

How Artificial Intelligence changes the World

Today's changes have a new driver that only played a secondary role some years ago: Artificial Intelligence. The question how this will influence our future world can be summarized in one sentence: Machines become self-aware. An article by Klaus Henning in line with the talk he held at the 10th Daimler Sustainability-Dialogue.

In 1450, Johannes Gutenberg shocked society with the innovation of the letterpress. Today we are facing a similarly fundamental disruptive innovation: Everyone and everything will be connected. The development into this direction has already started a while ago, but with the entry of intelligence that is independent from the human into these connected systems, we are reaching a new dimension. The objects of our daily lives as well as vehicles and buildings become self-aware based on huge so-called "Big Data Lakes". The new dimension in this is that we are surrounded by digital agents, digital twins and digital shadows. It starts with the smart phones that will become intelligent "personal assistants".

In addition, around us lots of agents that are closely connected to our personal live will appear. We are about to have an interactive media center in our own houses that takes care of the fridge, that controls the entire energy supply and reminds us of our breakfast. However, the thinking bumper of a car is still far away. Nevertheless, it is foreseeable that we will be able to install intelligence into polymer materials so that for example the bumper realizes if a pedestrian is close and turns softer. Moreover, implanted car-diovascular pumps are going to become reality soon. Also, computers integrated into clothing will become normal. Perhaps we might even have a regulation for children to wear intelligent clothing on their way to school. There could be as well co-operative buildings in which humans intensively communicate with each other: Virtually open structures between apartments.

The age of machines with self-awareness

Artificial Intelligence has no limitations and will conquer all areas of this world. The age of machines that are self-aware starts now. But first of all: What is the core of Artificial Intelligence? What leads to its all-embracing influence? And why is "Deep Learning" – which is nothing more than closed-loop neuronal nets – the crucial break through instrument for Artificial Intelligence, even though the theory about it has been invented 30 years ago?

The decisive reason is the availability of data lakes – thanks to extreme networks and digital infrastructures that are the requirement so that closed-loop neuronal nets can be effectively developed. The combination of a high speed algorithms dealing with an enormous amount of data, a relatively easy learning algorithm and only very few "a priori" knowledge is the core of efficiency of modern Artificial Intelligence.

Age of the global-regional Homo Zappiens

Over the last decades, all these developments have led to a new type of human that is called Homo Zappiens by the Dutch scientist Wim Veen. A completely new understanding of the relation between humans and machines is being generated.

It is already normal that we have new forms of networking and that daily routines are organized over huge distances and around the globe. Moreover, it became normal that we interact in a remote and virtual living and working environment. But what is new about the Homo Zappiens?

Characteristics of the Homo Zappiens and Homo Sapiens in comparison (adapted from Veen & Vrakking, 2006)

Homo Zappiens	Homo Sapiens
High Speed	Conventional speed
Multi-tasking	Mono-tasking
Nonlinear approaches	Linear approaches
Iconic skills first	Reading skills first
Connected	Stand alone
Collaborative	Competitive
Learning by searching	Learning by absorbing
Learning by playing	Separating learning and playing
Learning by externalizing	Learning by internalizing
Using fantasy	Focused on reality

What has to be changed is the education process

This is what we, the managers, are radically confronted with. We will have a different generation of humans in our companies. We must offer them something. This generation is different and wants to work differently because old structures seem obsolete to them. Learning by experience, events and fun must be the trend if the systems of universities and schools do not want to come to a dead end.



"How is the world of work going to change?" This was one of the questions dealt with in the panel-discussion in which, among others, Wilfried Porth, Member of the Board of Management, Human Resources and Director of Labor Relations, participated.

The change will be much more radical within the world of business

Human work will be replaced or modified by the systems of Artificial Intelligence. It concerns white-collar jobs as well as highly-qualified work.

However, the fully automated car will not "only" drive fully automatically. For example, it will also be the central digital twin of mobile nursing staff. Using the swarm intelligence together with its "colleague cars", it will be responsible for the entire disposition, documentation, traffic jam surveillance, route optimization etc. Thus, nursing staff can simply get into the vehicle and already start a conversation with the next patient via skype. In this case, the car becomes part of our everyday life as a social robot.

The Age of hybrid intelligence

The human-to-machine interaction 4.0 creates a completely new dimension of cooperation between humans and intelligent objects. The age of hybrid intelligence between humans, machines and their particular digital shadows and intelligent agents has begun.

