

Welcome



VR & AI*



Curse or blessing of new technologies



A dialectical** controversy in a sociocultural context

- * Virtual Reality & Artificial Intelligence
- ** Philosophical method that questions its starting position through opposing claims and seeks to gain a higher kind of knowledge through the synthesis of both positions.

Rechtliches: Alle Inhalte, Ideen, Bilder, Texte und Animationen (LEGO) sind auf der KOBO-Philosophie aufgebaut und sind vom Gericht anerkannte Vermögenswerte der Firma Suprexa AG und somit umfassend urheberrechtlich geschützt. Die Suprexa AG verfügt über die alleinigen Nutzungsrechte von KOBO. Missbrauch und die Weitergabe von Bildern und Animationen ohne unsere ausdrückliche schriftliche Erlaubnis wird geahndet. Es werden Texte aus dem Buch KOBO Integrale Intelligenz, Kompendium zitiert. Das Buch ist steht kurz vor der Veröffentlichung und gilt als Quelle der Texte.

Alle Rechte vorbehalten. SUPREXA AG, Nordstrasse 18, CH-9410 Heiden, Oktober 2024.

Markus Bolli

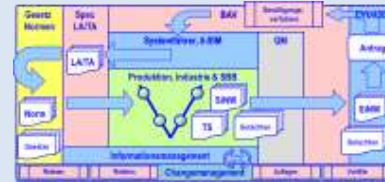
- Organization Developer
- Lecturer
- Designer for airplane and special vehicle
- Co-founder of the KOBO economy philosophy
- A big LEGO-Fan
- First ETCS-IOP SBB NBS/LBL
- Generic approval process ERTMS/ETCS (K-SINA)
- IBS/IBN Gotthard Basis Tunnel
- SmartRail4.0; Prototype of ATO-GoA2



Sources:

- <https://www.suprex.com>
- <https://www.essential-organization-framework.com/>
- ISBN-978-3-033-05941-2-TB-KOBO.pdf, ISBN 978-3-033-05485-1, Tunnelling the Gotthard
- SBB Publication 221018_Voruntersuchung-E2E-Automation_V01.00.pdf

Topics in Railway Business



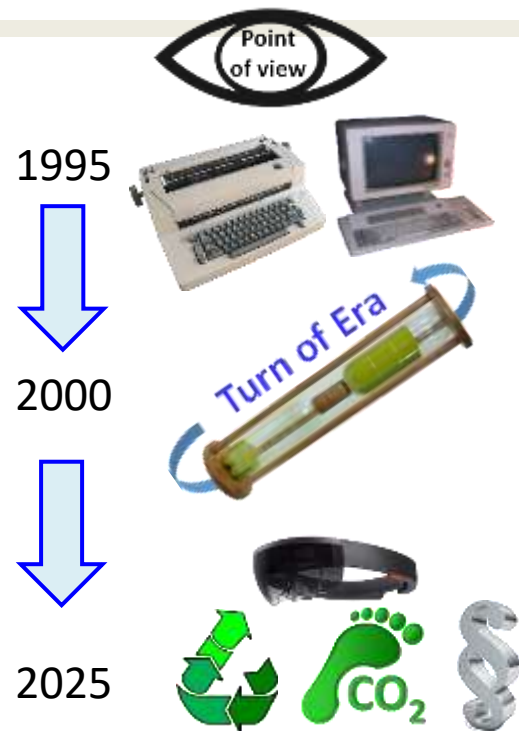
Preamble *(personal experiences of the last thirty years)*

I have been observing the transformations of various industries for more than 30 years. The following conclusions can be drawn from this personal experiences:

- Technologies are developing faster  than the sociocultural contexts. 
- Only a few companies have managed to come close to the level of Industry 4.0¹.
- Even this kind of companies stay still in the level of Industry 3.0 by using micro- electronics.



- We are looking at Virtual Reality VR and Artificial Intelligence AI under this premise.



¹ Industry 4.0 as an analogy to the definition of the German Ministry of Economics in 2000: "... based on cyber-physical ICT systems of ubiquitous computing in an integral space-time-environment of hyper-complex cybernetic (K+) and handled only by the autopoietic principals of an empathic society..."

Interim result 1):

*To go into the next level Industry 4.0,
we do not have any technical restrictions.*

Do we have socio-cultural barriers?

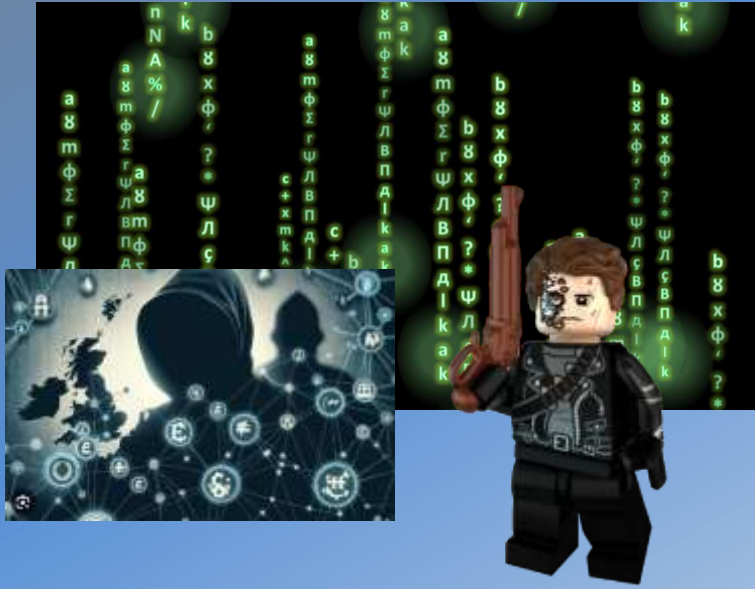


The background features a grid of various characters, including Latin letters (a, b, c, x, m, k, n, ö, #, %, /), Greek letters (ϕ, σ, ρ, ψ, λ, ζ, ν), and mathematical symbols (Λ, f, n, ö, #, %, /). Overlaid on this grid is a pattern of overlapping circles in shades of blue and purple, creating a layered, geometric effect.

What kind of future do we want?

Future I:

A world dominated by robots and cyborgs like in "The Matrix" or "Terminator" movies?



Future II:

A world of peace and social justice, based on science and empathy.





Chan Buddhist Metaphor

*“... a hammer is a hammer is a hammer.
You can use it to create sculptures or forge swords to kill people...”*

“The hammer is just a hammer”.



1. Introduction

Word clarification & Sharpening the mindset

Introduction (Program and word clarification: why we do and what do)

To make you feel comfortable, I will introduce the program to you.



1. Introduction: Why word clearing is important



2. Complexity in the railway business



3. New Time, New Role



4. Final Spurt



5. Conclusion



The degree of understanding¹ corresponds to the feelings:



High understanding causes high feelings.



Poor understanding or misunderstanding causes a bad mood.



The level of understanding can be measured using the KOBO Understanding Compass®.

➤ *Note: The English translations are primarily from Google.*

¹ See also ISBN-978-3-033-05941-2-TB-KOBO.pdf, P. 9 pp; Kobo uses four quotients of understanding: Information, Commitment, Attention, and Authenticity.

Introduction *(Word clarification for better understanding)*

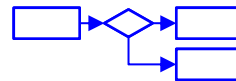
- Nothing is more wrong than the assumption a word has only one single and only one right meaning.
 - Example: The word “process” in different contexts.
 - Understanding requires a commitment about the references and the contexts.
- The most binding agreement is laws and the standardization supported by a law.

Industrialization

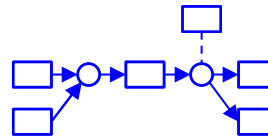
Chemistry



Engineering



Flow Chart accord. DIN 66001



Process accord. PETRI

Legal profession



Introduction *(Industrialization in antiquity)*



Troja 2400 BC



Egypt 1200 BC



Barbegal 300 AD



Rom 50 BC



Sir Francis Drake (+1596)



Wallenstein (+1634)



First Standard 08/15 (1915)

- A phalanx can only function with standardized, mass-produced spears and shields. This is the original form of the bourgeoisie and civil rights¹ in the middle age.
- The Egyptian conquests required mobility and 'standardized' modular systems for all chariots as well as for the knitted boats, in order to cross even a stony desert.
- The Romans' long-term success was based on the mass production of consumer and production goods (armaments) as well as standardized army processes.
- Drake and Wallenstein were pioneers of modern industrialized mass production, including production lines, standardization (caliber), standards, and training.
- 0815 the first German standard of the modern era, around 1915. Every breechblock fit every rifle.

1: Vgl. auch <https://soziologieblog.hypotheses.org/10664>: Der Begriff des Spiessbürgers kann bis ins zehnte Jahrhundert nach Christus zurückverfolgt werden, als sich erstmals städtische Bürgermilizen bildeten, die ihr Hab und Gut mit der traditionellen Waffe der städtischen, nichtadeligen Bevölkerung verteidigten, eben dem Spiess. Bürger gegen Adelige – ein Novum im Hochmittelalter.
Vgl. auch Schlachten um Bern. Nicht-Stadtbürger konnten Bürgerrechte und Schutz der Stadt Bern erlangen, indem sie als Spiessbürger die Stadt verteidigten. Schlacht bei der Schosshalde 1289.

