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JOB DISRUPTION

Why the labour market of tomorrow knows only a few winners, but many losers.



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1 Winter is coming

Probably the most famous quote of the HBO series *Game of Thrones* stands for the prospect of significantly worse times that will soon begin. To some, this quote may seem an inappropriate introduction to a book on digitization and innovation. After all, *Game of Thrones* is a series that takes place in a fantasy world. A fantasy world that is bursting with brutality and gets by without modern technology. But on closer inspection, the parallels with today's world become obvious. Most of the characters in *Game of Thrones* are busy with their own smaller trench warfare and don't seem to see the real danger rolling towards them.

At the beginning of the series, the balance of power is clear: there are the dominant, the influential, who possess it. But over time, characters who at first seemed insignificant manage to gain more and more influence over a short period of time, in order to ultimately possess the real power. Changes of power of this kind can also be observed in our world today. While long-established companies are desperately trying to stay in power, new companies like Amazon, Google or Facebook are controlling their market segments and moving further and further into other business areas.

In *Game of Thrones*, there is the ultimate boss, the Night King, with his army of the dead. If a human dies on the battlefield against this overpowering opponent, he fights only moments later on the side of the dead against the former allies. It's similar with today's jobs: As soon as a job is replaced by new technologies (dying), it's added to the "digitization army" at the same time. So this job is irrevocably lost for people. But does this comparison with digitization reflect the opinion of society? Is digitalization really seen as something bad or evil?

The digitization index D21, a study funded by the Federal Ministry of Economics and Energy,¹ provides an insight into this. In the study, 32 % of those surveyed stated that digitization was overtaxing them. In the same way, half of the respondents indicated that they refused to work with a robot that acted similarly to a human colleague. But travel in a self-propelled car was rejected even more. As many as 66 % of those surveyed stated that they feel uncomfortable using this technology. But despite these survey results, companies like Google, Tesla and Apple are investing billions and billions to make this technology possible. Do these companies know better than society? Possibly, because as Henry Ford said a century ago: "If I had asked people what they wanted, they would have said: 'Faster horses'." Today, however, hardly anyone would trade their car for a horse.

As the chapter title suggests, this book is not an example of optimistic literature. Rather, this book is intended to show what we as a society will face in the coming

¹ <https://www.jobdisruption.com/xyoblfx>

years. In the past, there were many thought leaders, scientists and visionaries who were very wrong about their vision of the future. This is why only technologies that already exist in practice today are presented in this book.

2 The four apocalyptic horsemen

The four apocalyptic horsemen form the core of this book. These are based on the messengers of the approaching Apocalypse from the sixth chapter of John's Revelation. Each of these apocalyptic horsemen is, in his own way, responsible for the fact that millions, if not billions, of jobs will change as a result of digitization. This does not necessarily mean that each job will only be done by one machine. Also, in the future, it will still make more sense in many cases to use a human being instead of machines or software. What is changing, however, is the value added. While in the past, profits were relatively widely distributed, tomorrow's value chain knows only a small number of winners. These winners have the potential to dominate the entire market.

2.1 The first apocalyptic horseman: Robots

If a journalist were to ask different people what robots might look like in the future, one or more interviewees would certainly think of the image of the Terminator T800, or something like it, a robot that looks like a human, but isn't a human. Under an organic shell of skin and hair, there are neither muscles nor bones, but only an endoskeleton made of cold titanium. Of course, this has nothing to do with reality. Already there are many robots that have as little in common with the Terminator as fire has with ice.

Over millions of years, evolution has established that our physique and brain structure are the measure of all things. This has allowed us to become the superior species on this planet. At the same time though, this does not necessarily mean that our body is best suited for every area of application. In nature there are countless living beings who have a fundamentally different body structure, which enables them to be clearly superior to us in various situations.

Currently, Usain Bolt holds the world record for the 100-meter distance at 9.58 seconds, but against a cheetah even he would lose. A cheetah only needs about six seconds.² The Boston Dynamics team has studied the running behavior of a cheetah and tried to develop a robot that uses its running technique. On the treadmill, this robot is already a little faster than Usain Bolt.³

This makes it clear that a universal robot is not always the best solution. Therefore, the shape of the robots is often adapted to their function, and there are a variety of robot types:

² <https://www.jobdisruption.com/xyob2fx>

³ <https://www.jobdisruption.com/xyob3fx>

Service robots

This category includes robots that perform various services, such as vacuuming, wiping or lawn mowing for humans.

Medical robot

This class of robots supports doctors in operations and examinations, for example, when absolute precision is required.

Industrial robots

These robots are often used in the automotive industry and help to manufacture vehicles and other things.

Autonomous mobile robots

In some cities there are already buses that bring their passengers autonomously from A to B.

Exploration robot

An exploration robot can be used, for example, to track down people trapped after an earthquake. After the nuclear accident in Fukushima, such robots were used to inspect reactors for damage.

Military robot

These robots are machines that can be used in the field and help soldiers to transport luggage. This category also includes remote-controlled combat drones that can attack targets around the world.

Humanoid Robots

These are robots whose construction is based on the human form. The motion sequences are similar to those of humans. These robots usually also have cameras and microphones to interact with humans.

What almost all these have in common is their high price compared to consumer electronics. Often even the costs for a simple robot are in the six-figure range. The more specific the application, the more expensive it becomes; in the medical field, the acquisition costs can even be in the millions. But when it comes to solving a task in exactly the same way each time, robots are now the means of choice.

Whenever the task varies though, it makes more sense to use a human, because robots have the disadvantage that they adapt poorly to a changing environment.

But how can it be that, with all the progress made in sensor technology, in engine development, and of course, in the field of artificial intelligence, robots can do so little compared to humans?

Theoretically, we already have the tools to build robots that can take on many different tasks, but there is a lack of practical implementation. The car manufacturer Tesla was on the verge of bankruptcy because production in the group was too strongly automated. The robots simply could not meet the requirements, so the processes were changed so that humans took over the tasks of robots again.⁴

It is easy to understand why there is a lack of implementation. If, for example, a person reaches into a box to remove an object, the brain unconsciously makes various assumptions: What weight will the object have? How much pressure must be applied so that the object is neither crushed nor slides out of the hand? Where is the best place to reach to access it?

A lifelong learning process enables us humans to find answers to these questions. As children, we find it difficult to take an object out of a box, but as time goes by, experience makes such simple tasks no longer a problem. If a robot now tries to learn to grab objects and move them to another location, it will need significantly more attempts than a human to complete this learning process.

This is because almost all new robots use artificial intelligence algorithms for the learning process. In most cases, these algorithms depend on seeing several thousand examples before they can perform tasks independently. Research is being done to develop algorithms that can learn from a few examples, but this still remains a huge problem in computer science.

The speed of learning can be increased to some extent by using several robots at the same time to build a collective experience, but this parallel learning structure has a serious disadvantage. Each robot is unique due to small inaccuracies in manufacturing.

These component tolerances provide for a so-called butterfly effect. Small differences add up and have a big effect at the end. As such, these inaccuracies can lead to the data obtained by robot A not being suitable for robot B and vice versa. A further problem, as mentioned before, is that robots are still very expensive, which is why their extensive use also leads to high costs.

In practice, attempts are made to solve the problem by means of simulations, replicating the learning process, which in reality would take years, within a few days. But our world is complex, which makes it difficult to create a comparable simulation environment. The problem of inaccuracies is not solved by this approach either, so it has to be considered separately in the simulation. One way to implement this is to constantly change the properties of the robot in the simulation. This increases the

⁴ <https://www.jobdisruption.com/xyob4fx>

chances that component tolerances will only have a negligible influence on the function of the robot in the real world. How well this works in practice can only be checked in reality, and these tests can only be carried out in real time.

This problem leads to the fact that development in the field of robotics does not progress as fast as it does with software alone. Nevertheless, there is clear progress in this sector that would have been unthinkable a few years ago.

A leading example is the robot Atlas, from Boston Dynamics. This robot can run without problems on two legs in the snow and even master complete courses.⁵ He can even do a somersault backward from a standing position without any problems, which only very few people can do.⁶

The media often talk about the robot Sophia, by Hanson Robotics. This robot already looks amazingly similar to a human and has mastered the ability to imitate human facial expressions. Even having a conversation with Sophia is possible.

If research in these areas can be continued and combined, it could be possible to develop a robot that can solve tasks similar to those of humans, although this is not foreseeable at the present time.

As a result, in the near future, there will only be robots in practical use that have been developed for a specific task. Even if these specially developed robots are still comparatively expensive today, they will become increasingly cheaper over time, and with an increasing range of functions. The small robots of the company Universal Robots (UR) can play an especially important role here. Based in Denmark it is the world market leader for so-called collaborative robots, Cobots.

These are the little brother of the big industrial robots. While industrial robots have so much power that they can easily tear a person in two, Cobots are usually unable to injure humans. That is why they are allowed to work with them without safety precautions. The simple legal provisions are not their only advantage. These robots are also much cheaper than industrial robots. The disadvantage of the Cobots is that their low weight does not allow them to carry out certain activities.

Nevertheless, the International Federation of Robotics (IFR) estimates that the share of these robots will increase to 34% by 2025. This is ten times the current value.⁷

These figures clearly show that the entry of robots into the world of work has only just begun.

⁵ <https://www.jobdisruption.com/xyob5fx>

⁶ <https://www.jobdisruption.com/xyob6fx>

⁷ <https://www.jobdisruption.com/xyob7fx>

2.2 The second apocalyptic horseman: Artificial Intelligence

Even now, robots are equipped with artificial intelligence. For a better distinction, the second apocalyptic horsemen only stands for bodiless artificial intelligence. The application scenarios differ fundamentally. Artificial intelligence in a robot is used to control its body and thus give the robot the possibility to perform various functions or activities.

The central difference between a normal computer program and an artificial intelligence is that in a normal computer program, the programmer determines the rules and processes. This is not the case with artificial intelligence. Here, artificial neural networks are fed with a large amount of data.

But not everything which has the label artificial intelligence is artificial intelligence. In computer science, it is used as a generic term for machines that are able to solve problems themselves. This definition is often used in marketing, where companies claim that artificial intelligence is used in their products. This sounds good, but frequently has nothing to do with the breakthroughs in artificial intelligence achieved in recent years. This is because techniques such as "deep learning" or "reinforcement learning," which are based on artificial neural networks, were used there.

The basic idea behind artificial neural networks is to imitate the behavior of the human brain. There are a huge number of neurons in our brains; strictly speaking, the average is eighty-six billion neurons in one brain,⁸ but we have only had this insight for a good hundred years. It used to be believed that the brain was an undifferentiated tissue. However, in 1901, the Spanish physiologist Santiago Ramon y Cajal recognized that the networking of nerve cells determines a direction for the transmission of information. It was found that the coupling of the nerve cells corresponds to a hierarchical system.

This construct of neurons used in the brain can be artificially reproduced in parts. The structure is called an artificial neural network. But it should not be confused with real human intelligence, because researchers have not yet discovered how our intelligence really works. Therefore, the techniques used in artificial neural networks differ significantly from the biochemical processes in our brain.

The methods used today in computer science are referred to as weak artificial intelligence. But that doesn't mean it can't beat us in sub-areas. When an artificial neural network is fed with large amounts of data, it is able to make various assumptions. Based on these assumptions, it can make decisions that the computer system implements in the next step. Nevertheless, this process has little to do with our intelligence.

⁸ <https://www.jobdisruption.com/xyob8fx>

For a long time, it seemed that research in the field of artificial intelligence was not promising. Sergey Brin (the co-founder of Google) said in an interview in the 1990s that everyone knew that artificial intelligence does not work. But only a couple decades later, AI is part of almost every Google project.⁹

There are two main reasons for this great advance:

- the exponential increase in the amount of data available, and
- the exponential increase in computing power.

The volume of data generated has risen sharply in recent years. In 2012, it was predicted that the amount generated worldwide in 2016 would be just over 10 zettabytes.¹⁰ In fact, the data volume in 2016 was already 16.1 zettabytes. For the year 2025, it is estimated that the annual volume of data generated will be 163 zettabytes.¹¹

These large amounts of data must, of course, be processed. Nowadays the calculations for creating artificial neural networks are not carried out on processor architectures known from the home computer, but on special GPU architectures. GPU architectures are graphics processors that are otherwise only used for processing computer games. It turned out that these are also particularly well suited for the mathematical calculations needed for artificial neural networks. NVIDIA - a major manufacturer of GPU systems - announced in May 2017 that in 2025 the performance of the GPU architecture would be a thousand times higher than that of the architectures used in normal computers (CPU).¹² These forecasts suggest that further major progress will also be made in the field of artificial intelligence in the coming years.

But already, the application possibilities are revolutionary. Language assistants like Alexa, Siri or Google Assistant seemed to be far away ten years ago, but have now arrived in everyday life. Probably the most revolutionary advance in artificial intelligence in recent years has come from Google, an achievement that even specialists said was at least ten years away, or might never even be reached. In March 2016, Google proved that these specialists had miscalculated, because that month, Google's artificial intelligence, AlphaGo, played against the recognized best Go player in the world, Lee Sedol. In this duel, man against machine, five games were played, and in the end the machine won the series 4 - 1.

⁹ <https://www.jobdisruption.com/xyob9fx>

¹⁰ <https://www.jobdisruption.com/xyob10fx>

¹¹ <https://www.jobdisruption.com/xyob11fx>

¹² <https://www.jobdisruption.com/xyob12fx>

One could assume that this is not something unusual, but something that might be useful for a side note on page 13 of a daily newspaper. After all, the best chess professional was dethroned by a computer system in 1997. But there is a big difference between chess and Go. Chess isn't as complex as Go. Go cannot be solved by strong computing power like chess, because the number of moves to be calculated in the game exceeds the number of atoms in the universe.¹³

When the best Go players in the world are asked why they made a particular move, they often cannot explain their move logically, because they chose it intuitively. So it's a gut feeling, what felt good.

During the five games between Lee Sedol and AlphaGo, two moves went down in history. In the thirty-seventh turn of the second game, Google's artificial intelligence placed a building block on the fifth row. This move was so unusual in the context of the game, that the commentators who followed the event live considered it to be an input error. It was an unthinkable decision, for up to this time the general doctrine was that such a move, at such a point, was always a bad idea.¹⁴ But it was because of this move that AlphaGo finally won the game and rewrote thousands of years of history. In Asia, the Go culture has existed for over 2,500 years. In China, there are even special Go schools where talented children are trained and encouraged.¹⁵

The second move that went down in history did not come from AlphaGo, but from Lee Sedol. It was move #78 in the fourth game. At that point, the commentators said it didn't look very good for Sedol and that he would have to do something special, or otherwise lose the game. He thought about his next move for thirty minutes and then played exactly that special move surprising both the commentators and AlphaGo. This was exactly his intention: to confuse the opponent. According to internal calculations, AlphaGo actually only gave this move a one in ten thousand chance that a human would play it. AlphaGo's countermove was retroactively a catastrophic mistake that caused it to lose the game. Here is a nice parallel to us humans. We too are sometimes exposed to a situation that surprises us and in which, looking back, we ask ourselves why we reacted so badly in that moment. After all, there would have been so many better alternatives.

