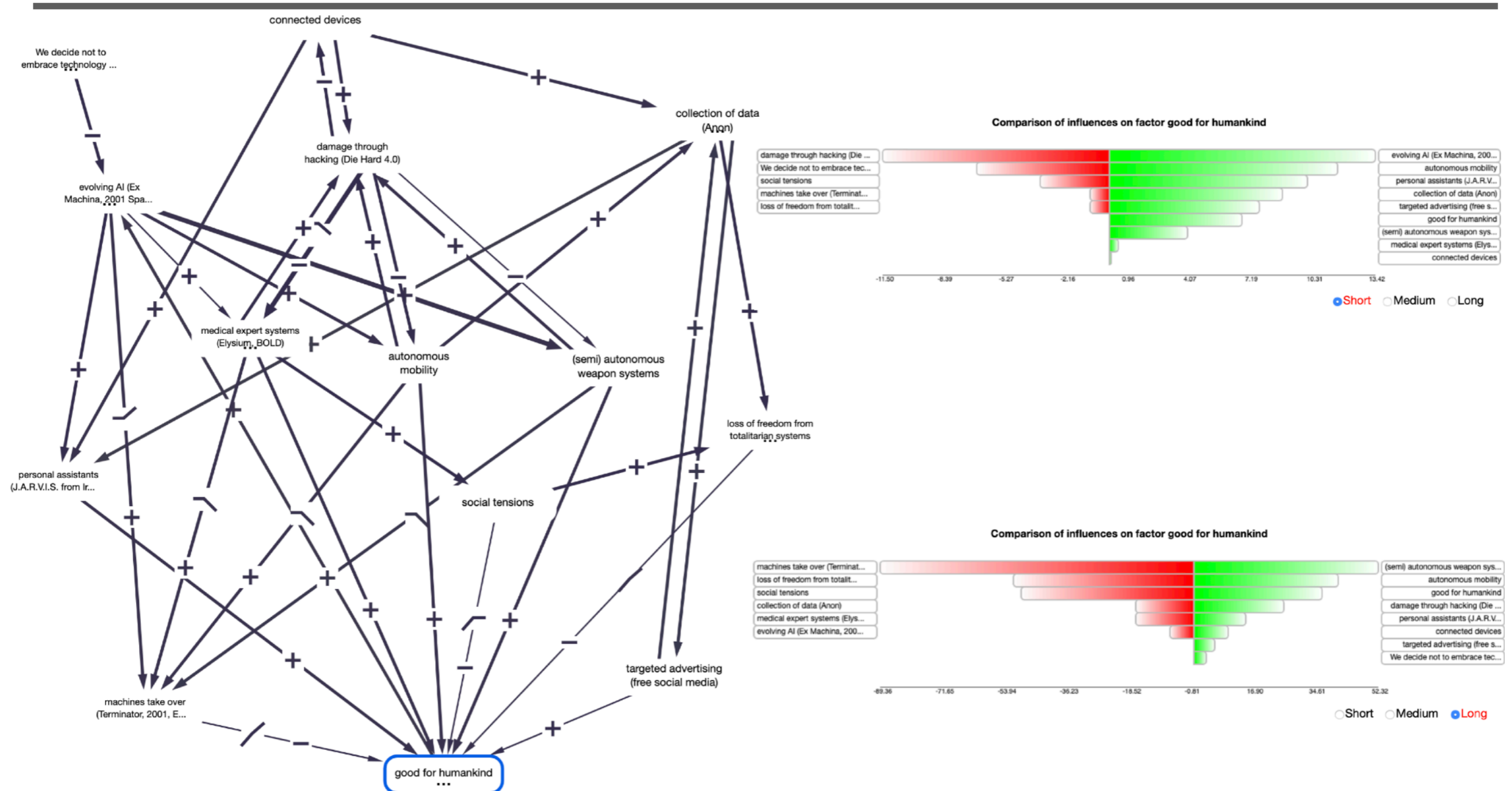




# ICT - Utopia or Dystopia?

Consideo - Kai Neumann, Franc Grimm



A cause-and-effect model that shows how dystopias become realistic in combination with initially harmless individual developments. In addition, the short- and long-term effect of the factors. E.g. deciding against the technologies would only be positive for mankind in the long term.



# ICT - Utopia or Dystopia?

SYSTEMIC FINDINGS FROM A SERIES OF ICT MODELS FOR THE FEDERAL ENVIRONMENT AGENCY

## Abstract



*Sensors - in this case at - not in the body*

Using a series of qualitative cause-and-effect models, we investigated the possibility of simulating the global spread of information and communication technologies for the Federal Environment Agency. The goal was to estimate the associated resource use and energy demand.

The great challenge is actually to predict the spread, since potentially disruptive developments are possible with the technologies, and since the assumption that there will simply be further growth of the economy and material wealth globally through optimized processes falls short.

Thus, in the simplest case, ICT may indeed simply accompany people's everyday lives and people at work. However, it is equally possible that automation and digitization will extremely increase productivity and save jobs, which can then also lead to a two-class society with correspondingly different ICT, depending on social policy. It is also conceivable that ICT will become more than just an accompaniment to our lives, and technologies will omnipresently change how we eat, how we move, what decisions we make in life and much more.