Introduction *(Industrialization - civil and military conflicts)*



5. Circular economy (Primacy of Nature)

Regenerative economic system and social justice.

4. Industry 4.0 (Primacy of Data)

Networking of people, machines, logistics and products.

3. Digital revolution (Primacy of Market)

Over capacity of production resources.

2. Industrial Revolution (Primacy of Production)

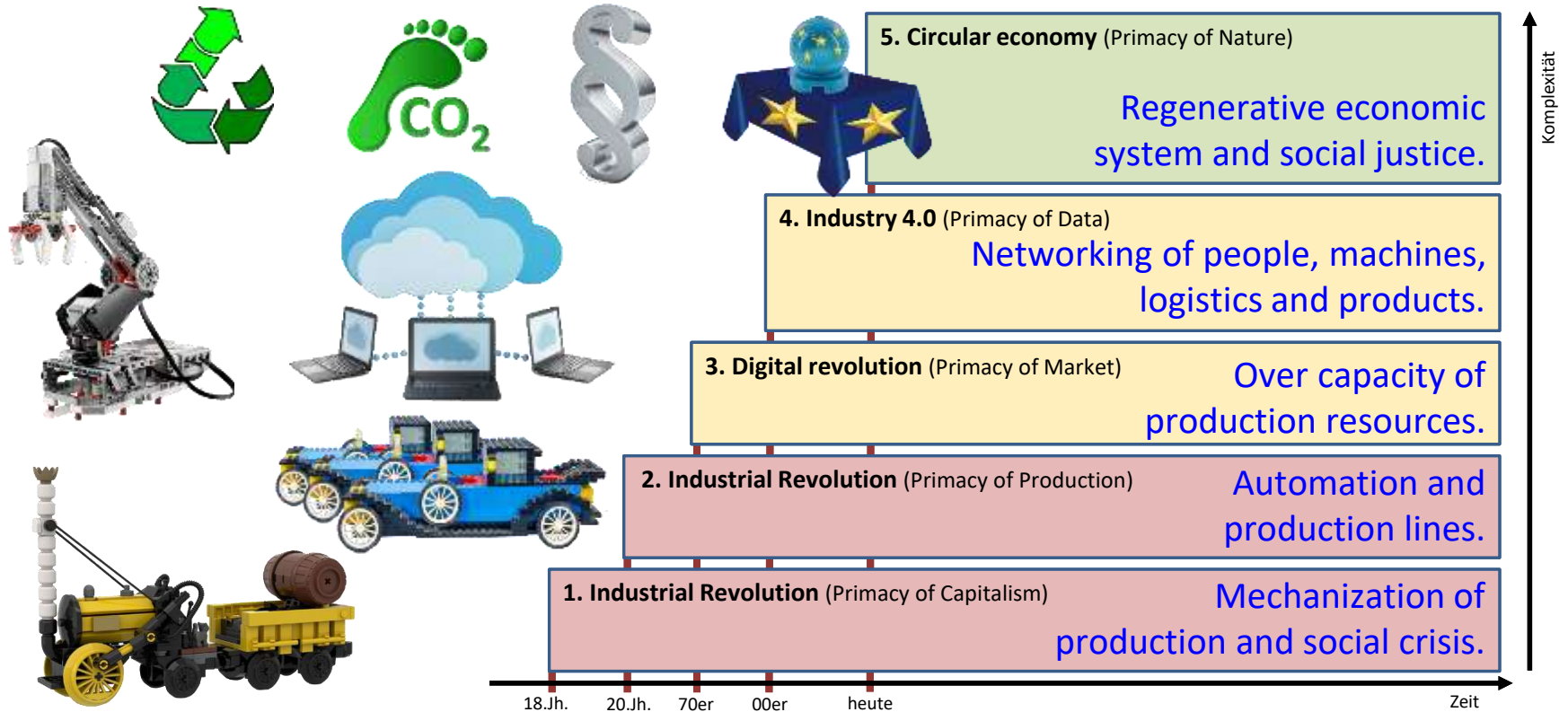
Automation and production lines.

1. Industrial Revolution (Primacy of Capitalism)

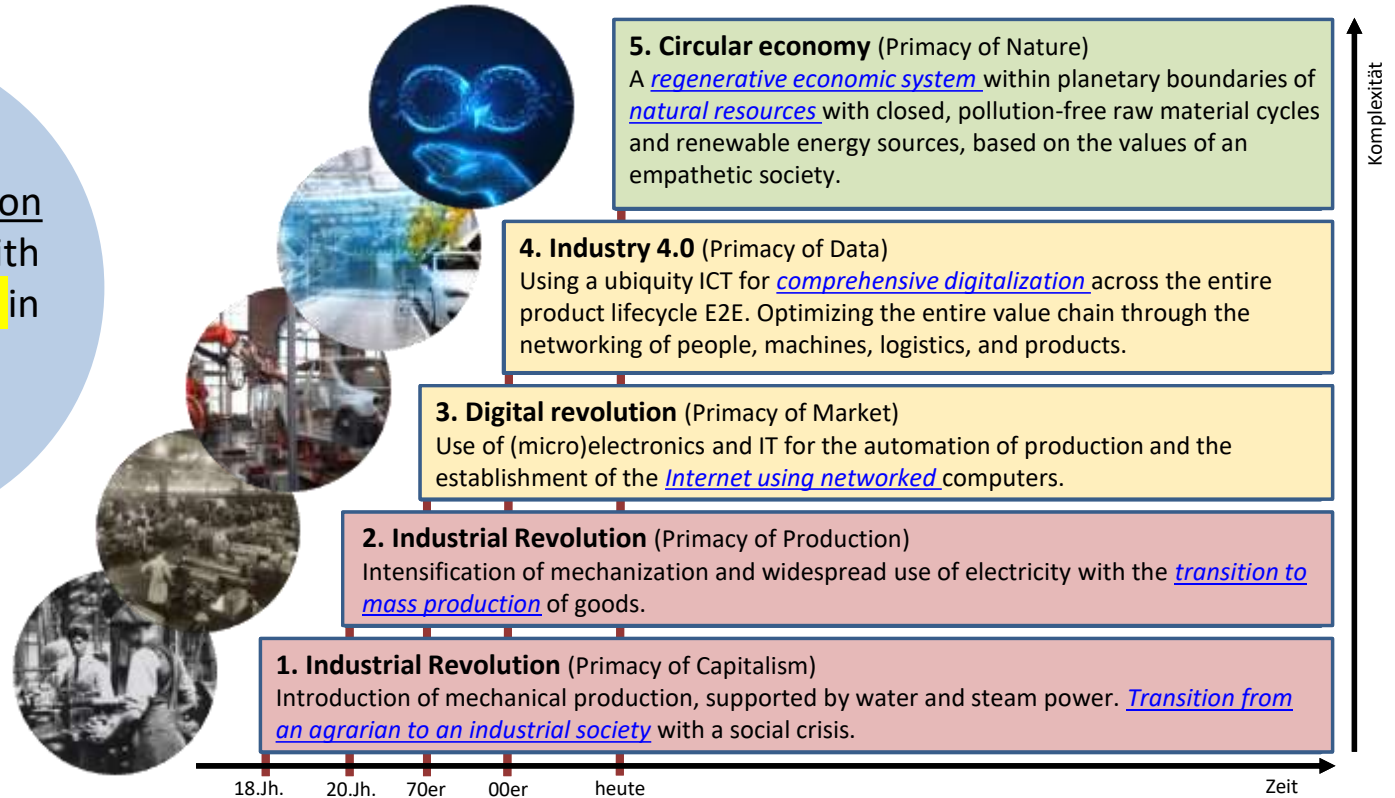
Mechanization of production and social crisis.



Introduction *(Industrialization of the modern era)*



Industrial Revolution Transformation with profound changes in economy and society



Introduction (Word clarification - AI is a black grey-horse)

241003_SRSS-MBO_Q-vs-Innovation_X01.00, S. 7 ff.

(Zitat)

„**Hyperkomplexe Problemstellungen*** können nur mit Hilfe von komplexen ICT-Systemen und **KI-gestützten Simulationen** sowie mittels der **einzigartigen kognitiven Fähigkeit des Menschen** hin zu einfachen Lösungen transferiert werden...“

(Translated Google): “**Hypercomplex problems*** can only be translated into simple solutions with the **help of complex ICT systems and AI-supported simulations**, as well as through **the unique cognitive abilities of humans**....”

- Artificiality and Intelligence are a contradiction in terms.
- Duden: intelligence is ... «...**The human capacity to think abstractly and rationally and to derive purposeful actions from this**...».
- If intelligence, according to the Duden dictionary, is reserved for humans, then it cannot be artificial.
- Therefore, artificial intelligence AI¹ is a black gray-horse.



I am a white grey-horse



Nevertheless:
It's better to ride a black grey-horse than to walk.