After the Go tournament, there were still a few optimists who hoped that humans would ultimately have a chance against AlphaGo. After all, Lee Sedol managed to win a game. But now, this chance is practically no longer given. At the end of 2017, Google introduced a new version of its artificial intelligence called AlphaGo Zero, which not only requires twelve times less resources, but is also far superior to the old

¹³ <https://www.jobdisruption.com/xyob13fx>

¹⁴ <https://www.jobdisruption.com/xyob14fx>

¹⁵ <https://www.jobdisruption.com/xyob15fx>

AlphaGo version in terms of play. This new version beat the old one 100 games to 0.

Another milestone was reached in August 2018. The artificial intelligence of the non-profit organization OpenAI won a five-to-five match in the computer game Dota 2 against a human team. The five human players who competed against the artificial intelligence were among the 0.05% of the best Dota 2 players in the world.

The main difference between this game and the game Go is that not all the information is visible. This means that players, like artificial intelligence, must make strategic decisions based on limited and non-existent information and constantly try to validate their information. Another big difference is that Go is a turn-based game. Players make their moves alternately, one after the other, while in Dota 2 the actions are executed simultaneously in real time.

AlphaGo Zero learned Go independently and without external input. With artificial intelligence for the game Dota 2, the OpenAI developers went a different way. They gave the system a large number of variables and thus only allowed it to learn certain aspects independently. Nevertheless, this is a great achievement in the field of artificial intelligence.

Currently, Google is researching the next milestone: to master the computer game Starcraft 2. Oriol Vinyals of DeepMind stated in an interview in March 2018 that he could not predict whether they would succeed in developing an artificial intelligence that could beat the best players in the world in Starcraft 2.¹⁶ Less than a year later, however, this hurdle was overcome. In January 2019, DeepMind introduced the artificial intelligence AlphaStar. It won at a rate of ten to one. A closer look at the games shows that artificial intelligence handles certain aspects of the game much better than humans ever could. At the same time though, it also showed tactical and strategic weaknesses. If AlphaStar succeeds in eliminating these weaknesses in the next version, this discipline will also go to the machines.

But why is so much time and energy being invested in developing systems that can beat the best computer players in the world?

A computer game has several advantages. In contrast to our planet, it represents a much less complex world. In addition, activities and action sequences can be carried out faster than in real time. This makes it possible, for example, for a computer system to build up experience within a few hours, for which people would need years or decades.

But all of this is not decisive. Rather, it is about the possibility of transferring a developed technology to other areas. DeepMind, the Google subsidiary behind the

¹⁶ <https://www.jobdisruption.com/xyob16fx>

artificial intelligence of AlphaGo and AlphaGo Zero, differs fundamentally in its approach from the developments of OpenAI. DeepMind is about developing a universal algorithm that not only masters one activity, such as beating the best Go player in the world, but can also be used in other areas. This is exactly what they demonstrated with AlphaZero, not to be confused with AlphaGo Zero. AlphaZero learned chess in a very short time, and after four hours was already better than the world's best chess program, Stockfish 8.¹⁷ Out of 100 games, AlphaZero won 28 - and 72 were draws. AlphaZero didn't lose a game. The development years that flowed into Stockfish 8 to create the best chess program in the world became meaningless within a very short time.

Many people today think, "I have so much experience in my job that a machine could never learn it in a very short time." Progress in the field of artificial intelligence shows that this does not always have to be true.

¹⁷ <https://www.jobdisruption.com/xyob17fx>

2.3 The third apocalyptic horseman: Virtualization

While the potential for change of robots and artificial intelligence through media representation is generally known, the effects of virtualization are virtually unknown. This unknown has consequences: Almost all studies look at the impact of technologies such as robots and artificial intelligence on the job market, but the other aspect of digitization is often ignored.

Particularly critical is the fact that researchers and experts tend to point out jobs or activities that cannot be performed by robots or artificial intelligence as safe. Listening to the keynote speech by Dr. Britta Matthes, head of the research group Occupational Labor Markets, toward the end of the speech one is presented with various jobs that have been newly created in recent years and have potential for the future.¹⁸ She highlights creative jobs such as UX designers or game-world designers that cannot be taken over by computer systems today. This statement is correct at first glance, but quickly leads to the false conclusion that these jobs are safe. The opposite is the case: Jobs or activities in which digital products such as the design of a user interface are created are much more at risk of falling victim to digitization.

Suppose an artist draws a picture and sells it in his gallery. He can only sell this drawing once, because as soon as the picture has changed hands, it is no longer in the possession of the artist. In the digital world, the case would be a little different, because a copy would simply be made and sent to the buyer. Thus the artist keeps his picture, even if he sells it.

In the physical world, the image must also be handed over. This can be done in person at the gallery or by a courier such as Deutsche Post. However, if the buyer is in Australia, courier transport will take some time.

In the digital world, it makes no difference where the buyer and artist are located in relation to each other. As long as there is a digital connection between them, the image can be transmitted in seconds.

These differences change the rules of the market and lead to two important effects:

- almost complete market transparency
- very short reaction time between supply and demand

For example, if a customer searches the Internet for a digital product, such as a course on dog photography, they can usually purchase it online and view it immediately. At the same time, the customer also sees whether other providers offer courses on the same topic.

¹⁸ <https://www.jobdisruption.com/xyob18fx>

A high degree of transparency is achieved not only by the fact that the price of each provider is visible, but also by the fact that evaluations of the quality of the product are available. These reviews are usually created by other clients and help potential new clients make the best personal choices.

In the physical world, this is different, because a local shoe shop in Düsseldorf only competes with other local shoe retailers, but not with a shoe shop in Munich. In theory, 3.5 billion people can be reached simultaneously on the Internet and as a result, all online merchants in the same product category are in a direct competitive situation.

This global competitive situation often creates unfair advantages. The first company to offer a product develops a strong superiority. Suppose there are two manufacturers of smartphone cases that are sold through Amazon. Manufacturer A has been selling this product for several months and has already received five hundred positive reviews. Manufacturer B is new to the market and has no reviews yet. If a customer feels that both shells are equally good, they will usually choose the product from manufacturer A, because a number of other customers have already had a positive experience. For the customer, the risk of buying an unknown product is greater than that of buying a product with which numerous other customers have already had positive experiences.

Of course we don't have to pay attention to evaluations, but we are social beings, and the experiences of other people help us to make objectively better decisions, where we would otherwise have to rely on our gut feeling.

If customers are now more likely to buy the product of manufacturer A, the chance increases that this manufacturer will receive further positive ratings and extend its lead. However, evaluations must be viewed critically. For a customer, the difference is of course greater if manufacturer A has collected five hundred positive ratings and manufacturer B has collected zero, than if manufacturer A has collected a thousand and manufacturer B has collected five hundred.

The impact of this difference in practice naturally depends, to a large extent, on how important the valuations are to the customer. Nevertheless, it can be clearly shown that the existing transparency makes it more difficult to enter an existing market with a similar product. This is why start-ups are often recommended not to serve the entire market, but to go into a niche.

In addition to transparency, speed is the second important factor. In the case of digital goods, the customer usually receives their goods immediately, depending on their type and volume.

In general, it can be said that the speed of the exchange of physical goods is increasing more and more. Amazon is already testing deliveries within an hour in various

cities. In the past, it was customary in the mail-order business for the delivery to take a week or longer. Customers have now become used to the high speed and expect deliveries in the shortest possible time. This puts more and more pressure on the local trade, because their biggest advantage is that the goods are immediately available. If general delivery time is reduced further, the local trade loses its most important edge and the price comparison becomes more and more decisive.

Local trade used to be of vital importance for almost all producers. This is still the case in many examples, but the monopoly position is weakening. Previously, only local retailers had access to customers, but with the advent of platforms like Amazon, this has changed. So it's no surprise that several major manufacturers such as Nike have decided to sell their shoes directly to consumers via Amazon. It should be clear that this will have a direct impact on the business model of existing local shoe retailers.

Anyone who now believes that the development outlined applies only to capital goods is mistaken, because services that have no physical elements can also be booked via the Internet. Already there is the option to find freelancers for almost every activity on platforms such as Upwork - the largest freelancer platform in the world. Contractors and customers have the opportunity to evaluate each other. In addition, contractors can create profiles and publish examples of their previous work.

If a client wants to offer a new job, they can create a project description to which freelancers can apply. It is also possible for the client to invite specific freelancers to their project.

But because there are often many applicants for a project, the freelancer who wants the job must somehow stand out from the crowd. There are two ways to do this: either with their profile and the ratings they've achieved so far, or with their price. If a freelancer has no ratings, they have little choice but to lower their price to build a reputation that will ultimately allow them to land better-paid jobs. This does not yet take into account the fact that there are many countries in which the cost of living is relatively low compared to Germany. Freelancers from these countries are therefore always able to offer a better price.

While in the past, service providers and companies only had to fear the competition in their own locations, today it is a global competition that is much more difficult to avoid. It becomes even more difficult when the users or customers of a product represent additional value. This results in a so-called network effect, which inevitably ends in a winner-takes-all scenario.

In simplified form, this network effect can be shown using the example of a telephone. If only two people in the world had a telephone, only one connection could be established between those two people. Now, if five people had telephones, ten

connections could already be established between them. With just an additional seven people, up to twelve, there would already be sixty-six connections.

This means that the more people who own a telephone, the more valuable the telephone becomes for each individual owner, because the person can reach more and more people. The number of people in such a network has a value. If there are two different networks, and one has fifty thousand members, while the other has only fifty, the network with fifty thousand is much more valuable, because many more people can be reached there.

For companies that develop products that have a network effect, it is clearly particularly important to quickly attract a large number of users. If the companies succeed in doing so, they will have the best chances of monopolizing this segment.

A good example is WhatsApp, which is used by more than a billion users every day. If a competitor were to bring a similar app to the market that WhatsApp could match or even slightly underperform in functionality, this app would have little chance of success due to the network effect. If someone who hasn't had a smartphone before asks their environment which messenger app they can use to reach their friends, they are very likely to install the app that can reach the most people. Once a critical mass has been reached, a company can hardly be deprived of its supremacy.

Even large, influential corporations fail at this hurdle. In 2010, Google launched a Twitter competitor called Google Buzz.¹⁹ Less than two years later, Google discontinued the service to focus on Google+. Google+ was a competitor to Facebook. Google tried to force usage by requiring Google+ to pair with other company services, such as YouTube. This meant that people who wanted to write comments under a video, for example, needed an account on Google+. But even this drastic measure was not successful. Google never succeeded in establishing a comparable competitor product to Facebook. In 2015, Google decided to remove the mandatory pairing.²⁰ Meanwhile, Google+ has been discontinued.

Microsoft has had a similar experience with its search engine Bing. Microsoft is still trying to establish a competitor product to the Google search engine on the market. However, despite Bing's default setting as the standard search engine in the Windows and Windows Mobile operating systems, and in the Microsoft assistant Cortana, Microsoft has never managed to achieve a significant market share vis-à-vis Google.

In Germany, over 90% of all Internet users use Google as their search engine. At less than 5%, Bing's share is far behind.²¹ Google's search engine could be assumed to be a normal product, and the individual user, unlike messenger services, would

¹⁹ <https://www.jobdisruption.com/xyob19fx>

²⁰ <https://www.jobdisruption.com/xyob20fx>

²¹ <https://www.jobdisruption.com/xyob21fx>

have no value. For the user, it is not necessarily important whether other people also use the search engine, because they are only looking for an answer to their problem. But this assumption is wrong, because with every search query, the user transfers further data to Google. In addition to the search word, there is the time of the search, the operating system of the smartphone or computer, the approximate location of the user and how the user reacted to the search results displayed, such as which search result the user clicked on and how long they stayed on the linked website. In the same way, Google records whether the user returns to select a different search result because they did not find what they were looking for in the first hit. All this data ensures that Google can improve its product with every search query.

Once the critical mass of users has been reached, this does not necessarily mean that this result will be held forever and ever. Innovations can attack this supremacy, because with high transparency, customers can judge well whether a product is better or worse than the competition. The Cologne-based company DeepL has recently gained more and more market share over Google's translator Google Translate, because the translation quality of DeepL is noticeably better.

The fact that DeepL is perceived as better is due to the excellent data quality. For years, DeepL, formerly called Linguee, has done nothing but collect high-standard translations and evaluate them for quality by human editors.

Google's translations are based on its own system, called "Google Neural Machine Translation." DeepL takes a different approach here. It uses "Convolutional Neural Networks," a technique of machine learning that is mainly used to classify images. These two innovative changes over Google create a competitive advantage that allows DeepL to compete with its rival. If both systems were to use the same technology and the same data basis, DeepL would hardly have a chance of attracting the general public.

In order to compete with a digital product in global transparent networks, an innovative approach is needed in order to make the product distinguishable. Otherwise, there is a high risk that the product or service that more quickly becomes known to the population will dominate the market. This rapid growth usually costs a lot of money and is one of the main reasons why there are virtually no large digital companies in Europe.

There are many examples of dream growth rates and high losses. Facebook, Airbnb and Uber were gigantic money destruction machines in the beginning from a traditional commercial point of view, but today they have monopolies in their fields.

But what happens if there is no or only a small innovative approach to a digital product? In this situation, prices are falling towards zero. There are numerous examples of this, whether with music, films, navigation systems, or news services. Within less

than two decades, price margins in this sector have almost disintegrated. Many people used to buy daily newspapers, but only one in a hundred readers who used to buy newspapers pays for digital online services.²²

If a company tries to stick to the existing model, there is a good chance that it will sink. Blockbuster had the opportunity to buy Netflix, but continued to stick to its existing video store business model. Many companies want to avoid this negative example and that is why almost all industries are trying to transfer a large part of their added value to the digital world by innovating their business models.

There, the margins are clearly smaller, but it creates an enterprise to secure the supremacy and earn, due to the winner-takes-all principle, substantially more. If there is only one winner, it means, conversely, that there are inevitably many losers. This creates a large risk potential for millions of jobs.

²² <https://www.jobdisruption.com/xyob22fx>

2.4 The fourth apocalyptic horseman: X-Tralization

X-Tralization is the interaction of centralization and decentralization of services. In centralization, similar activities are carried out in one place. Decentralization involves the allocation of different tasks to different entities.

However, one system is not necessarily superior to the other, but often there is an interplay, depending on which technology is more suitable.

Cloud server architectures are a well-known example of significant centralization benefits. The popularity of these services has risen sharply in recent years, as companies no longer have to operate their own data centers, but can purchase the required computing power on a scalable basis from one of the large cloud providers. This has several advantages: there are savings in personnel who set up and maintain the hardware of the servers. This type of staff is usually well trained and comparatively expensive on the labor market. Because the hardware is rented monthly, the fixed costs can also be calculated much better. In addition, there is no need for large initial investments. This in turn reduces the risk of a bad investment.

Suppose a company purchases servers designed to handle up to ten thousand customers simultaneously, but after two months' management realizes that well over ten thousand customers want to access the server at the same time, causing problems. In this case, new hardware would have to be purchased again. Alternatively, if the interest decreases after a certain period of time, then the extra servers will be hardly utilized, while still consuming a large amount of energy.

It is even more difficult for companies to react to short-term visitor rushes. If, an advertising spot is broadcast on television, this can lead to tens of thousands of people accessing the company's website at the same time, especially after it has been broadcast. The problem is similar on special days, such as Christmas, when the number of customers is significantly higher.

IT security also plays a major role. If companies have their own servers, they must also be protected against the latest security vulnerabilities. That is why it is important to employ trained personnel to take care of them.

