and in profit from automation is not popping up

WB 2018: for L/MIC manufacture for exports will no longer be a pathway to growth



L/MIC will experience “premature deindustrialization” – thus under-employment and growing inequality

ILO 2018: machines, robots , computers will increasingly have an absolute advantage over labour



Re-shoring production to AIC in Europe (and North America) could result in lost livelihood and a spike in slavery, labour abuses and trafficking in SEA

The impact of computerisation, robotisation, algorithmic control and AI on industrial work (in Europe)

1. most threatened by further automation:

- office and administrative jobs including secretaries
- call-centres
- low-skilled jobs in manufacturing such as: textile, clothing, footwear, electrical and electronics – if “re-shoring” would appear

2. strong changes are underway:

- farming agriculture,
- retailing,
- trucking,
- publishing,
- banking,
- lawyers,
- radiologists



The “smart glove”, a wearable cyberphysical system used for manual operations

The worker becomes part of the machine

3. in manufacturing de-qualification of skilled workers can be expected

- who feed the algorithms with their “tacit knowledge”
- So that direct labour is replicated, extended and/or entirely replaced with autonomous machines
- workers lose control over their decisions to machines
- in the long run can be replaced by low skilled , much cheaper (migrant) workers

4. for high-skilled workers digitalization will go together with:

- further delimitation of work
- acceleration and more intense work
- more stress
- new challenges of work-life balance

Work on demand – on „digital labour platforms“

from the perspective of employers:

- relying less on a permanent workforce
- hire on demand
- employment relationship limited to a work assignment
- new jobs lack clear organizational allocation
- ties to firms are cut
- trade unions: larger difficulties to communicate with employees/represent their interests
- all routine work: subject to off-shoring
- digital services divided into ever smaller parts, delegated to “virtual workers”

from click/cloud/crowd/micro-workers: a new type of „mass worker“

- no longer grouped in factories
- distributed worldwide
- very different social backgrounds and professional experiences
- low and erratic earnings
- often isolated and invisible
- incorrect classification (as “independent contractors”)
- difficult to find and use national jurisdiction responsible for regulation
- vanishing division between work and private life
- neoliberal ideology: micro-tasks often not viewed as dependant labour!

20 WAYS TO MAKE MONEY

MICROWORKERS

- | | |
|------------------|-------------------|
| 1. Facebook | 14. Promotion |
| 2. Twitter | 15. Click, Search |
| 3. Google | 16. Commenting |
| 4. YouTube | 17. Surveys |
| 5. Write Article | 18. Signup |
| 6. Write Review | 19. Blogs |
| 7. Download | 20. Other |
| 8. Testing | |
| 9. Forums | |
| 10. Leads | |
| 11. Yahoo | |
| 12. Mobile apps | |
| 13. Boonmark | |



earnfreedollars.com

4thIR establishes a “new standard of work”

For many workers on the global market place the 4thIR mean:

- irregularity
- flexibility
- uncertainty
- unpredictability
- different sort of “risks”
- unstable employment
- low wages/income
- more dangerous working conditions
- no regular social benefits
- often denied rights to join a union

For those still working in factories:

- controlled by Apps and algorithms –
- equivalent to the old assembly line – but much harder to stop!

The capitalism of digital platforms and algorithms makes labour discipline more rigid as it imposes seemly ‘scientific’ measurements and evaluations

Geopolitical conflicts of data-based societies

1. Technical bottlenecks of the 4IR and the new “Tech-Geopolitics”

- lack of **fiber-optic networks** – as precondition for mobile communication standard 5G
- standardized application programming interface, common data language, **integration of largely self-sufficient technical system**
- countries/EU must have a “**close value chain**” (chips, computers, batteries, software including the valuable algorithms - protected by IPRs) for “**technological sovereignty**” (**background for EU program GAIA X**)
- capability to **prevent/ react on cyber-attacks against companies and infrastructure**

