



# The World in the Advent of "Artificial Intelligence"

A Systemic Analysis

# CONTENT

PROLOG .....	3
1. Artifacts of Intelligence .....	4
1.1 Definition .....	4
1.2 Neuron Networks .....	5
1.3 Paradigm Shift in Computer Science .....	6
1.4 AI Assistants .....	8
2 Consciousness .....	9
2.1 Only a Model .....	9
2.2 With AI to Expand Consciousness.....	10
2.3 From Intelligence to Transcendence .....	11
2.4 School - What now?.....	12
3 Culture.....	14
3.1 Dimensions .....	14
3.2 Values in Motion.....	16
3.3 Zeitgeist .....	17
3.4 AI the New Power .....	18
4 Context.....	19
4.1 Complexity between Chaos and Order.....	20
4.2 Systemic Structures .....	21
4.3 Crystalline Intelligence .....	23
4.4 Social Relativity.....	24

## PROLOG

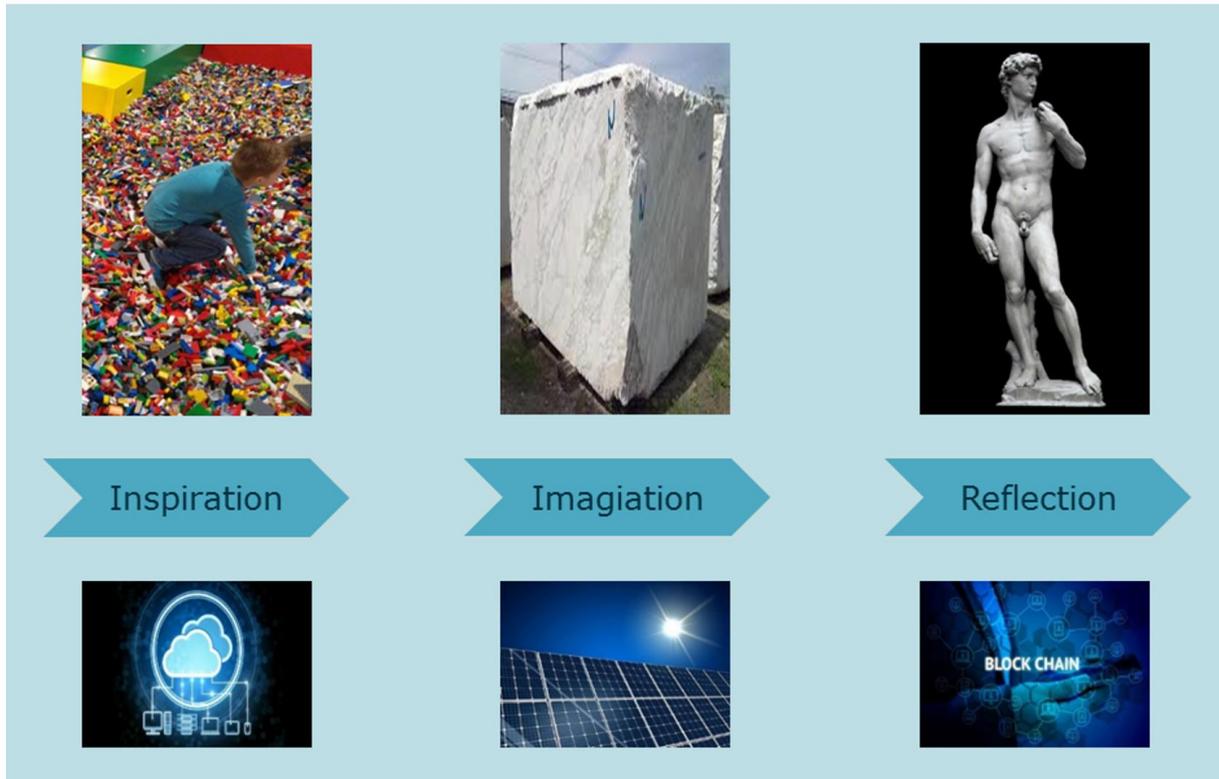
Hardly any technological development has led to as many discussions as the development of AI systems. Especially since Google has succeeded in bringing a learning system to the level of a human go player. Technological advances have been made in the meantime. The mathematical foundations were created. Not least by the Austrian Sepp Hochreiter in his work on the "Long Term Short Memory". An algorithm that is built into every "Natural Language Program" today. Language processing and image recognition are the two "domains" that are the most developed. Computers have learned to see and speak. " Demis Hassabis, the founder of DeepMind on the future of AI: "*What I'm really excited to use this kind of AI for is science and advancing that faster.*"

All of this trigger's great economic expectations, but it also leads to great uncertainty. While the US and China are viewed mainly positively, there is great skepticism in Europe. In particular, consumers fear for their privacy. Many EU countries have therefore adopted national laws to protect data. What is good for consumers slows down the development of AI applications in that it provides far too little training data. Europe is in a dilemma between data protection and innovation. Technical understanding alone does not help in this situation. A more comprehensive approach is needed. The following is a systemics analysis according to the framework by Ken Wilber.

Wilber proposes a model with an internal and external perspective, each divided into collective and individual aspects. This results in the four quadrants: artifacts, consciousness, culture and context. According to these dimensions, the various forms are now being worked out.

## 1. Artifacts of Intelligence

There are many definitions of the phenomenon of intelligence. A very common saying: "*Intelligence is the ability to achieve target e in complex systems*". The human brain seems to be well suited to this. From flint to nuclear power, but also from homeostasis to pollution. Humans must take note of the fact that with increasing complexity, the neural ability to solve is no longer enough. Artificial intelligence as an extension of human thought will open previously unknown spaces for solutions. AI is not only, but exists in different forms:



### 1.1 Definition

AI deals with methods that allow a computer to solve tasks that, if solved by humans, require intelligence. A distinction is made between strong and weak AI. Today's systems are from the category "weak AI" where specific problems such as, read, see, play, etc. can be solved. Systems with general solution competence, which also exceed human abilities, then belong to the "strong AI". It does not yet exist. They are predicted by Ray Kurzweil for the year 2049 under the "singularity". The time when a machine is stronger than the human brain. There are currently two real-world systems available:

**Machine learning** generates knowledge from experience. An artificial system learns from examples and can generalize them after the end of the learning phase. Algorithms build a statistical model based on training data. It is guided learning so-called "supervised learning" we know it from the driving school.

In **deep learning**, a multi-layered neural network classification performs tasks directly from images, texts, or acoustic data. Previously unknown features arise. It's like learning between master and scholar. The latter looks on, works with him and learns the order. "Unsupervised Learning". All these technologies are based on today's digital chips. In particular, it is AI processors, vector machines with enormous "floating point operation" capacity.

## Künstliche Intelligenz (weak / strong)

KI beschäftigt sich mit Methoden, die es einem Computer ermöglichen, solche Aufgaben zu lösen, die, wenn sie vom Menschen gelöst werden, Intelligenz erfordern.



... the environment is changing continuously

## Machine Learning (supervised learning)

Generierung von Wissen aus Erfahrung. Ein künstliches System lernt aus Beispielen (MNIST) und kann diese nach Beendigung der Lernphase verallgemeinern. Dazu bauen Algorithmen ein statistisches Modell auf, das auf Trainingsdaten beruht



... objects are too complex to be modeled explicitly

## Deep Learning (unsupervised learning)

Ein mehrschichtiges neuronales Netz führt Klassifikationsaufgaben direkt aus Bildern, Text oder akustischen Daten.



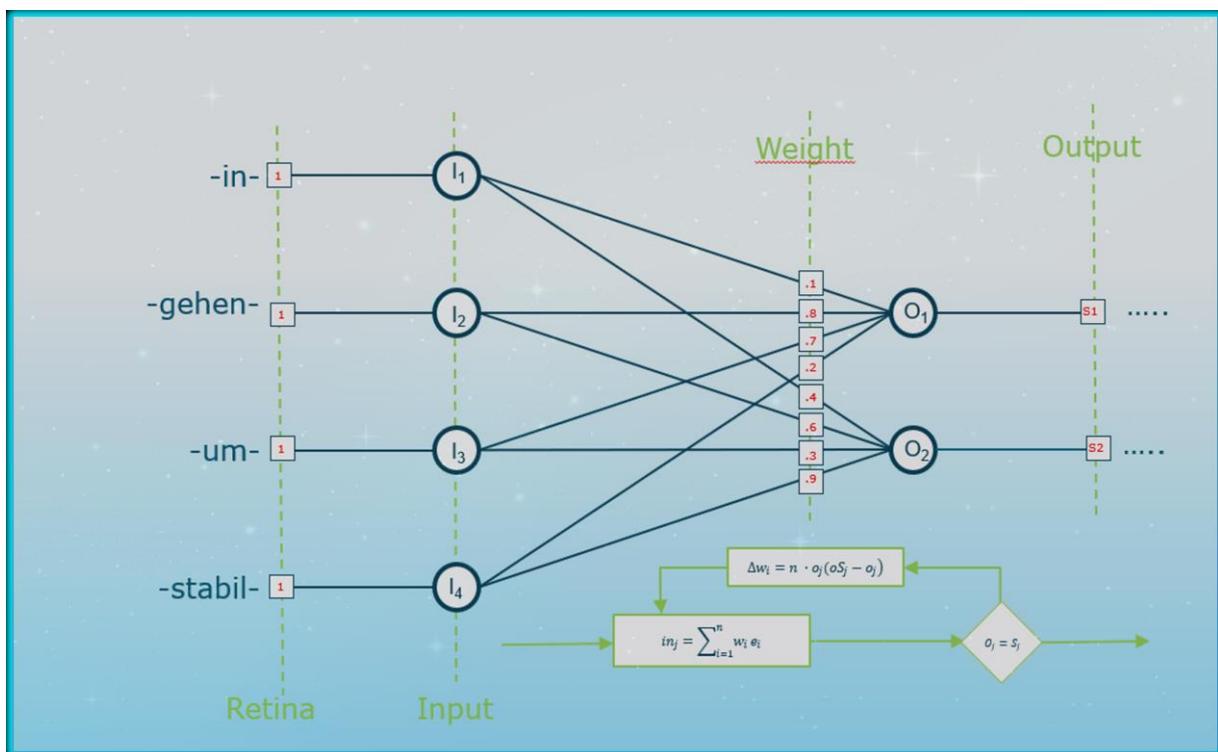
... dynamics and the system itself is subject to change

## 1.2 Neuron Networks

The neuron network is at the heart of today's technical intelligence. The comparison to the biological neuron of the human brain is often drawn. A membrane surrounds the nucleus, which performs calculations in the form of chemical reacting. The cell itself is connected to others via an axon, the derivation. The feed is via dendrites, which transport electrical signals. At the entrance is the synapse, which converts the electrical signals into chemical signals. This is where learning happens. Synapses allow a more or less strong signal to the nucleus. The weighting in the synapse is in turn a chemical process that is adapted by repetition, i.e. learning. When learning traffic signs or vocabulary, repetition is the appropriate procedure for this. The power of the human brain is created by the thousand-fold networking of each cell. Hundreds of billions of connected cells then result in our intelligence. The synapses weights can take values between 0 and 1 so infinitely many gradations. This is precisely what can't be achieved with native digital technology, because it is just binary.

