

I have a dream – new technologies change the world

Herwig Friedag

Actually, the members of the ICV International Working Group were planning to establish an international working group in 2020, PS fashion, a fashion company from Serbia with ideas, tips etc. But Covid19 did not allow this. What to do?

The management team decided after a survey of all working group members to work on self-defined topics via the internet, i.e. with teams, zoom or Skype. The following four topics were selected in a doodle survey:

- 1. ideas for ensuring liquidity in the company*
- 2. change of the business model in the near future*
- 3 What kind of new technologies will bring about major changes in our lives in a few years' time?*
- 4. how to make social responsibility (CSR) measurable in order to use CSR as part of the business model of companies*

A team of the ICV International Working Group, consisting of

- Peter Janzekovic (e-mail: insilico.info@gmail.com) from Ljubljana,
- Edyta Szarska (e-mail: edyta.szarska@controllingpartner.pl) from Warsaw,
- Borut Kadunc (e-mail: bkaduncsi@yahoo.com) from Ljubljana,
- Roger Maurer (e-mail: roger.maurer@web.de) from Constance,
- Marcin Wizgird (e-mail: marcin.wizgird@gmail.com) from Warsaw and
- Herwig Friedag (e-mail: consult@friedag.com) from Berlin

has dealt with the topic of new technologies that change the world in Corona Summer / Autumn 2020.

Subgroups highlighted the main topics

- Artificial Intelligence
- Hydrogen
- 5G Telephony

- The subject of 3D printing was only touched upon in passing

We assume that these new processes, which are already being used in pilot applications, will have a serious impact on our lives in the coming decades - and also relevant implications for the business models of many companies!

We would like to start with some basic facts about the new technologies and then describe the "dream of a new world"...

New technology is changing our world

1. Artificial intelligence (AI) thinks with and ahead

You may also have wondered: you have been surfing the Internet interested in a new car, had a look at some homepages and then you get pictures and advertisements for this car over and over again when you are on the road. These are programmed algorithms that recorded your search behaviour and use this information to create advertising offers for companies...

Amazon has been using comparable algorithms for a long time. They suggest things to you when you make a purchase that "you" should actually order. These are first attempts to automate processes with the help of artificial intelligence.

"In general, artificial intelligence refers to the attempt to emulate certain decision-making structures of humans, for example by building and programming a computer in such a way that it can process problems relatively independently.

The so-called "strong AI" aims to create an intelligence that is supposed to mechanise human thinking, or to design and build a machine that reacts intelligently or behaves just like a human being.¹

But of course it does not stop at these rather simple algorithms. The development is very fast. Here are some examples of already existing AI applications or those that will be launched soon, which in principle have the following advantages:

- availability around the clock
- usage especially for recurring activities
- reduction of overly human errors

Example 1

Autonomous driving cars (private cars, lorries, public transport)

More and more often we experience cars that drive "on their own", although in most cases the driver still has to sit in the car and intervene if necessary. But anyone who has driven a Tesla several times will notice that the car is learning, because all movement data is stored centrally and from this, ever better driving profiles are created.



¹ https://de.wikipedia.org/wiki/K%C3%BCnstliche_Intelligenz (2020-10-12)

We are therefore not only dealing with a self-driving system but also with a learning system.

The advantage in future will be a relevant reduction in the number of accidents and their consequences. In addition, autonomous public transport vehicles will soon pick up passengers at home and drop them off at their destination or at the next railway station; the taxi driven by a driver will soon be obsolete. The same applies to trucks that will automatically drive from A to B; the driver is then only needed for loading and unloading - if at all!

Example 2

Knowledge-based systems

We already know Google and comparable search systems. They are used millions of times a day and have replaced encyclopaedias and many reference books. But existing possibilities will be more often available for generating knowledge:

- Doctors receive more reliable indications
- Lawyers get more accurate proposals for decisions
- Schoolchildren receive examples of style and content for correct essays...



The knowledge of the world in your pocket! And then also language-based.

Example 3

Manufacturing systems with robot support



With how many recurring activities was production in the past! Today, robots do this. Robot systems are becoming more and more complex, work together more and more and thus produce industrial products in large quantity. Also in the medical technology more and more robot

systems are gaining ground.