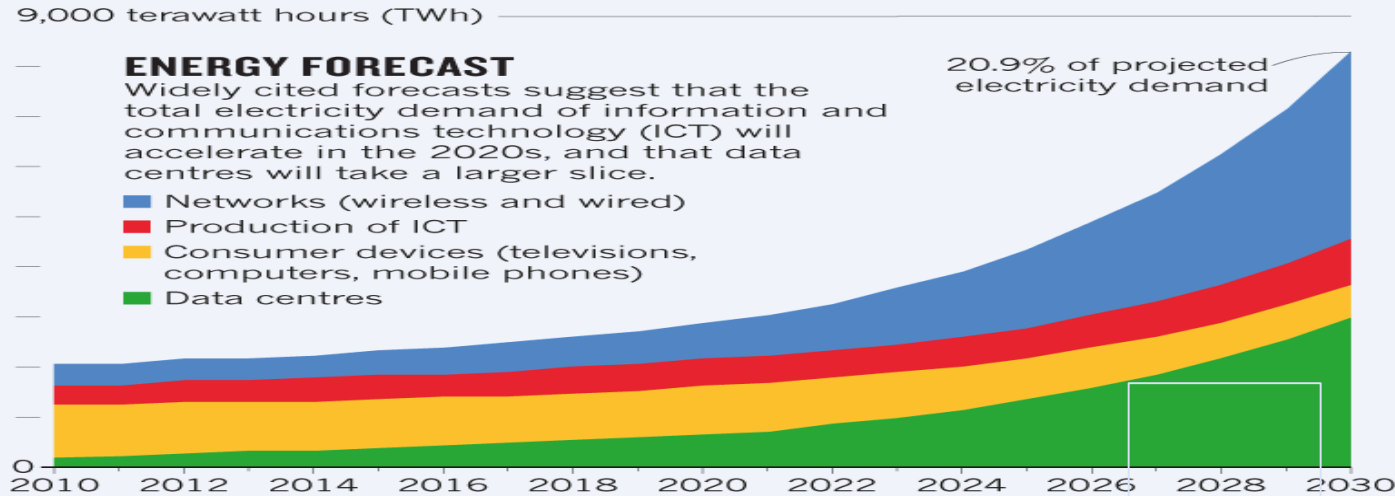
2. Ecological constraints of the 4IR

- data need **huge amount of energy** (thus also water and land)- trade-offs are unavoidable
- “**critical metals**” are **needed** to produce “smart products and services” but also for: renewable energy production, transmission of energy, modern military system
- “critical metals “ are **produced only in some few countries** (CHINA!)
- **recycling rates of “critical metals” are very low** (1-3%) – but it only occurs to the extent that is lowers production costs

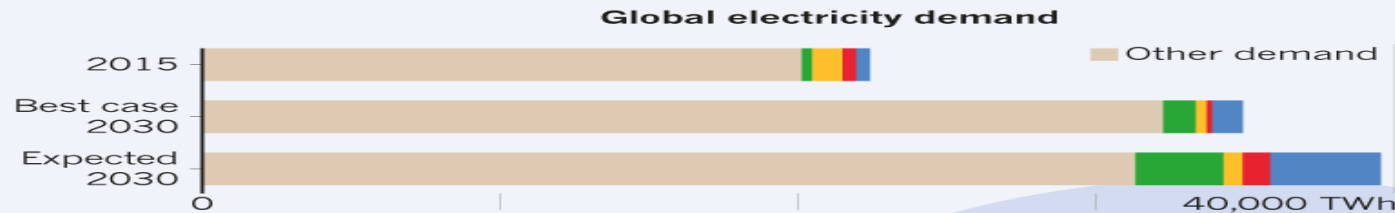
3. Security and military consequences of disruptive technologies

- **all AI-based autonomous systems are proverbial “dual-use technologies”**
- Thus, we see a **close cooperation between the GAFAM complex and the US army** (also in China and Russia!?)

Data as „fuel of the future“ need huge amount of energy



The chart above is an 'expected case' projection from Anders Andrae, a specialist in sustainable ICT. In his 'best case' scenario, ICT grows to only 8% of total electricity demand by 2030, rather than to 21%.



INTERNET EXPLOSION

Internet traffic* is growing exponentially, and reached more than a zettabyte (ZB, 1×10^{21} bytes) in 2017.

1987
2 TB†

1997
60 PB

2007
50 EB

2017
1.1 ZB

*Traffic to and from data centres.