Technical neurons are now mathematical models, which via floating-point arithmetic synapses allow [1] weights with a resolution of  $10^6$ . Although still not analogous, but already enough for easy learning. Technical networks are structured in several layers. An input layer takes over the data from sensors, which are then transferred to an output layer via several hidden layers. Each neuron is networked with each other in the deeper layer. In the individual neuron, the sum of the weighted inputs with the output function is then processed into an output signal. The performance of electronic meshes is now defined by the width of the input layer, the number of hidden layers, the output function, and the granularity of the weights. Mathematically speaking, it is matrices that are manipulated via simple vector operations such as addition and multiplication. Processors with pronounced vector arithmetic are therefore in demand. From a mathematical point of view, graphics processors are particularly suitable for this purpose. Sophisticated networks are now modeled by computers with multiple graphics cards. NVIDIA pioneered the development of graphics processors and is now a leader in AI technology. Among other things, systems for autonomous driving are manufactured here.

The starting point for any modeling is the structuring of a mesh according to width and depth. Depending on the requirements, different types such as the backpropagation network have prevailed. From a dynamics point of view, all weights receive random initial values. The network does not yet recognize anything. As well as a person who does not yet know any traffic signs. Now the learning process begins, i.e. the training. The model could be shown the image of a stop board at the entrance and the word Stop could be given at the exit. The same thing is now happening with all traffic signs. With each pass, the weights are adjusted and thus the detection rate is gradually improved. The more runs the better the result. This will continue until all traffic signs have been learned. Here, too, computing power is crucial. The calculation of complex networks, i.e. the training, can take up to days. Even with high-performance computers and high learning rates, a 100% result cannot be achieved. Only probabilities can be determined. Just like a human being, who can be wrong about a road sign. For simple requirements such as the detection of traffic signs, artificial intelligence already reach values by 98%. While this is about 95% in humans. In this respect, you should already rely on AI when driving.



### 1.3 Paradigm Shift in Computer Science

The previous digital information technology is characterized by high precision. Based on the yes/no decisions, the system provides accurate information. Whether an aircraft is full or not, there are precise statements about this. Together with the logical operands AND, OR, NOT, rule-based systems are available though they are very complicated.

These includes enterprise resource systems, flight control, industrial controls and games. So deterministic systems. If the rules are known for this, they only must be coded in programs. Often, however, the rules are not obvious and not even the human experts are able to describe them. In such cases, a hypothesis is first established, after which the system is then developed.

Whether it actually reflects reality can only be determined during testing. In the case of divergences, this can lead to uncalculated additional costs and late consequences. Occasionally it is even

necessary to build the whole thing completely new again. In order to avoid this as much as possible, engineering has also prevailed in software development.

Recently, Margaret Hamilton was awarded, long afterward, for her work on controlling the lunar landing ferry. It was the first engineering-generated software. Over time, the following pattern has manifested itself. There is a problem, a hypothesis is created for this and then a corresponding program is written. The hypothesis for the moon landing must have been quite good. So, there is always a problem about the hypothesis to solve.

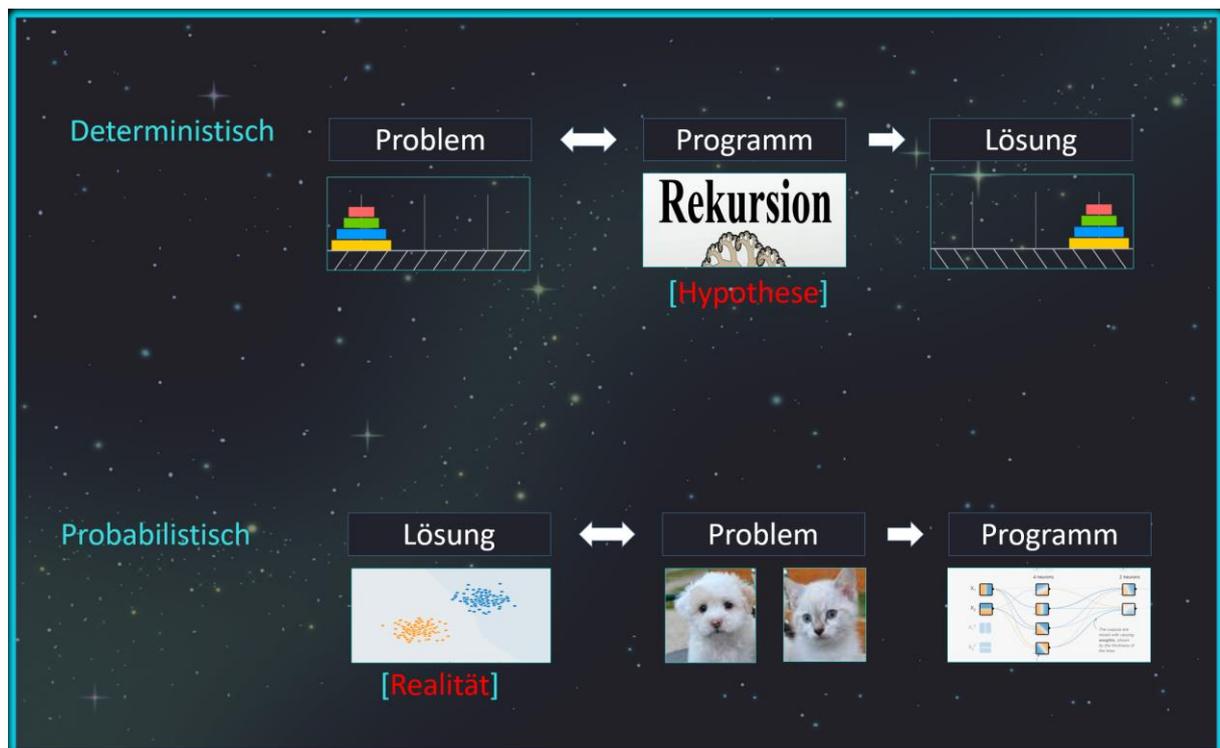
Now, however, there are problems for which solutions already exist. People see a picture and can decide if a dog or a cat is to be seen. However, the recognition process is hardly subject to rules. The same is true of language comprehension.

Programmers have tried in vain for decades to create rule-based dictation systems. It was only with the advent of self-learning systems that "Computer vision" and "Natural Language Processing NLP" became possible. Learning systems can find out the rules between problem and solution themselves.

A system is no longer programmed but trained. The rules are then fixed in the synapse's weights. A sequence of numbers that is readable by humans but does not allow understanding. It's like looking into a human brain and wanting to see what a person thinks. Troubleshooting and a point change are no longer possible.

If an autonomous vehicle makes a mistake, it cannot be corrected as with rule-based systems. Instead, the system needs to be retrained with improved data. It is likely that the error will be fixed. However, it is not certain whether there are no other previously shown errors. It is the same with human learning.

If I have successfully quit smoking, it is not guaranteed that another vice will appear. So, training networks is the new paradigm of computer science. It runs from the solution to the problem to the rules.



## 1.4 AI Assistants

Professors and managers have had them for a long time, the assistants. This refers to employees who provide services to their boss in order to free him from routine work. They make appointments, write texts, edit manuscripts, etc. All the tasks they learned during their education. A "supervised learning" in which a teacher gives instructions and controls success. However, this knowledge is not sufficient because each industry has its own "knowledge" and the associated technical terminology. Specialist knowledge and skills must be built up. This process varies from supervising to mentoring. With this, the future assistant has built up a knowledge for those domains. For good service, it is also necessary to know his boss and his surroundings well. Clubs, sports, politics, residential areas, networks are environmental variables that significantly influence our behavior. When I know in what context a person acts, I also know a lot about his personality. Assistants then align their work. Appointments at the blockhouse, book business trips in connection with events, etc. Time and resources are saved. Anything possible if assistants can combine domain and contextual knowledge. Easier to live with assistants.



**KONTEXT:**

- Scope
- Opportunities
- Entietities
- Experience
- Distinguish
- Unforced Learning

**DOMAIN:**

- Computervision
- Language NLP
- Classes
- Labels
- Prediction
- Goals
- Skills

This is exactly what the world's great digitalizes promise and offer services for this purpose. We saw the template for a digital assistant in the movie "Her". Theodore and Samantha, the assistant, initially have inconsequential dialogues. As the story progresses, a deeper relation develops, ending in a sexual affair.

Not possible in digital reality, it is often argued, because computers cannot develop feelings. What is already working satisfactorily are speech and image function assistants. The Google Assistant recognizes multiple languages at the same time and also many technical words. Probably the best right now. Apple performs better when it comes to punctuation detection. Microsoft is catching up, although its translator delivers very valuable results.

Mails, chats, text messages and notes no longer need to be typed. Even longer texts can be easily captured with assistants and translated in all directions. For image recognition, it is the applications Google Photos and Adobe Lightroom. Facial recognition anyway and search via image input recently.

You take a photo with the Google Assistant and search. This way you can also search for objects without having a linguistic reference. Like a small child with the index finger "there" and the parents say it. Alibaba has built the visual search into its shop. Just take pictures of your girlfriend's shoes and they're in the shopping basket.

In particular, shopping assistants possess enormous domain knowledge. From ordering, through payment, delivery to complaints, everything is well established. Now it is important to get to know the customer. This requires contextual information mostly from different sources. Social media, booking platforms, ticket shops, consumption data, etc. are desired. The better the context info, the better the personality profile derived from it and the more efficient the advertising. Assuming this would have a 70% accuracy. Then it would be more intelligent not to advertise, more to supply them immediately. From "shipping" then "shopping" could lead to a change of consciousness.

## 2 Consciousness

Can AI reach consciousness? In order to answer this question, the phenomenon itself must be clarified. A short definition could be: "An intelligent system capable of self-reflection". Neuroscientists like Christof Koch are convinced that our brain contains everything it needs for consciousness. Whether it still needs a non-local component (a soul) has been dealt with by the religions for millennia.