Cloud providers such as Amazon Web Services (AWS) naturally have a large team of IT security specialists who protect the servers against attacks. Here, the use of cloud services, provided they are configured correctly, is usually more secure than using servers that you maintain yourself.

The benefits of purchasing computing power for businesses are obvious and it is not surprising that various companies with a valuation of billions have been set up on the basis of Amazon Web Services alone. One of these companies is Instagram. Before it was purchased by Facebook for one billion dollars in 2012, the team, which at the time consisted of only thirteen people, used Amazon Web Services to make

their app available to hundreds of millions of users.²³ Other examples of companies that have used AWS as a central foundation for their business model include Airbnb, Netflix, and Spotify.

Centralization of services does not only affect digital products. Activities that require many employees can also be centralized and made available as a service. Fulfillment by Amazon (FBA) is such a service. Amazon stores goods for other companies in its warehouses and sends them to the buyer. If a customer sends the product back because they don't want it after all, Amazon also takes care of the reverse processing of the order. In this case, one process of a value chain is taken over by another service provider, in this case Amazon.

The company that uses such a service again has many advantages. It requires fewer employees and no large warehouses, reducing costs. In many cases, the costs for shipping the items are also lower than if the company booked the service itself via a shipping provider such as Deutsche Post.

In addition to reducing costs, such centralized services also offer the option of scaling. If the order offer increases, the company can grow quickly by simply adding new services. Conversely, if the order offer is decreased, you can react quickly by reducing the number of services.

Of course, this practice does not only apply to digital services, but can also be transferred to other industries. An example of this is Wework; with this business model, long-term leases are a thing of the past. Companies can rent individual rooms or entire furnished floors and terminate at the end of the month. For companies, this is a dream. You can make much better calculations with the monthly prices, as there is no long contract commitment and therefore virtually no risk.

It should be noted that X-Tralization does not consist of centralization alone, but rather of the interplay of centralization and decentralization. The best known example of decentralization is Wikipedia. Encyclopedias such as Encarta or Brockhaus used to dominate the market. But since the breakthrough of Wikipedia, they no longer play a role. Wikipedia replaced a centralized structure with a more efficient and better decentralized structure. As such it cannot be said that one structure is superior to another. It strongly depends on the application and the circumstances.

Another example of decentralization is Airbnb where overnight accommodations are distributed in a decentralized fashion, in individual properties. This enables travelers to find overnight accommodation in a city independently of hotels. Luxury hotels are probably not threatened by these developments, but Airbnb is a direct competitor for smaller hotels or guesthouses that do not offer great comfort.

²³ <https://www.jobdisruption.com/xyob23fx>

Data scientists are among the best-paid workers, and finding them for businesses is anything but easy. But why hire these people in the first place when you can out-source the problems they are supposed to solve? Kaggle is a prime example. On this platform, competitions are held to develop the best algorithm to solve a problem. The team or person who finds the most efficient solution wins prize money. The participants do not have to come from the respective subject area. If, for example, biomarkers are to be correctly identified, the winning team does not necessarily have to have an understanding of biology. The opposite is often the case. Innovative ideas and approaches often come from outside an industry.

What is striking about all these platforms is that we are experiencing X-Tralization in its purest form here. We have a centralized platform that can be used by everyone, but at the same time we have many decentralized units that also offer services or products.

Although this X-Tralization has immense advantages for companies and their customers, it also has a negative impact on the labor market. Due to the advantages, companies will, in the future, rely more strongly on service providers that offer various services at a fixed price through centralization. At the same time, new competition is emerging from decentralized providers who offer various services on the side. As a result, many jobs that companies have previously created internally will become more standardized and will be outsourced to new service providers in the next step. This is likely to result in the loss of many traditional jobs.

3 Disruption in practice

In countless articles, newspapers describe a horror scenario according to which half of all Germans could lose their jobs within twenty years. But on the other hand, there are also enough articles that claim: yes, due to digitization one or the other job is no longer needed, but the effects are nowhere near as bad as some researchers claim. It's hard to say who's right, because in many cases hypotheses are made that cannot be proven by either side. Nobody knows exactly how the future will develop.

One thing that is much easier to predict is demographic change. In Germany, the average age in 2017 was 45.9 years.²⁴ If one believes the figures of the IAB research report from 2016, the number of employed people in the worst-case scenario could be reduced from more than 45 million today, to 36 million in 2060.²⁵ This would equate to a reduction of 20% over the next forty years. If the productivity of a country like Germany were to fall in the next few years, the prospects for the future would be catastrophic. It is therefore of central importance for the economy to develop new technologies that generate higher productivity, despite demographic change. But the past has shown that in many cases, the use of digital systems leads to many losers and few winners. This chapter shows what changes can be expected in different industries.

²⁴ <https://www.jobdisruption.com/xyob24fx>

²⁵ <https://www.jobdisruption.com/xyob25fx>

3.1 Banks

The banking sector is particularly under suspicion as a hub of future unemployment and this fear has a long tradition: When the first ATMs were put into operation more than fifty years ago, there was a lot of excitement because many bank employees were worried about their jobs. At that time, one of the main activities in banks was the deposit and withdrawal of cash. But bank employees did not become unemployed; on the contrary, more and more jobs were created in this sector.

Why do many experts today claim that a particularly large number of employees will be affected in the banking sector? After all, there were warnings in the past of high job losses in the sector, but the opposite ended up being true.

A glance at the figures for recent years explains the opinion of many experts, as the number of credit institutions in Germany has fallen by just under 25% since 2004 to 1,823 in 2017.²⁶

Not only has the number of banks declined, but also the number of branches and salaried employees. In Germany, for example, 722,000 people were employed in the credit sector in 2003, compared with only 586,250 in 2017. This corresponds to a decline of almost 19% in only fourteen years.²⁷

The reduction in the number of branches is even more serious. In 2004, there were 47,835 locations in Germany, falling to 36,005 by 2015; a reduction of just under 25% in eleven years.²⁸

These figures indicate that the credit and banking sectors are already feeling the effects of digitization and the worst is yet to come. Now 74.3 % of all transactions in Germany today are carried out with cash, compared with 82 % in 2011.²⁹ Economists such as Jörn Quitzau (Head of Economic Trends at Berenberg Bank) expect the share of cash transactions to fall below 50% by 2030.

Until now, card payments have often not been worthwhile for merchants, because banks have charged high fees. But in December 2015, a new European Union regulation on credit card fees came into force, limiting the so-called interchange fee to 0.3% of turnover.³⁰

As a result, many banks increased the annual fees that a customer pays for the provision of a credit card to compensate for the income lost from payment transactions. Such an approach may be a short-term solution, but in the longer term it will lead to customers switching to other providers with lower charges. Even if the use of EC

²⁶ <https://www.jobdisruption.com/xyob26fx>

²⁷ <https://www.jobdisruption.com/xyob27fx>

²⁸ <https://www.jobdisruption.com/xyob28fx>

²⁹ <https://www.jobdisruption.com/xyob29fx>

³⁰ <https://www.jobdisruption.com/xyob30fx>

and credit cards increases, the majority of Germans pay with cash. No other EU country pays more often with cash than we do.

In a direct comparison with China, we can look backward here. The so-called "Singles' Day" is the day with the highest turnover of the year, comparable to Black Friday in the USA. On this day, more transactions are carried out in China than in Germany in one year. Particularly noteworthy here is the fact that 60. % of customers already used biometric features such as fingerprints or facial recognition when paying for Singles Day purchases in 2018.³¹

The first German providers also now offer payment by smartphone, which is authenticated by a fingerprint or facial recognition. Payment by smartphone is not yet widespread. This is mainly due to the fact that it has only been possible to use the Google Pay service since June 2018.³² Mobile payment with the iPhone has only been possible in Germany via Apple Pay since December 2018.

But these services cannot be used by everyone, because they depend strongly on the bank with which the user maintains an account. Sparkassen and Volksbanken do not support Apple Pay, for example. This makes it impossible for many iPhone owners to pay via their smartphone. For the Android operating system, a separate technical solution was developed, which is not possible on the iPhone - Apple does not release its interface for other developers. It remains to be seen whether the banks will manage to assert themselves against Google Pay with their own solution. In October 2018, Google entered into a cooperation agreement with PayPal that enables all PayPal customers to use their smartphones to pay a multitude of merchants via Google Pay, e.g. Rewe, Kaufland or Aldi.

As if these changes weren't already worrying enough for the banks, more clouds are already gathering. In September 2019, a payment services directive with the abbreviation "PSD2" will come into force. This policy will not only force banks to give third parties access to their customers' account movements, it will also require them to allow third parties to carry out account transactions. Access to the account, however, will only occur if the customer gives permission, and it will be possible for the customer to choose which services receive permission and which do not.

The EU hopes that this new directive will significantly reduce the transaction costs that arise when money is sent from A to B. At the same time though, this also means that the banks will be losing not only parts of their sovereignty, but also their sources of money.

Another source of income for the banks is net interest income, but the key interest rate of the European Central Bank has been 0% since March 2016. The low interest

³¹ <https://www.jobdisruption.com/xyob31fx>

³² <https://www.jobdisruption.com/xyob32fx>

rate policy is melting the interest margin, which means that the banks are making less and less profits in this area as well.

At the same time, banks also have high costs. They must drive transformation, implement new processes and reposition themselves. This is why a number of banks have started charging customers for using their accounts in recent years. However, since not every bank charges fees for the provision of an account, such a procedure is always associated with the risk that the individual moves and the bank no longer earns any money at all from them.

Examples to date show how much pressure banks are under. If it were up to some crypto-enthusiasts, banks would be abolished and replaced by a decentralized system such as Bitcoin.

For each transaction, the bank acts as an intermediary and ensures that the transaction is carried out correctly. This control function can be divided between many different instances by clever usage of a variety of algorithms and computers. The transaction costs for the individual user who sends money around the world in the form of Bitcoin or other cryptocurrencies are low compared to the transaction costs of banks.

Be that as it may, the total costs of such a system are in reality significantly higher and are simply distributed among a large number of actors. The Dutch economist Alex de Vries has calculated in his scientific work that the minimum annual energy consumption of the Bitcoin network is 2.55 gigawatts. For comparison, Ireland has an energy consumption of 3.1 gigawatts.³³

It's not only the high electricity costs of the cryptocurrencies that are problematic, but also the manipulation possibilities. In general, it can be said that cryptocurrencies are well protected against manipulation, but in recent years there have been repeated thefts totaling in the millions.

Here, it was not the cryptocurrencies themselves that were attacked, but trading exchanges or services based on the cryptocurrencies. This, of course, makes no difference to those affected. As there is no central control authority, it is impossible for them to get the money back.

Moreover, countries such as China have no interest in transactions taking place from A to B without central control and in 2017, trade with cryptocurrencies was banned there. Whether the existing cryptocurrencies will become a danger for the banks remains to be seen.

Banks not only take care of smooth payment transactions, they also advise their customers on asset accumulation. Whether it's a building savings contract, loan

³³ <https://www.jobdisruption.com/xyob33fx>

financing or investment fund, a bank takes care of all these offers and in recent years, the number of so-called Roboadvisors has continued to increase.

Algorithms advise their clients which investment strategy is best for them. Credits can be conveniently compared online and the cheapest determined. Today it is still opaque for the customer, because often clauses are hidden in the small print and intentionally difficult for them to understand. This could change in the future. The Legaltech company Lawgeex, founded in 2014, specializes in investigating contracts with the help of artificial intelligence. Clauses that are problematic or violate applicable law are found and presented to the customer as a result.

In a direct comparison, twenty top lawyers competed against the artificial intelligence created by Lawgeex. The lawyers each had up to four hours to read through five confidentiality agreements and examine them for risks.

Subsequently, the reports were reviewed by law professors from Stanford, Duke and Southern California Universities. The best lawyer received a rating of 94 %, exactly the same value as the artificial intelligence. The worst lawyer had a score of 69 %. The average was 85%. While each lawyer took an average of ninety-two minutes to review the five confidentiality agreements, artificial intelligence needed only twenty-six seconds to analyze them.

This test shows what is already possible today. It doesn't take much imagination to see that something like this can also be developed for the banking sector, where the customer wants to examine the offers for risks and traps. This would create transparency that banks certainly do not want.

Developments are not good for jobs in banking. While trading in securities used to be loud and hectic on the floor, today, machines handle the transactions. Due to increasing competition from start-ups in financial technology (FinTech), banks' margins will continue to shrink in the coming years, leading to severe job losses.

3.2 Gastronomy

The fact that the catering and restaurant industries are threatened by high job losses will probably come as a surprise to many. That's logical, because if you look around here in Germany, there are hardly any restaurants that can manage without plenty of staff. There may be a few exceptions in Japan, where restaurants already manage without employees, but these have not yet become widespread. Regardless, there is no guarantee that jobs in this industry are safe and in order to understand why this business area is also massively threatened by digitization, it is advisable to take a look at the processes of a typical restaurant.

For this, we take as an example an Italian restaurant that is open from Monday to Sunday 17:30 to 0:00. Before the restaurant can open on Mondays, various precautions must be taken. The service staff must ensure that the guests feel comfortable in the restaurant. The tables must be decorated and equipped with clean tablecloths. The floor and the WCs must also be cleaned. When guests enter our Italian restaurant, they will be warmly welcomed by the reception staff. The diners will be asked whether they have made a reservation and will then be taken to the designated or free place. As soon as the guests have taken their seats, the waiter comes a little later to the table and hands them the menu. He then asks if they already know what they want to drink and takes the order. If the order is placed using a digital terminal, the drinks can be prepared by the counter staff at the same time. In a traditional order with pen and paper, the waiter has to enter the order in the cash register later, which causes an additional work step. After the guests have received their drinks, the orders for the food and any additional requests are taken. In the kitchen, the cook prepares the ordered meal. As soon as this step is completed, the waiter brings the meal to the table. After eating, the waiter takes the empty plates to the kitchen, where they are washed by the kitchen staff. As soon as the guests ask for the invoice, it is created by the waiter and then paid in cash or electronically. Since it is a security risk to store many cash reserves in the restaurant, these must be brought to the bank at certain intervals. Many restaurants and cafés in Sweden are already trying to avoid this additional step by simply no longer accepting cash. This happens to the chagrin of many tourists, who complain, but can do nothing else but pay cashless.³⁴

Of course, these are not the only activities that take place in the restaurant. In addition, bookings must be made, food must be checked for freshness, and marketing measures must be carried out. All these activities could only be carried out by an autonomous system with a lot of technical expertise and a high capital investment, which is why a large part of the processes in the catering industry still run exactly as they did twenty years ago. This does not mean, however, that the majority of jobs in

³⁴ <https://www.jobdisruption.com/xyob34fx>

this area are secure, as various chains are already beginning to make some of the activities described above more efficient.

In restaurant chains such as Vapiano, the concept of self-service is used. This is how it works: As soon as a guest enters the restaurant, they receive a chip card. With this chip card, they go to a terminal where orders can be placed. After they have placed the order with the cook, the food is prepared right in front of their eyes. So that it can later be allocated which guest has ordered what, the customer must place their card on a chip card reader when placing the order. The system then notes that a Pizza Margherita and an apple spritzer, for example, were ordered with this card.

At the end of the visit, the customer pays for the food stored in the system at the checkout. Because the customer brings their food to the restaurant table, personnel is naturally saved, in this case the waiters. By depositing food orders on a chip card, only one central cash register is required, which also leads to a reduction in staff. As all meals are already digitally recorded, the invoices can be easily and quickly integrated into the accounting system.