The age of predominance of the human over the objects created by him is coming to an end. Of course, the human-to-human interaction will still play a fundamental role in the future – perhaps even more than today. There is no alternative.

But necessarily a “partnership at eye level” must be developed. The idea of the “predominance” of the human over the machine is obsolete.



A new dimension of communication between humans and intelligent objects (Picture sources: IMA/ZLW & IfU, RWTH Aachen University, jim @ Fotolia.com, P3 OSTO)

The machine-to-machine communication that takes place without any human will rapidly increase because every machine has its digital agent.

On the long term, all technical objects of the real world will become intelligent

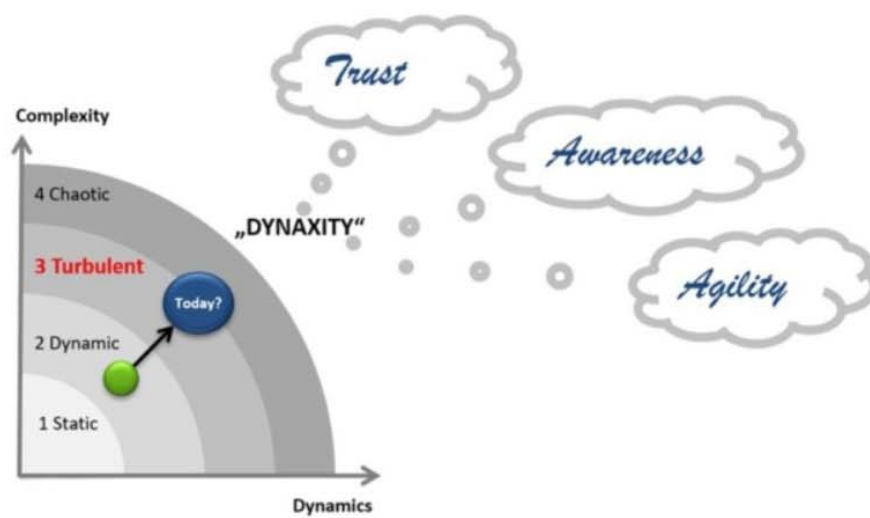
The digital shadows, the “digital skin” will become a dominant part of technology and human identity – in communication between machine and machine, between human and human and between machine and human. A “dynamics of digital shadows”, that works simultaneously and increasingly develops a high intelligence, will evolve.

This is the actual “revelation”: On the long term, all technical objects of the real world will become intelligent and develop self-awareness as well as a sense of themselves. There will be a life-long learning process of those objects and they will learn together with their technical partners and with the human, too. “Driving schools” for technical objects will become normal. The omnipresent and discreet interaction between the digital shadows of technology and humans will dominate all aspects of communication.

This has enormous effects on the digital system landscape with the dimensions that intelligence is everywhere, that the physical and digital world are linked and that we need new types of (IT) -infrastructures.

Success factors of human acting: Agility, trust and (emotional) awareness

What are the success factors for such a profound digital transformation that takes place under the dominant factor of Artificial Intelligence? According to our consulting experiences, the central success factors under these turbulent conditions are agility, trust and (emotional) awareness. In our experience, each of these factors is essential for the success of this transformation – they are “KO factors”. If one of the factors does not work, the whole will fail.



Success factors of human acting under turbulent conditions (Picture sources: P3 OSTO, Köln)

Agility does not only mean using Scrum or similar software development method, but to adapt the entire structure of a company to agile principles – including all processes from product development, production, product modifications to ramp-up processes and administrative structures. This is a huge issue and usually the product development department is ahead of the rest of the company. Central departments, such as administration, finances or controlling often find it harder even though it is more necessary in their departments.

Furthermore, it requires a culture of trust – vertically and horizontally between humans and departments. If your organization does not provide this, you can forget about the transformation! It will not work!

And if there is no (emotional) awareness – if you do not ask: What is actually happening? What is culturally happening? Which tensions exist? If you do not have a perception for those factors in their range and diversity, you will not succeed. This way of being aware is the art to perceive but not to suppress the whole complexity and dynamics (Dynaxity). But awareness is only an art to be learned. It is a mindless, that empowers me to endure these perceptions and makes me free to rush into unreflected quick and useless action.

Each of those three features has to be fulfilled in high quality to make the change work.



„May we all succeed in actively designing the new world of hybrid intelligence of humans and Artificial Intelligence according to our values, before others do it without reflecting their values.“

Prof. Dr.-Ing. Klaus Henning