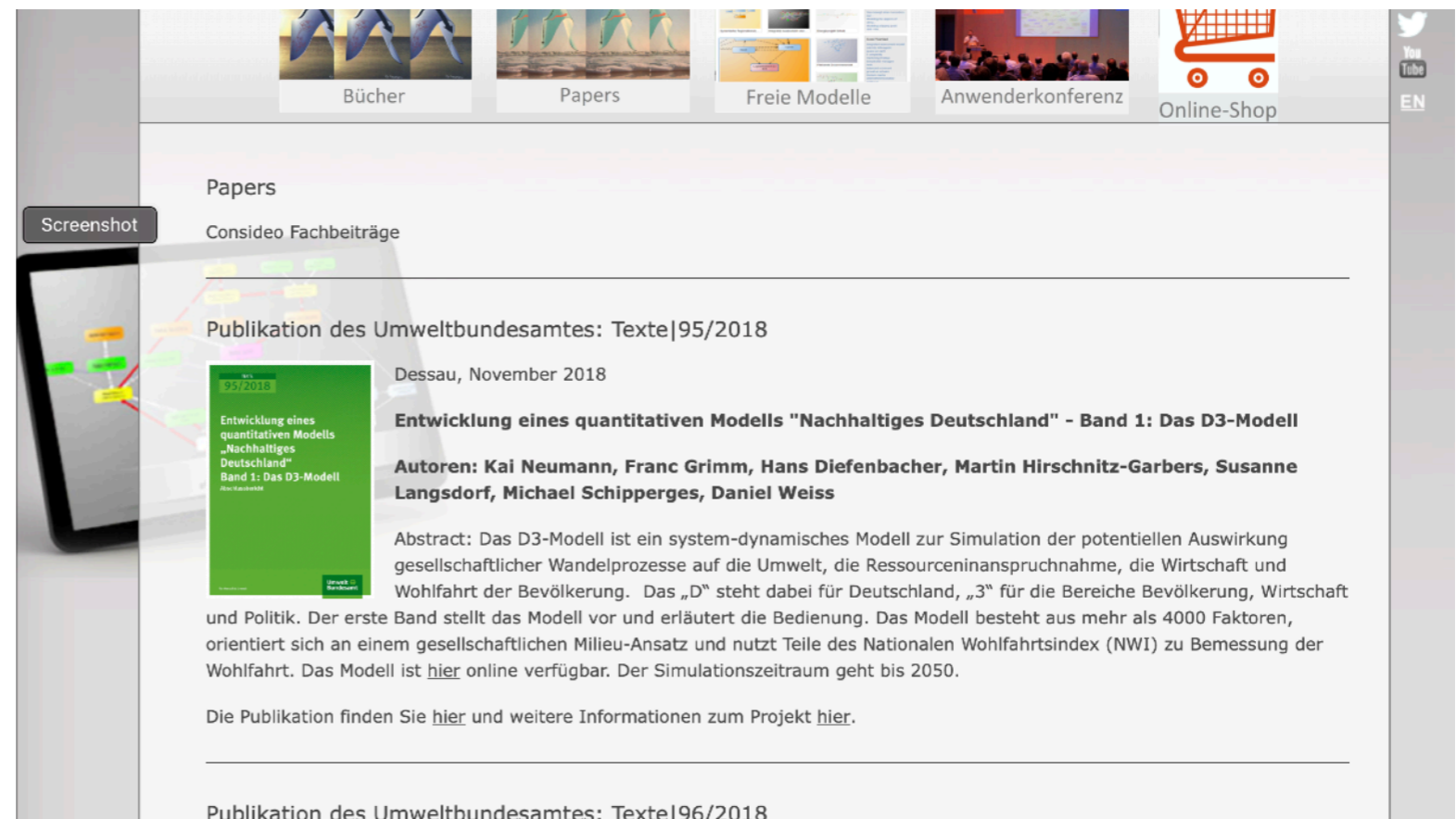
And finally, there is the possibility that technologies will take on a life of their own and artificial intelligence will set itself exponentially evolving goals that will make us humans more or less superfluous. This sounds gloomy, but it can be logically deduced and is now also being held out as a prospect by other prominent parties.

## The 'grey series'

Studies do not seem to reach policymakers at all, are usually too specific for the general public, and are all too often perceived as competition by other scientists or are then not taken up.

We can reach policy makers through the public, and for the scientific community we will continue to write official project reports and also peer-reviewed articles. But for the public, we want to offer an attractive readable format that gets to the heart of findings and action to be derived from them - our 'gray series' in reference to the term "gray literature."

Information and communication technologies, and with them digitization, automation and artificial intelligence, are discussed with a great deal of hope and naivety in terms of sustainability. Hope that



Screenshot of the Consideo website with the project reports and scientific publications linked there (<https://www.consideo.com/papers-33.html>)

processes will be optimized. Naivety that development could be normatively controlled. Thus, optimized processes quickly mean rebound effects with simply more material consumption. The spread of ICT follows economic, technological and social developments and their socio-economic and psychological drivers in a self-dynamic way.

This paper shows these inherent dynamics and puts the current discussion about political options into perspective.