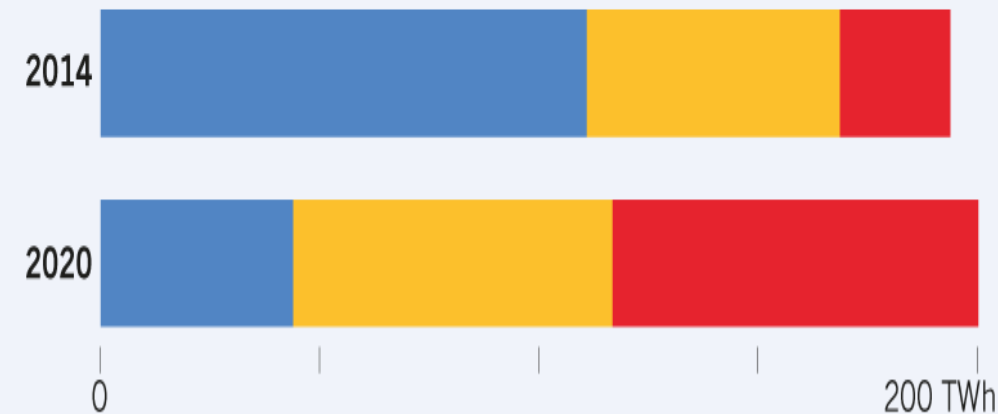
†TB, terabyte (10^{12} bytes); PB, petabyte (10^{15} bytes); EB, exabyte (10^{18} bytes).

©nature

HYPERSCALE SHIFT

Efficient 'hyperscale' data centres are predicted to swallow up half of data-centre electricity demand by 2020, as smaller, less-efficient centres shut down.

■ Traditional data centres ■ Cloud data centres (non-hyperscale)
■ Hyperscale data centres



©nature

Source: Jones 2018 on the basis of
Andrea/Edler 2015 : On Global Electricity Usage of
Communication Technology

“Critical metals” are needed to produce the ‘smart products’

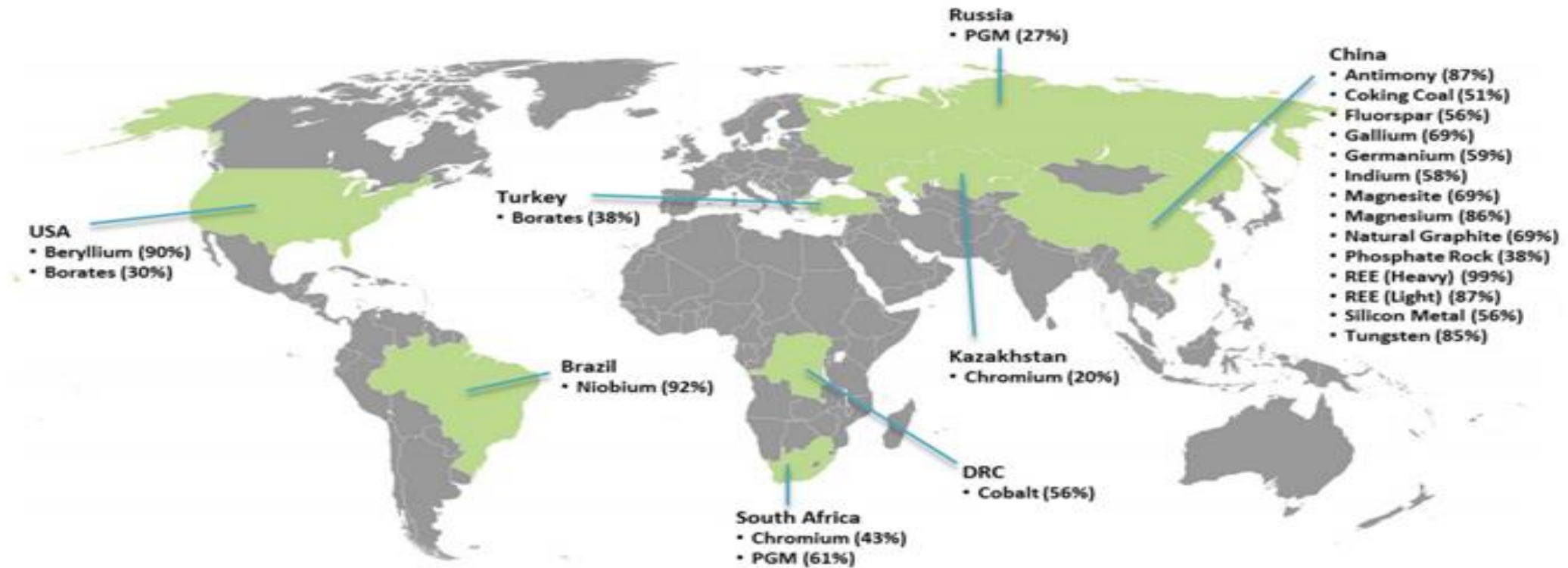
1. The “**smart products**” to be produced via digitalisation of production **need metals and minerals**
2. which must be **transported** from locations of origin (where they are **mined**) to locations where they will be processed and consumed – this also **needs energy** and is **causing emissions and social damages** to workers and communities