In the 1970s, consciousness was understood as a step-by-step development. The development of consciousness in human beings (Jean Piaget, 1980) should be like that of societies (Jean Gebser, 1973). The American physicist Michio Kaku distanced himself from these eight-stage models and proposed a three-stage model. As a result, beings can build on each other a spatial (reptiles), a social (mammals) or cognitive (human) consciousness.

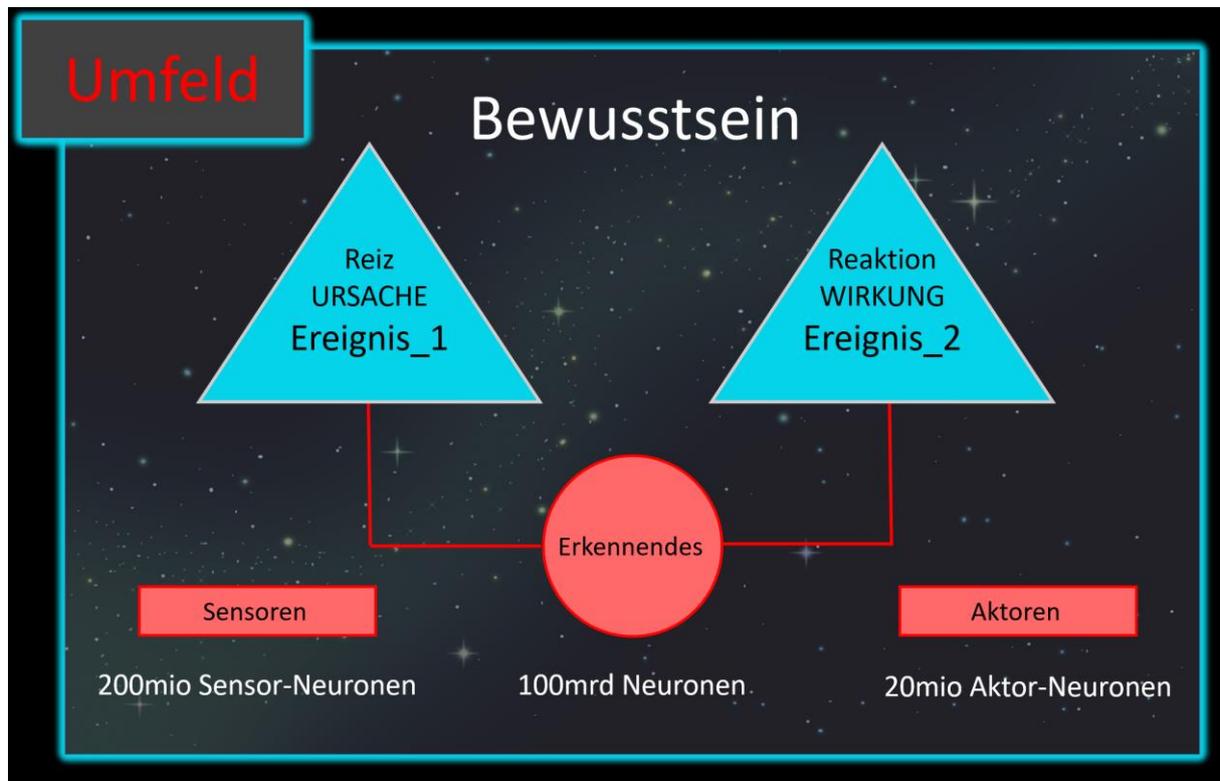
A next level of consciousness would probably be the predictive. It could be that this is achieved by man by evolutionary processes once in millennia. AI will probably be faster and that answers the initial question. If one is concerned about an artificial consciousness, a hypothetical model is required.

### 2.1 Only a Model

The central element of consciousness is a "recognizing system" which can distinguish between two events. Either cause of effect or stimulus of reaction. In addition, these events must be saved for later recognition. Information about events is collected via sensors and can be generated via actuators. All this together in one body (embodiment) and in an environment (environment) gives rise to consciousness.

If the system recognizes that the cause of an effect comes from itself, self-confidence arises. Consciousness is bound to matter with 100 billion neurons. It's not just the sheer amount, it's their networking. Brain scans show a cluster-like intense local association of neurons with a few remote connections. For Christof Koch, this is a typical requirement for consciousness. Such a hypothetical consciousness could be realized by means of artificial networks.

Due to the energy consumption of the computers, however, it is currently not feasible. If my car can tell me where it stands, it has already reached the consciousness of a reptile. A somewhat less drastic approach would be to increase human consciousness by technical means.

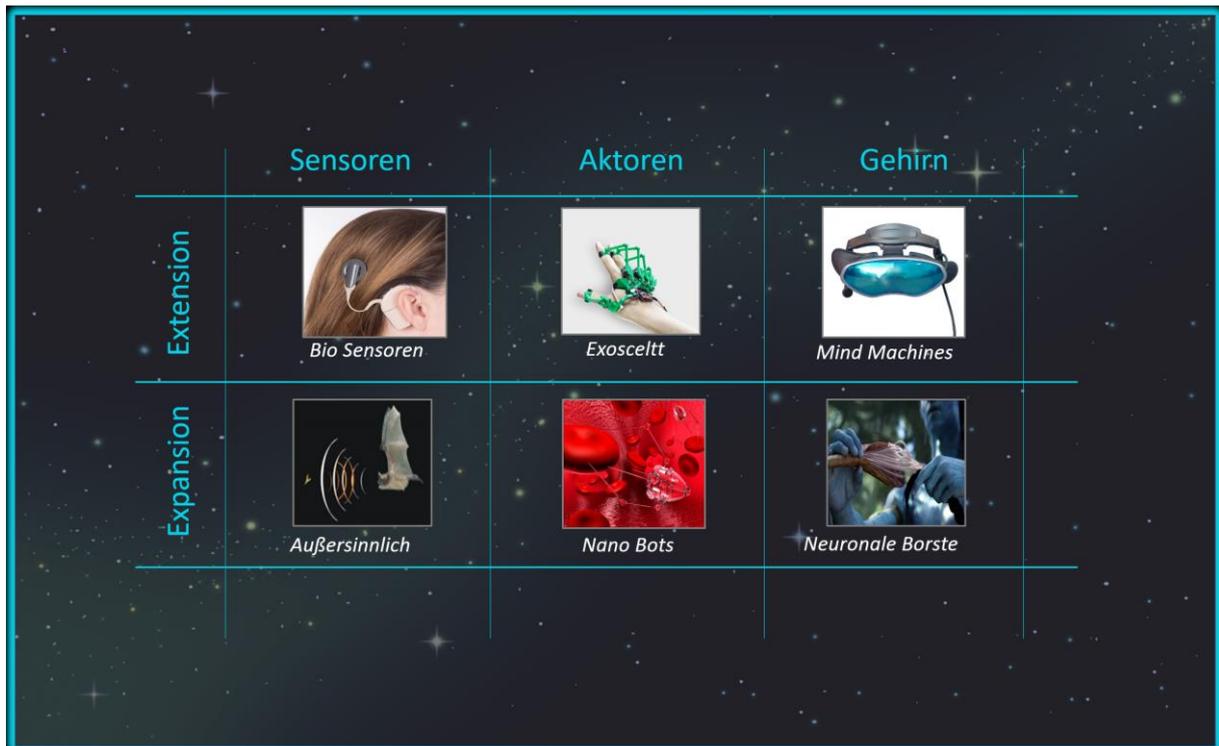


## 2.2 With AI to Expand Consciousness

Change of consciousness can either happen in the recognizing system (internally) or evoked by body and environment. Purely internal changes in consciousness are likely to be rare. Even in meditation, in flow or in lucid dreaming the body is involved in moderation. Breathing, posture room temperature, food, etc. affect our mental state.

Consciousness without a body is not conceivable for man, because it is not possible to experience it. From a technological point of view, there are two approaches. During the advance in the sense of an extension, existing systems are changed. Existing sensors are changed with speakers in the cheekbones, semi-permeable screen glasses or exoskeletons. Seeing the world through an AR glasses changes consciousness.

In the case of expansion, new sensory systems, which do not yet exist, are added. Sensors for ultrasound, magnetic fields or nanobots provide completely new experiences. The proliferation of the human body around wearables is in progress. Smartwatches create new health awareness. Once smartphones are built into the body, we are not far from a cyborg. The result is a merger of Artificial Intelligence (AI) and Biological Intelligence (BI). What then emerges?



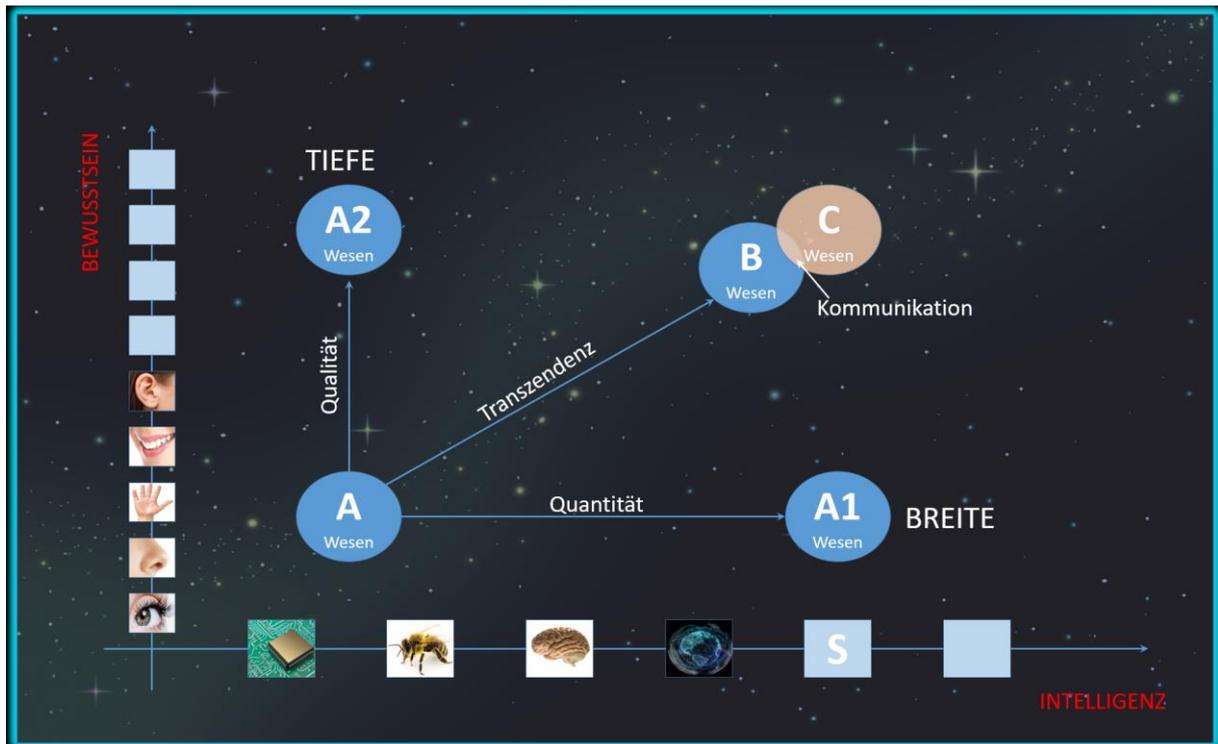
## 2.3 From Intelligence to Transcendence

Beings can evolve in two directions. Once in a quantitative by increase of intelligence (width). As the biological development on our planet has shown, a provisional maximum is likely to be reached with man.