Example 4

AI-supported warfare

At present, the main focus is still on detection and recognition, i.e. information obtained with AI-controlled robots. Soon, however, AI-based systems will actively intervene in warfare and replace humans.



Artificial intelligence has many advantages for people, but will lead to a significant proportion of current jobs being lost worldwide; replacements will be available, but preferably for well-trained people.

Economically, the large US companies seem to be to be the winner of AI because of large amount of own data. However, not only the European Union is preparing legislation that will allow all interested parties to get access to data (Data Use Basic Regulation) and thus the use of AI-based systems. Access to data will be crucial for the future of companies, for new insights and innovations!

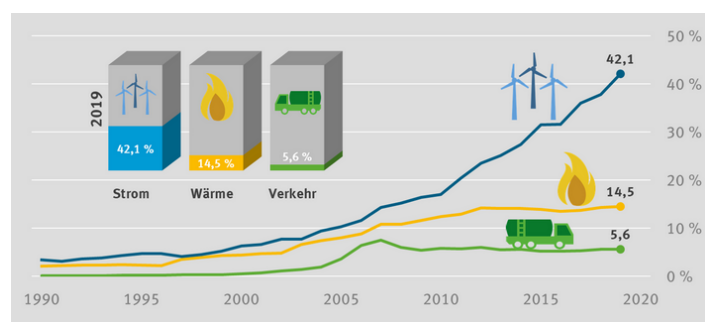
2. Hydrogen as the energy carrier of the future

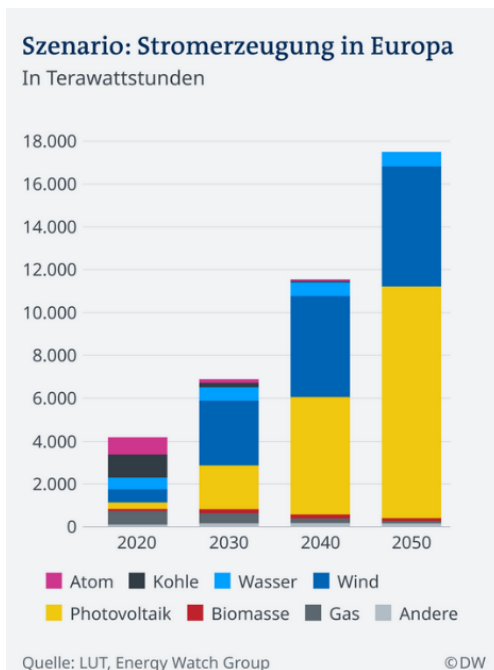
Primarily from the environmental protection point of view (reduction of CO₂ emissions), work is underway worldwide to restrict the usage of carbon-based energy.

Oil and gas, but also nuclear energy with the problem of the final storage, are to be completely replaced by "clean" renewable energy within the next 30 years.

Solar and wind energy, and also biomass, are possible options. This is not only for electricity generation, but also for process energy for industry and for heating energy for buildings / hot water and for transport.

Renewable Energies: Share in the sectors electricity, heat and traffic



Scenario: electricity-generation in Europe in Terawatt-hrs.


The storage of energy is (still) problematic at present: battery storage systems are expensive, heavy and their production is rather not ecological yet. Other storage methods are either only available in some countries (water storage) or have not been developed yet in a marketable way.

The situation is different with hydrogen: although there is an energy loss of up to 20% in the production of hydrogen from electricity, it is cheaper to produce hydrogen than to shut down wind generators or to take solar plants² off the grid if unusable electrical energy is available. Hydrogen can easily be stored and transported in the existing gas pipeline network.

Hydrogen can be used to operate heating systems. Trucks can travel hundreds of kilometres and aircrafts can fly, and industrial processes can be carried out without problems. This has been recognised by the European Commission, which has drawn up a hydrogen strategy for the coming decades.



The CO²-free hydrogen future is not far off: China, the USA, Japan and Europe are investing billions of Euro to make hydrogen technology practical on a large scale and thus to reduce CO² emissions significantly.