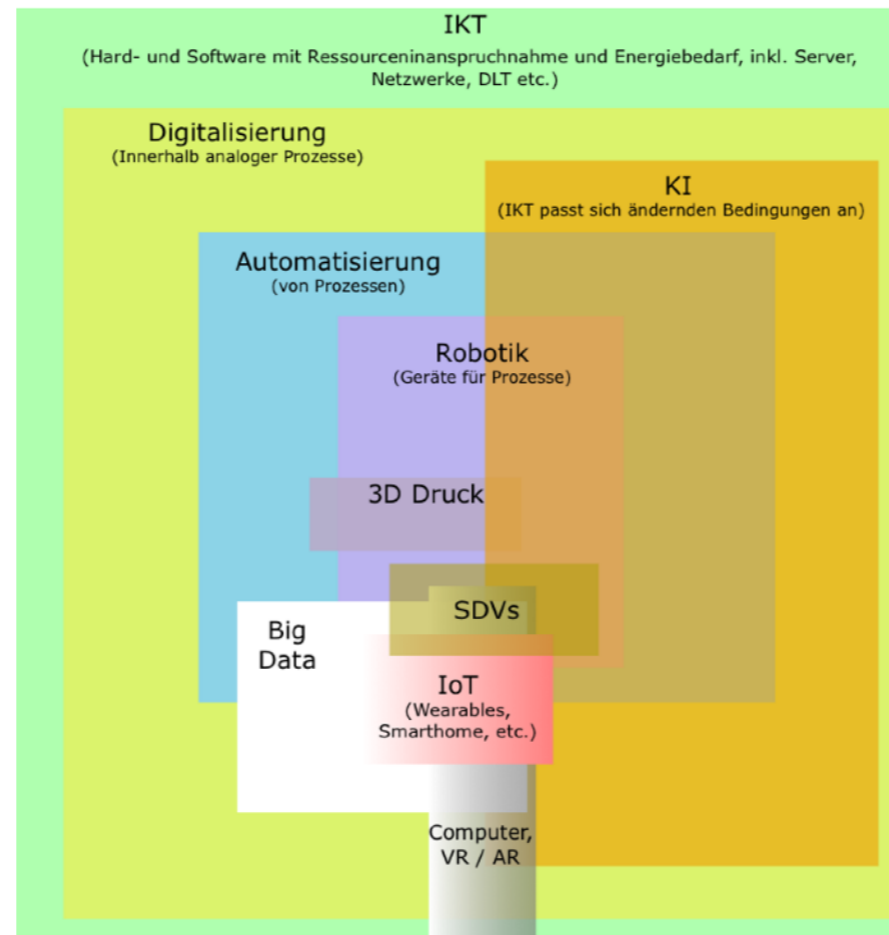


# ICT - UTOPIA OR DYSTOPIA?

## The ICT models

The Federal Environment Agency had actually only asked for an extrapolation of the global resource and energy requirements by the ICT sector. In fact, this is also possible in principle, for example, by assuming a certain number of devices per person in private and professional life as well as in public spaces, and based on this, the assumed data flows and required infrastructures. We can then simply link such a model to the GEE(R) model.

On closer inspection, however, it becomes clear that such assumptions about the further spread of ICT nationally and, above all, internationally cannot simply be understood as growth in material prosperity and certainly not as the possibility of using less energy and resources with more efficient processes.



*Terms around ICT and their relation*

The desire for efficiency gains, for example through autonomous cabs in rural areas, through intelligent traffic flow control in the city, through weeding robots etc. in high-precision agriculture, through recycling robots in industry, etc., is likely to be easily disenchanted by rebound effects if

savings simply lead to more consumption elsewhere.

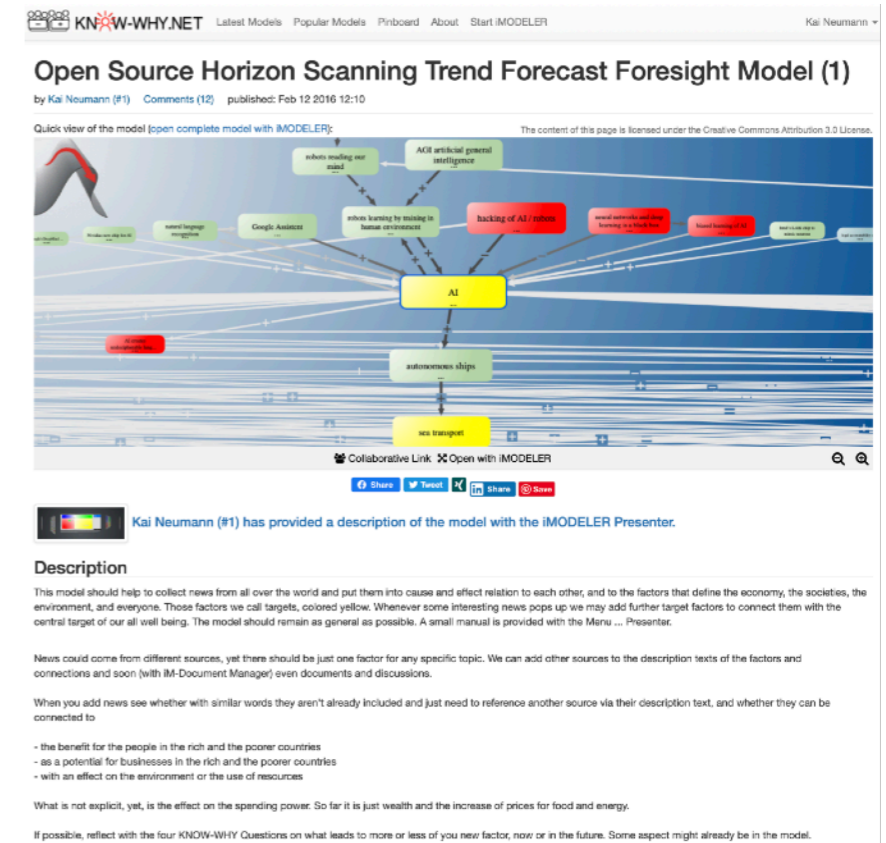
Above all, however, the growth of material wealth must be questioned with a closer look at the potential dynamics of technological, economic and social developments. For this reason, we first looked at our open source horizon scanning model and then developed a model on technology development, one on global economic implications, one on the ambivalences of autonomous vehicles, and one on potentially dystopian developments.