On the other hand, in a qualitative direction by expanding consciousness (depth). This is achieved by an enrichment of sensory input and mundane output. Five senses in mammals and the capacity of the brain have led to human cognitive awareness.

Probably the biological limit has been reached. Not so the artificial. The current AI is used as a development machine for the next generation. If the corresponding technology can keep pace, exponential growth of AI is very likely. With the photography of a black hole and the X-ray telescopic LOFAR, additional sensors are already establishing themselves.

The man with superintelligence and over-consciousness. But who is this "humane"? By no means will all people have access. How big the elite of transhumanists will be and how they will deal with the humans is science fiction. What is real, however, is parents' concern for their children's future. What should / need to be learned?



## 2.4 School - What now?

Education is not the top issue in European politics. It comes clearly after migration and climate change. Both issues that will occupy us even longer. But a well-educated population is needed to solve it. Emerging economies are recommended education as a possible way out of poverty. Children who can't read or write but can already use a smartphone. Are they still illiterate? You could use translators to speak any language and shop through image recognition. So exactly those skills that artificial intelligence provides.

Writing, at least in handwriting, will soon have run out in the industrialized nations. It is already the case today that young people hardly write anything by hand after their schooling. Writing will soon only be learned for school. However, the opposite is true when it comes to spreading. We will need this capability in dealing with AI.

Interface between man and machine will be the language. Whereby the machine will be adaptive, i.e. will adapt to the language of the user. The wider the interface, the more extensive the vocabulary. Learning to speak at a high level will be the first and most important task of schools. Learning foreign languages, except for English, will become less important in the future. Language will manifest itself as a measure of intelligence.

The greatest effort for schools will probably be related to learning social skills. The acquisition of social skills takes a lot of biological practice and therefore time. Many teachers complain today because they don't have enough time to teach. In intercultural classes, it is also centering, empathy and language that occupy a wide space. Developing an understanding of foreign cultures will be essential for world peace. Therefore, every student needs a semester abroad.

The all-over-the-most superimposed digital technology is a consequence of 400 years of natural sciences. With Isaac Newton (1642) a movement was set in motion, the basis of which was the experiment. Since then, only what is comprehensible and can be remodeled in mathematical language has been more valid. Now STEM subjects (science, technology, engineering, mathematics)

are not common favorite subjects. Especially in AI, however, it is mathematics that decides on "being or not being". When a nation commits to the AI future, it also means a penetration of STEM studies. Incentives are needed for this, because a technical study lasts the longest and is probably the most difficult.

Interest in science in primary schools must also be encouraged. Learning technology in a playful way is in the nature of man. Awakening curiosity, initiating a thirst for research and developing the joy of experimentation should already be the school spirit today.

**Gaming:** Simulation, Projekte, Kreativität

**Geist:** Spiritualität, Religion Sinn sein

**Mathe:** Technik, Programmieren, modellieren

**Social:** Kulturen, Fremde Wesen, Empathie

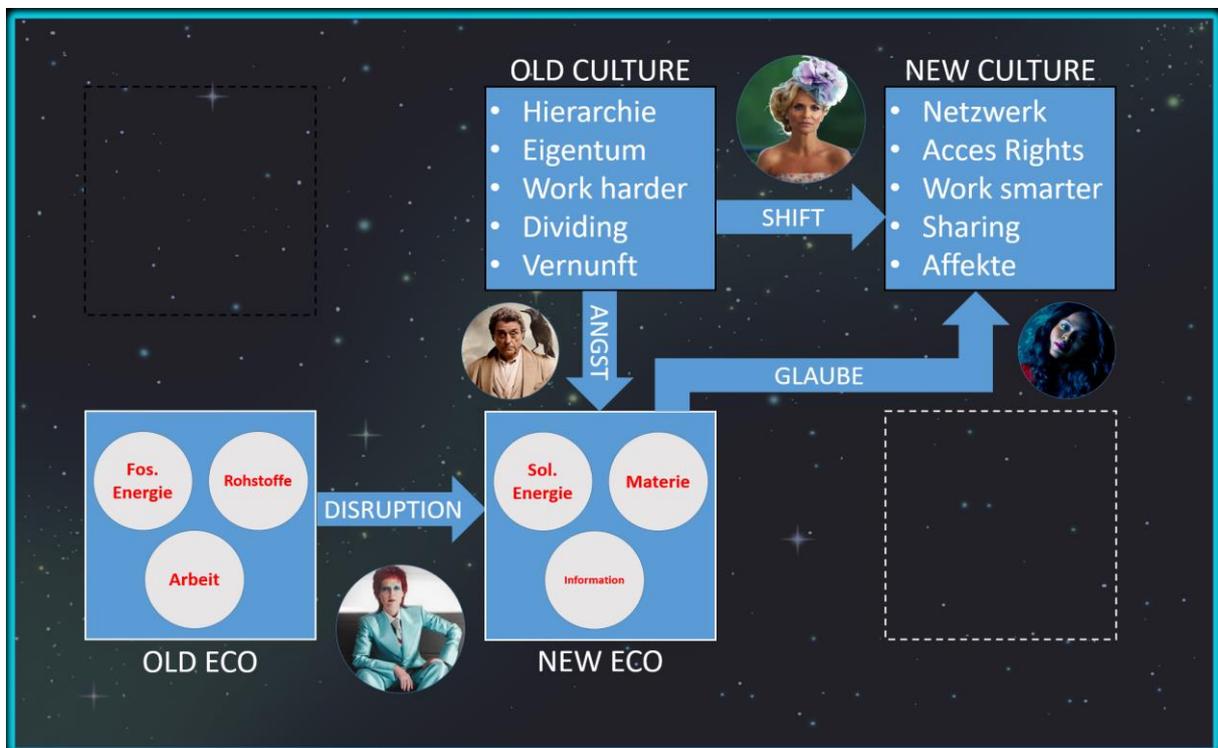
**Sprache:** Begriffe, Wortschatz, Sprachlogik

Right, you can't explain the world through mathematics alone. Complexity is the opposite of Newton's worldview, in which any effect can be attributed to a cause. Complex systems are characterized by long-distance and side effects, which are often not deterministic. Effects of interventions in nature are becoming less and less predictable. Once made, they are hardly reversible (irreversible) or only with great effort to repair. We do not have to learn to implement immediately everything that is technically feasible. Simulation in conjunction with augmented reality also shows the unexpected results. Sometimes the simulation will be sufficient, and you can leave nature untouched. With 3D and 4K, long-distance travel is unnecessary and could contribute to climate protection. The main feature of AI is its predictive logic. Scenarios can be predicted according to probability. The school of the future will show the world through the AR glasses and with probabilities of effects. This is how responsible societies will develop.

A popular wisdom says: "*Health is not everything, but without health everything is nothing*". Longevity, healthy aging and mental strength are common desires. Health care and the health industry make a significant contribution to this. In the end, it remains the responsibility of each individual. Prevention is a recognized method of ensuring vitality. This requires discipline, self-control and renunciation. All human qualities that do not bring joy to themselves. Self-control can be learned and must cover the entire training system as a shell. A healthy life of one's own in a destroyed environment is excluded. It is important to see the earth like a living being and to treat it accordingly. No one, no God, will take away from us the healing. This knowledge also belongs in the sphere of education.

### 3 Culture

The economic system of the 20th century was shaped by the factors of raw materials, labor and fossil energy. These have led to increasing growth and general prosperity in the industrialized countries. Obviously, a system change is imminent, which also affects the old factors of production. Raw materials are replaced by programmable matter, electricity generated from solar energy and work are increasingly replaced by computer science. This new paradigm meets existing culture. Concerns about prosperity, work and the preservation of social status are triggered. There are massive disturbances. In the beginning, there is only one small group that believes in the new. There are more and more of them, creating a "cultural shift". Technological change is the driver of cultural change. Fire, stone, weapons, the wheel, etc. were such indications in human history. Today, the smart phone has radically changed the communication culture. Culture in general are unwritten agreements of a group that are sanctioned in case of non-compliance. Once accepted all your friends are in a WhatsApp group; only you are not. It's going to be very fast and you're not there anymore. Membership requires compliance with cultural rules.