² "Green hydrogen" is produced in an environmentally friendly way from wind and solar energy. By the way: an area of 370 km * 370 km in the Sahara would be sufficient to produce enough (solar) energy for the current needs of the whole world!

But of course hydrogen can also be produced from gas, coal or oil etc...

3. 5G – more than just making phone calls

"5G (fifth generation mobile communications) is a mobile communications standard that has been gaining popularity since 2019. Compared to LTE (4G), 5G technology has the following improved characteristics:

- data rates up to 10 Gbit/s;
- usage of higher frequency ranges;
- increased frequency capacity and data throughput;
- real-time transmission, capable of simultaneously addressing 100 billion mobile phones worldwide;
- latency from a few milliseconds to less than one millisecond.

5G technology is basically geared towards three different application scenarios.

1. eMBB: enhanced Mobile BroadBand, i.e. an extended mobile broadband connection to provide mobile devices with the highest possible data rates.
2. mMTC: massive Machine Type Communication. This area mainly concerns the "Internet of Things" (IoT) and aims to support as many connections as possible with rather low data rates and low power consumption.
3. uRLLC: ultra-reliable and low latency, to provide reliable, low-latency connections, for example for autonomous driving or industrial automation"³.

Since this technology is already being tested, there are already tests for applications that show where the journey will take us:

a) Rapid assistance in the health sector

First-aid clinics are already in operation in Barcelona, providing doctors with real-time patient data as they travel to the hospital. The 5G technology enables precise video diagnosis and the use of high-resolution scanners.

b) Remote operations using 5G

³ <https://de.wikipedia.org/wiki/5G>

Operations have also been tested, with the (specialist) doctor performing an operation several thousand kilometres away from the patient. This is particularly useful for rare diseases where there are few specialists worldwide, but also in areas that are difficult to reach.



c) Autonomous driving

Thanks to the very low latency it is possible to drive safely autonomously. Latency is the reaction time between sending an information and a reaction. With 5G latency will be 5 to later only 1 millisecond, while the human being needs about 20 milliseconds to react! In combination with AI, it is possible to drive safely autonomously.



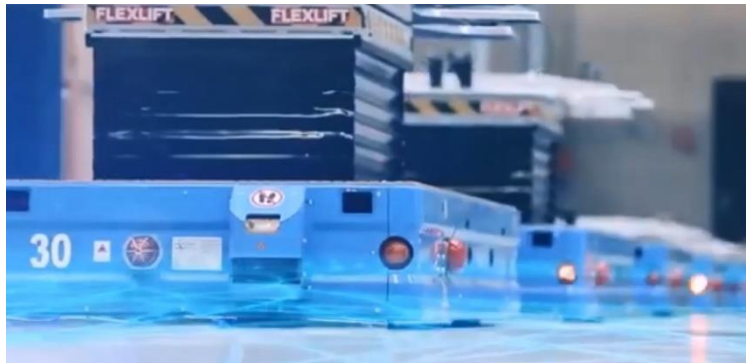
The first 5G test modules were installed near Munich to test the largely delay-free exchange of information between vehicles. Networked vehicles send information on speed, position and lane changes directly to all vehicles within a radius of 320 metres, which can then automatically adjust their driving style.

Autonomous driving will have a serious impact on our lives: Taxis, public transport vehicles and lorries will be driverless; the cost of using these means of transport will be almost halved... - and many drivers will become unemployed.

d) Internet of Things

The new mobile radio standard has completely new dimensions for the

Internet of Things (IoT) and Industry 4.0. The networking of machines and devices with the help of sensors will enable a variety of application scenarios: Networking and control of production / plant / warehouses / logistics, intelligent maintenance, smart cities (intelligent parking management, intelligent street lighting and traffic lights, rubbish bins that report their fill level, etc.), smart metering (remote reading of meter



readings) and smart homes (monitoring and remote control of e.g. temperature, humidity and shutters and intelligent security measures).