1 Duden: AI is now attempting to replicate these human thought and recognition processes in an automated form.

Introduction (Word clearing of problem definition by university of St. Gallen)



- **simple problems:** have some **factors** of influence, low **dynamics** and a low **interaction**.

(Examples: making budget, calculate a simple linear CO₂ balance)

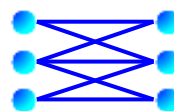


- one-dimensional



- **complicated problems:** **many factors** of influence but **few dynamics** and **few interactions**.

(Examples: planning the rollout of a software, calculate a complicated CO₂ balance)

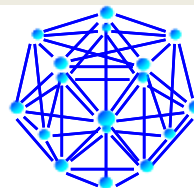


- two-dimensional

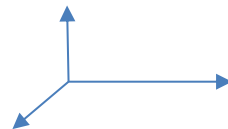


- **complex problems:** **few factors** of influence very **high dynamics** and a **much interactions**.

(Examples: analysis of the market situation; calculate a CO₂ balance of dynamic, constantly interacting systems; Model: Icosahedron, build on 20 equilateral triangle).



- tree-dimensional



- **hyper-complex problems:** **many factors** of influence and **extremely high dynamics** and an **extremely high interaction**.

(Examples: Safety approval of the Gotthard Basis Tunnel; calculate a CO₂ balance of system in E2E-perspectives; See also Heisenberg uncertainty principle: Either you know the location of a particle, or you know his movement, living in stochastic situations).

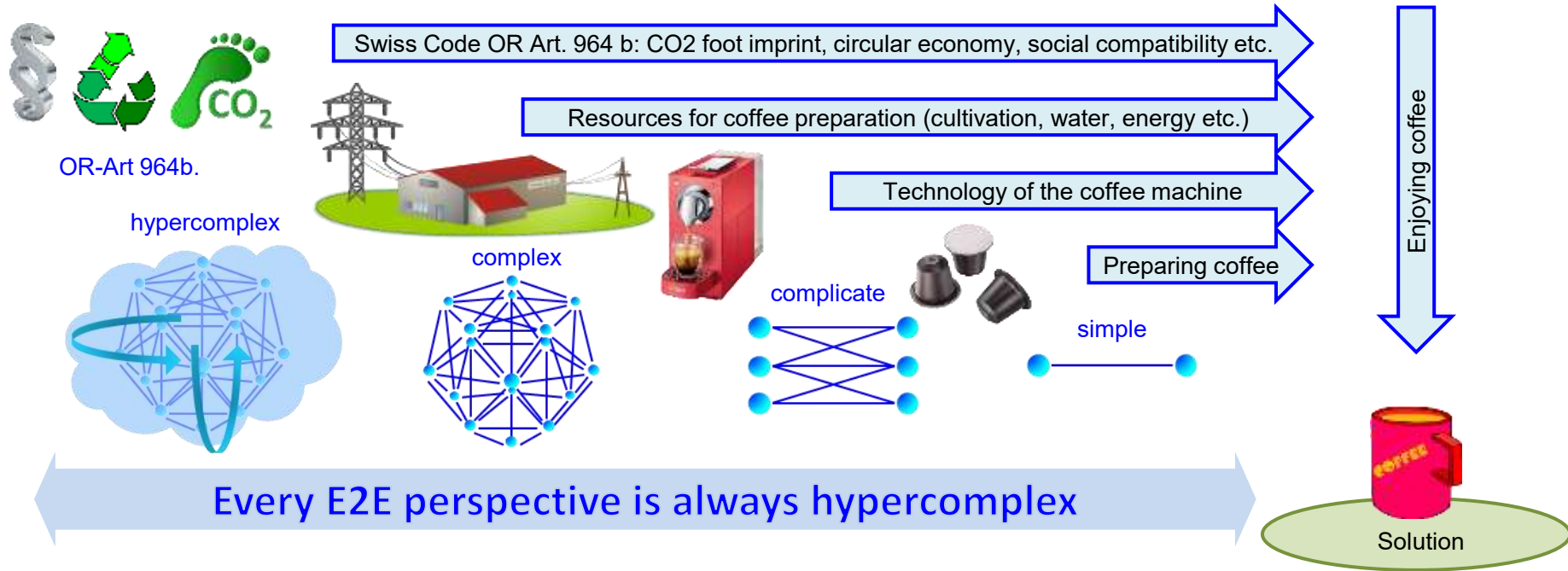


- n-dimensional



Quelle: In Anlehnung an Ulrich, Probst 2001 – Anleitung zum ganzheitlichen Denken; S. 109; Vgl. auch KOBO-TB-Integrale-Intelligenz-978-3-033-05941-2.pdf, S. 36 ff. ; vgl. auch Stafford Beer, Foerster, Malik, Müller-Stewens: Society of Cybernetic; vgl. auch KOBO 211110_Dialektik-Problemlösung_X02.00.pptx

Introduction *(Difficulty levels of a cup of coffee)*



Introduction *(Scientific sources of economic and humanities)*

- There is no perfect method, but rather the best possible tools and resources for the tasks at hand.



- Organisationslehre:** Abramovitz, Beer, Bleicher, Brenner, Burdett, Drucker, Gomez, Heidegger, Hemel, Hilb, Jenny, Kaplan, Kosiol, Krieg, Küng, MacMenamin, Maier, Malik, Müller-Stewens, Nolan, Nordsieck, Oeller, Porter, Probst, Rosenstiel, Rüdiger, Rüegg-Stürm, Sedlacek, Stafford, Stöger, Suter, Ulrich, Vahs, Walter, Weerda, Wieland, Willi, Zarnekow
- Philosophie:** Ashby, Beck/Cowan, Bornemann, Foerster, Gebser, Goldman, Goleman, Rifkin, Schuhmacher, Wilber
- Psychologie:** Herrmann, Klemenoff, Muschick, Peschanel, Reinsch, Riemann, Rogers, Spinola, Thomann, Wiener
- Neurobiologie:** Blackmore, Damasio, Dawkins, Gazzaniga, MacLean, Rosch, Roth, Sperry, Thompson, Varela, Vester

Interim result 2):

*We have the systems-theoretical foundations
for Industry 4.0 since the 1970s.*

(See Cybernetics by Ashby, Foerster, Malik, Ulrich-Probst, Mueller-Stevens etc.)

*We known the philosophical and psychological ideas
for Industry 4.0 since 1950s*

(See Gebser, Herrmann, Wilber, Blackmore, Riffkin, Riemann, Thomann, Damsio etc.)



Why don't we move?

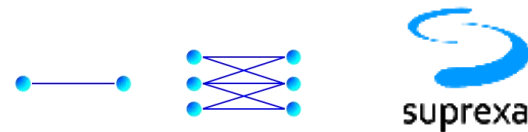


2. Complexity

Complexity and diversity in railway business



ETCS Technology (many factors of influence but few dynamics and few interactions)



Eurobalise



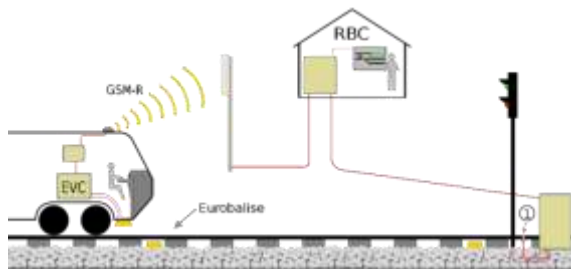
On board computer (EVC)



DMI in the cab



Odometrie (CORRAIL, Radar)