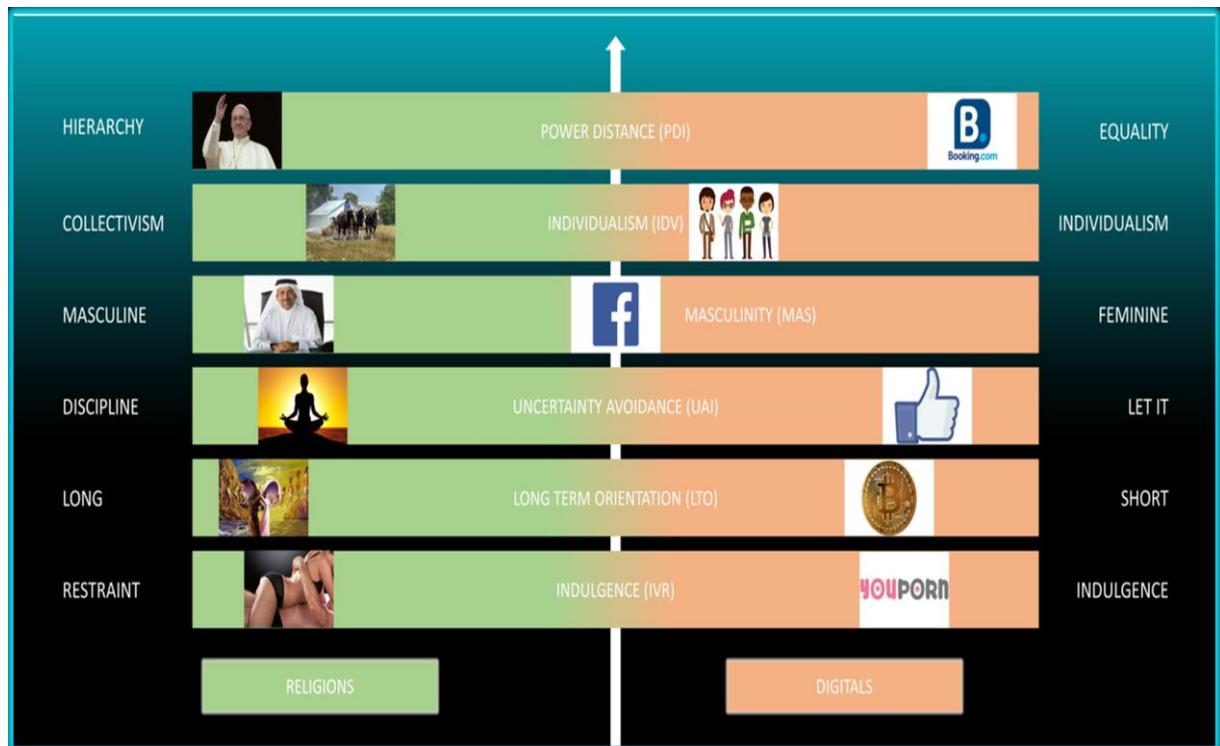


#### 3.1 Dimensions

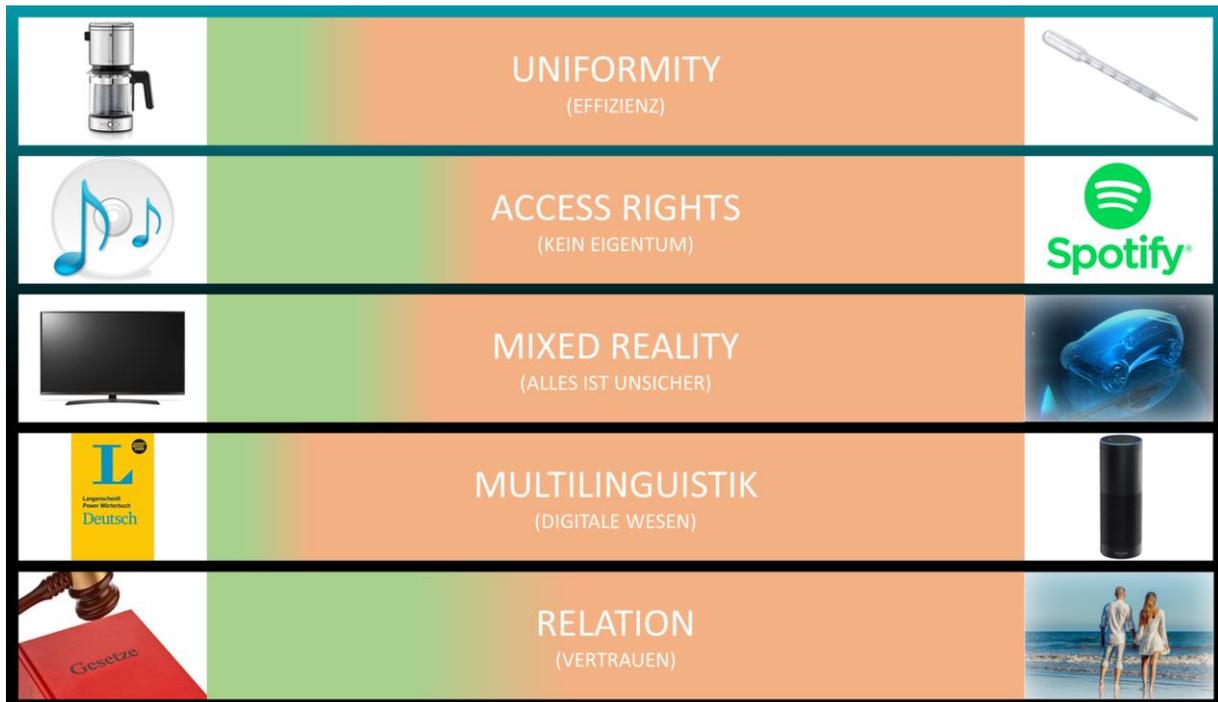
In human history, cultural boundaries were mostly geographical units. Valleys, islands, continents, etc. were natural and at the same time cultural units. However, the boundary of a culture can be completely independent of geographical conditions. Thus, a group of deeply religious Swiss migrated in the 17th century to Amerika. The religious community known today as "Amish" is defined by an extreme system of values. They do not use technical equipment and tools powered by motors. This excludes the use of all electrical appliances and cars. Nevertheless, this group also has similar behaviors. The Dutchman Geert Hofstede (1928) has devoted himself scientifically to such things. He found that cultures can be differentiated over six bipolar expressions. If one compares the one side of the scheme with the respective maximum expressions, they describe a traditional, religiously oriented culture. Strong hierarchy, male, collective, disciplined, long-term oriented and abstinent are their attributes. These are manifestations such as equality, individuality, the feminine, uncertainty,

short-termism and enjoyment. All characteristics of a Western industrial society. Hofstede's works are widely recognized and extremely important in intercultural communication.

In a global world, more and more cultural groupings are developing whose borders are virtual. To this end, further cultural dimensions need to be introduced.

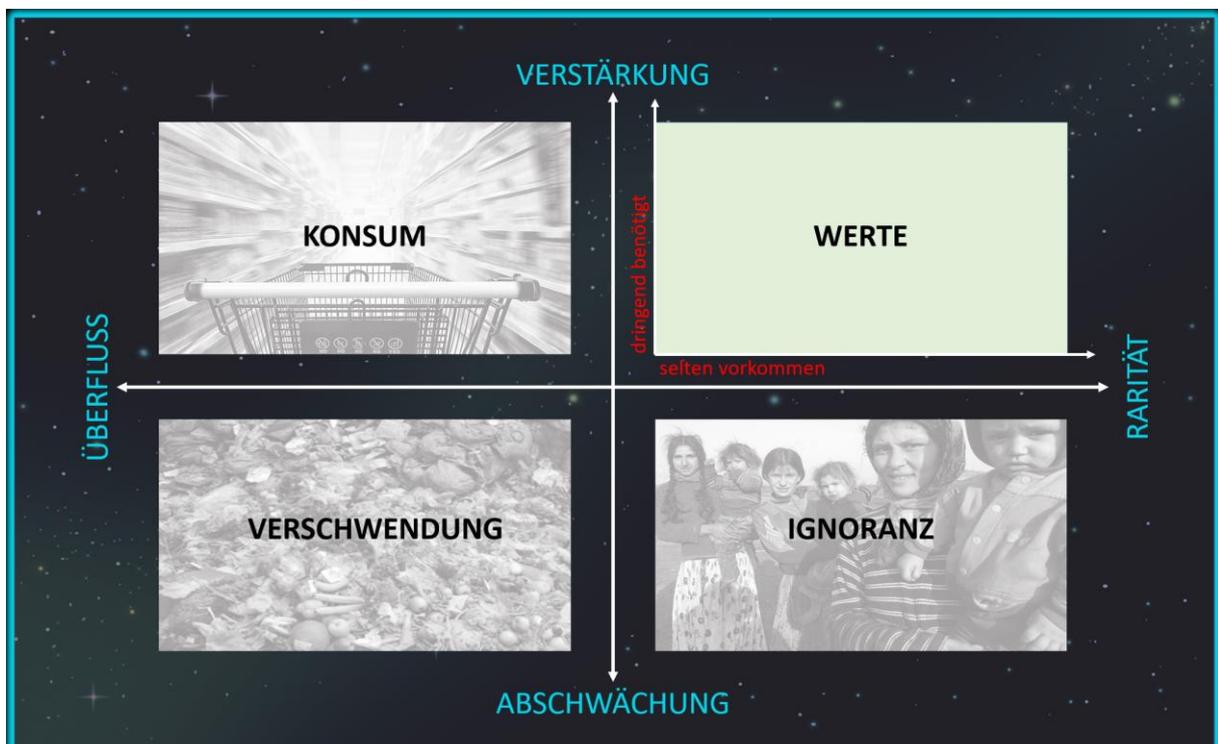


With the added dimension of efficiency, ownership, security, acceptance and trust, a global culture can be described for the time being. Economic performance will continue to determine living standards. Whoever produces most efficiently, i.e. the fastest, cheapest and with the best quality, will do the business. Nevertheless, the global customer will not acquire as much property in the future. It will suffice if he has access rights, as the music industry has been doing for a long time. This trend extends to software, bicycles, scooters, power banks and will soon also include the car. Significantly fewer units per class are then needed. In China, bicycle and power bank sharing have already prevailed. WeChat and therefore access rights has everyone there anyway. Sharing culture also brings with its uncertainty. There might not be a bicycle available. Thus, uncertainty will expand in all areas of life. Already clearly recognizable by the news. It is sometimes difficult to distinguish between real and fake messages. As the quality of virtual space increases, differentiation becomes more and more difficult. Real space is also changing. New entities arrive. Digital beings in various phenomena that speak our languages take up space. The autonomous car, the household robot, swarms of digital insects for cleaning and waste disposal, etc. are surrounded by us. All entities are based on artificial intelligence. The acceptance of a global culture will have to be very high. Much greater than the European support for Islamic immigrants. Despite all the uncertainty, many futurologists predict a prosperous 21<sup>st</sup> century. Yes, there will be environmental disasters, terrorist attacks, financial crises and civil wars. All terrible individual events that do not stop global cultural development. Confidence in the world as a whole is evolving. The daily twitters of Trump and Johnson hardly worry anyone anymore. In summary, a global culture can be described as: *"Highly efficient, unowned, insecure, tolerant people with confidence in the world as a whole"*. Signals for this are the worldwide equal presentation of news broadcasts, music and dance of the young people, uniform prayer book = smartphone, the car, TV series, social media and cloud computing. What was once valuable to us can now be meaningless. The values change!



### 3.2 Values in Motion

A distinction is often made between material and spiritual values. Both phenomena can be easily embedded in a two-dimensional matrix. In the x - direction, the occurrence is applied and, in the y - direction the reinforcement is applied. This results in the four quadrants: consumption, waste, ignorance and desire. The consumer has at his disposal an offer that goes far beyond his needs.