However, the fact that the customer carries out various activities leads to a reduction in comfort, because a service that the waiter has otherwise provided must be carried out by the customers themselves in this case. But reduced comfort is not the only disadvantage. Customers have to wait in long lines until it is their turn, as the preparation of food takes a certain amount of time. In a normal restaurant, the guest can spend this time at the table and talk with their partner, friends or business partners. In order to counter these handicaps, Vapiano is testing self-service terminals at various locations. These are computer terminals at which the customer can place their order via a screen. The costs for these terminals are comparatively low if the alternative is to hire more staff.

As soon as the guest has entered their order at the computer terminal, they receive a pager, which will beep as soon as the food can be picked up. This means that the customer no longer has to stand in line, but can talk to their companions. In addition, the waiting time is reduced, because the chef no longer has to ask the customer what food they would like and how it should be prepared. Instead, the chef just sees this information on a screen.

Self-service terminals are of course not only used by Vapiano. McDonald's has been using them for several years and has converted more and more branches to the new concept. Of particular interest here is the attempt to use an optimized user interface to get guests to pay by card instead of cash.

During the payment process, the question "Where would you like to pay?" appears on the computer terminal. The customer can choose between two different options.

The first option is: "Right here with card free of charge and simple," while the wording of the second option is: "Cash at a cash register (with waiting time if necessary)." But that's not all: The two options do not appear equally, but rather the first is clearly highlighted, while the second appears next to it in small font.

Although these are only small modifications, they can have a major impact. There are numerous studies that have shown what influence the design of interfaces has on the behavior of users. One of these is the study by psychologists Eric Johnson and Dan Goldstein. They examined the role of standard selection in deciding whether someone is willing to donate organs. The result was clear: the pre-selection process largely determines whether someone becomes an organ donor or not. Therefore, the organ donor rate in Germany is only 12%, but in Austria, Belgium and France it is over 99%.³⁵

The study by Ryan Hamilton, Jiewen Hong and Alexander Chernew is also impressive. In their experiment, potential buyers evaluated two different sofas, labeled A and B. Sofa A had a soft and comfortable upholstery, but was not so durable. Only 42.3% of respondents preferred this sofa to the more durable alternative, B. However, when three more sofas - C, D and E - were added to the choices, 77.4% opted for Sofa A with the softer and more comfortable upholstery. This does not make sense rationally, because if more options are added, this should ensure that fewer people take variant A. Instead, the opposite occurred, and variant A was chosen significantly more of the time.

What had happened? The quality of the newly added sofas was significantly worse than that of either A or B, so the customer could really actually only choose between A and B still. Who voluntarily takes poor quality? However, sofas C, D and E were not as comfortable as sofa A.

Sofa A thus had a unique selling point, in the area of comfort, which led to 77.4 % of respondents opting for this sofa, an increase of over 35%. The authors named this effect the "Perceptual Focus Effect."³⁶

Knowing that customer decisions can be influenced by intelligent changes in the business environment, it is understandable why McDonald's presents certain options differently.

Since the beginning of 2017, the Group has been testing a further digitization concept in which the guest receives a small Bluetooth sensor to which their order is assigned. This enables the waiters to find the right guest in the restaurant. This of course increases customer comfort, as the customer now gets their food brought to the table. McDonald's plans to introduce this concept in all branches.

³⁵ <https://www.jobdisruption.com/xyob35fx>

³⁶ <https://www.jobdisruption.com/xyob36fx>

In recent years, McDonald's has invested a lot of money and time to promote this app. Even though the reviews are rather bad compared to others, McDonald's has succeeded to the degree that it is often among the most popular in app stores.

With the help of the app, even more possibilities can be realized. This means that guests can not only place an order at the self-service terminal or at an order counter in the restaurant, but can also do so directly and conveniently using an app. Ordering in this way has other important advantages for McDonald's. For example, the customer provides access to a large amount of different data. The permissions that the app requests during installation are extensive. For example, it requires access to the user's identity, contacts and location. This allows extensive customer data to be collected, which can then be used for better and more targeted advertising. Another advantage of the app: individual notifications can be sent directly to the customers. Normal restaurants like our Italian one from the previous example have to place expensive ads on Google or Facebook, or in the regional newspaper. Not so with McDonald's: the company can send its advertisements directly to its customers via its app.

It is understandable that the development of such apps is usually expensive and therefore out of the question for the small local restaurant. But a restaurant does not have to develop all services itself, instead it can conveniently integrate services from other companies into its process.

Especially for restaurants, platforms like Lieferheld or Lieferando are suitable. Restaurants can post their dishes there and have the opportunity to access customers they probably would not have reached otherwise.

But there are also disadvantages. The restaurant must pay part of the profit to the platform and set up its own delivery service. It also loses the direct line to the customer, because on the platform, the restaurant is only one of many and is in a transparent price war. The platform operators do not care which restaurant the customer orders from, because they receive the same commission from each restaurant.

Already there are restaurants that limit themselves to the delivery of food. There's no way to eat locally anymore. This logically reduces the rental costs, as only a small kitchen is needed to prepare the dishes, and everything else is superfluous. This enables these restaurants to offer lower prices, which in turn puts pressure on the other restaurants. Of course, not every restaurant wants to set up its own delivery service, because this is also associated with additional costs. But now there are delivery services like Foodora in many cities that a restaurant can use. Each delivery in the city costs a certain amount, which varies depending on the transportation provider and location. However, these services are not only suitable for smaller restaurants that cannot afford their own delivery service, but are also used today by larger chains such as McDonald's.

The more different mobility services that are on the road, the lower the prices for the delivery. In this case, of course, the competitive pressure on restaurants that do not use such services and where customers can only buy food directly from the restaurant increases as well. For the customer, on the other hand, things are getting better and better. They can choose from an abundance of restaurants and do not even have to leave the house. These examples illustrate that digitization is already being implemented in many areas today and that this is fundamentally changing various activities such as taking and issuing orders.

But there are also changes in the kitchen itself. Although robots are still an absolute exception in the field of gastronomy today (at least in Europe), a lot of money is being invested in the development of robots that can prepare different dishes as well as a human being. That such a robot will eventually exist is within the realm of possibility, but currently there is no technology that can hold a candle to a human cook. The question is: is it necessary in practice to have a robot that can cook as well and in as multi-faceted a way as a human being? No, because machines can be developed that can handle not all, but certain tasks performed by a cook just as well. For example, it is already no problem at all to teach a robot how to push a pizza into the oven.

The simpler the activity, the faster and cheaper it is to copy the activity for a robot. Many restaurants already use convenience products. These are products that only need to be warmed up and are ready to serve immediately. A well-known example of a convenience product is Hollandaise sauce. Nowadays, the majority of restaurants no longer prepare this freshly, but rather serve it warmed up. It goes without saying that heating food is no problem for robots, because even today there are robots that can carry out much more complex tasks in the kitchen. Miso Robotics robot has already mastered turning burger patties and cleaning the grill plate afterward.

Just as restaurant chains such as Vapiano and McDonald's are now pioneers in the introduction of self-service terminals, they will be pioneers in the introduction of automatic machines. Because these chains can test the use of robots in a few restaurants without any great risk. If these tests are successful, they will be extended to all other stores.

A smaller Italian restaurant will only be able to carry out such a transformation at high risk and expense. Therefore, there is a good chance that it will continue to rely on proven concepts. This can turn out to be fatal if large chains reduce their prices significantly as a result of labor cost savings. However, the extent to which labor costs can be reduced at all is still pure speculation today and depends heavily on the costs of these robots.

There has been a trend in recent years: people eat more consciously. It is important for them to know where their food comes from, which additives are used and how they are processed. There is still a lot of catching up to be done in this area in the

gastronomy sector. This is shown by the food scandals of recent years. According to statements by current and former employees, the Vapiano restaurant chain has subsequently changed the shelf life of foodstuffs.³⁷ This is mainly due to the fact that restaurants in Germany are still allowed to sell expired foods. There are no general requirements as to how long a restaurant may sell defrosted meat or vegetables.

The more digitized a restaurant is, the more data can be made available to the guest. From a technical point of view, there is nothing to prevent the development of a system in which the customer receives a small chip card in addition to the meal, on which all information about the ordered meal is stored. There are no limits to the imagination in the information that could be provided to the guest. For example, it could be information about which farmer the meat comes from, which ingredients were used, when the goods were fetched from the refrigerator, when the goods were bought on the market - all the way up to a video from the kitchen in which the customer can see afterward how the food was prepared. All the guest has to do is hold their smartphone over their chip card and they can see all the information. This would create even more advantages, especially for restaurant chains, because if a large amount of data is collected, the collected data can also be used to show potential options for where and how the respective restaurants can improve.

While restaurants used to attract attention mainly through word of mouth and local advertising, now online presence plays an increasingly important role. Here the potential guests can inform themselves about the service and the specialties offered. Of course, it is also important that ratings on the various platforms show a positive image of the restaurant.

If a restaurant does not use these networks, it already has a competitive disadvantage, because customers who come to the city from outside need some form of orientation. This can be the reception at the hotel or the internet. If restaurants do not present themselves there or neglect it, these customers go to other restaurants.

In summary, it can be said that gastronomy is already one of the most competitive industries in Germany today. With increasing digitalization, this competition is intensified. As soon as a restaurant automates a sub-area, it becomes more competitive. This is leading to a spiral that is introducing more and more digitization into the industry to catch up or to stand out from the competition. With increasing digitalization, restaurants are becoming more and more comparable, which means that in the end, only the most successful restaurants will survive.

³⁷ <https://www.jobdisruption.com/xyob37fx>

3.3 Traffic and transport

This sector is probably the most important job sector in Germany and not only because we Germans are known worldwide for our automotive industry. In recent years it has already been possible to observe how existing structures in this area are changing.

The taxi competitor Uber was founded in March 2009 and has been expanding at a rapid pace ever since. Only not in Germany, because here the service is forbidden. But this ban is wobbling, as the Federal Minister of Transport Andreas Scheuer wants to open the German market for such driving services by 2021.³⁸

Anyone who wants to bring people from A to B in Germany today must comply with the Passenger Transport Act, a law that divides passenger transport into two areas: Taxis and car rental services. The law does not define rental car traffic as the rental of a vehicle, but as a planned transport service.

In taxi traffic, the requirements are much stricter than in rental car traffic. If someone plans to start a taxi business in Germany, they must first acquire a passenger transport permit (also known as a P permit).

But not everyone can acquire this passenger transport document. There are several hurdles. For instance, the person must be at least twenty-one years old and prove personal, health and professional aptitude. In taxi traffic, a local knowledge examination must always be taken.

Special regulations apply to rental car traffic. By the summer of 2017, a local history examination for cities with more than fifty thousand inhabitants also had to be taken. Since then, however, the law has been amended so that local inspections are no longer required for rental car traffic.

But, the acquisition of a passenger transport license is not enough. In addition, a permit called a taxi license is required. This leads to the next problem, because the number of new issues is very limited, especially in larger cities such as Berlin or Munich. This regulation ensures that there is no oversupply of taxi drivers. But what can a person do if they still want to be a self-employed taxi driver in one of these cities? In this case, they only have the option of buying an existing taxi company. Otherwise, the alternative remains rental car traffic, for which, there are also strict specifications. This is precisely where Uber can help with its new business model for Germany, which is already permitted to some degree today. In the cities of Berlin, Munich and Düsseldorf, Uber arranges trips that obey the rules of rental car traffic. Although not every private individual can bring people from A to B, Uber helps to lower the entry

³⁸ <https://www.jobdisruption.com/xyob38fx>

hurdles significantly, as no taxi license and no local inspection are required for rental car journeys as described above.

One of the legal requirements for rental car journeys is that every driver returns to the place of business after the journey. This rule does not apply though if a new order has been received via the company headquarters (Uber app). Many taxi companies accuse Uber drivers of deliberately breaking this rule. This goes so far that Uber drivers in the three above-mentioned cities are followed and monitored by taxi drivers.

This example clearly shows that in many cases, the problems are not technical but rather legal. Uber tries to deal with the strong regulations with ingenious methods in the best possible way, which of course fuels anger and fear in the taxi industry. Examples from a number of cities abroad where prices for taxi services have fallen sharply show that this fear is justified. But not only taxi companies are afraid of new technologies like the Uber platform, Uber is also afraid that its business model will soon fall victim to an even more disruptive model. To avoid this danger, it invests billions in self-propelled cars. That this fear of Uber is not a fantasy became apparent when Google introduced its own transport service, Waymo One. It no longer relies on human drivers, but on autonomous cars.

Self-propelled cars are of course not only a risk for Uber, but also for millions of workers, because it is not only taxi drivers who are affected, but all transport services as well. Whether truck drivers, bus drivers or postmen, all these jobs could become superfluous in the future. But as things stand, it is not certain that self-propelled cars will roll out onto the roads in the next few years. Even experts in this field disagree on how long it will take for this technology to get by without a human driver and travel independently from one point to another. Experts call this scenario Level 5 autonomy.

The main reason that critics name along with technical difficulty is problems with the legislation. Who is liable in the event of an accident? What requirements must be met for cars to be allowed to drive on roads without test drivers? Who's to blame for a death? These simple questions show how difficult it can be to define the framework conditions that are the absolute minimum for driverless cars to be able to travel on German roads.

Nobody can say for sure how long it will take for cars in Germany to drive autonomously. But already being used in cities are autonomous robots in the form of shuttle buses. In Hamburg, Deutsche Bahn uses a small electric bus with six seats and standing room. As with self-propelled cars, there is currently one accompanying person on board. As of 2021, these buses will run without these drivers. However, these are slow-moving buses that cannot be compared to a normal car, so the regulations in this area are less strict.

In California and Arizona at least, the legal difficulties seem to have been solved. Although there was resistance from various sides against the enactment of these laws, they were waved through. In these US states, it is possible for companies to put vehicles on the road that no longer have test drivers on board.

Interestingly, however, John Krafcik, CEO of Waymo, says he doesn't believe that self-propelled cars will ever get by without human help³⁹. Waymo is not an arbitrary company, but a Google subsidiary, which at the moment is regarded as the measure of all things in the field of autonomous driving. It is easy to see that this statement by the CEO is in stark contradiction to the recently adopted legal basis. Because if self-propelled cars cannot do without human help, how can they safely participate in road traffic? Waymo solves this problem with a remote control. The autonomous vehicles are monitored by a control center, so people in the Waymo control center can take over by remote control if necessary, for example if the autonomous system fails, if a passenger requests it, or if the vehicle reports a situation in which it is not sure what action to take. Germany is currently far behind in this development. VW boss Herbert Diess said in an interview that Google is one to two years ahead at the moment.⁴⁰

Assuming that the technology for self-propelled cars and trucks is improved in the next few years to such an extent that it functions faultlessly, this does not necessarily mean that all jobs in the transport business will be eliminated immediately. There are still workflows such as unloading trucks or delivering goods to the front door where people are still needed. But these activities are also being attacked by digitalization, as the chapter on "Warehousing, logistics and deliveries" will show.

Self-propelled cars have an impact not only on this sector, but also beyond, as the production of the cars themselves will change fundamentally in the next few years. Away from the combustion engine, toward the electric car, is the motto. According to estimates, this will ensure that up to thirty thousand people will lose their jobs at VW alone.⁴¹ An electric motor is much easier to build, because many less parts are needed. Due to the lower proportion of components, there is also less need for maintenance, which has an influence on workshops. At the same time, a large number of new jobs are being created, because a new infrastructure has to be set up for electric cars.