As there is almost no latency at 5G, this

allows the combination of automatic machines for the production of one-offs, so that production can return to the customer. High-quality goods can thus be produced in an order-oriented and customer-oriented manner and delivered quickly. The production comes back to the cities!

e) Intelligent agriculture

Smart farming uses key technologies for feeding a growing world population: algorithms of artificial intelligence or machine learning predict the



susceptibility of crops to diseases and inform farmers where exactly pests and diseases affect crops. These algorithms are mainly based on data analysis and thus enable potentials such as:

- Recognition of soil characteristics and yield capacity
- Precise addition of fertilisers and spraying of crops
- Real-time automated adjustments in the field, e.g. track guidance, allow increased machine efficiency and performance, resulting in lower operating costs, time savings and higher yields per field

f) High data rates

In densely populated cities, the mobile network has to serve a large number of users at the same time. In particular during major events (e.g. sports or music events, Christmas markets and New Year's Eve), tens of thousands of customers are often served simultaneously in a very

confined space. While 4G has reached its limits here, 5G will be able to provide mobile coverage even in these exceptional situations. With the new technology, customers will also benefit from ultra-high resolution images, video streams and online games.



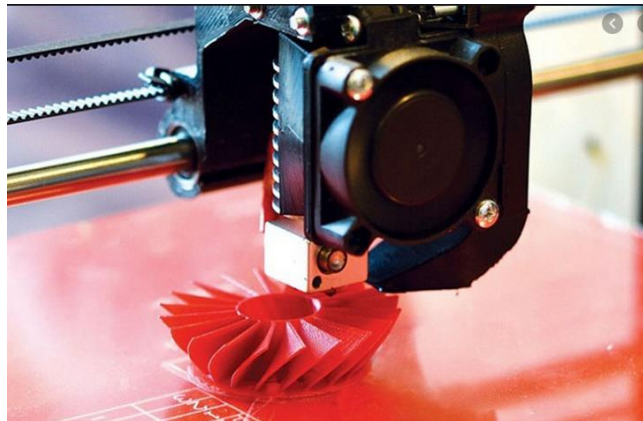
Another challenge is the supply in difficult situations such as in urban canyons and inside buildings. In many areas there is no or inadequate supply of telecommunications services, and fast networks are often lacking. Here, the 5G network with its high data rates and speed can replace traditional fixed networks (copper or fibre networks) and guarantee customers flexible use.

4. 3D printing revolutionises the industry

"3D printing, also known as Additive Manufacturing (AM) is a comprehensive term for all manufacturing processes in which material is applied layer by layer to create three-dimensional objects (workpieces). In this process, the layer-by-layer construction is computer-controlled from one or more liquid or solid materials according to specified dimensions and shapes (see CAD/CAM). Physical or chemical hardening or melting processes take place during assembly.

Typical materials for 3D printing are plastics, synthetic resins, ceramics and metals. In the meantime, carbon and graphite materials have also been developed for 3D printing of carbon parts. Although these are often forming processes, no special tools are required for a specific product, which have stored the respective geometry of the workpiece (for example casting moulds).

3D printers are used in industry, for making model and for research to produce models, samples, prototypes, tools, end products and for private use. There are also applications in the home, entertainment, construction, art and medicine.⁴



3D printing can be used in almost all production processes. At present, the printing speed is (still) relatively low, so that only small series or individual production makes sense. However, as production is already "on demand", especially for high-quality goods, and customers expect individualised products, this - in conjunction with the other technologies described above - will lead to a revolution in our society, especially in cities.

New technologies change our world

Fifteen minutes to go to work, for shopping, to the doctor or to the kindergarten in a quarter of an hour: after the Corona pandemic, the vision of the 15-minute city is more topical than ever. But will this be possible in our grown cities? How are urban planners facing up to these challenges, what opportunities are opening up thanks to new technologies?

The following story will deal with these issues:

⁴ : <https://de.wikipedia.org/wiki/3D-Druck> (2020-10-12)

I had a dream

Frank lives with Jana and their two children Jens and Karolina in a suburb of Berlin. A five-room flat allows him and his wife to do some of their work online, i.e. in their home office. Thanks to the fast communication networks, the connection to their companies, but also to customers and suppliers is unproblematic; most of the work can be done online. But both Jana and Frank of course have to be at the company office few days a week.