Trackside Radio Block Center

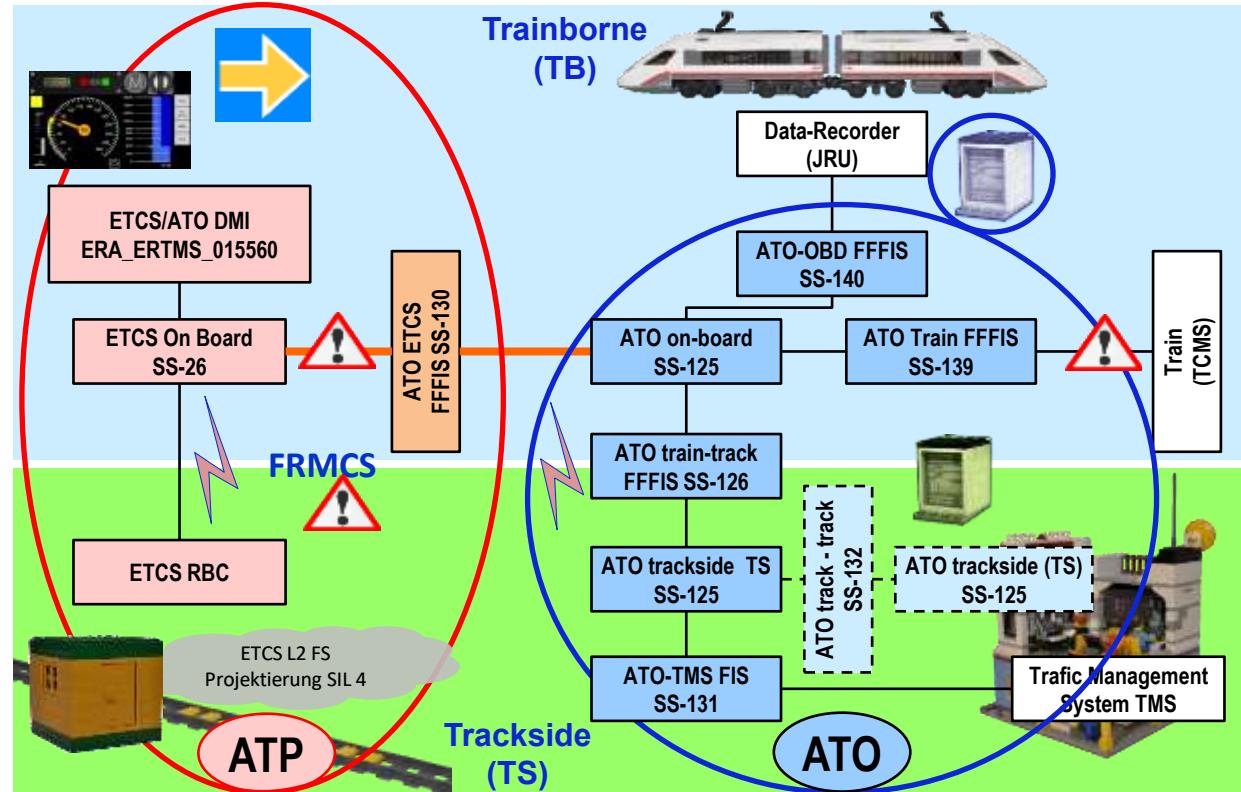


GSM-R Transmitter

ATO@ETCS Regulation *(few factors of influence very high dynamics and a much interactions)*

Legende:

- | | |
|--------|--|
| ATP: | Automatic Train Protection, CH & EU(interoperable) = ETCS, National e.g. D = LZB/PZB, FR=KVB... |
| ATO | Automatic Train Operation (meint nicht nur FZ, sondern Bahnbetrieb) |
| DMI | Driver-Machine Interface, bestehend aus ETCS und GSM-R / FRMCS |
| ERTMS | European Rail Traffic Management System (ETCS + GSM-R) |
| FIS: | Function Interface Specification (Internationale) |
| FRMCS: | Future Railway Mobile Communication System |
| L2 | ETCS Level2 zeichnet sich durch eine ständige Kommunikation zwischen Fahrzeug und ETCS-Streckenzentrale via Euroradio aus. |
| SS: | Sub Set, Beschreibung einer Funktion im Regelwerk |
| TSI | Technical Specification of Interoperability |
| TIU: | Transmission Interface Unit, Schnittstelle für Remote Control units. |
| TMS: | Traffic Management System (Bei SBB zentrale Intelligenz zu Berechnung des konfliktfreien und Energiesparenden Fahrens; Journey- und Segmentfile) |
| JRU: | Juridical Recording Unit, Elektronische Fahrtenregistrierung (EFR) |
| TCMS | Train Control & Monitoring (Management) System |

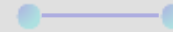




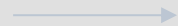
Level of difficulties of ERTMS (ETCS&GSM-R) & ATO technologies

- **simple problems:** have some factors of influence, low dynamics and a low interaction.

(Examples: making budget, calculate a simple linear CO₂ balance)

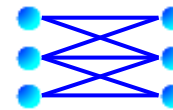


- one-dimensional



- **complicated problems:** many factors of influence but few dynamics and few interactions.

(Examples: planning the rollout of a software, calculate a complicated CO₂ balance)

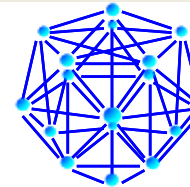


- two-dimensional

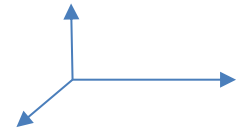


- **complex problems:** few factors of influence very high dynamics and a much interactions.

(Examples: analysis of the market situation; calculate a CO₂ balance of dynamic, constantly interacting systems; Model: Icosahedron, build on 20 equilateral triangle).



- tree-dimensional



- **hyper-complex problems:** many factors of influence and extremely high dynamics and an extremely high interaction.

(Examples: Safety approval of the Gotthard Basis Tunnel; calculate a CO₂ balance of system in E2E-perspectives; See also Heisenberg uncertainty principle: Either you know the location of a particle, or you know his movement, living in stochastic situations).

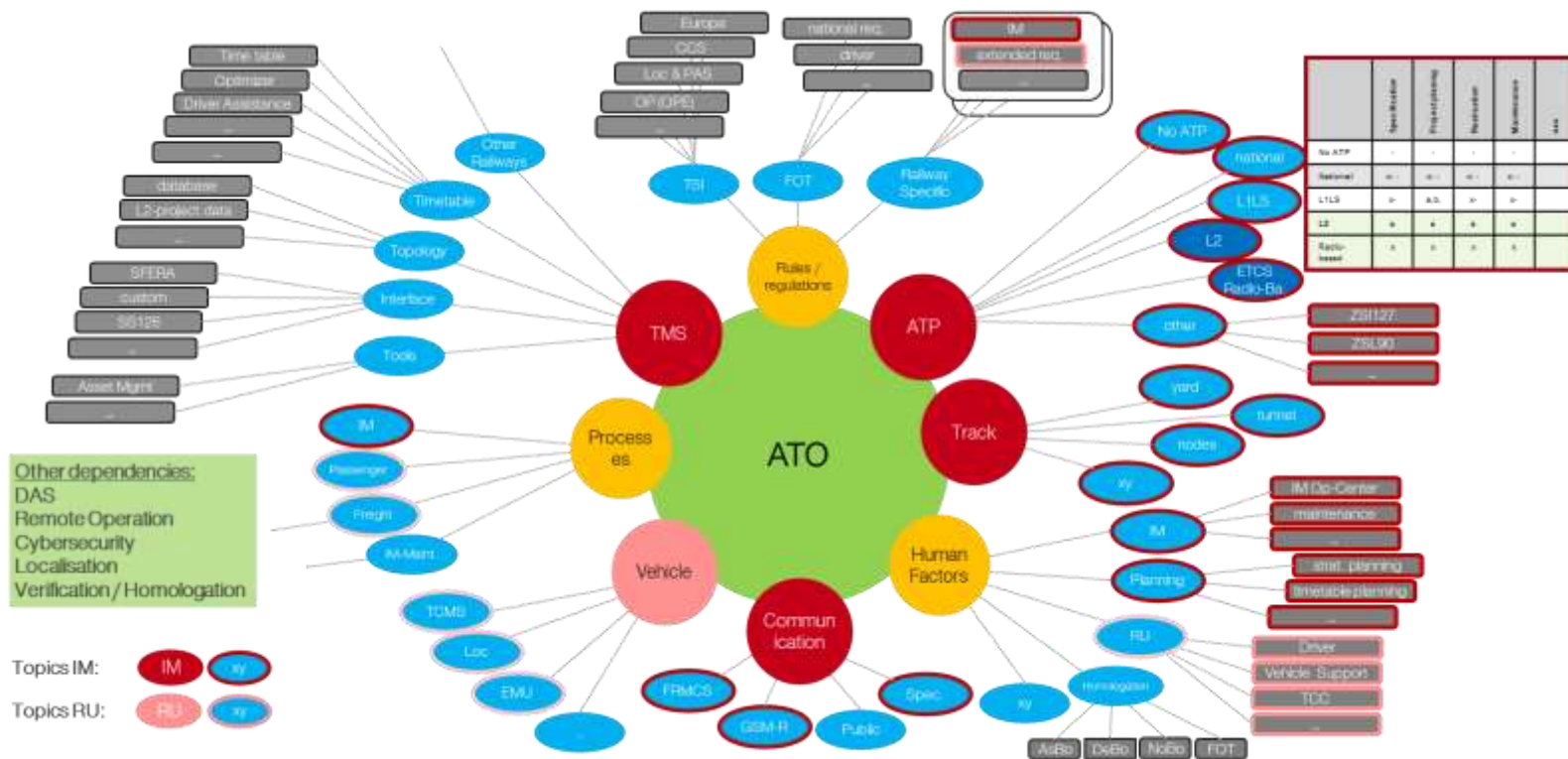


- n-dimensional



Quelle: In Anlehnung an [Ulrich, Probst 2001 – Anleitung zum ganzheitlichen Denken; S. 109](#); Vgl. auch KOBO-TB-Integrale-Intelligenz-978-3-033-05941-2.pdf, S. 36 ff. ; vgl. auch Stafford Beer, Foerster, Malik, Müller-Stewens: Society of Cybernetic; vgl. auch KOBO 211110_Dialektik-Problemlösung_X02.00.pptx

ATO organization (many factors, extremely high dynamics and extremely high interaction)



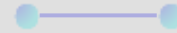
2022-05-21 RAILTECH EUROPE 2022 Utrecht: ATO Specification status and challenges (SBB)

7

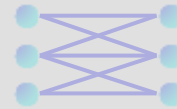
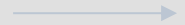


Level of difficulties ERTMS & ATO & organization

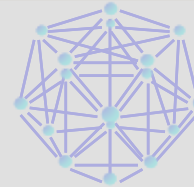
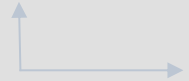
- **simple problems:** have some factors of influence, low dynamics and a low interaction.
(Examples: making budget, calculate a simple linear CO₂ balance)
- **complicated problems:** many factors of influence but few dynamics and few interactions.
(Examples: planning the rollout of a software, calculate a complicated CO₂ balance)
- **complex problems:** few factors of influence very high dynamics and a much interactions.
(Examples: analysis of the market situation; calculate a CO₂ balance of dynamic, constantly interacting systems; Model: Icosahedron, build on 20 equilateral triangle).
- **hyper-complex problems:** many factors of influence and extremely high dynamics and an extremely high interaction.
(Examples: Safety approval of the Gotthard Basis Tunnel; calculate a CO₂ balance of system in E2E-perspectives; See also Heisenberg uncertainty principle: Either you know the location of a particle, or you know his movement, living in stochastic situations).