A large part of goods traffic in Germany is carried out via freight traffic in addition to trucks. Here, too, there are efforts to develop trains that manage without a train leader. France plans to deploy self-propelled trains in 2023, but at this stage the process will only be tested, with full-scale introduction to take place starting in 2025. So far, there has been no news from Deutsche Bahn in this direction. Prof. Dr. Sabina

³⁹ <https://www.jobdisruption.com/xyob39fx>

⁴⁰ <https://www.jobdisruption.com/xyob123fx>

⁴¹ <https://www.jobdisruption.com/xyob124fx>

Jeschke, Director for Digitization and Technology and specialist in the field of artificial intelligence, said that for the time being there will be no autonomously running trains at Deutsche Bahn. Other, more urgent problems would have to be solved beforehand, such as the interplay between old and new technology, with parts of the system that are over a hundred years old.⁴²

Another type of transport robot currently being tested is drones. Deutsche Post is testing the delivery of medication to Juist Island. In air traffic, drones must not be controlled outside the drone operator's range of vision. This project has been granted an exemption, allowing the drone to fly autonomously. However, the requirements necessitate that the drone be constantly monitored by a mobile ground station in Norddeich during its flight. This makes it possible to intervene at any time in the event of malfunctions or emergency situations. These drones will probably not be used in the mass market in the near future, e.g. to deliver a pizza to a customer's garden, due to the extensive airspace regulations. The example of the Euro Hawk (a flying spy drone) shows how complicated these guidelines are. The German government spent 700 million euros on this project before it was abandoned due to approval problems.⁴³

Regardless, autonomous vehicles are not only being researched on land and in the air, but also in water. Together with Intel, the Rolls-Royce Group is planning autonomous ships to set sail in 2025. These ships are to do without human personnel and be used as freighters. This would not only significantly reduce the cost of transporting goods, but would also reduce the risk, as the majority of maritime accidents are due to human error. But even in shipping, there are still many regulatory problems that have to be solved before the first ships can set sail.

There seems to be some movement at least in this area, as the International Maritime Organization (IMO) is currently discussing an extensive catalogue of questions on operation, safety aspects and hazard prevention. The catalogue is to result in a legal framework in the foreseeable future.⁴⁴

Self-propelled cars, trains and ships are not the only changes that characterize this sector. A few years ago, the majority of car drivers still had maps in their cars, but at some point more and more of these maps were disposed of and replaced by navigation devices. When these devices came on the market, there were still headlines in the media about drivers who had blindly trusted their navigation device and in the worst case had landed somewhere in the water. Now the map material is so good that one can often trust the navigation systems more than one's own sense of orientation. This is due to the constant adaptation and revision of the material. In 2013,

⁴² <https://www.jobdisruption.com/xyob125fx>

⁴³ <https://www.jobdisruption.com/xyob40fx>

⁴⁴ <https://www.jobdisruption.com/xyob41fx>

Google bought the traffic app Waze for more than one billion US dollars. This service is an online network for motorists. The app collects traffic information and offers this data to other users. Users can also report roadworks, natural disasters and local events. This way the users are informed among themselves about traffic jams, accidents or radar traps. This feature is of course valuable for Google when it comes to keeping your maps up to date.

If users have activated the Google Now service, Google automatically remembers where a person often is at certain times. This can be one's place of work or place of residence. The service then informs the user if traffic jams or other obstacles are waiting on possible routes before the driver has started. These navigation systems are the basis for a number of new business models that have emerged in recent years. Services such as Uber or Foodora would be unthinkable without these navigation aids, because they ensure that a skill that was previously essential is no longer important. Orientation in cities is not an easy activity. As early as 2000, scientists discovered that certain areas of the brains of taxi drivers were enlarged.⁴⁵

Tomtom unveiled the first mobile navigation device at Cebit 2004, ushering in a revolution. The price of only 799 euros was a bargain compared to the fixed systems installed in cars, which cost several thousand euros.⁴⁶ But almost fifteen years later, the revolutionary itself is threatened with extinction: the future of navigation is the smartphone. For consumers, the price has dropped from several thousand euros to zero in less than two decades. Today, all you need is an Internet connection and free access to the best maps in the world.

⁴⁵ <https://www.jobdisruption.com/xyob42fx>

⁴⁶ <https://www.jobdisruption.com/xyob43fx>

3.4 Warehousing, logistics and deliveries

According to a study by management consultants PwC, logistics costs will fall by up to 47% by 2030.⁴⁷ This is to be made possible by various novel technical achievements. Perhaps most importantly, the use of self-propelled vehicles should be mentioned here.

Autonomous vehicles cannot yet be used on public roads, and it remains to be seen whether this will change in the coming years. Far fewer regulations have to be observed when autonomous vehicles such as forklifts are used in warehouses. In order to make work processes as efficient as possible, it is therefore advisable to rely on autonomous robots in these industries.

How well this works in practice can already be seen in the Amazon camps. There's an army of self-propelled robots in the camp and as soon as an order comes in, an employee does not go to the warehouse to pick up the goods, rather the stocked shelves go to the employee. On their screen, the employee sees exactly in which compartment the desired item is, and only has to take it out and pack it into the parcel to be sent. As soon as the object has been removed, the next shelf moves forward. The employee is only a gear wheel in a computer-controlled gearbox. They no longer receive their instructions from their superior, but from a computer system that processes all processes simultaneously. This can also be used to determine clear performance data. The system knows exactly how fast each employee is working.

Amazon is working diligently to further optimize this system by means of so-called "picking challenges." A robot arm should be able to grab different objects and deposit them at certain positions. If it is possible in the next few years to create a robot that can reliably grip different goods and place them in the respective parcels, many people who work in logistics today will probably become unemployed.

Amazon is often criticized in the media for not paying its employees fair wages. Especially on busy days such as Christmas or Black Friday, the Verdi union calls for strikes. So far, the efforts have hardly been crowned with success. Verdi wants Amazon's employees to be paid in accordance with the collective agreement for retail and mail order business. Amazon consistently refuses to do so.

Amazon's logistics units are independent subsidiaries that invoice the parent company for their services. This is why Amazon argues that only activities that belong to the logistics sector are carried out there. At the same time, Amazon states that the company pays wages at the upper end of the spectrum in the logistics sector. On the other hand, it can be argued that Amazon is a mail-order company, as it is there that the main sales are generated.

⁴⁷ <https://www.jobdisruption.com/xyob44fx>

No matter which side you are on, it is clear that strikes in other industries, such as railways or airports, often shut down traffic, while at Amazon there are virtually no disruptions, even during the stressful Christmas period. The reason for this is simple: Amazon's logistics centers are controlled by a central authority. If there are breakdowns in one dispatch center, these are simply taken over by another - if necessary, from abroad. The computer system responds perfectly to these disturbances, as the last five years, in which Verdi has called for strikes at various times, have shown. This example shows the benefits that networked logistics can bring and how little influence a union has in this industry today once the background processes are predominantly digitalized.

But logistics does not only take place within warehouses. UPS is the logistics service provider with the highest turnover in the world. DHL is just behind in second place, and it is questionable whether this ranking will be maintained in ten years' time. Amazon has already ordered twenty thousand Mercedes Benz trucks and is thus part of the logistics sector. The fact that Amazon wants to build its own logistics empire is no longer a secret. Not only is the truck fleet to be expanded, but also the cargo airline segment: Amazon Air is to grow to sixty aircraft in the next three years.⁴⁸ With a fleet of two hundred. DHL of course has considerably more aircraft, but this is also DHL's main business model. In addition, the share of DHL parcels sent by Amazon in Germany is already 18 %. If a large proportion of these parcels were delivered to the customer via Amazon's own logistics unit, this would probably result in a large drop in DHL's turnover.

Amazon is also competing directly with logistics service providers in city centers with its Locker Stations. These are package stations to which Amazon only delivers its own packages. Customers have three working days to pick up the ordered goods. Even though only four hundred locker stations were in operation in Germany in 2018, the number is likely to rise sharply in the coming years. Logistics service providers such as Hermes and DPD work together with local companies where the goods can be shipped and collected by the customer. Since February 1, 2019, Hermes has demanded a higher amount if a delivery is to be made directly to your home instead of to a parcel shop.

If, however, the majority of the population rejects such boxes because it is more convenient to have the goods delivered directly to their homes, this does not mean that the parcels will still be delivered by one person in the future.

The robots of the company Starship show what such a thing can look like. At a speed of six kilometers per hour, the delivery robot travels over the sidewalks to the desired addresses. This type of transport service is currently being tested in fifteen countries. The founder of Starship is no stranger: In the early 2000s, he was Chief Technical

⁴⁸ <https://www.jobdisruption.com/xyob45fx>

Architect at Skype, so he knows exactly how to change an industry through a disruptive approach. Sidewalks can already be mastered by robots today without difficulty. As soon as the robot has arrived at its destination, the customer can unlock the loading hatch with their smartphone and remove the goods.

This technology still has some disadvantages. Due to the low speed, it is only worthwhile to use the robot for deliveries in the immediate vicinity, because the robot has to return to the main station after each delivery before it can serve the next customer. Besides, at the moment, only accompanied driving takes place. This means that Starship employees must either run next to the robot or monitor it by remote control via the Internet.

Should these disadvantages be eliminated in future versions, so that the robots can drive autonomously through the area, this would not mean that they would also be accepted by society. Currently only a few test robots drive across the streets. If several thousand were on the move at the same time, residents could find this swarm disturbing.

Vandalism could also become a problem for Starship or other companies. In the USA, there have already been attacks on Waymo's self-propelled vehicles because people are afraid of losing their jobs in the near future due to these cars.

3.5 Farming

Most farms no longer have anything in common with the idyllic image of a 1950s farm. Many farmers are experiencing a brutal struggle for survival. In the 1970s, there were still about 1.2 million farms, with an average area of about eleven hectares. In 2016 there were only about 275,000 farms left, but each of them took care of sixty hectares. In the last 20 years alone, the number of farms has fallen by 40%.⁴⁹ A hundred years ago, a farmer in Germany produced so much food that around four people could feed on it. Today a farmer can feed 155 people. This is because both the area for which a farmer is responsible and the crop yield obtained from, it have both increased significantly. There are currently about 45 million people employed in Germany⁵⁰, of which 940,000 work in agriculture.⁵¹ This corresponds to about 2% of the population; in the 1950s, just under 20% worked in this sector.⁵²

These numbers paint a clear picture. The industry has been undergoing drastic change processes for several decades. The large farms are technologically better positioned than many factories. For example, dairy farmers can display various information on each cow at the touch of a button. This not only involves static information, such as the date of birth or the vaccination status, but also dynamic data, such as current feed consumption, the quantity of milk delivered, and the movement index.

Such systems are, of course, not cheap to purchase and are often only worthwhile with a larger number of animals, which leads to a threatening situation for smaller farms. Larger companies with modern equipment are much more expensive, but also much more productive. The large quantities of milk, meat or cereals they produce reduce production costs. Smaller farms with little agricultural land or few animals often cannot keep up with this price. Of course, agricultural subsidies also play a role; according to the current Agricultural Atlas, large farms in particular are preferred by EU agricultural subsidies.⁵³ The economies of scale of larger production and the preference for subsidies mean that many smaller farms have to close for economic reasons. At the same time, the surviving farms are getting bigger and bigger.

For a long time, the machines in agriculture became larger and more powerful. Some tractors cost far more than 500,000 euros. But there are attempts to create a new type of robot that is small and mobile. The Ecorobotix AG robot, is autonomous and draws its energy from solar cells. This makes it possible for it to drive twelve hours a day across the field and take care of the plants. It removes weeds and distributes a

⁴⁹ <https://www.jobdisruption.com/xyob46fx>

⁵⁰ <https://www.jobdisruption.com/xyob47fx>

⁵¹ <https://www.jobdisruption.com/xyob48fx>

⁵² <https://www.jobdisruption.com/xyob49fx>

⁵³ <https://www.jobdisruption.com/xyob50fx>

micro-dose of herbicides. This targeted application reduces the use of herbicides by up to 90%.

There are also other advantages: A lot of data can be collected through the installed cameras. This allows the farmer to know exactly how large the crop is and how high the expected harvest will be. On large fields, more than one of these smaller robots will be used, with many traveling across the fields like a swarm.

Such data can be determined not only by robots traveling across the field, but also by satellite images from space. The Earth observation program Copernicus of the European Space Agency ESA produces a large number of satellite images every day. Among other things, images are taken in the infrared range to determine in which areas there is a nutrient deficit in the fields and where the farmer should distribute fertilizer again. In ten days, these satellites can cover the entire Earth. The data from the satellite program is available to everyone free of charge. This also means that it is possible to monitor exactly which farmer has grown which crops and how high the yield will be for that farmer.

Another trend that has become apparent more recently, is the networking of machines with each other. Many different types of equipment are used in agriculture but the time window for harvesting is small, so it is important that the expensive machines work together around the clock during this period. If one does not succeed in harvesting the fields in the short harvest period, the goods are lost.

Looking at the developments of recent years, it is clear that agriculture is developing more and more in such a way that tasks are carried out autonomously by machines, while humans only carry out monitoring activities. But as the chapter "Technicians, mechatronics engineers and mechanics" will show, the machines monitor themselves more and more by means of a multitude of sensors and will therefore be able to detect malfunctions in advance. The greater the degree to which technical systems take over, the less human labor is required. At the same time, this opens up the possibility that companies that normally have nothing to do with agriculture may penetrate this sector, as has already been the case in many other areas.

It could be particularly threatening for breeding farms for the production of animal meat. Attempts to produce artificial meat have made significant progress in recent years. Companies such as Mosa Meat and Memphis Meats develop meat that is artificially produced using stem cells. In the next few years, these companies plan to be so far along with their developments that they can bring their product onto the market. Initially, prices for artificial meat will be significantly higher than for meat from conventional production. Whether it will be possible to produce artificial meat more cheaply is not yet foreseeable. If this were to happen, it would mean that today's livestock farms would be in serious danger of losing their livelihoods.

But even without disruptive technologies, there is a clear tendency for more and more smaller companies to be displaced by larger ones. The large enterprises use modern, expensive technologies and thereby create a competitive advantage for themselves, which leads to the fact that they can produce cheaper goods, down to the single kilo.

3.6 Hotel and tourism industry

When, in June 2008, the three founders Brian Chesky, Joe Gebbia and Nathan Blecharczyk pitched their idea AirBed & Breakfast in front of seven investors in Silicon Valley, they received five rejections - and the remaining two investors didn't even bother to answer them.⁵⁴ Their idea was as simple as it was unspectacular: they wanted to create a platform where guests could book accommodation with locals instead of hotels.

Not even ten years later, it was precisely this company that ensured regulations were passed in many cities to prevent houses or apartments from being let commercially to tourists. The history of AirBed & Breakfast, which was renamed Airbnb a year after its founding, is so extraordinary that a book has been written about it.⁵⁵ Airbnb should not have had a chance at all, because of the network effect.

The fact that Airbnb nevertheless prevailed over larger platforms such as www.couchsurfing.com was probably due to two important reasons. In contrast to the business model of their competitors, each transaction went through Airbnb from start to finish. The user therefore knew that their payment via the platform meant that everything was already done in advance. The second important reason: Airbnb had developed a simple and appealing design for its platform. This is not surprising, because two of the three founders had design backgrounds.