## Horizon Scanning

On KNOW-WHY.net, an open source horizon scanning model is continuously being developed, which puts the latest news on the development of technologies in particular into the systemic context. An evaluation of this model gives an idea of the future possibilities of ICT. A selection:

- Speech recognition for human-machine interaction and real-time translation ("Babelfish") between humans.
- Brain Computer Interfaces (BCI)
- Imitative learning, for example of industrial robots or of robots in fully automated fast-food restaurants
- AI-driven chemistry
- AI-driven design
- AI-driven production
- AI-driven software development
- AI-driven legal work (reviewing and writing contracts)
- AI-driven autonomous vehicles
- AI-driven connected transportation systems
- AI-controlled robots for weeding and picking fruit
- AI-controlled everyday robots, such as for household chores and caregiving
- AI-controlled combat robots
- Swarm intelligent drones with facial recognition
- AI-controlled computer games



### The Open Source Horizon Scanning Model

- AI controlled friend substitutes, therapists, ...
- AI controlled examination and treatment of patients
- AI controlled advertising
- AI controlled type and style advice
- AI creates music and other art



The reinforcing feedback loops are offset by the energy demand, the potential overloading of infrastructures, at least in the short term, and the shortage of raw materials. However, these are immediately put into perspective by the balancing feedback loops of increased efficiency as well as recycling and substitution.

The diagram illustrates a complex system of causal relationships between various technological and societal factors. The central node is "Computer, Sensoren", which is connected to many other nodes. Key nodes include "KI", "Digitalisierung Medizin", "Digitalisierung Verwaltung, Schule, ...", "Server, Leitungen, Mobilfunk, Speicher", "Überlastung der Infrastrukturen", "Daten-Verschlüsselung", "Energiebedarf", "Umwelteinfluss", "Recycling", "Verknappung von Rohstoffen", "Substitution", "Effizienz pro Service- Einheit", "Wohlfahrt", "3D Druck", "Industrie 4.0", "Fluggeräte", "Vernetzte (teil)autonome Mobilität", "Smart Cities", "Smart Homes", "Wearables", "Roboter als pers. Assistenten", "Bevölkerungs-Wachstum", "KI", "Digitalisierung Medizin", "Digitalisierung Verwaltung, Schule, ...", "Server, Leitungen, Mobilfunk, Speicher", "Überlastung der Infrastrukturen", "Daten-Verschlüsselung", "Energiebedarf", "Umwelteinfluss", "Recycling", "Verknappung von Rohstoffen", "Substitution", "Effizienz pro Service- Einheit", "Wohlfahrt", "3D Druck", "Industrie 4.0", "Fluggeräte", "Vernetzte (teil)autonome Mobilität", "Smart Cities", "Smart Homes", "Wearables", "Roboter als pers. Assistenten", "Bevölkerungs-Wachstum".

Arrows with "+" signs indicate positive feedback loops, while arrows with "-" signs indicate negative feedback loops. Key feedback loops are highlighted in pink, including one labeled "+ Rebound" and another labeled "+ oder - ?". The diagram illustrates how technological progress leads to increased resource consumption and environmental impact, and how these factors can feedback into the system.

The diagram illustrates a complex system of causal relationships between various socio-economic and environmental factors. The nodes are interconnected by arrows, many of which are labeled with polarity signs (+/-) and specific causal mechanisms.