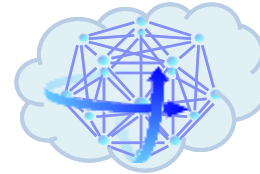
- one-dimensional



- two-dimensional



- tree-dimensional



- n-dimensional



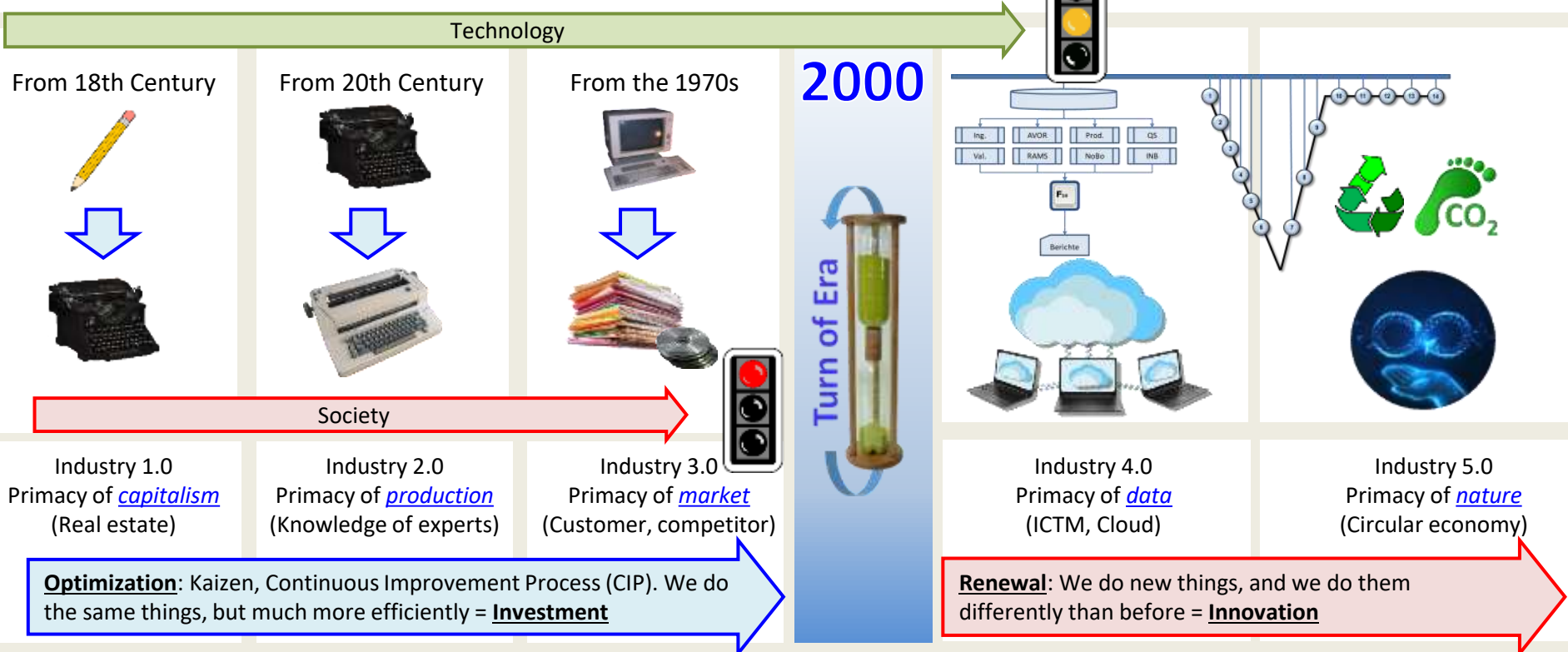
Quelle: In Anlehnung an Ulrich, Probst 2001 – Anleitung zum ganzheitlichen Denken; S. 109; Vgl. auch KOBO-TB-Integrale-Intelligenz-978-3-033-05941-2.pdf, S. 36 ff. ; vgl. auch Stafford Beer, Foerster, Malik, Müller-Stewens: Society of Cybernetic; vgl. auch KOBO 211110_Dialektik-Problemlösung_X02.00.pptx

3. New Time, New Role

Based on John O. Burdett



Turn of Era 2000 *(Optimizing vs. renewal)*



1 Vgl. Hoffmann/Barruetto (2023) Das Design humaner Unternehmungen, S. 50 ff. „...einhergehenden massiven Kulturwandel, begleitet durch einen Werte- und Mindset-Change...“

Turn of Era 2000 *(Paradigm shift through massive acceleration and networking)*



Simple to complicated

The first moon landing on July 20, 1969, was certainly a great event in the period before the year 2000. Nevertheless, this pioneering achievement is technically extremely complicated – but not complex. Here are some reasons for that thesis:

- Complicate problems have many influencing factors but little dynamic and little interaction.
 - The flight looks like a ballistic event, comparable to the flight of an arrow from a bow towards a visible target.
 - Navigation is done using optical devices, similar to a sextant.
- Each task on its own is a simple problem, but there are so many of them, which makes it complicated.

2000



Complexity to hyper complexity

What has changed dramatically since 2000?

- The amount of information and networking (icosahedron).
 - The acceleration of information thanks to ubiquitous ICT and high availability (accelerated icosahedron).
 - The transformation from separate space and time to a space-time structuring of simultaneity, as well as new effects such as...
 - ... Heisenberg's uncertainty principle: "I can say what something is (existence) or what it has for kind of effects (essence) – but never both at the same time."
- For example, Telecom, Sozial Media, etc.

Complexity



Hyper complexity

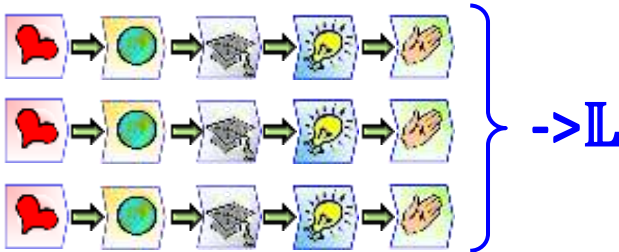


Turn of Era 2000 *(Change of methods)*

Before the Turn of Era 2000

Preamble: Ashby's Theorem of Variety: *"...The variety of the system dictates the variety of the method by which the system can be controlled..."*

- Simple to complicated problems are solved using a multiple, linear-sequential method.



3. Digital revolution (Primacy of Market)

Use of (micro)electronics and IT for the automation of production and the establishment of the Internet using networked computers.

2000

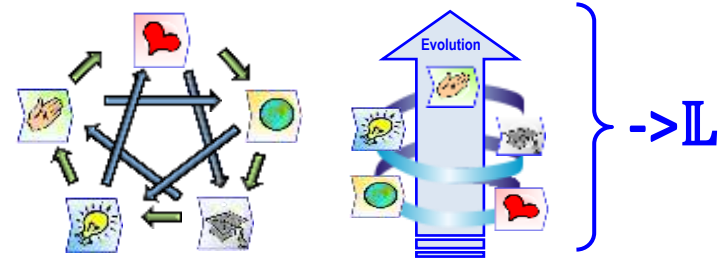


After the Turn of Era 2000

What is the big change of the Turn of Era?

Conclusion: high availability and massive acceleration.

- Complex to hypercomplex problems are mastered using a multi-incremental, circular-evolutionary, iterative method.