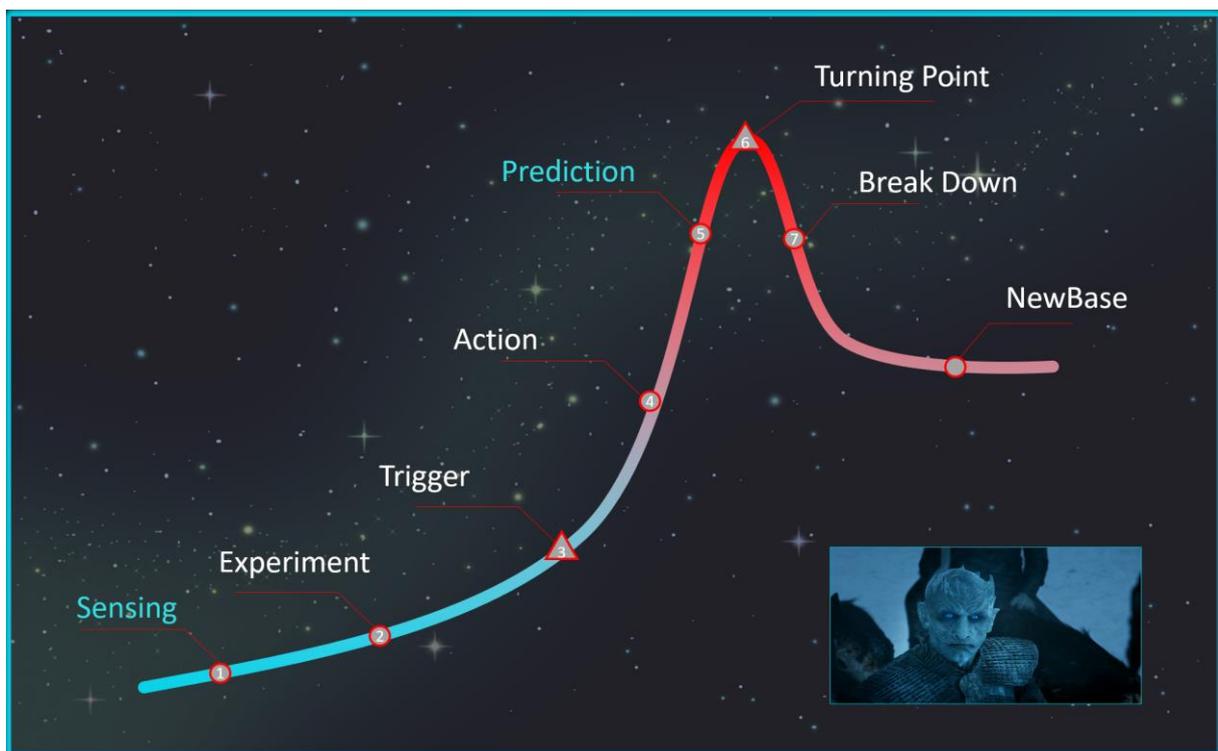


There is abundance, so goods would actually have little value. Nevertheless, iPhones, organic products and cosmetics are paid many times the production value. The psychological amplifiers, i.e. the advertising, have worked well for this. Such successes can usually not be planned because the

human psyche is too complex for this. Above all, people reacted to advertising in very different ways individually. This is where the advertising industry gets a good reduction from AI. The more data about a person is known, the more targeted the advertising can be designed. Amazon is in the process of selling its Echodot for €1, well below its production value. The strategy behind this is clear – collect data for AI. Data, an intangible asset, is still not very much sought after. The "desirable" attribute arises when something is urgently needed, and its occurrence is a rarity. The opposite is when something is abundant, and no one really needs it. It comes to a fraternity. In the industrialized countries, food is available to a degree that leads to known waste. In the end, there are still phenomena that are very rare but are hardly in demand by anyone. They are simply ignored. Electric drive for cars has been known for a century. But no one was interested. But suddenly it's there - why?

### 3.3 Zeitgeist

The sudden, explosive appearance of apparitions is part of today's zeitgeist. For a long time, this game was reserved for insiders. In 2018, however, it was suddenly downloaded a billion times. Pokémon Go. As soon as it had come, it disappeared again. Today, only real fans play with the monster. The process of sudden, explosive growth and the unexpected collapse that followed can be depicted in the zeitgeist line.

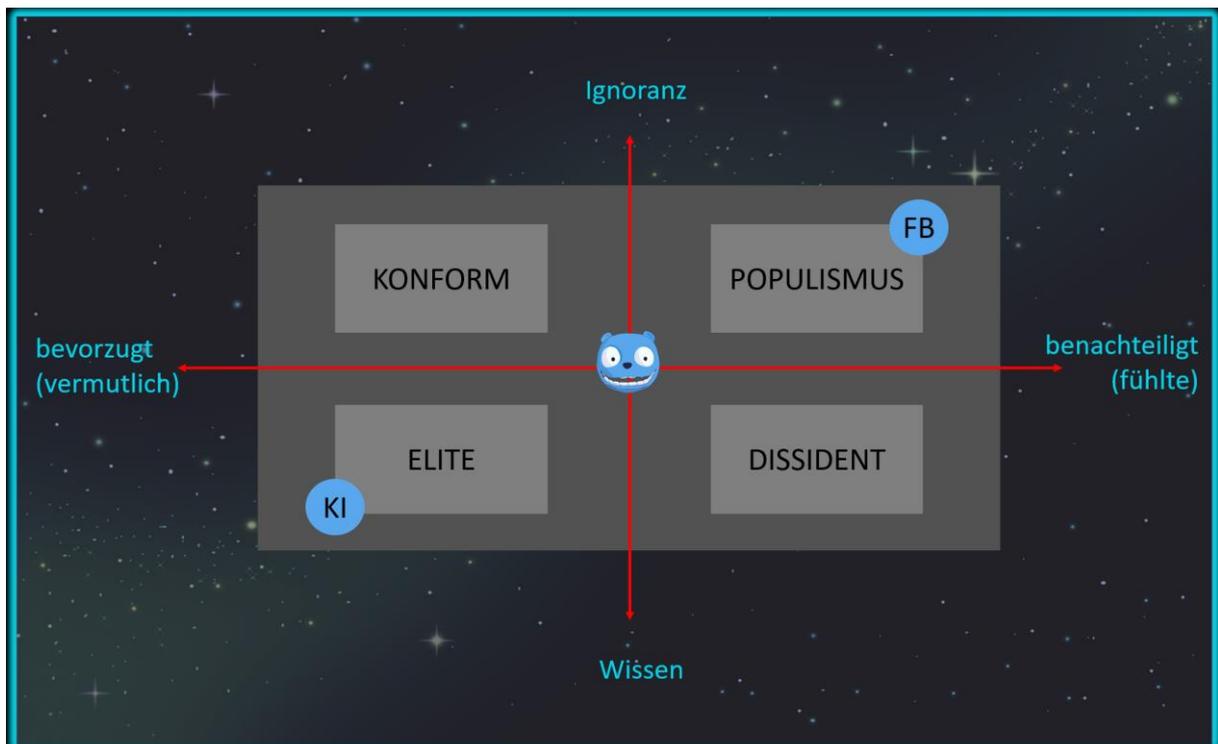


A trigger defines the turning point between linear and exponential development. Only, you always recognize this trigger only in hindsight. The trigger for the electric car was Elon Musk with the Tesla, for AI it was Demis Hassabis with the Go Challenge and for the digital currency possibly bitcoin. Everyone wants to jump on the then moving train. The German automotive industry has learned that this is not possible so easily. Whether you're there or not is decided well before the time of the trigger. We need to develop a sense of future hype. Otto Scharmer described the necessary skills in his book "Presencing, U-Theory" in 2007. And this well before the big hypes arrived; speaks for Scharmer's theory. It is not dismissed by the recognition of future developments. You also have to know the field. At least in small-scale experiments to learn about trial and error. So, you are well prepared for day X, the trigger. Once the train is running, you don't have time to think. This phase is

marked by awakening. Ramp up production, start advertising, organize distribution, ensure financing, etc. determine what happens. In fact, you would have a carefree life. Wouldn't it be the Turning Point that is already re-entering the collapse. This point, too, is usually only recognizable in hindsight. The business is still going well but the end is already defined. This is the time of glossy brochures. There's something else to pretend that doesn't exist anymore. It was still invested in CD productions when Napster already exercised music sharing. The collapse itself is painful and marked by actions. The Turning Point is easier to recognize. There should be sufficient data available for its "prediction" which, in conjunction with machine learning, at least give warning signals. "Every end is a new beginning": such a folk wisdom. After the break down, the system stabilizes again, and a new base is created. This can be higher, but also deeper than the output. Even total destruction is not excluded, as the extinction of the dinosaurs has shown. This cycle has become known through the consulting company Gartner through its hype cycle presentation. In the current release, autonomous driving, quantum computing and general AI will only reach a plateau of productivity in more than ten years. A trigger is expected with neuromorphic hardware. These are synthetic neurons and synapses that are constructed like a brain. New, highly scaled and energy-saving neuron networks are then conceivable. If you have missed a cycle, this is not a problem either, because new ones are constantly being created in terms of time and space. The zeitgeist blows in waves. Sometimes storms also arise – revolutions.

### 3.4 AI the New Power

Power has always been exercised over the last thousands of years by people who are in power. Whereby power describes those possibilities to enforce his will with others without their consent. Power is likely to continue to be pin downed to individual persons in the future. But the real forces will shift. Between perceived disadvantage and presumed preference, a field for the knowledgeable and ignorant opens up. Populists, dissidents, conformists and elites are floundering in the market of power.



Obviously, populists are currently in high season. Many people who feel disadvantaged and have little systemic knowledge can be manipulated relatively easily. Opposite them is a mostly smaller group of knowledgeable people, who are additionally seen by themselves as preferred. Elites are characterized above all by high intelligence. These groups will be able to use artificial intelligence for themselves. This creates a leverage effect and power becomes the exclusivity. It is not for nothing that the current rulers claim the monopoly on AI for themselves. It is a mandatory measure to maintain power.

Or as China announces it will be the world's leading AI nation by 2030. With the many conformists and few dissidents, there are still easy-to-use groups. But for everyone, they need a face. People and politicians who will represent power in the future are actors who perform under a script and under a direction. The real power lies in the hands of the elites with their artificial intelligence. Even today's Donald's and Borries are already such role players. Whether they themselves are aware of this is uncertain.

The phenomenon of virtual political power is addressed in the episode "Waldo Candidacy" of the series Black Mirror. It's not even a real person, it's just a cartoon character who wins an election in this story. Similarly, Facebook was involved in the last US presidential election. Still a bit clumsy, because it came to the public in hindsight. The power will be in the future with those who have the highest (technical) intelligence and best actors. Although, it could change the environment.