In the early years of Airbnb, it was mainly locals who earned a little extra money by leaving strangers a room or an apartment to spend the night in. Now, more and more commercial providers are advertising that operate functioning business models via Airbnb. In the meantime, various cities have adopted regulations to curb precisely this practice. In Berlin, the law prohibiting the use of second homes for other purposes means that they may only be rented out to holidaymakers for a maximum of 90 days per year. The reason for these regulations was not to protect local hotels, but to prevent rents in the city to rise further. In many cases, a landlord can earn significantly more money with a platform like Airbnb than with a normal rental, which is understandably problematic for many locals. Some cities go one step further and it is now totally forbidden in Palma de Mallorca to rent rooms or apartments privately to tourists.

Of course, Airbnb is also a thorn in the side of many hotels, as some tourists prefer a booking via Airbnb instead of an overnight stay in a hotel. But this proportion is lower than one would expect at first glance. Looking at the ten cities in the USA

⁵⁴ <https://www.jobdisruption.com/xyob51fx>

⁵⁵ <https://www.jobdisruption.com/xyob147fx>

where Airbnb has the largest market share, the average number of hotel nights booked was only 1.3% lower and hotel revenues only 1.5% lower.⁵⁶

The research on Airbnb's impact on the hotel industry dates back to 2014, and now the percentages are likely to be higher, as the number of accommodations on offer has quadrupled since 2014.⁵⁷ But even this quadrupling is no cause for concern for the hotels at the moment, as the number of hotel nights has also increased at the same time. In Germany alone, the number of hotel nights rose from 187 million in 2008 to 253 million in 2017. This is an average annual increase of 3.4%.⁵⁸

Usually, the comfort of a hotel room is also higher than that of an accommodation booked through Airbnb, but that is exactly what the company would like to change. So it introduced a new section called Airbnb Plus. This seal can be awarded to outstanding hosts who are rated by more than 100 factors.⁵⁹ The number of accommodations bearing this seal today is manageable, so Airbnb is currently still far from being a threat to the very existence of hotels.

There is already one particular area though where Airbnb takes the cake - social media. With an average of twenty-three thousand interactions per post, Airbnb achieved more than three times the commitment of the Four Seasons hotel chain, which leads the social media index among hotel chains.⁶⁰

In addition to Airbnb, there are other disruptive attackers who want to change the hotel market. Booking portals such as www.trivago.de or www.booking.com ensure transparency between hotels, and in 2016 arranged a quarter of all overnight stays.⁶¹ At the same time, it must also be emphasized that these booking portals still charge a high commission for the mediation. On average, this is 15%. Until a few years ago, hotels that wanted to be listed on the portals were not allowed to offer a lower price outside the booking platform due to so-called parity clauses. This has changed due to regulations of the Bundeskartellamt. Many hotels today quote lower prices on their own websites, but need their own booking systems to do so.

In the past, most bookings were made by telephone. The number of these bookings has been declining significantly for years due to Internet booking portals. Nevertheless, a hotel must offer both services so that customers can book both offline and online. One or the other hotel chain operating call centers may have experienced a reduction in personnel costs due to the cultural change away from the telephone to the Internet, but for most smaller hotels, it is unlikely to make a difference. Of course,

⁵⁶ <https://www.jobdisruption.com/xyob52fx>

⁵⁷ <https://www.jobdisruption.com/xyob53fx>

⁵⁸ <https://www.jobdisruption.com/xyob54fx>

⁵⁹ <https://www.jobdisruption.com/xyob55fx>

⁶⁰ <https://www.jobdisruption.com/xyob56fx>

⁶¹ <https://www.jobdisruption.com/xyob57fx>

the hotel employees, who would otherwise spend considerably more time on telephone conversations, can now use the time for other tasks, although it is questionable whether this will lead to significant staff savings. In the daily hotel business, there are also quiet phases throughout the day in which such activities can be carried out.

Hotels are also increasingly entering into partnerships with influencers. This creates a win-win situation, as influencers must constantly post new, exciting and interesting content in order to keep their users in the game. At the same time, hotels profit from the fact that they can send out targeted advertising to the group relevant to them. However, additional staff are needed for the communication and support of the influencers. Hotel chains logically have a big advantage here because they can provide these resources more easily.

On the job market as a whole, this does not cause any changes, because the tasks within the hotels will not alter decisively. Although various hotel chains are already using robot butlers to deliver drinks and snacks to their guests' rooms, guests expect the rooms to be clean and the beds fresh.

The real danger for hotels is only likely to come with the widespread introduction of autonomous cars. If you take a look at the concept papers of Toyota, for example, self-propelled cars become service providers. This means that the autonomously driving car can also easily be a self-propelled hotel room. These cars are comparable to the sleeper cars of the German Railway, only much more comfortable and better tuned to the users. As these are only concepts, it is uncertain when guests will be able to use such a service for the first time in practice and above all, when and whether this type of means of transport will become widespread.

While jobs in the hotel sector are largely secure, travel agencies are different. In 2002 there were 14,235 travel agencies in Germany; in 2017 the figure was only 11,116. It should, of course, be taken into account that the collection method was changed in 2015. From that date onward, travel agencies were also included in the group of companies that only had a tour operator license. According to the old calculation method, there are just under 10,000 travel agencies in Germany.

The number of travel agencies in Germany has been stable since 2012 and has not decreased further. This is no reason though to breathe a sigh of relief, as the average travel expenditure of Germans rose by more than 13 % over the same period.

Another reason why fewer travel agencies are dying is the increased complexity of bookings. Peter Thiel describes an apt example in his book *From Zero to One*. In 2012, where the American airlines together had a turnover of 160 billion US dollars, while Google only had a turnover of 50 billion US dollars. At the same time, Google made more than a hundred times more profit than airlines, because of its monopoly position. Due to strong competition, companies are always looking for new ways to make money. Creativity was demonstrated by Ryanair, which offers cheap flights but has

high hidden costs, e.g. booking an extra piece of baggage if it does not exactly meet the specifications.

When booking a trip on the Internet, you must therefore pay close attention to the conditions under which the trip is booked. This procedure is too complex for many customers, so they prefer to book through a travel agency. Here, hidden clauses and cumbersome booking options are no guarantee of survival for the agencies. Just as there are already assistants in other industries today who analyze account bookings and show where customers can save simply by pressing a button, there will also be assistants in tourism in the future who help customers to book their travel simply and without fear of hidden clauses. This is likely to further reduce the number of travel agencies.

3.7 Healthcare sector

There is hardly a sector that offers such a reliable job guarantee as the health sector. But this is not due to a lack of innovation potential, rather too strong regulations. What happens when a strong regulation is overturned by the European Court of Justice was observed after the landmark ruling on the price fixing of prescription drugs. This ruling allows foreign mail-order pharmacies to give discounts on medicines, something that is not currently permitted for German online pharmacies. It is understandable that the German Association of Pharmacists is deeply unhappy with this discrimination. But the demand is not to abolish price maintenance, rather to prohibit the online dispatch of medicines.

At first glance, the demand seems exaggerated, because the mail-order business with prescription drugs only has a market share of 1.1% in Germany. Actually, such a low market share should hardly make a difference. But appearances are deceptive, because the mail-order business with non-prescription medicines is already at 13%, and the trend is rising. To forego 13% of sales can already be crucial to the existence of one or the other pharmacy. But why are so few prescription drugs currently sold and shipped by mail order? Shouldn't the proportion be higher because foreign companies can give discounts?

The reason for the large difference in market share is that the prescription has to be submitted in paper form to the pharmacy. If a customer buys from an online pharmacy, they first have to send in the prescription, so it naturally takes longer for the medication to reach them. This will all change with the introduction of the e-Recipe. e-Recipes can be transmitted digitally to the online pharmacy and processed immediately. This possibility already exists in seventeen European countries. The introduction of the e-Prescription is planned for the end of 2019 in Germany. As a result of this change, the market share that goes to online pharmacies is likely to increase sharply. The extent to which this will affect local pharmacies cannot yet be predicted. It is currently planned that foreign online pharmacies may give a discount of a maximum of 2.50 euros on one pack as long as the proportion of prescription medicines is less than 5%. Whether these regulations are in conformity with EU law is also uncertain.

Probably much more threatening for pharmacies are the vending machines that DocMorris tests. Due to the so-called third-party ownership ban, pharmacy chains such as DocMorris are prohibited in Germany. Nevertheless, DocMorris opened a pharmacy in April 2017 in the village of Hüffenhardt with its two thousand inhabitants. Customers could be advised via video chat, and medicines could be released from the Netherlands at the push of a button. But less than forty-eight hours after opening, this dispenser was banned by the courts. What sounds like a victory for the local pharmacists could only be a won battle in a lost war, because DocMorris has filed an appeal as expected, which will now, as of January 2019, be heard before the

Higher Regional Court. But even if DocMorris loses every battle up to the ECJ and the last battle there, this could be advantageous for the company. The current reason given by the court as to why a ban was imposed in this case is that a pharmacy vending machine is not comparable to a pick-up station, because the customer in Hüffenhardt purchases medicines for which no sales contract had previously been concluded and which were therefore not delivered to them. In addition, the customer would receive the medicines directly and not, as in a mail order business, sometime later. If the basic conditions as to why these automats were rejected are clearly defined, new concepts can be developed from this, which consider exactly these points, making automatons in certain forms possible. As an alternative, the laws could also change. However, this is a lengthy process, especially in this sector.

A current example is telemedicine. A relaxation of the law was passed here in May 2018. But at its core, not much changed. Although an exclusive remote treatment without prior personal initial contact is permitted "in individual cases" - and if it is medically and therapeutically justifiable - the doctor may not yet issue a prescription to the patient. At least in Germany, a relaxation is planned in the next few years. But there are also many other regulations. For example, current legislation prohibits all advertising for remote treatment. Even if the regulations are relaxed, the factor still remains that video consultation hours are paid less by the health insurance companies. So why should a doctor offer this service if they would get significantly more money for a normal visit? The company that finds an answer to this question must develop a process that is significantly more cost-effective. Should this succeed, it could result in a competitive advantage.

General practitioners aren't the only ones facing competition from digitalization - specialists are as well. Geoffrey Hinton, known as the father of artificial intelligence, said as early as 2016 that one should stop training radiologists because artificial intelligence would be better at detecting cancer in the next few years than the best radiologists in its field. He could be right about this assessment. Whether radiologists or dermatologists, the current systems are already better than doctors today. But it will probably take some time before this technology is used on a broad front. In addition, the new European Medical Device Regulation (MDR) will apply from May 26, 2020. In contrast to the previous directive, the criticality of the information generated by this software is now also taken into account. This means that standalone software can also be classified in the highest medical class (3), depending on the respective risk potential.⁶² The higher the classification, the greater the manufacturer's obligations. As a result, development is much more protracted and cost-intensive.

⁶² <https://www.jobdisruption.com/xyob58fx>

The extent to which health apps such as "Ada - Deine Gesundheitshelferin" will have to be specially certified remains to be seen. Ada has already been installed millions of times on smartphones and helps patients make a diagnosis using artificial intelligence. The focus here is not on replacing the doctor - the app should be seen as a supporting measure. Starting in January 2019, Techniker Krankenkasse Ada wants to integrate Ada into its own app. Here, the customer can go through a system check and then talk to a tele-doctor in the medical center of the Techniker Krankenkasse. However, this cannot replace a normal doctor, since, as already mentioned, only the doctor on site may issue prescriptions and certificates of incapacity for work.

But it is not only regulations that secure jobs in the health sector. Demographic change is leading to an increase in the number of people requiring medical assistance. As a result, significantly more personnel will probably be needed in the coming years as there is already a considerable shortage of nursing care in particular. We will see how and whether this problem can be solved in Japan, where the world's oldest population currently lives. Here, due to their cultural norms, people in Japan are more open to the use of robots in care than people in Europe. That is why it does not mean that the solutions that are implemented there will necessarily also be suitable for the people here. For example, there are robots that mimic the behavior of an animal. These cuddly robots are primarily intended for use in dementia patients to reduce stress, stimulate speech and awaken memories. While in Japan, such robots are predominantly positively received, the reactions in Germany are predominantly negative. Many critics see such a robot as inhuman and cold care. From a purely scientific point of view, there is currently too little knowledge as to whether such a robot has a positive or negative effect. But even if it turns out that these robots have positive benefits, this only helps caregivers in their heavy physical activities to a limited extent. Although the Fraunhofer Institute is working on robots that help lift people to make the job of nursing staff easier, it will certainly take several years, probably decades, before these robots can be used cost-effectively in nursing. What is already available, are intuitive systems that can detect whether, for instance, an elderly person has fallen and in the next step, inform a nurse so that they can be treated as quickly as possible.

All in all, it can be said that, precisely because of demographic change, there is hardly a sector that is as secure against job loss as the health sector. But there are exceptions in this sector as well, such as pharmacists, which face stronger online competition year after year. As in any other sector, digitization will lead to change in this area, but far from at the pace of other sectors. This will result in a large proportion of jobs being comparatively secure. Nevertheless, employees should not sit back and relax, because new technologies such as CRISPR/Cas9 could open up opportunities that we can only dream of today. It's not for nothing that technology giants like Google invest billions in the healthcare sector. The start-up Calico (California Life Company), founded in 2013, was endowed with 1.5 billion US dollars of venture capital

alone and has no less goal than to find the Holy Grail, which makes immortality possible.

3.8 Office occupations, civil servants and the public service

In Germany, more than two million employees subject to social insurance contributions currently work in office occupations. The range of activities is broad: from telephone support and appointment organization to the administration of e-mails and mail.

Especially in recent years, the market for virtual assistants has also grown, as many of these activities do not necessarily have to be performed at the company's location, but can be undertaken from almost anywhere in the world. This has been made possible by the fact that communication within and outside companies has become flexible and can be organized from any location as a result of digitalization.

But most companies are miles away from the dream of a paperless office. According to a study by the International Data Corporation, the share of paper-based documents in companies was 49% in 2014. For 2016, the share was expected to fall to 36%. In reality, it only dropped to 47%.⁶³ For the German paper mills, these are encouraging figures, but not for the environment. As far as the use of paper is concerned, Germany is in fourth place worldwide. Only China, the USA and Japan consume more paper than Germany. This means we use as much paper as the continents of Africa and South America put together. Every German used almost 250 kilograms in 2015.⁶⁴ Similar to cashless payment, many Germans are sticking to their old habits, although for economic and ecological reasons there is virtually no reason why. The framework conditions for digital accounting were also brought into line with the Tax Simplification Act passed in 2011. Nevertheless, many companies continue to use paper invoices. Not only are invoices printed, but also other documents such as delivery notes, forms or lists. Digital solutions already exist for all of these, so that it would be possible to do without printed documents entirely. Instead, the old processes are continued out of habit.