Frank's company produces spare parts for high-quality printers in the middle of the city. Whereas the company used to be far out in the country, it is now located in the middle of the city: the shortage of labour was the cause. The employees no longer wanted to have to travel long distances. Since modern production methods are no longer geared to large quantities but to small series, the move to the city centre was an obvious choice. The company is supplied early in the morning by automated delivery vans. They bring the goods from "goods hubs" in the surrounding area to the city districts.

Frank's task is to coordinate production with customer orders; this is usually a time problem, because customers need the spare parts as quickly as possible, but keeping all variants in stock is too expensive.

Jana works in sales for a marketing agency. Customer contacts such as the joint development of marketing campaigns, inspiring meetings with each other are an important part of her work. Not everything goes online!



Both used to have a car each, but now they drive to work in the city (at usually different times): first with a self-driving public transport minibus, which picks them up at home a few minutes after ordering and - together with some other passengers - takes them to the next train station. If the

journey has to be particularly fast, self-driving taxis can take passengers to their destination thanks to the fairly open roads.

But living with technologies that were unthinkable 20 years ago is leading to further changes:

- Recently, Jana was ill and had to contact her family doctor. This was done online, of course; her blood values were also checked online: Fortunately without serious findings.
- The locomotive of Jens' electric train (something so old-fashioned is back in!) had to be repaired because the housing was broken. With a 3D printer suitable for everyday use and the corresponding printing instructions, the part could be quickly reproduced.

When the children Jens and Karolina move from the local primary school to secondary schools further away, public transport connections are a possibility. But the family is considering the alternative of moving back to the city:

Whereas in the past there was one car for every two inhabitants, private cars are now an exception in urban areas. It is very easy to rent a car or to get to work or shopping (even decentralised again!) on foot, by bike or by public transport. AI-algorithms ensure that the vehicles are provided quickly. As a result, the streets are emptier and parking spaces have been converted into recreational areas. In addition, formerly large car park areas could be developed with flats. Life in the city has become quieter again, and thanks to better air it has also become healthier, greener and more sociable!

The energy supply of the cities is decentralised. On all roofs there are solar collectors, which provide sufficient energy for the city at least during the day. Alternatively, hydrogen is used for heating and for larger transport modes, but also as process energy. Hydrogen is produced in Spain, Greece and North Africa and pumped to Northern and Central Europe via existing pipelines - and also creates employment in these countries / regions.

And here is one last piece of news, which is rather alarming:

Frank just heard in the news that Mark Zuckerberg has been elected US president for the 4th time (although he still runs facebook and can therefore use his extensive power over social media).

So: "does not work" does even not exist in our dream world...

Conclusion: see new technologies as opportunities

Many people will lose their jobs due to the technological upheavals. Increased education and retraining efforts must be made to ensure that we do not lose (up to 50%) of the working population on the road to the future. But today we still have some time to make the transition soft. Just as we have managed in recent decades to replace lost job opportunities with new employment.

Companies should adapt to the new technologies at an early stage, seize opportunities and consider the risks of "business as usual". This is where controllers can help, controllers who must prove themselves not as "number crunchers" but as managers of the future.

A dream? Of course, we will need another 20 or 30 years to make this a reality. But without visions and without the first steps, we will never reach the goal of more livable cities, of lifting the separation between living, working and living.

ICV international work group

Leader of the ICV's international working group, which was founded in 2015, is Edyta Szarska, owner of Controlling Partner in Warsaw Poland, (www.controllingpartner.pl, e-mail: edyta.szarska@controllingpartner.pl)

She is assisted by the working group's management team:

Romina Oreskovic (HR), Group Finance Director at ORBICO GROUP, a Croatian company based in Zagreb and active throughout Europe (e-mail: romina.oreskovic@orbico.com) and

Dr. Herwig Friedag (D), experienced Berlin consultant with over 25 years of experience (e-mail: consult@friedag.com)

For further information, please see:

<https://www.icv-controlling.com/en/work-groups/international-work-group.html>

Each year a company is usually analysed to provide the target company with ideas, suggestions and ideas (but not a holistic management consultancy) for modern management in all areas of the company.



Use of Zoom in corona times