## 4 Context

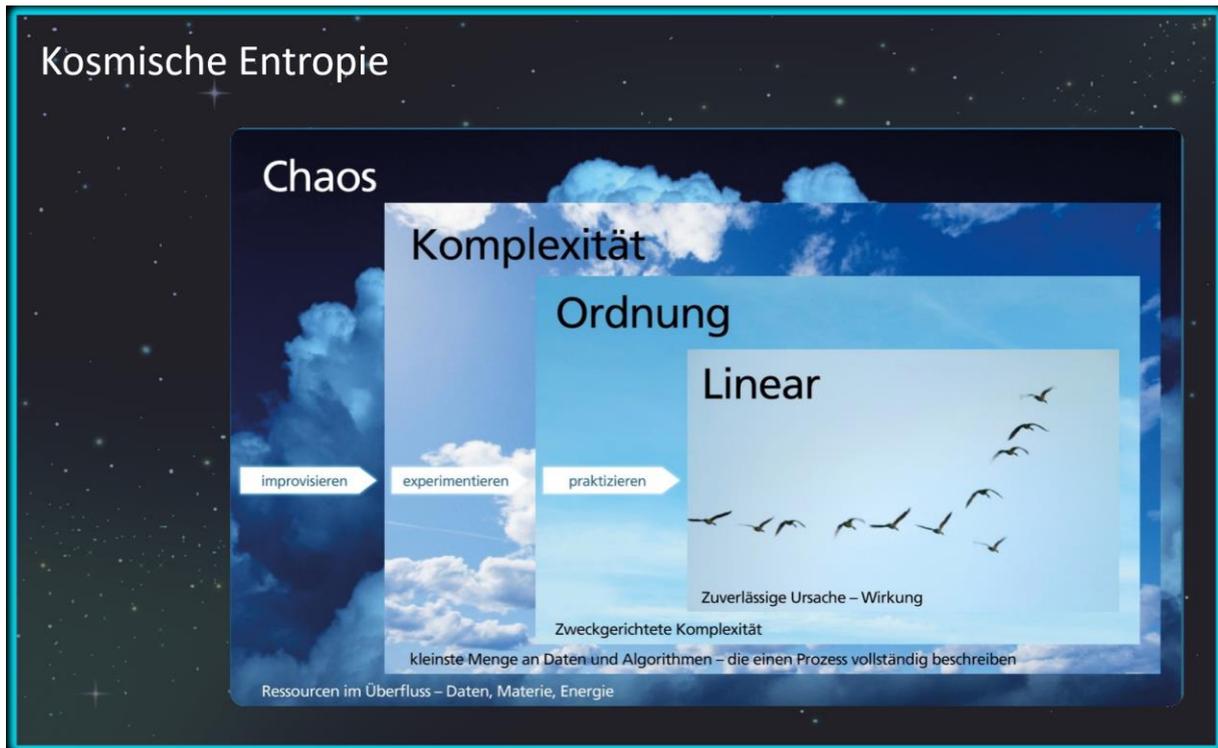
All statements and conclusions made so far presuppose a linear development. We are no longer surprised when techniques from the science fiction films become reality. Flying cars, humanoid robots or brain uploads are in development. As long as these creations show roughly the expected effects, we are talking about linearity. But it could also be completely different. That is, when this changes the environment dramatically and the man cannot adapt quickly enough. Chernobyl has shown that radioactivity does not mean the end of mammals. After about thirty generations, the bodies have adapted to the new environment. This takes much less time for wolves than for humans. The intensive preoccupation with the future, the possible scenarios and the predicted consequences alone brings security. The more accurate the predictions the more stable the world seems to us. AI as a "Prediction Machine" will be able to make a significant contribution to this. There could be negative feedback. Technologically triggered complexity is also linearized by technology.

K o m p l e x i t ä t s b r a d		
Ausprägung	Beispiel	Behandlung
Exponentialität		
Pos. Rückkopplung		
Zeitversetzte Wirkung		
Fernwirkung		
Nebenwirkung		
Neg. Rückkopplung		
Unmittelbare Wirkung		

#### 4.1 Complexity between Chaos and Order

The hallmark of complexity lies in the effect of causes. There is side-, distance- and time-delayed effects with exponential course. With this, cause and effect can no longer be precisely differentiated. Additional complexity is present in self adaptive systems. These are all those who have a learning capacity and can adapt to the environment, i.e. are adaptive. Humans are therefore complex beings whose behavior is difficult to predict. The same applies to artificial systems that can be learned. For AI opponents, this is the most important argument. The development of AI is unpredictable and therefore uncontrollable. The only way to intervene in this case is to provide energy. Systems that do not have an energy supply decay, as defined first main principle of thermodynamics and referred to as entropy. According to this principle, everything cools down, order disintegrates and drifts apart. In fact, chaos reigns with an abundance of matter and energy. In fact, however, we are experiencing a world of high order. Road traffic planning, regional planning, ISO layer model, IEEE, etc. ensure a largely smooth everyday life. In order to maintain all this, it requires both energy supply and information. These two variables are the opponents of entropy. Matter in the form of raw materials still plays a major role in today's economic system. There are, however, signals that raw materials are becoming less important because matter becomes programmable. For now, in a still primitive version via 3D printer. Later, possibly at the quantum level. Then it was reduced again to the availability of energy and information. This issue is currently being discussed in the media on Netflix's side. If the data is correct, the streamer needs 200 billion KWh for server operation alone. The power consumption of the screens is not included. The equivalent of an episode is expected to take a 6.3 km drive. Information needs energy and both together generate order. Thus, in an entropy chaos, a life in linearity is possible. Reality has developed a variety of structures for this purpose.

# Kosmische Entropie



## 4.2 Systemic Structures

The most well-known millennia old form of social coexistence is the patriarchal hierarchy. With the advent of the Internet, we became aware of the gender-neutral network structure. Insects, fish and birds have developed the swarm as their organization. The chain strand was not invented by Bitcoin either but has its prototype in the DNA. Organisms have developed these different structures because they have brought benefits in evolution. For comparison, the attributes of range, communication, resources and intelligence should be used.

Thus, the territory determines the reach of the hierarchy. Commands always run from top to bottom and are reported exactly the other way around. Power is centralized, at the top, and requires unconditional obedience. This is precisely where the intelligence of hierarchies lies. A central office is informed about everything and can distribute knowledge in a targeted manner. In modern hierarchies, the CEO is reported, and each department receives only the information they need to carry out their work. This structure has made it possible to manage a work-sharing economy. Technically, this form of organization is applied to file managers and functional programming.

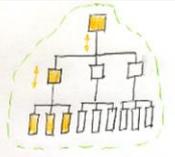
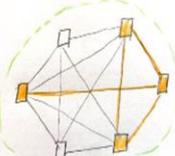
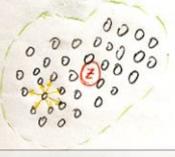
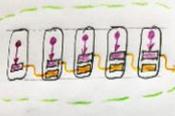
The range of a swarm can usually be determined by visual observation. It is already uplifting to watch a large flock of birds in the evening sun. Its structural limits are regulated by the food supply. Within the organization there are simple rules. Each member must always pay attention to the exact distance to the neighbor. Requirements for its individual intelligence are therefore very low. The so-called swarm intelligence is an emerging phenomenon in which the whole is more than the sum of the parts. Actual weak individuals such as locusts can thus cause a natural disaster. The apparently uncontrolled forms of movement of a swarm arise from the search for food. A flock of birds traces its trail by tracking insects (swarms). Technical swarms are still not widely used. At the Ars Electronica Festival 2018 in Linz you could see a swarm of drones. Light patterns were drawn into the night sky. The largest artificial swarm performance to date was shown in 2019 at the 70th anniversary of the People's Republic of China. About 2,000 actors equipped with portable screens showed modern China as a growing plant. The science fiction series "Black Mirror" has worked on this theme using

the example of mechanical bees, for pollinating flowers. Economic application is most likely in the health sector as nanobots and in the environmental field as cleaning insects.

Over the last 140 years, the power generation and the resulting distribution have led to network structures. Technical facilities such as gas, electricity or data networks are designed in such a way that each participant has equal access and that a disturbance cannot lead to a system failure. If you stab a finger through a cobweb, a hole is created, but the web overall remains. Self-healing networks such as the Internet are characterized by enormous stability. The more nodes and the more edges (connections) the more reliable. Networks have a horizontal structure but are organized into levels. Electromagnetic signals are running at the bottom, which enable information transport at the next higher level. In principle, each actuator (node) can connect to any other. According to Marc Buchanan's "Small World" theory, it takes a maximum of six nodes to reach everyone else. In a network, therefore, the Pope is far away for all. Hierarchies are thus wiped out. The power of the individual actuators results from their degree of networking and resources. Those who can feed a lot into the net are interesting and become more often connected and thus a powerful node. In social media, these are the influencers, i.e. actuators / people with interesting content. An actuator picks up information, processes it, and releases it. There is a strengthening or weakening. This degree of activation can change over time and the network is therefore capable of learning. Number of nodes, their activation capability and degree of networking determine the intelligence of a network. 3.5 billion smartphone users worldwide are already in the human brain dimension (14 billion neurons). In substance, the Internet could already be thinking. Unfortunately, as part of it, we are unable to recognize this emergent phenomenon. Werner Herzog also has the documentary "What the Internet Dreams of". It is possible that an AI system with global consciousness is developing right now. The necessary "Small World Architecture" is typical of the Web. On social media we have many close connections and a few long-distance connections. This is precisely what is required for awareness. Normally it is quiet in the net, there is a light spirit blowing there and there. Actually, insignificant events can trigger a storm. See the Ibiza video of the Austrian Vice-Chancellor from 2019.

It is often difficult to impossible to understand the flow of information in a network. Confidentiality, integrity and availability are a prerequisite for security on the network. Some of these requirements can be covered by encryption. Data can only be viewed and modified by people who also have the rights to do so. Biometric two factors authentication and quantitative encryption ensure this. A network architecture largely ensures trouble-free access. If the data centers are now also redundantly constructed, availability is also guaranteed. The integrity of data, i.e. protection against manipulation, is a serious problem. In particular, in the case of transactions of valuables, criminal interference occurs again. What is needed is a transparent data structure that necessarily documents every transaction.

The block-chain structure is an adequate system for this purpose. Each record is linked to its predecessor and successor. The record itself is clearly signed using one cryptographic method. If this crypto code is now built into the link, it is called a hash. A complete, unchangeable chain of records is the result. Every share, residential and every car can be tracked over its lifetime. The limits of a chain structure lie in the capacity of the database and the width of the hash value. With terabytes and 64 bits, billions of blocks are possible. In order to have more potential than existing transactions on the stock exchange or the real estate market require. The intelligence of a chain structure lies in its linear cause – effect linkage. Complete tracing to the first transaction brings confidence and security. That's the power of blockchain. Intelligence does not always have to be fluid; it can also crystallize into structures.