**Key Nodes and their Interactions:**

- Design for Recycling** (top left) has a positive influence on **Recycling ...** (labeled with a +) and a negative influence on **ökologische Gegenbewegung** (labeled with a -).
- Recycling ...** (top left) has a positive influence on **Design for Recycling** (labeled with a +) and a negative influence on **Rohstoff-Verknappung** (labeled with a -).
- Rohstoff-Verknappung** (top center) has a positive influence on **Preis** (labeled with a +) and a negative influence on **Recycling ...** (labeled with a -).
- Preis** (top center) has a positive influence on **Nachfrage** (labeled with a +) and a negative influence on **Wohlstand (BIPs) in der Welt** (labeled with a -).
- Fortschritt** (middle left) has a positive influence on **Nachfrage** (labeled with a +) and a negative influence on **Wohlstand (BIPs) in der Welt** (labeled with a -).
- Nachfrage** (middle center) has a positive influence on **Preis** (labeled with a +) and a negative influence on **Wohlstand (BIPs) in der Welt** (labeled with a -).
- Klimawandel** (middle left) has a positive influence on **Kosten des Klimawandels** (labeled with a +) and a negative influence on **Effektivitäts-Steigerung** (labeled with a -).
- Effektivitäts-Steigerung** (middle center) has a positive influence on **Klimawandel** (labeled with a +) and a negative influence on **Kosten des Klimawandels** (labeled with a -).
- Kosten des Klimawandels** (bottom left) has a positive influence on **Gadgets der breiten Masse** (labeled with a +) and a negative influence on **Arbeitszeits-Verkürzung** (labeled with a -).
- Gadgets der breiten Masse** (bottom center) has a positive influence on **Arbeitszeits-Verkürzung** (labeled with a +) and a negative influence on **Grundeinkommen** (labeled with a -).
- Arbeitszeits-Verkürzung** (bottom center) has a positive influence on **Grundeinkommen** (labeled with a +) and a negative influence on **Grundeinkommen** (labeled with a -).
- Grundeinkommen** (bottom right) has a positive influence on **Grundeinkommen** (labeled with a +) and a negative influence on **Grundeinkommen** (labeled with a -).
- 'Fliegende' Autos Wohlhabender** (middle right) has a positive influence on **Wohlstand (BIPs) in der Welt** (labeled with a +) and a negative influence on **Wohlstand (BIPs) in der Welt** (labeled with a -).
- Wohlstand (BIPs) in der Welt** (middle right) has a positive influence on **Wohlstand (BIPs) in der Welt** (labeled with a +) and a negative influence on **Wohlstand (BIPs) in der Welt** (labeled with a -).
- Rebound** (middle right) has a positive influence on **Wohlstand (BIPs) in der Welt** (labeled with a +) and a negative influence on **Wohlstand (BIPs) in der Welt** (labeled with a -).
- Suffizienz** (middle right) has a positive influence on **Wohlstand (BIPs) in der Welt** (labeled with a +) and a negative influence on **Wohlstand (BIPs) in der Welt** (labeled with a -).
- Krankheiten** (middle right) has a positive influence on **Wohlstand (BIPs) in der Welt** (labeled with a +) and a negative influence on **Wohlstand (BIPs) in der Welt** (labeled with a -).
- IKT weltweit** (middle left) has a positive influence on **Nachfrage** (labeled with a +) and a negative influence on **Wohlstand (BIPs) in der Welt** (labeled with a -).
- ökologische Gegenbewegung** (top right) has a positive influence on **Wohlstand (BIPs) in der Welt** (labeled with a +) and a negative influence on **Wohlstand (BIPs) in der Welt** (labeled with a -).
- Biomass Economy** (top right) has a positive influence on **Wohlstand (BIPs) in der Welt** (labeled with a +) and a negative influence on **Wohlstand (BIPs) in der Welt** (labeled with a -).
- Rohstoffförderer** (middle right) has a positive influence on **Wohlstand (BIPs) in der Welt** (labeled with a +) and a negative influence on **Wohlstand (BIPs) in der Welt** (labeled with a -).
- Umweltauswirkungen** (top center) has a positive influence on **ökologische Gegenbewegung** (labeled with a +).
- Substitution** (middle center) has a positive influence on **Preis** (labeled with a +) and a negative influence on **Wohlstand (BIPs) in der Welt** (labeled with a -).
- Nachahmer** (middle right) has a positive influence on **Wohlstand (BIPs) in der Welt** (labeled with a +) and a negative influence on **Wohlstand (BIPs) in der Welt** (labeled with a -).
- Steuern** (middle right) has a positive influence on **Wohlstand (BIPs) in der Welt** (labeled with a +) and a negative influence on **Wohlstand (BIPs) in der Welt** (labeled with a -).

The supply of and demand for ICT are the logical successors to previous revolutions (industrial agriculture, mass production, the service society and, currently, the still labor-intensive development of IT). Even side effects of ICT boost the economy.

The big difference is that automation and digitization - even if not yet today, but foreseeable in the near future - can replace human labor without creating sufficient jobs for it or elsewhere as an alternative.

Moreover, the profiteers of this economic power no longer need the mass of cheap labor, and it will depend on the social design of further digitization - especially with the prospect of leapfrogging in regions of the world where raw materials and crops can be harvested more cheaply by robots than by humans.