Particularly in the public sector, processes are still paper-heavy today. If an employee wishes to take leave, paper applications often have to be prepared in multiple versions. Filling out travel expense requests is also often tedious and time-consuming. In addition to the internal processes of public authorities, the processes for providing services to the citizen are also slow. For the foundation of a company in Germany, countless documents have to be filled in and processed. When setting up a UG or GmbH, the procedure can take one to two months. Estonia shows that there is another way. All Estonians have an electronic identity. Many government services can be carried out within minutes using these. With the digital health card, for example, it can be determined at the click of a mouse whether the citizen wants to be an organ

⁶³ <https://www.jobdisruption.com/xyob59fx>

⁶⁴ <https://www.jobdisruption.com/xyob60fx>

donor or not. Doctors can access this information as needed. In Germany, such revolutions are being delayed due to data protection and security concerns. So it is no wonder that Germany only ranks twentieth in the EU ranking of the state of digital administration. Last year, Germany was still in eighteenth place and Estonia, as in the previous year, is still in first place. Data protection concerns do not seem to be a problem, although the European Basic Data Protection Regulation also applies there. This shows that there are sufficient possibilities to implement digital projects if they are intended.

Even if many processes here in Germany still run exactly as they did twenty years ago, the old practices will have to be digitized in the coming years for cost reasons. In 2015, the National Standards Control Council of the Confederation determined in an expert opinion that fees could be reduced by almost 35% and administrative costs by almost 33% if eGovernment were to function properly.⁶⁵ But why is it that despite this enormous potential for savings, so few processes have been digitized?

According to a survey by the Fraunhofer Institute, most employees (86%) find the operation of software applications on the computer too cumbersome. Instead, they prefer to complete their tasks on paper.⁶⁶ Another aspect is the fear of data loss; if a cyber-attack on the entire infrastructure succeeds, all data could possibly be destroyed. This is particularly problematic when legal requirements force the authorities to keep certain documents for ten years.

Whether a company switches to new digital processes often depends on the corporate culture and the industry. Nevertheless, companies that switch to the new technologies in time can gain a competitive advantage. With regard to the General Data Protection Regulation, which came into force in May 2018, digitized companies have clear advantages here, because the General Data Protection Regulation applies not just to digital data, but to all personal data. With this regulation, every inhabitant of the EU has the right to ask any company what personal data that company has stored about them. This also applies to data stored in structured form on paper. The processing of inquiries where the data is stored in paper form is naturally more intensive in terms of personnel than with data stored exclusively in digital form. Companies such as Google or Facebook have created autonomous processes for requests for information in which the user can query all stored data without human interaction. Even though the initial investments in digital processes are quite high, companies have little choice but to digitize them.

For a number of employees, however, digitization has major disadvantages, because software makes certain work steps superfluous. Although new work steps are added, due to higher documentation requirements, these steps can in many cases be carried

⁶⁵ <https://www.jobdisruption.com/xyob61fx>

⁶⁶ <https://www.jobdisruption.com/xyob62fx>

out automatically by software solutions. At the same time, it is also possible to have tasks processed by external companies. This applies not only to private companies, which are dependent on reducing costs, but also to civil servants and employees in the public sector. Estonia is now the benchmark in e-government, and more and more countries will implement similar processes and procedures, making many of the jobs occupied today redundant.

3.9 Technicians, mechatronics engineers and mechanics

Smart machines pose the greatest threat to this group. If a machine breaks down in a factory, the technician must be on site and repair it within the shortest possible time, because every minute that nothing is produced is associated with high costs. So what could be more obvious than to find out when a machine will fail? This procedure is called predictive maintenance and describes how machines monitor themselves and sound the alarm before a failure occurs. This is done by collecting and analyzing a variety of different data. Within the large data sets, an attempt is made to identify those patterns which indicate that the machine will suffer a malfunction in the near future.

Expensive machines that work around the clock are particularly suitable for predictive maintenance. Previously, for instance, Siemens gas turbines were replaced after a fixed number of hours. Today, 1,500 sensors analyze the turbines and can thus provide information about the current and future condition at any time. With the help of artificial intelligence, the collected data can be used to implement a turbine control system that even exceeds the results of Siemens engineers in some areas.⁶⁷ Siemens uses predictive maintenance not only in turbines, but also in trains. There, a special focus is placed on the reliability of the doors. It is now possible to predict which doors will fail in a period of ten days.

Predictive maintenance can be used not only in complex industrial plants, but almost everywhere. Zolitron, a start-up from Bochum, is developing intelligent sensors for waste containers. These sensors determine the fill level of each individual container, allowing the most effective route for waste collection to be planned. The battery never needs to be replaced because a technology called "MicroEnergy-Harvesting" is used. The sensor generates energy from its environment in the microwatt range, which is stored.

With the increasing use of sensors, the technical profession is changing at the same time. Checklists were used to decide when to replace a part, but now smart devices know for themselves when the right time has come. If the service warning lamp lights up in the car, a diagnostic device is first connected in the workshop. This tells the car mechanic exactly where the problem is. There are a number of different suppliers for these diagnostic devices, because the manufacturers are forced by EU regulations to open the interfaces. If there were no such regulations, only workshops authorized by the car manufacturers could carry out repairs. What this looks like in practice can be observed at Apple. Many customers received an error with the identifier "Error 53" after updating to iOS 9. The affected customers had previously taken their defective iPhone to an Apple non-certified repair dealer to have it repaired. There, the work is often much cheaper than in the certified Apple service shops. Apple stated

⁶⁷ <https://www.jobdisruption.com/xyob63fx>

in a statement that the update was an oversight, but this example clearly shows the power manufacturers have over the service process.

Many companies still have a department manager who specifies when and how repairs are to be carried out by the technicians, but this will change in the coming years. In some companies, technicians already receive their orders via the smartphone. This makes the technician transparent, because the software that coordinates the appointments in the background has information sovereignty. This saves resources and makes business processes more efficient. Concurrently, platform business models can also be developed from this: At Uber, independent taxi drivers decide whether to accept or refuse orders. Of course, this could also be achieved with a pool of independent technicians. The technicians store a competence profile and are offered jobs that can be completed on short notice. There is no question that the technician's job will also be needed in the future. But how many will be needed and what skills they will require is still open.

3.10 Designers and creators

This type of job is cited by many as a prime example of jobs that are the safest from digitization. Creativity is something that robots can't handle. But in the field of artificial intelligence, there is a lot of work being done to change this. It is already possible to extract the style of famous artists and transfer it to new areas. But design and creation are usually much more than just the transfer of styles.

Take a caricature, not only is the image of a person drawn in a certain style, but the face is also deliberately changed. Designers of caricatures have to identify the most important features of faces and overdraw them in a targeted manner. Without a doubt, a lot of creativity is required for this process, but algorithms can already do this.⁶⁸

Fortunately, drawing illustrations is not the only activity of designers. A professional designer does not draw a logo or design out of nothing, but inquires beforehand about the purpose and the target group, in order to best align the design with it. Apple, for instance, is praised for its simple and noble design. Nevertheless, it cannot be denied that good design is quickly copied. It has been proven that one or the other electronics manufacturer was inspired by the design of the iPhone. But Apple's actions against Samsung, for example, show how difficult and time-consuming it is to prove guilty copyright or trademark infringement. If a corporation with a large legal department already has strong problems defending itself against product imitation, how are individual artists supposed to do this? This could be one of the reasons why the designs of many smartphones, websites and videos are quite similar.

But there are other possible reasons. While websites used to be programmed with a lot of personnel, now modular systems or content management systems are often used. The WordPress content management system is used on 30 % of all websites worldwide. Within WordPress, it is possible to create the design individually using so-called themes. Designers can also develop these themes themselves, which can then be conveniently added to the WordPress installation by the buyer. They are then offered for sale, on marketplaces such as www.themeforest.net. Themeforest is part of the Envato market platform, which offers a variety of other design elements such as videos, graphics and 3D files. These templates also allow less-skilled designers to create beautiful websites, memorable videos and chic PowerPoint presentations. Through global, transparent networks, designers around the world compete with local designers.

In many countries of course, the cost of living is lower than in Germany, which means that the costs for design services are also significantly lower. There are those who claim that designers in Germany are better educated and therefore deliver

⁶⁸ <https://www.jobdisruption.com/xyob64fx>

higher-quality work. What sounds logical at first glance, and probably also often corresponds to today's reality, will no longer be true tomorrow. The label "Made in Germany" was originally introduced in Great Britain at the end of the 19th century to protect against cheaper and inferior imported goods from Germany. Over time, however, Germany has transformed the junk logo into a seal of quality in the eyes of buyers. Why shouldn't designers from India, Indonesia or Kenya do the same? The designers in these countries also use state-of-the-art design software such as the Adobe Cloud. What still protects German designers today is the experience and quality of education at universities, the language barrier, and different cultures. But day by day, the number of free design tutorials and tutorials on YouTube is increasing, and the competitive edge dwindling. The language barrier is also getting lower and lower due to the continuous improvement of English language skills and the increasing quality of automatic translations. The only thing that remains is the different culture or the missing understanding of culture. It remains to be seen whether this alone will be enough to compensate for the price difference in the future.

In addition to the points mentioned above, there is another problem for clients. How does the customer know who is the better designer? Platforms like www.upwork.com have a solution for this, because designers can upload their portfolios there and present them to the public. Not only that, potential customers can also see how other customers have rated each designer. Just as Amazon product reviews help you choose the right product, they help you choose the right designer.

If a customer has now chosen a good designer, whether in India via Upwork or in Germany via an agency, the cooperation will not necessarily run smoothly. Often, the customer's ideas and what the designer delivers as a design are more separated from each other than North and South Korea. The reasons for this can, of course, be many and varied. The customer has not expressed themselves well enough, the designer has interpreted it differently, or what the customer had so beautifully imagined in their head simply doesn't look that way in reality. But there is a remedy for the problem, and this solution is called design competition. This is great for the customer and extremely bad for the designer, because here we have a classic winner-takes-all situation. On websites such as www.99designs.com a customer can advertise their project as a competition. In a defined time window, designers from all over the world can then submit design proposals that the customer can evaluate and judge. The designer can view the assessments and can see how their own performs in relation to those of other designers. If your own design is judged worse in comparison, you would be well advised to amend your own work, otherwise you have no chance of getting any of the money, because even the runner-up gets nothing. If a designer wins such a competition, they not only receive the money, but it is also noted that they have won a design competition. The more they win, the higher their status rises. Of course, designers can also be booked outside of the competitions for designs. The more competitions a designer has won, the more likely it is that they will also be

asked for outside competitions. For the customer though, it does not make sense in every situation to use the offers of these online platforms. Although they can save a lot of money here, they also have to invest a lot of time and resources in order to get the best possible result. It is easier to go to established agencies that have a pool of specialists they can call upon. What is apparent though, is that on the platforms designers are forming networks and offering the same service as German agencies.

As is the case in many areas of digitization, the same applies here: If a designer is among the best in their class, they can benefit greatly from the possibilities of digitization. But especially for those prospective designers who have yet to build up a portfolio and a customer base or who cannot keep up with the best in terms of quality, it is a shark tank. The mixture of standardized solutions such as templates, software that can create creative works, and competition from countries where the cost of living is lower, is disastrous.

3.11 Retail

The Internet has put a lot of pressure on the retail trade in recent years. While once it was the only place where people used to shop, the picture has now changed. Every year more people order on the Internet, regardless of opening hours. But the round-the-clock shopping experience is not the only reason why. Where once a customer had to go to a specialist retailer to receive comprehensive advice, more information on the products is now available on the Internet, so the information there is often better than that from a local retailer.

On the Internet, anyone can find out about a wide range of products, regardless of shop opening hours. Detailed descriptions, test reports and test videos help the user to get a much more comprehensive picture than would be possible in the retail trade. Be that as it may, there is one advantage still held by the physical shopping: in contrast to online trading, the user can try out the product and buy it immediately. Amazon is about to attack that edge. In cities such as Berlin and Munich, it is already experimenting with offering delivery within an hour.

Another oft-mentioned advantage of the retail trade: as soon as a problem occurs, the customer has a direct contact person on site. How good the customer service is of course depends on the respective shop. Especially in the case of electronic devices, the retail trade often has to send the devices to the manufacturer itself, so that there's hardly any advantage for the customer in this situation.

Over the last few years, it has been observed that the advantages of the local trader over Internet trading have become smaller and smaller, while the disadvantages have become greater and greater. The biggest disadvantage of stationary trading compared to online competition is the price. Hardly any local dealer is able to offer the customer the Internet price. This is not surprising, as the online merchant has significantly lower costs. Of course, shipping costs are added to the product price for an online purchase, but in view of the significantly lower product price, these are of little consequence. The online retailer has notably lower rental, personnel and installation costs, which means they can offer a much better deal. A local trader can do little about this, because the rental costs for a central shop are usually higher than the rental costs for a warehouse outside the city. As a rule, a retail salesperson also demands more salary than a logistics specialist. In addition, the customer wants an appealing-looking interior so that they feel comfortable during the shopping experience. In view of this competitive situation, it is no wonder that in many urban hubs, shops are empty and even large chains like Toys R Us go bankrupt.

Nevertheless, this does not mean that local trade is dead or doomed, but must adapt to the new digital conditions. One way of doing this is to significantly improve the overall customer experience, by offering additional services. The Apple Stores are a good example of how this can look - not the high-quality design and well-trained

staff, but the daily events that take place in the sales rooms. One day there is a course that shows how to create spectacular portraits or selfies with Apple products, while the next children can learn how to experiment with robots in interactive projects. Clearly, not every retailer has Apple's margins to afford such stores and events. Nevertheless, a retailer must develop some form of innovation, otherwise they will have a hard time surviving in the face of increasing competition.

In the summer of 2017, Amazon bought the food chain Whole Foods. As soon as the Group received the approval of the regulatory authorities for the takeover, prices for a large number of the most popular products were reduced by up to 50 % - a challenge to the competition. In August 2018, Amazon announced that it would open three thousand stores over the next three years that would be equipped with the Amazon Go till-free system. In these shops, there is no waiting time because the customer registers at the entrance with their smartphone and is followed by cameras from that point on so, if the customer removes a salad from the shelf, it is added to their virtual shopping list. If they put it back, the article is automatically removed. As soon as the customer has collected all the items they need and leaves the store, the goods taken with them will be billed to the customer's Amazon account. It is obvious that this system has an impact on a cashier's job, but other effects take place in the background. Amazon generates a lot of useful data through the cameras. By registering, Amazon knows which customer has just entered the shop. In the next step, the system can collect information about which items were viewed but not purchased. With every purchase, Amazon gets more data and a better personality profile of the customer.

In December 2013, Amazon filed a patent entitled "Method and system for anticipatory package shipping."⁶⁹ The goal is to determine which items can be reasonably expected to be shipped to the customer before the customer places an order. For example, a user would never run the risk of having too little toilet paper.

The future will show whether normal retail can compete against a system that probably knows the customer better than the customer knows him or herself. At the moment, it is clear that job profiles in the retail sector will change. The most likely case is a split. On one side, there are those who, under the guidance of computer systems, are only busy replenishing stocks - and on the other, there are the staff, who are highly trained and can not only support the customer professionally, but also have the emotional intelligence to understand exactly what a customer's needs are at that moment and how they can be optimally satisfied.

Added to this future, which is anything but rosy for many employees in the retail sector, there are other issues that could also have a strong negative impact on job prospects. In the past, it was incredibly difficult for product manufacturers to reach

⁶⁹ <https://www.jobdisruption.com/xyob65fx>

their customers because dealers had built up a relationship with them over many years. This has changed fundamentally in recent times, as platforms like Amazon have managed to establish an interface between the producer and the customer, with major brands such as Nike selling directly to consumers via Amazon.