	Schema	REICHWEITE [Grenzen]	KOMMUNIKATION [Medien]	MACHT [Ressourcen]	INTELLIGENZ [Bewusstsein]	TECHNIK Natur
Hierarchie		<ul style="list-style-type: none"> <li>• Territorium</li> <li>• Erreichbarkeit</li> <li>• Räumliche Distanz</li> </ul>	<ul style="list-style-type: none"> <li>• Befehl oben &gt; unten</li> <li>• Reported unten &gt; oben</li> <li>• Decodierung - lesen</li> </ul>	<ul style="list-style-type: none"> <li>• Zentralisiert</li> <li>• Energie unten &gt; oben</li> <li>• Befehl - Zwang</li> <li>• Gehorsam - unbedingt</li> </ul>	<ul style="list-style-type: none"> <li>• Glauben</li> <li>• Diktatur</li> <li>• Eindeutiges Ziel</li> <li>• Kumuliert oben</li> </ul>	
Netz		<ul style="list-style-type: none"> <li>• Access</li> <li>• Lines</li> <li>• Nodes</li> </ul>	<ul style="list-style-type: none"> <li>• Elektromagnetisch</li> <li>• Jeder mit jedem</li> <li>• Codec's</li> </ul>	<ul style="list-style-type: none"> <li>• Dezentral</li> <li>• AccessRights</li> <li>• Aktoren</li> </ul>	<ul style="list-style-type: none"> <li>• Netzintelligenz</li> <li>• SmallWorld</li> <li>• Fragmentiert</li> </ul>	
Schwarm		<ul style="list-style-type: none"> <li>• Replikation</li> <li>• Nahrung</li> <li>• Wetter</li> </ul>	<ul style="list-style-type: none"> <li>• Signale</li> <li>• Feedback</li> <li>• Positionsbedingt</li> </ul>	<ul style="list-style-type: none"> <li>• Optimierter Beutezug</li> <li>• Innerer Zusammenhalt</li> </ul>	<ul style="list-style-type: none"> <li>• Schwarmintelligenz</li> <li>• Einfache Individuen</li> <li>• Ganes mehr als Teile</li> </ul>	
Chain		<ul style="list-style-type: none"> <li>• Sequentiell</li> <li>• Unbegrenzt</li> <li>• Rechenleistung</li> </ul>	<ul style="list-style-type: none"> <li>• Pre - Post</li> <li>• Hash Referenzwert</li> <li>• Public - Private</li> </ul>	<ul style="list-style-type: none"> <li>• Vertrauen</li> <li>• Integrität</li> <li>• Stabilität</li> </ul>	<ul style="list-style-type: none"> <li>• Interne Logik</li> <li>• Ursache - Wirkung</li> <li>• Linearität</li> </ul>	

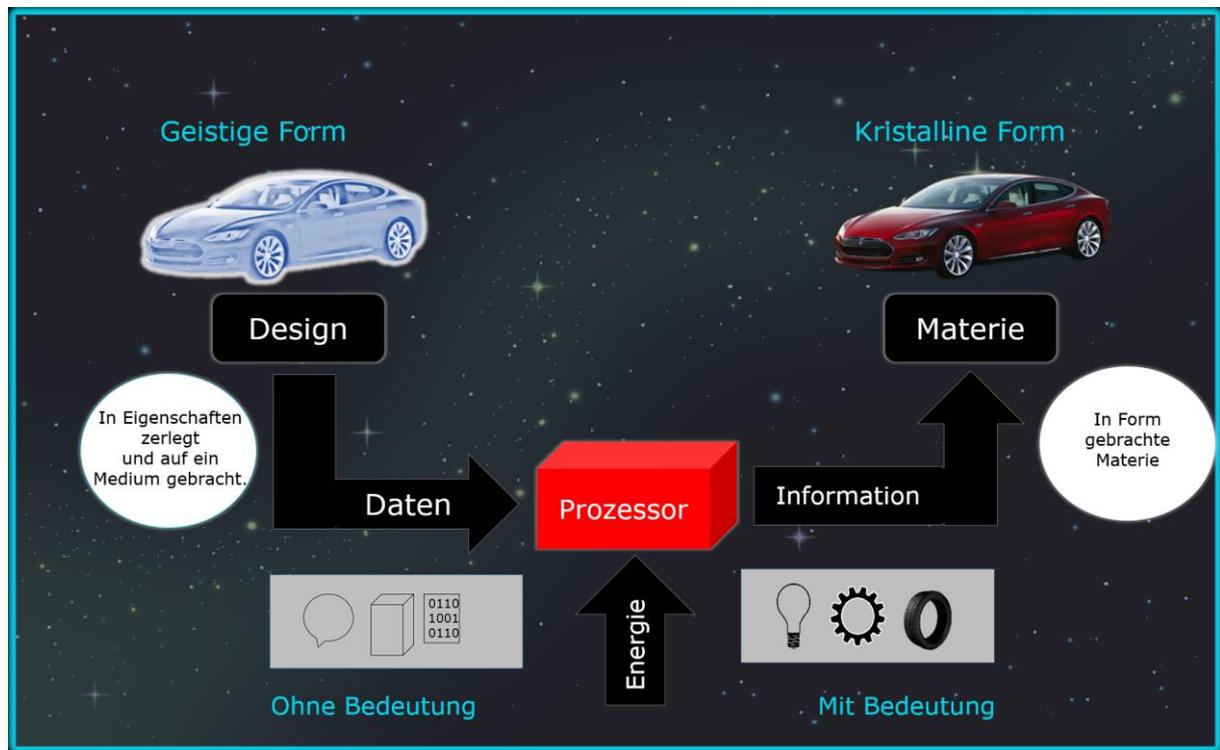
### 4.3 Crystalline Intelligence

Humans have been concerned about intelligence since ancient times. Today, the dual model according to Raymond Cattell (1963) is widely recognized. This distinguishes between fluid and crystalline intelligence. When it comes to learning new things without relying on prior knowledge, one speaks of fluid thinking. New, abstract problems are solved in this way. In particular, this is an ability of children and adolescents. It is assumed that fluid intelligence is genetic and thus cross-cultural. Crystalline intelligence, on the other hand, is a result of learning, i.e. a cognitive ability that results from a myriad of learning experiences. Knowledge and skills have crystallized. Naturally, this increases as we age. Seniors are able to adapt to new situations using analogy. As the neural streak tightens, fluid intelligence decreases. Those who were equipped with a high fluid intelligence by birth and used it for lifelong learning still have a high level of intelligence in old age. In machine learning, it is very similar.

A technical neural network must be trained according to its conception. A learning process that is carried out until the output meets expectations. Using the example of the traffic signs, they are likely to recognize them. With the end of the training and test runs, the neurons - weights stabilized so crystallized. As long as no new traffic signs are added, there is no need for a new training run. The model can be installed in any number of cars. So, cars have crystalline intelligence. In addition, they also need fluid intelligence in order to be able to navigate completely new traffic situations. A well-trained and experienced vehicle will have fewer mistakes.

Crystalline intelligence does not necessarily have to be based on digital technology. It can already be immanent in a device. It has already happened to many (me in Cologne) that they were standing in front of a ticket machine and did not get a ticket out. "Such a stupid machine" is usually the reaction to it. Conversely, you get your hands-on devices and objects that you have never seen before and can operate them easily. The intelligence was put into the construction. The ride in the metro of Chengdu has a completely different design. I tap my destination via a touchscreen and get the right ticket immediately. The fewer buttons and switches a device has, the more crystalline intelligence

must be built in. One of the most horrible devices was the video recorder from the 1980s. A time-delayed recording took a considerable amount of human intelligence. Such a device would be absolutely unsellable today. Now Alexa controls the Amazon Fire Stick. Buttons and switches are becoming less, voice control is increasing. Technical intelligence becomes crystalline.



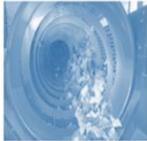
#### 4.4 Social Relativity

In China, video cameras are found in places of work as well as in public spaces. They are accepted by the society. In Europe, people are much more sensitive in this regard. A camera in the workplace requires the approval of the works council and it is difficult to get it. Every public camera also needs a data protection policy. The same technique is assessed differently. Acceptance is relative and depends on culture, region, zeitgeist, and digital mind.

Waste is a global problem. It starts with its perception and varies from region to region. In Cairo, the waste is in the drinking water canals, while in California, throwing away a cigarette butt is already leading to painful punishments. In Europe, waste separation has become a culture, recycling techniques are there and are being perfected by means of digitization.

Nutrition another global issue is also very relative. In the supermarkets of consumer societies, a wide area is planned for pet food, while in the Central African Republic more than 50% of the population is still starving. Animal love is a phenomenon that is already very relative in the same region. While dogs and cats already have family status, pigs and chickens are still bred in masses.

Similarly, the assessment of artificial intelligence is relative. While some (Europeans) fear the end of humanism, the others (Chinese) hope for a glorious society. Intelligence itself is relative, as it is always seen in relation to human beings. What weak AI will do can already be classified quite well.

	ZEIT – GEIST	REGION	KULTUR	TECHNIK	DIGITAL
NORMEN					
ETHIK					
ÄSTHETIK					
WAHRNEHMUNG					

In the case of strong AI, science fiction is needed. While in "Transcendence" the human being manages to catch it again, she can borrow from "Ex Machina". The future is open and could be a vector of the following dimensions:

- Confidence in the world as a whole (Holist)
- Political honesty (radical)
- Uncertainty is a driving force for new things (creativity)
- Existence of Digital Beings (Acceptance)
- Probability is the only security (pattern)
- Unsharp targets - multiple attractors (horizon)
- Complex VUCA World (ambiguity)
- Others always want something different (speed)
- Unconditional service (competence)
- Property and resources (attention)

Anthropologists have developed the concept of space for global, cultural epochs. This is how the first anthropological space describes the hunters – societies with their herds, armaments and clans. Followed by the warriors – societies with territories, armies and slaves. Today, we live in the third anthropological space of the consumer. We are a society whose culture is determined by money, raw materials and factories. The transition to the "Society of Intelligence" is dominated by data, algorithms and AI. Intelligence is bound to matter. Quantum physics could greatly reduce the necessary mass so that a spread in the universe is possible. The most diverse biological and technical organisms then appear. The "spirituals" with their knowledge and wisdom would then determine the transhuman space. The course is being set today.

Manfred Litzlbauer