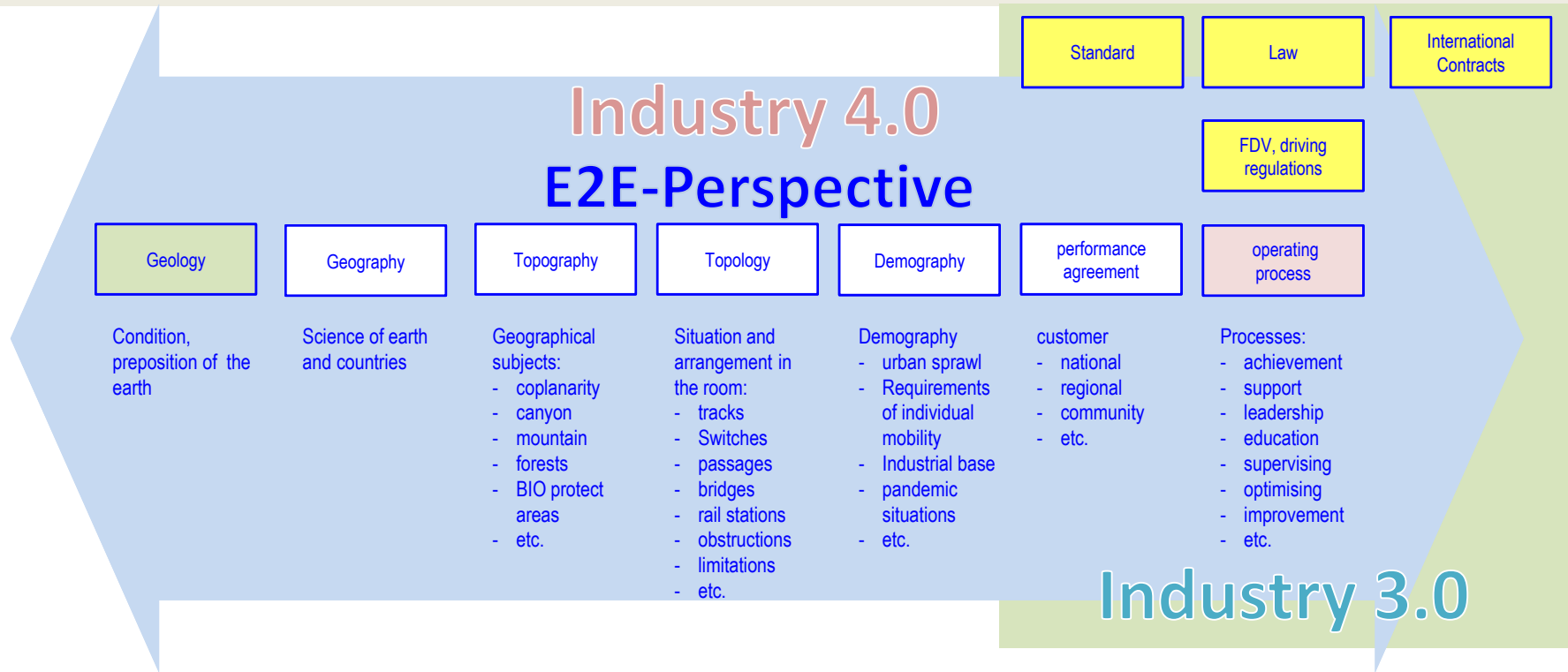


4. Industry 4.0 (Primacy of Data)

Using a ubiquity ICT for comprehensive digitalization across the entire product lifecycle E2E. Optimizing the entire value chain through the networking of people, machines, logistics, and products.

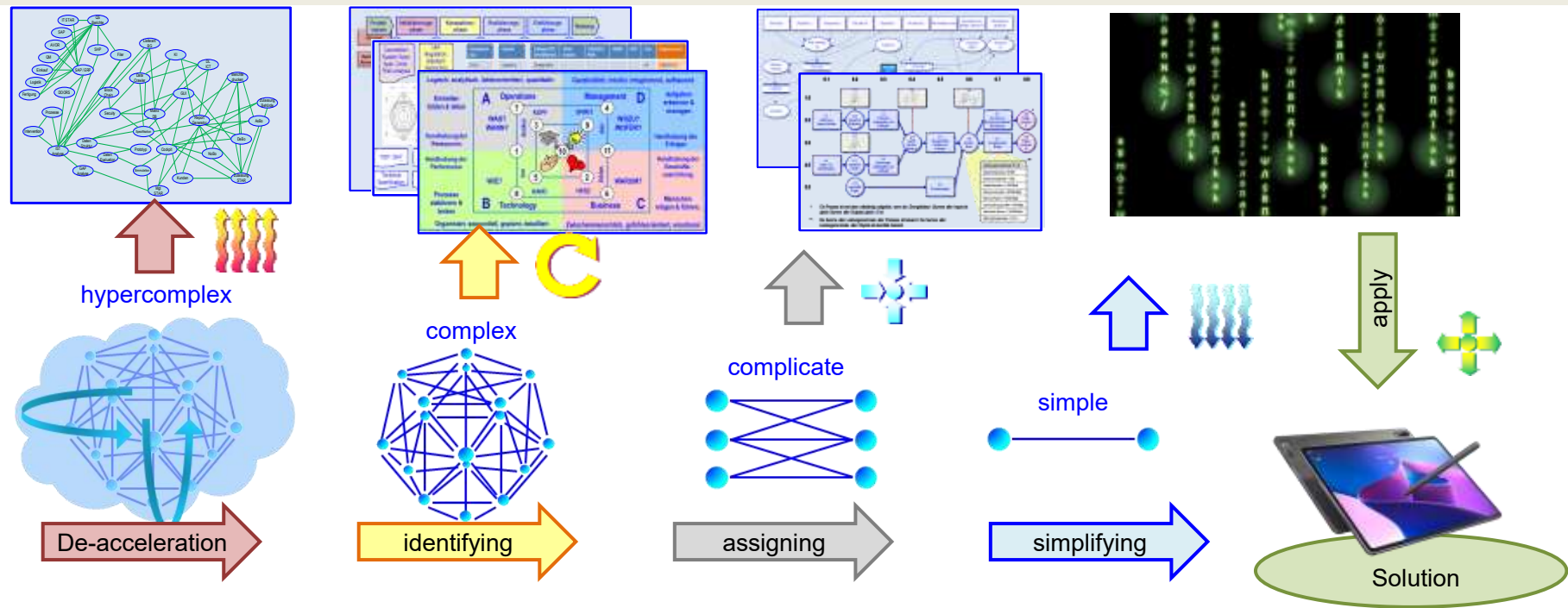
1 Vgl. Bolli/Koch. (2016). Integrale Intelligenz, S. 21 ff. Die KOBO-GERA-Entwicklungsmethode©, vgl. auch <https://www.essential-organization-framework.com/>; vgl. auch Ulrich, Probst 2001 – Anleitung zum ganzheitlichen Denken; Gomez, Probst 1999 – Die Praxis des ganzheitlichen Problemlösens etc.

The real causality of operating processes E2E



We have definitely: many factors of influence and extremely high dynamics and an extremely high interaction

Possible way to find a solution



Quelle: KOBO-TB-Integrale-Intelligenz-978-3-033-05941-2.pdf, S. 21 ff.

Example simulation with AI support



- Simulation for managers and leaders in villages and companies, who want to [develop the transformation](#) to the [17 Sustainable Development Goals](#) (SDGs) (Netto '0' CO2)
- The virtual container of the simulation software from icondu can be adapted to any project task.
- a good prerequisite for a dynamic project cockpit of a project portfolio manager of Industry 4.0.