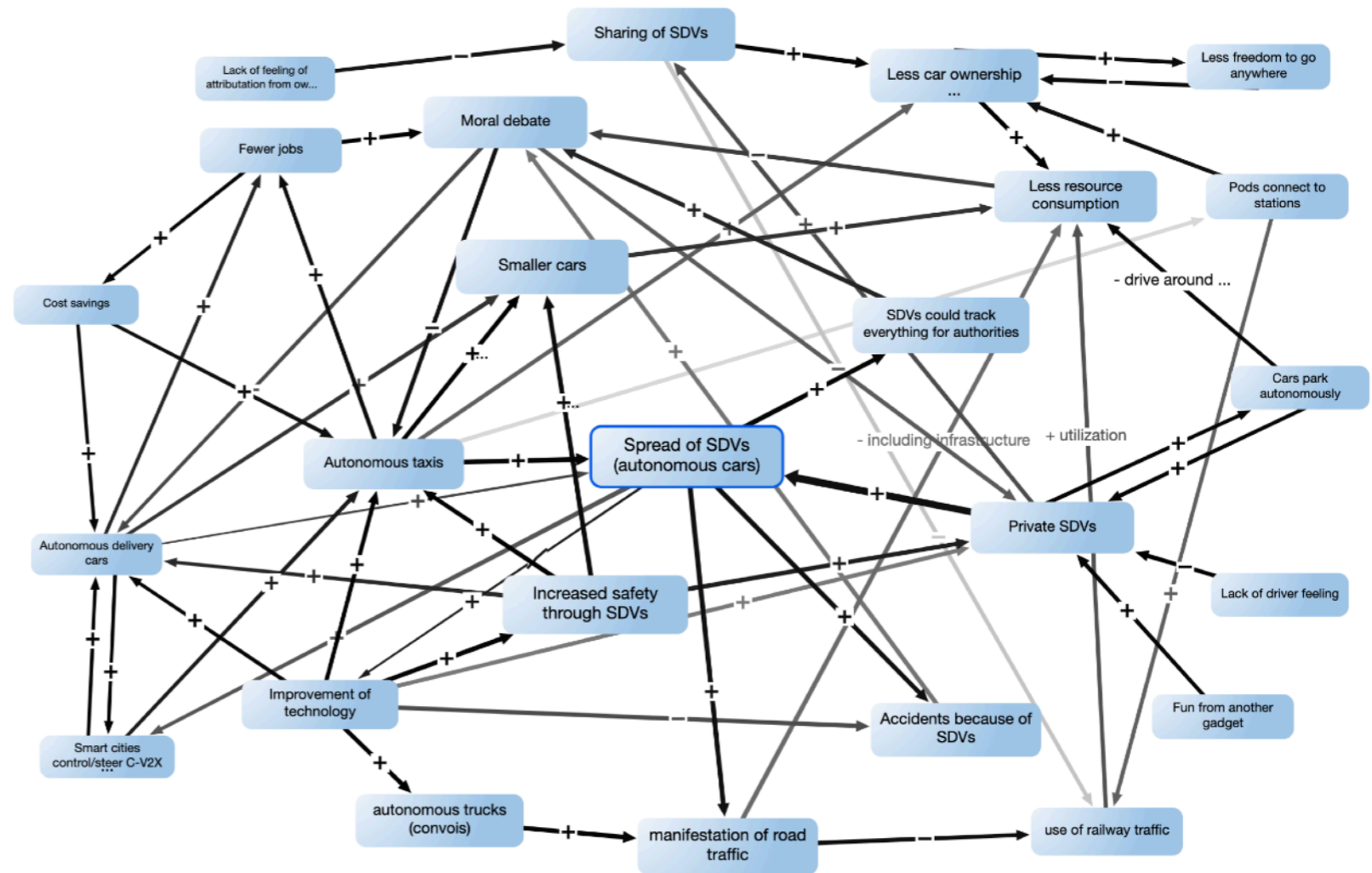
*Economic view of the development of ICT - will the broad masses have ICT, or only a few wealthy people all the more for it?*



## Trade-Offs of SDVs

Autonomous vehicles (Self Driving Vehicles) show particularly many ambivalences. On the one hand, smaller, safer vehicles, when highly utilized, can lead to less demand for energy and raw materials. On the other hand, these manifest road congestion, especially with regard to streamlined autonomous truck convoys and more space for those who want to continue driving their own cars.

The latter are also the opposing forces for a consequent spread of shared vehicles: many people insist on their status symbol, on the active driving experience and on the freedom to have their own car at their disposal at any time. So instead of sharing cars, it may be just as feasible for people to just let their cars find parking on their own, and to



*SDVs and the arguments pro and con*

let their cars drive in traffic jams to make better use of their time in them.

But there will still be quite a few hurdles along the way, from moral aspects of autonomous driving (does saving people in the car take precedence over people in front of

the car?) to data traffic congestion (5G or then 6G) to the question of whether conventional cars will then be forced to network in a Vehicle to Everything (V2X).



### Likelihood of dystopian developments

The model on the dynamics of ICT developments (see three pages earlier) highlighted the self-reinforcing impact loops between artificial intelligence and its application in a wide variety of areas. Artificial intelligence ultimately means that an IT system perceives the changing conditions of its environment and acts successfully in response, whether on the basis of predefined rules (expert systems), through similar situations (neural networks), or, in perspective, through its own agenda.

Such AI systems can then be used equally in all areas and advances also become usable in all areas. This is the reason why the still modest successes of AI today will foreseeably enable disruptive developments.

Unlike humans, in AI an intelligence only needs to be learned once, and any subsequent system can pick up where another system has gone before within seconds, without extensive learning.