- antimony
- beryllium
- cobalt
- copper
- fluorspar
- gallium
- germanium
- graphite
- indium
- magnesium
- niobium
- platinum group metals
- rare earth elements
- tantalum
- tungsten

needed for:
infrastructure development, fossil and nuclear-based energy production, chemical industry, aerospace, medical equipment, advanced communication (GPS, space-based satellites and command-systems), signal amplification infrastructure

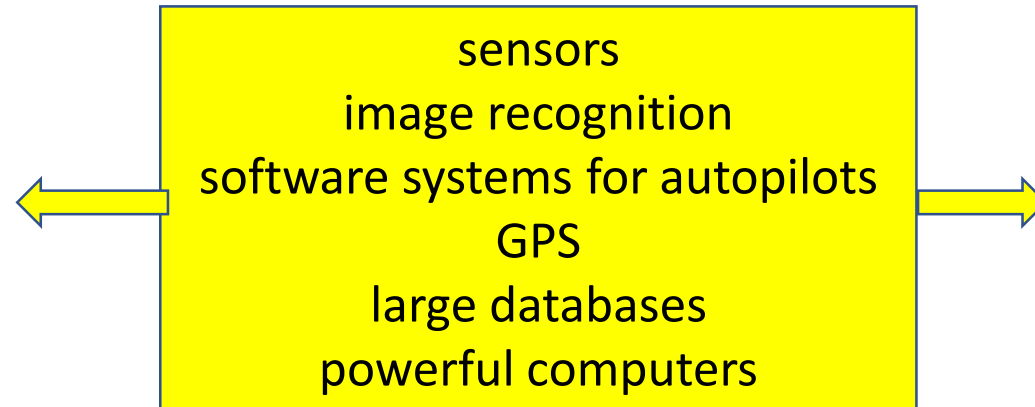
1. **Renewable energy production**
2. **Transmission of energy**
3. **Modern military systems**
4. **Industry 4.0**

The European Commission (EC) has announced that there are now 20 raw materials that are critical to the EU economy, up from 14 in 2010.



Digitalisation and AI-based autonomous systems: the backbone of coming „hyper-wars“

- autonomous control of machines
- means of transport and locomotion
- drones in leisure activities, applied for parcel delivery, in agriculture, energy sector ect.



- autonomous weapon systems:
- remotely piloted aircrafts
- self-firing systems (border control)
- underwater drones
- unmanned combat ships

Self-firing
systems
SGR-A1
South-
Korean
army



Combat
drone
X-47B
US
Army



US Army 2017: fully integrate AWS into the Army
forces between 2031-2040



Autonomous defense system MANTIS
German Bundeswehr

**This will revolutionize war fighting – cause rapid acceleration of escalation –
seperation of nuclear and other weapons is dwindling**

The „live blood“ of digital capitalism is owned by US (and Chinas) „Tech-Oligopolis“

ARPANET: developed in cooperation US government/US military/US elite universities



INTERNET: developed by Silicon Valley corporations

GOOGLE:

- in 2004 bought software "EARTH VIEWER" from US army, developed it further to GOOGLE EARTH, GOOGLE MAPS
- Pentagon cooperates regarding recognition software - in "Project Mayen" Google develops further "TEMSOR FLOW" for the Pentagon
- since 2007 provides special engineering and data center capacity for algorithmic war fighting

AMAZON:
develops cloud server for US secret service

MICROSOFT

- sold 4 mio license of WINDOW 10 to defense ministry under Obama
- built up a secret cloud structure for connecting all military formations and activities with US military bases across the world
- in March 2021 won the \$ 21.9bn "Joint Enterprise Defense Instructure" (JEDI) contract with the Pentagon

Numerous conflicts and trade-offs linked to the 4thIR – for which there can be no Win-Win-solutions – thus we should address these questions:

Shouldn't we not try to set limits for technical (and self) optimization?

Should we really replace humans in so many functions?

Why should we make ourselves redundant in so many senses?

In which areas should we use AI meaningfully and where should we prevent its use?

How can we regain control over digital infrastructures?

Can any of these questions be answered within capitalism?