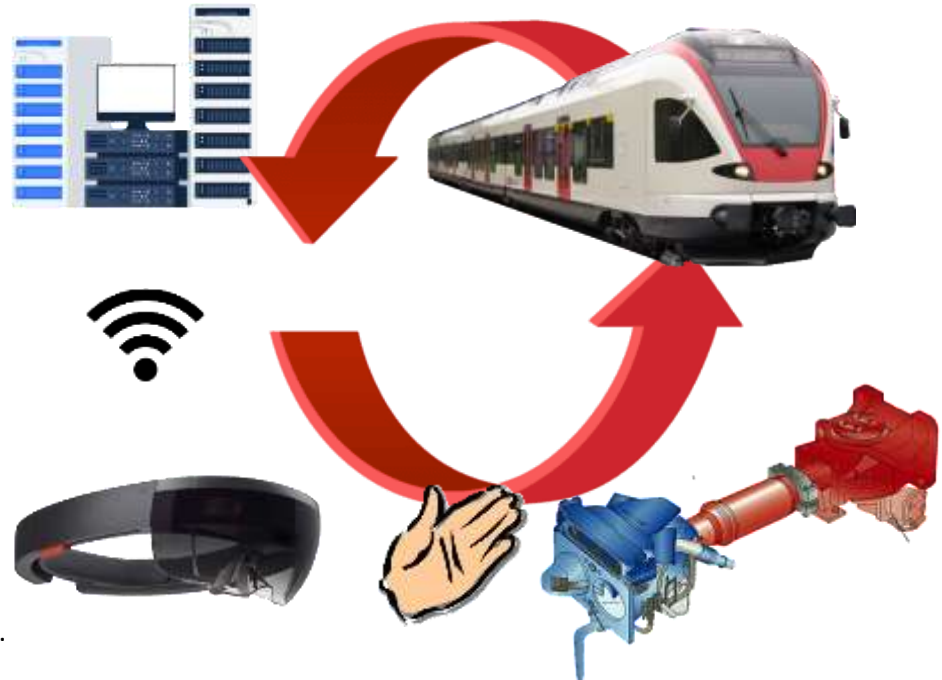
Modellierung und Simulation

Quelle <https://icondu.de/impaction/>

Example simulation with AI and VR support

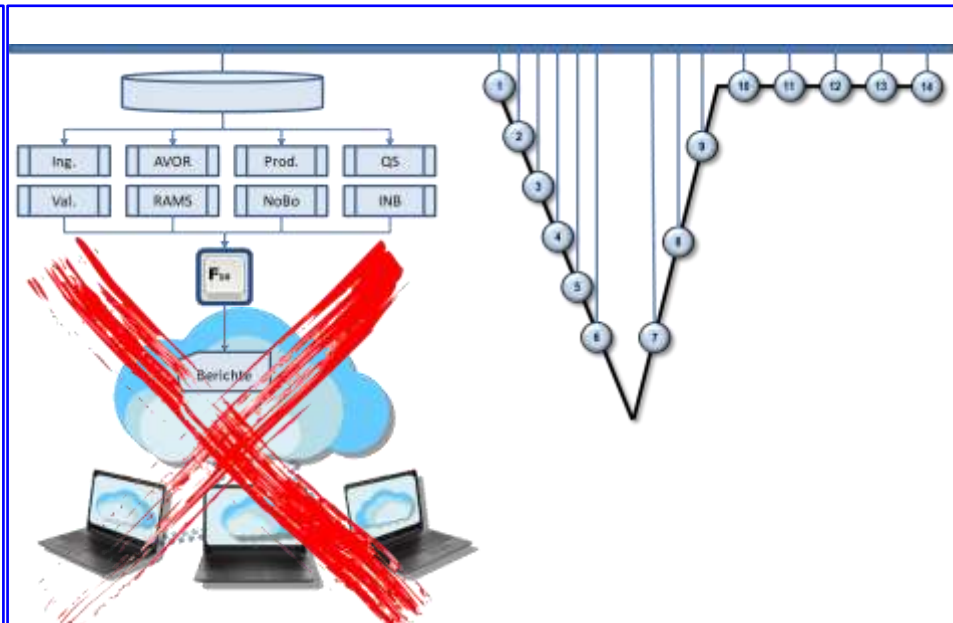
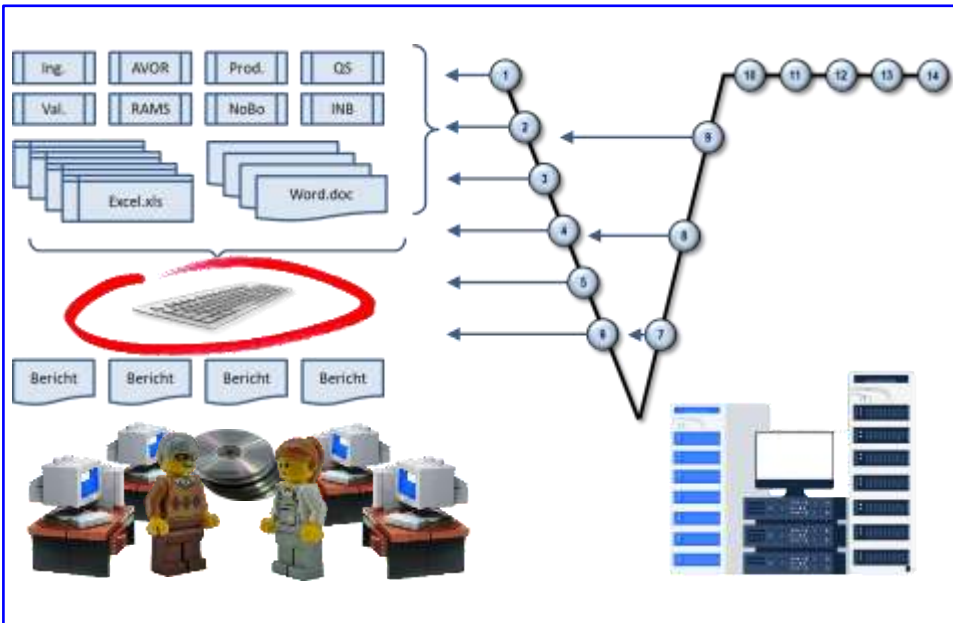
ETH zürich

- Complete maintenance of the automatic coupling of the SBB Flirt.
 - Tasks are determined by (AI) and transmitted wirelessly to the service technician's visors.
 - The actions are visually monitored (VR; perception) and the feedback data is sent back to the host (close system circuit).
 - The movements of the service technician are also tracked in the room and factored into the next action.
- Note: that's just a standalone lab solution. The stringency of the date do not exist, because of the manual input of printouts of the origin data of the production. **No Change Management acc. ITIL.**



Quelle <https://icondu.de/impactation/>

ICTM 3.0 vs. ICTM 4.0

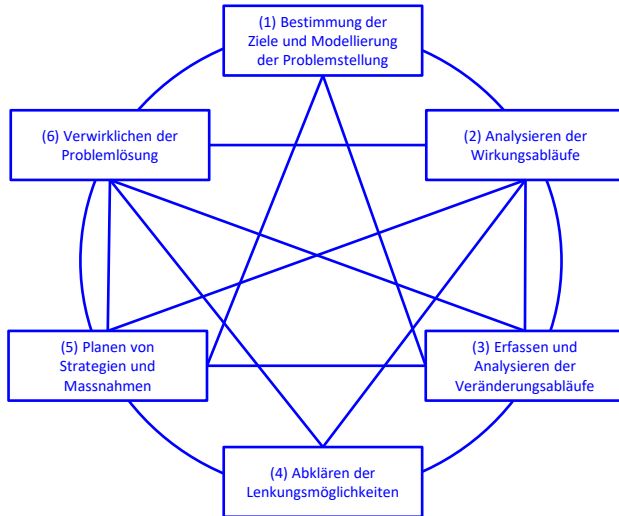


Quellen: 240529_Planung-full-DIGIT-NW-STAR_X01.00.pptx, S. 53 ff.; Vgl. auch KOB0-Kompndium, S. 1078 ff.

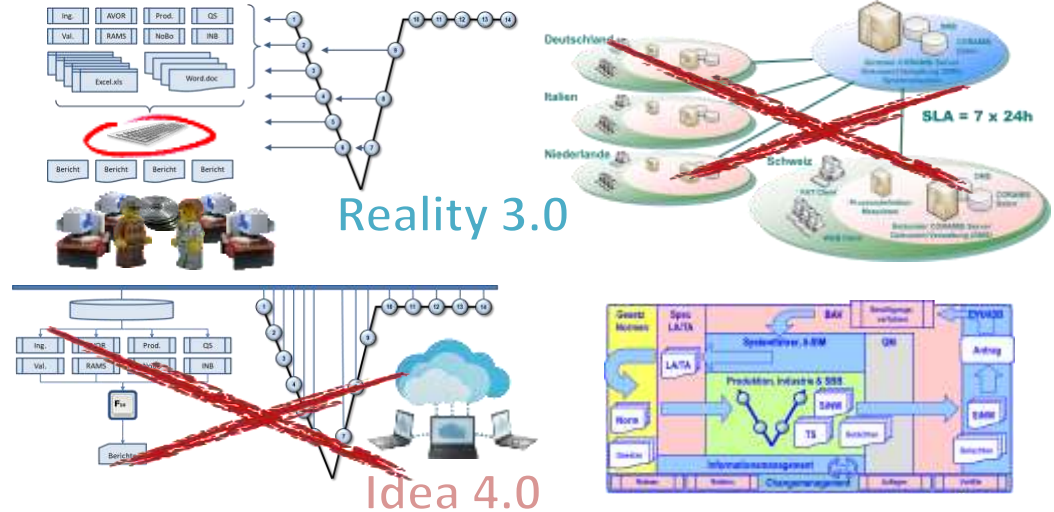
Science-Fiction?



- The authors Ulrich/Probst/Gomez as well as Malik have defined these difficulties recognized by the own solution methods in the 1980s and 1990s.



- CORAMIS* and K-SINA was developed already for the UNISIG with the GERA development method 2006.



- * CORAMIS: Corridor A Management-Information-System for digitalised, AI based approval process according to SWISS Regulation K-SINA (Conception to handling Safety Cases RAMS) based on EN50126 ff.

- 1 vgl. 96 Vgl. dazu Ulrich, Probst 2001 – Anleitung zum ganzheitlichen Denken; Gomez, Probst 1999 – Die Praxis des ganzheitlichen Problemlösens. Vgl. Ulrich, Probst 2001 – Anleitung zum ganzheitlichen Denken; Gomez, Probst 1999 – Die Praxis des ganzheitlichen Problemlösens
- 2: Vgl. Malik 2008 – Strategie des Managements komplexer Systeme; vgl. auch Vgl. Bolli/Koch. (2016). Integrale Intelligenz - der Weg zur nachhaltig erfolgreichen Unternehmung, S. 21 ff

Contradiction

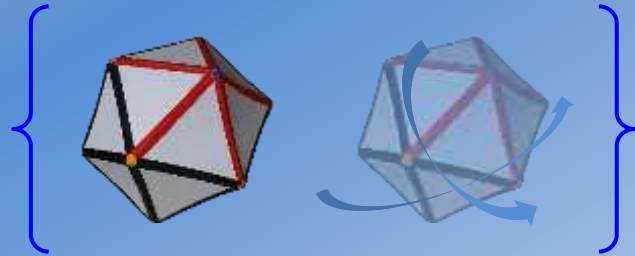


- When complex questions demand complex methods (Ashby) like AI and VR and those must be run against a meta-data-cloud to produce good results, we need extremely high performance in data centers.
- Extremely high performance in data centers requires an exorbitant amount of energy, both for operation and for cooling the processors.
- It could be that in our quest to save the world we progress the global warming so strong that we will arrive even too late to the target.