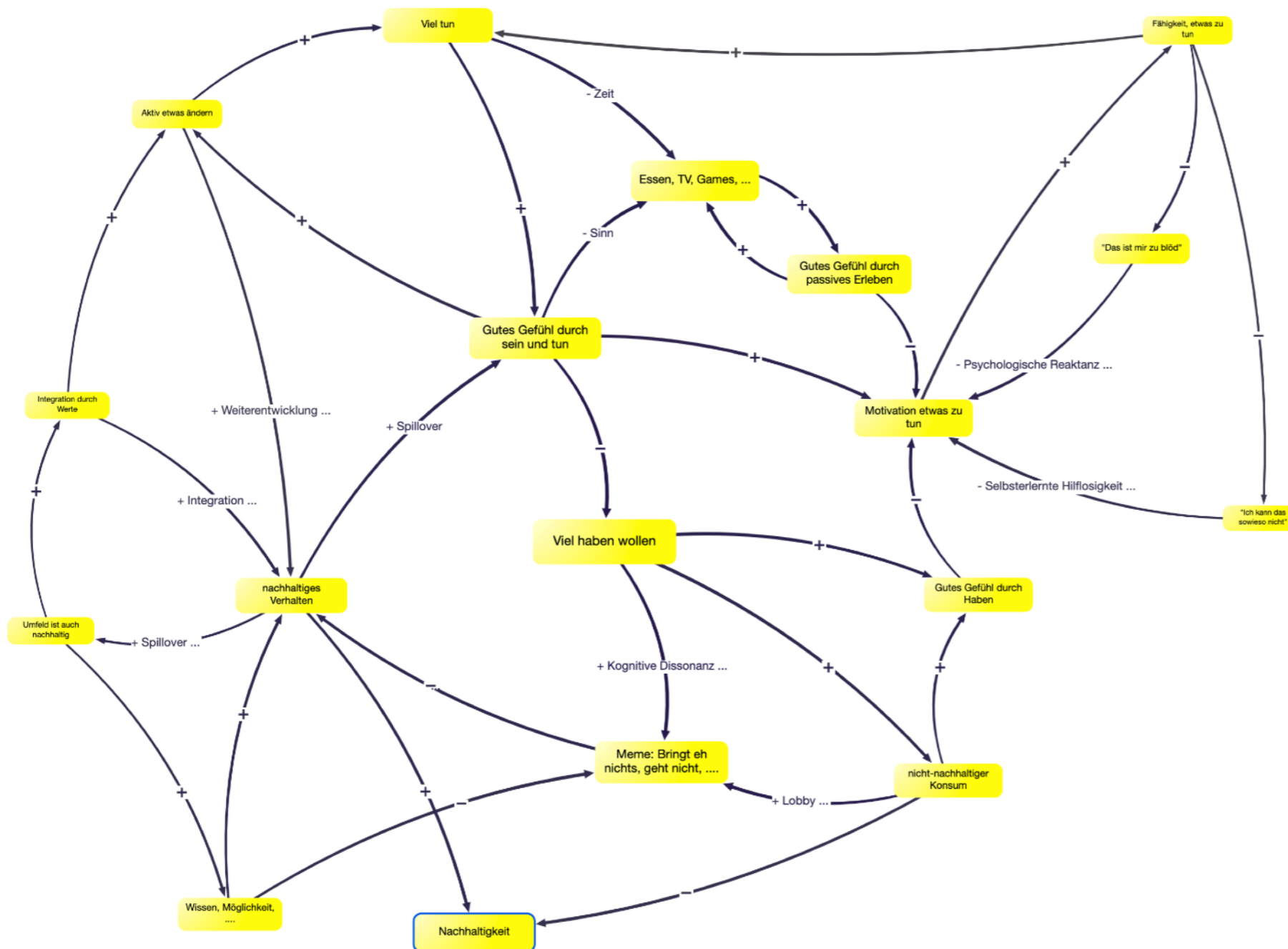
The model on the cover of this paper shows how developments and applications of AI that were once independent can suddenly become dangerous when combined. Autonomous vehicles and facial recognition can be used for low-cost combat drones. Firefighting robots that are supposed to be able to make autonomous decisions in crisis situations, as well as nursing robots with potentials for improvisation, can become extremely dangerous with the algorithm for autonomous goal setting that has not yet been made public, especially when the

infrastructures of our society and all our actions are digitized.

We are currently experiencing how in many areas what is feasible is done, and not what is needed. A combination of this will then not be controllable at all, and in everything, as mentioned above, the social question will play a role in how losers of these developments become radicals, refugees or simply second-class data suppliers.



# ICT - UTOPIA OR DYSTOPIA?



## 'Virtual' experiences as a driver

In his books, Yuval Noah Harari ultimately warns of the possibility that in the future we will even be very well supplied with good feelings by algorithms.

Although we are also active and learning in some virtual experiences, the temptation of rather passive pleasures is great for many.

Consequently, the market behind it is also huge, and a conscious decision against the consumption of gadgets and in favor of an active experience of people and nature is becoming a social and thus political challenge.

*Qualitative cause-effect model on the question of how sustainable behavior, the consumption of things and the good feeling to be passively obtained through TV, food and virtual worlds are related. In fact, we can objectively have the same feelings through active doing as through having and passive experiencing.*



### ICT - what can politics do?

Politics has little scope for shaping the developments outlined above - even if the various departments are currently making great efforts to set guidelines.