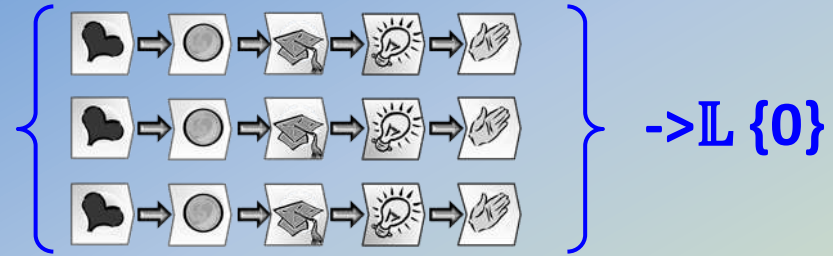
Interim result 3):

Could one of the reasons for the slow transformation of society be that too many people are trying to solve today's problems with yesterday's methods?

Difficulty level of the problems today



Yesterday's problem-solving method



4. Final Spurt





simple

An end-to-end analysis is also not always helpful or even necessary. Some time a clear focus on a concentrated matter helps.

As explained at the beginning (see slide 18), ...

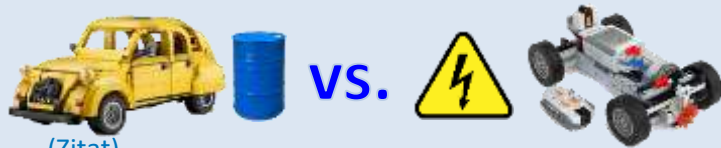
- ... have some factors of influence, low dynamics and a low interaction. ...
(Examples: making budget, calculate a simple linear CO₂ balance)
- *A good estimate is better than a wrong calculation.*

[illegible]

Solution

Linear vs. integral E2E Perspective *(Electro vs. Diesel)*

241003_SRSS-MBO_Q-vs-Innovation_X01.00, S. 3 ff.



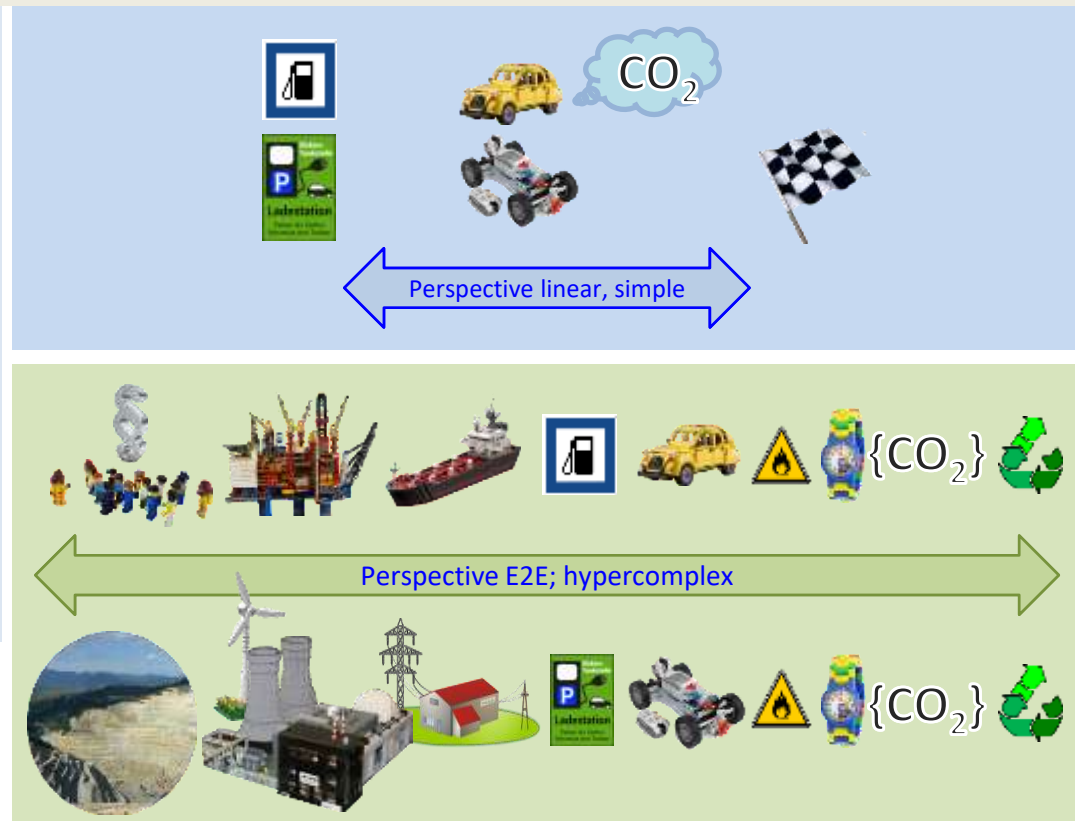
(Zitat)

„If I compare the two key players electro car and diesel driven car, beginning by the electrical outlet and the diesel station, until the performance of kilometres on the wheel, then the electro car will have the better CO₂ balance...

... If I do the same analysis, beginning by the primary material of rear-earth and crude oil deposit, loss energy on transport environments, risks of protentional fire and poisonous emissions, and social fairness etc. could be the CO₂ balance is better for the diesel car.“

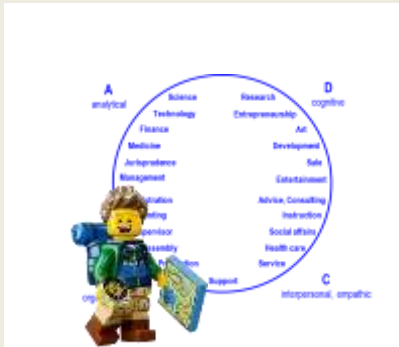
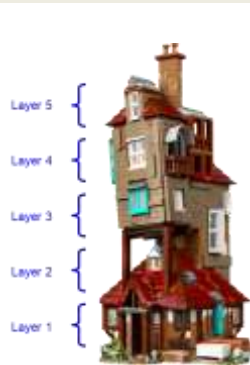
(Zitat Ende)

→ **We know so little yet, but enough to act!**



Other sociocultural problems to prevent innovation

- Wrong mindset: What shall not be - does not exist.
- Different understanding: complexity is a variable.
- Confusion between to be a scientist and/or a believer in something.
- May the right person in the wrong role.
- Conclusion in the mind of 'Ockhams razor': If stupidity or intention is the reason for the same negative result, it is the stupidity mostly which triggers a disaster.





VR & AI



VR & AI are neither evil nor a blessing.
VR & AI are just tools



A hammer is just a hammer.

5. Conclusion

Using virtual reality VR and artificial intelligence AI is not optional, but mandatory.

That is the mouse trap of the time



Final word: John O. Burdett



- We must promote head/**method**, hand/**talent**, heart/**empathy** and spirit/**consciousness** similarly with the same intensity and passion.
- **Education** is the only way to achieve sustainable changes.



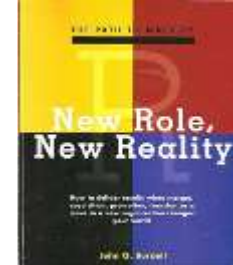
Recommendation

- Wie Hoffmann/Barrueto¹ in ihrem Buch „Das Design humaner Unternehmen“ bemerken:

(Zitat²)

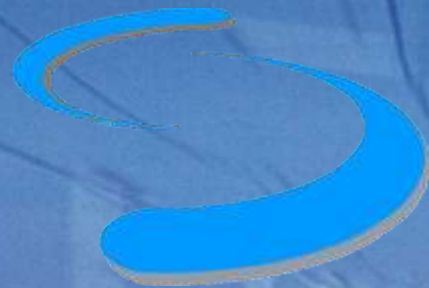
«Die Vorteile, die sich aus der vierten industriellen Revolution ergeben könnten, können nur mit einem einhergehenden massiven Kulturwandel, begleitet durch einen Werte- und Mindset-Change in der Organisation, erschlossen werden.»

(Zitat Ende)



1 Vgl. Hoffmann/Barrueto (2023) Das Design humaner Unternehmungen, S. 50 ff.; vgl. auch KOBO – Integrale Intelligenz ISBN-978-3-033-05941-2-TB-KOBO.pdf; vgl. auch Burdett, John O. (2000): New Role, New Reality – ISBN 978-0968723302

2 Google: "The potential benefits of the fourth industrial revolution can only be realized with a massive cultural shift, accompanied by a change in values and mindset within the organizations..."



Thank you

Markus Bolli

- END -