Ethical limits comparable to the ban on human cloning or the restriction of genetic engineering are unlikely to be enforceable even internationally.

A digital, robot, wealth, CO2 or/and raw materials tax could make ICT more expensive and provide money for a so-called unconditional basic income and for a better international distribution of value creation, but they run counter to the interests of the national business lobby.

Attempts to address the longevity and repairability of devices first of all fundamentally contradict

technological progress in international competition.

On the other hand, it is easier to implement a design for recycling and corresponding recycling systems, as well as minimum standards for the extraction of raw materials.

When it comes to data collection, policymakers seem almost overwhelmed. Facebook etc. violate existing law and yet they are seen as too popular and too financially powerful to really take effective action against them. With the justification that a data collector knows us better than we know ourselves via cookies for our own good, cookies do not become a real option but have to be explicitly rejected in a comparatively elaborate way.

Another example is the 5G radio network, the health consequences of which are only to be researched in the current application.

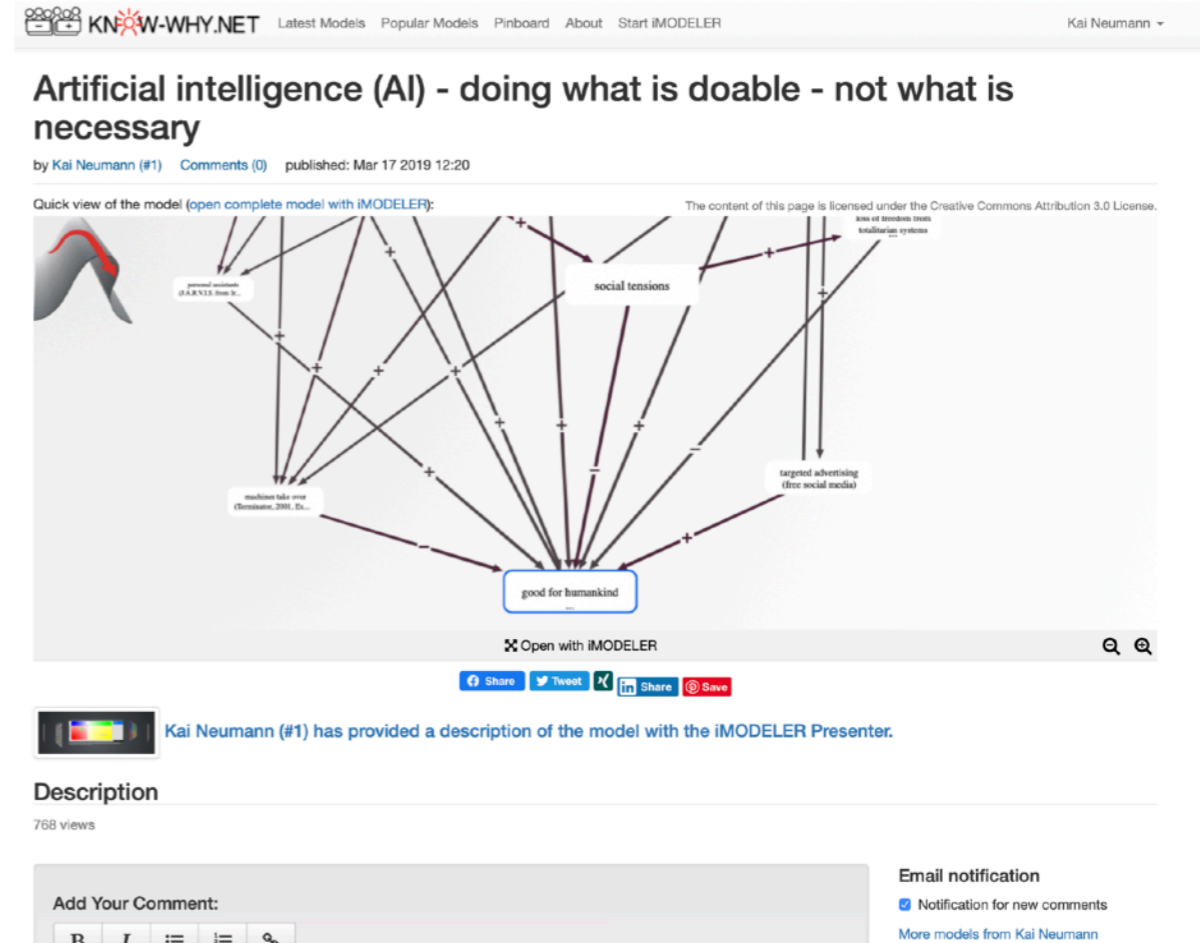
It is not only in the area of security that politics must win over IT talent with money.

But politics has the greatest leverage indirectly if it enables society to find out and implement who it wants to be. Peace, culture, human coexistence, an intact environment, etc. can become consciously - or through nudging also unconsciously - chosen goals for us, to which the ICTs then also subordinate themselves. Data collectors and care robots would suddenly become useless.



## Sources, references

The publication of the models is partly done via the platform KNOW-WHY.NET.



## About Consideo

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With the platform KNOW-WHY.NET we offer collective interconnections.

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