Parallel to this development, traders began to become producers themselves. Chains such as Kaufland, Aldi and Lidl sell their own products via their trading network. According to the Patent and Trade Mark Office, Lidl, for example, is the owner of the "Silvercrest" trade mark. Under this brand, Lidl sells various electronic products, from waffles to irons, and has two decisive advantages. The first advantage is the higher margin: you can earn more with your own product. But the second advantage is even more important: control over the product. If a chain sells an electronic product from an unknown manufacturer and it later turns out that the quality was not particularly good, the retailer not only has to deal with the returns, but also runs the risk that their own brand suffers as a result.

Large discounters aren't the only ones bringing their own products onto the market - an increasing number of smaller retailers are as well. What used to only be possible for major chains is now simpler than ever. Products are manufactured over the Internet in China according to the dealer's specifications. The contractor receives deliveries at various intervals in only small amounts, which they can test and inspect. As soon as a product meets the contractor's expectations, production begins in large quantities. For quality control, independent service providers in China are commissioned to monitor the production process in the factories and ensure that everything meets the client's requirements during final acceptance. Here in Germany, the goods can be delivered directly to the Amazon warehouse or to your own branch. If the delivery arrives at Amazon, it takes care of the logistics from that point on. The retailer only has to sell the goods to the customer via their own Internet shop or the Amazon website. If the retailer directs the goods to their own warehouse, they can also sell them in their own local shop.

While traders become producers, producers also become traders. Not only via their own online shop and Amazon, but also in their own branches outside of the Internet. Tesla has been fighting for years in several states in the USA in court, for the right to sell directly to the customer. This is not allowed in all states; in Utah and Texas, amongst others, Tesla only has galleries where cars can be viewed, but not sold. So, if a Texan wants to buy a Tesla Model X, they have to travel to another state. It would have been easier for Tesla to comply with the regulations, but for the company, it is of fundamental importance to maintain control over the distribution channels. Tesla sees no future in the traditional model with a large number of individual dealers. In addition to Tesla, Volkswagen is also planning to enter direct sales. In April 2020, an online platform is to be opened on which customers can buy their vehicles directly. To this end, VW has concluded new dealer agreements which make

it possible to establish direct contact with the customer. This was previously not possible due to the old agreements. This development shows that the retail trade will change fundamentally in the next few years. Many different concepts are being tried, and it is not yet clear which ones will prevail. Retailers such as Media Markt and Saturn are testing the rental of promotional space in their shops.⁷⁰ This enables the manufacturer to present their own products in the best possible way according to their specifications.

It is difficult to predict how all this will affect employment in the sector. Systems in which the customers scan the goods themselves or systems without cash registers are likely to destroy many jobs. However, an Amazon Go store cannot get by completely without employees. Take the entrance area, an employee helps with logging in using the app, and in the alcohol area it is checked that no alcohol is acquired by children and adolescents. But vending machines in China show that it is already possible to do without employees. The customer also registers there with their app, whereupon they gain access to the shop. All goods are equipped with small, inexpensive chips that have to be scanned by the customer at the checkout. In the last step, the customer is shown a QR code via which they pay, whereupon a door opens through which they can leave.⁷¹ Of course, even in this case, there is still a need for employees to replenish these stores, but this certainly does not require retail training. On the other hand, new jobs are also being created, but they are often much more demanding. For instance, employees who are not only familiar with the product features, but can also provide direct assistance to customers with technical problems.

⁷⁰ <https://www.jobdisruption.com/xyob66fx>

⁷¹ <https://www.jobdisruption.com/xyob67fx>

3.12 Painters, plumbers and other professions related to Tradespeople

There is hardly a sector that is so safe from digital disruption and at the same time so unattractive. Despite rosy prospects for the future, training companies hardly find any new applicants. There are many reasons for this. In 2006, the proportion of school-leavers with a school-leaving certificate (Abitur) was 30%; today it has risen to 41%. A student who has attended school for twelve or thirteen years prefers to study, rather than receive an education for which nine or ten years of schooling would have been sufficient. In addition, despite the large shortage of qualified personnel, the salary is comparatively low. At the same time, the work of roofers, bricklayers and carpenters involves significantly more risk. According to the Bund der Versicherten, 40% of the craftsmen do not manage to continue to do their job until retirement age. For doctors, lawyers and chemists, the rate is only 6%.⁷²

According to figures from the Bavarian Chamber of Skilled Crafts, the average age of plumbers and heating engineers is fifty years and that of metal workers is fifty-three. One of the most important challenges for skilled trades companies is therefore to present their job profile attractively for young people. This should happen exactly where the young target group is located. Companies that implement this consistently are much better positioned in the battle for talent. Of course, it is not enough to just establish digital communication - the processes in the company must also be digitized, because in a painter or plumber's business, there are many other processes in addition to the craft activity. Whether it's time spent recording or sending invoices, all these activities can be optimized by digital processes.

While platforms such as Uber pose a major threat to the existing taxi industry, the situation is different in the craft sector. Although there are platforms such as www.my-hammer.de here as well, the order situation of most companies is so strong that there is hardly any threatening competition. Whether this will also be the case in the future is glass ball reading, but as more and more terminal devices and systems are equipped with electronic sensors, there could also be changes in the awarding of contracts here. If something requires fixing but goes unnoticed, lead to more extensive damage of the building. If such a gutter is equipped with sensors that measure the flow rate and detect a blockage, the order can be placed directly with the craftsman on site. But the greatest risks for craft enterprises are the shortage of skilled workers and the lack of ability to present themselves attractively to young people. The companies that manage to digitize their internal processes and also utilize the technologies used by the younger generation in the company have the best chances of getting the coveted personnel.

⁷² <https://www.jobdisruption.com/xyob68fx>

3.13 Bricklayers, architects and estate agents

For a long time, a house was considered a safe investment for a pension, but will this continue? Interest rates are currently low, which has led to many people buying their own homes. The loans often have maturities over decades and are ultimately nothing more than a bet on the future.

If a property is purchased for personal use, the buyer hopes that this investment will pay off through the saved rent. But should there be a professional change, a house can quickly become a loss-making business. Each purchase is subject to the land transfer tax, which varies between 3.5% and 6.5% of the purchase price, depending on the federal state. The costs for notary and land register entry amount as a rule to 1.5% of the purchase price. If the property is acquired through an agent, the commission is between 3.5 and 7%. The bottom line is that an amount of well over 10% can quickly accumulate. With a house price of 350,000 euros, this already corresponds to the value of a good middle-class car. This should be taken into consideration before the purchase of the property, because a quick resale can lead to a high loss.

Until now, the value of a house has usually increased but now they can be produced using 3D printing at a fraction of the time and cost previously required. Dubai wants to become a pioneer in this field and a lot is being invested there to enable a quarter of all houses in the city to be produced using 3D printing by 2030.⁷³

Already there are several start-ups that can produce small houses at extremely low costs, in the range of four to ten thousand US dollars. Of course these houses are not comparable with the usual real estate in Germany. Nevertheless, this development shows where we are heading. At the Dutch Design Week festival in October 2018, the first 3D-printed bridge was presented, which is scheduled to go into operation at the beginning of 2019. Originally, the company MX3D planned to build the bridge directly at the intended location in Amsterdam with four 3D steel printers. The city administrators instead considered this to be too insecure, and so it was printed in a warehouse.⁷⁴ In theory, of course, there is nothing to prevent the buildings from being built where they are needed. This should save transport and storage costs. Whilst there is understandable excitement for this new technology, it should be clear that not every house can be produced as a 3D print and that developments in the construction industry are still in their infancy. Though impossible to predict what this will be like in twenty years' time, in the worst-case scenario, homeowners could lose a lot of value in their real estate if new construction takes a fraction of today's costs.

⁷³ <https://www.jobdisruption.com/xyob69fx>

⁷⁴ <https://www.jobdisruption.com/xyob70fx>

Customers now have the choice between a prefabricated house and a house that has been tailored to their wishes by an architect. Both variants have their advantages and disadvantages. In the case of a prefabricated house, the customer has the opportunity to see in advance what the house will look like; in the case of houses designed by architects, this was previously only possible to a limited extent. This is all changing precisely due to the use of virtual reality glasses, meaning that a customer can walk through the house to be built and see which things they would prefer to be different. At the same time, the prefabricated manufacturers are upgrading and offering the opportunity to modify the prefabricated houses individually.

This is not good news for architects, because prefabricated houses are much cheaper. Even if the architect's job is relatively secure, (since there will always be someone in the future who doesn't want an off-the-peg house), the market could become smaller. When an architect draws a house on a computer, it is a virtual product that can be used as a basis for other clients. If a large market for house designs emerges, as is already the case with other design elements, even less experienced architects could work competitively. This should start a downward price spiral, as is already happening in the markets for photos or designs, where previously several hundred euros had to be paid for pictures so that they could be used on one's homepage.

If, on the other hand, a customer does not want to build a house, but would rather buy an apartment or a house that has already been built, they often fall back on a real estate agent. In 2014, half of all privately sold properties were still brokered through an estate agent.⁷⁵ While previously, real estate was advertised in newspapers, today the search is carried out on the Internet. In 2013, the online share was already at 90%.⁷⁶ The reputation of real estate agents is not the best - they are often considered inefficient, opaque and overpaid. If a house or apartment owner commissions a real estate agent, they usually have little insight into the sales process. Dubious brokers take advantage of this by getting the seller to sell directly to the first prospective buyer, so that the broker gets their commission as quickly as possible. In addition to the sales process, the estate agent also has other tasks, such as determining the price of the property. They usually do this with the help of empirical values. But here, too, there are inexpensive competing products with which real estate prices can be calculated online. So agents face competition not only when it comes to value assessment through online platforms, but also when it comes to looking after viewing appointments and selling properties. Online platforms such as www.maklaro.de work together with independent consultants on site. Customers can conveniently enter a viewing appointment online and the sites are equipped with a question-answer catalogue tailored to the properties. If a house or apartment is sold today, the buyer

⁷⁵ <https://www.jobdisruption.com/xyob71fx>

⁷⁶ <https://www.jobdisruption.com/xyob72fx>

usually pays the broker's commission. Negotiations are currently underway on a legislative directive that stipulates that only the one who hires the broker must pay. This is not good news for estate agents.

The market is splitting into commercial and private real estate. While private real estate is usually a long-term acquisition, the situation is different for commercial real estate. Seldom does a company keep the same property for a long period of time; successful companies usually grow larger and need more space, while unsuccessful ones eventually cease operations. This is exactly where the www.wework.com business model comes in. Wework negotiates long-term rental agreements with the real estate owners and this is a lucrative deal for both sides. The real estate owner has the security of income over a long period of time, while Wework pays lower rents due to the longer term. However, the platform does not occupy the leased properties itself, but re-rents them to other companies at a higher rate. Companies that rent their real estate through Wework enjoy many advantages. They are able to rent a space which perfectly fits their requirements and do not have to worry about the design/furnishings of the rooms or their cleaning. But the main advantage is flexibility. Companies can terminate their contracts on a monthly basis. So if a company grows, additional space can simply be rented as needed. If a business model does not run according to plan, the lease can be terminated conveniently at the end of the month. If more and more providers offer flexible real estate contracts, this is likely to be a big competitor for real estate agents in the commercial real estate sector.

3.14 Teachers, lecturers and professors

This occupational group largely concerns imparting knowledge. If parents of school-age children were asked whether they would prefer their child to be taught by a human being or by software, hardly anyone would prefer the machine as a knowledge mediator for their own children, because it is not only about imparting knowledge, but also about conveying values and providing comprehensive assistance with problems. But is a human teacher really a better choice in any situation? Probably not. If a child miscalculates on a math task, it may be difficult for a teacher to find out exactly where the child made a thinking mistake. Software could quickly find this out and provide better assistance. In some schools, a hybrid route is already being chosen. Students work on tasks on the computer and the teacher gets a precise overview of which student is currently in which lesson. If necessary, they can support the individual pupil.

Companies need to train their employees to be prepared for future tasks, but external training is often expensive. An alternative to this is cost-effective online courses in which employees can acquire new skills directly in the workplace. It is understandable that these low-cost offers make it more difficult for lecturers to push through more expensive prices. But what about professors who teach at universities or universities of applied sciences? As a rule, professors have a research assignment in addition to their teaching assignment. This will hardly fall victim to digitization. Even so, this profession is severely threatened, at least if one believes the words of Clay Christensen. Christensen is considered the luminary in the field of disruptive business models and predicted in 2013 that in the next ten to fifteen years, 50% of all universities in the USA would go bankrupt. Although not much had changed at the universities in the USA by 2017, he repeated his statement and assumed that the great wave of bankruptcies would occur in the next nine years. His argument is simple: in the USA, tuition fees are incredibly high and universities do not provide the added value to justify these inflated prices. Online courses and career-tailored programs have a better cost-benefit ratio. He compares the development of universities with transistor radios from the 1950s. At that time, radios were operated with tubes that were superior to cheaper transistor radios in terms of sound quality. In terms of mobility and price, however, tube radios had disadvantages. As the sound quality of transistor radios improved over time, all tube manufacturers went bankrupt. Currently, the support and knowledge transfer at normal universities is much better, but online universities also have strong advantages that speak for them. They are scalable and independent of time and place. Christensen is therefore of the opinion that it is only a matter of time before fewer and fewer people will attend classical universities and the majority will change.

In the USA, the debt burden from student loans amounts to 1.5 trillion US dollars. Since the 2010-2011 school year alone, the debt burden has increased by about 500

billion dollars.⁷⁷ The average debt for attending a university with the goal of obtaining a bachelor's degree is 28,400 dollars.⁷⁸ Despite this high debt burden, other forms of education such as Massive Open Online Courses (MOOCs) have not established themselves on a broad front, even though there are a large number of free courses in addition to paid ones. Many students make use of these offers, but most do not complete their studies. According to a study by MIT and Harvard Universities, 95% of students dropped out of such courses between 2012 and 2013. The main reason given for such a high rate is that there is no live teacher involvement. In many cases, course participants receive automatic feedback after a test or quiz, but this cannot be compared to on-site support. But there are other reasons that explain why the drop-out rate is so high. Free online courses are especially quickly booked - one or two clicks are usually enough and the course participant is already registered. The investment is small. If a student drops out of the course, they have invested comparatively little. At a local university, the investment is already much higher. The student has to attend lectures, exercises and seminars where they interact with other students, from which social contacts are formed. However, attendance is not compulsory at all universities, so students can, of course, decide for themselves whether or not to attend lectures.

Whether this is better or worse has been answered in a metastudy based on 298 studies. It showed that there is a clear link between students' attendance at courses and the success of their studies. The higher the absence, the worse the students scored in the exam. So it is no wonder that the completion rate for MOOCs is so low. Every day, you are faced with the choice between many different employment opportunities. You have the opportunity to watch an exciting YouTube video or write your master thesis. Which action is performed depends in many cases on the usefulness. Activities that promise an immediate benefit are more likely to be carried out, while activities that are considered less useful are less likely to be selected. The longer it takes for results to be visible, the more appealing the delay is. This behavior can be proven by the research of the Canadian Piers Steel from the University of Calgary.⁷⁹

Another disadvantage of the MOOCs is their general and state recognition. The completion of an online course cannot be compared with the achievement of a Bachelor's or Master's degree. There, a student has to complete different modules, and only when they have managed to achieve all the required achievements for that course of study is the educational degree achieved. Many universities have recognized this problem and offer the possibility of conducting a state-recognized Bachelor's or Master's degree online. As a rule though, these offers are anything but inexpensive

⁷⁷ <https://www.jobdisruption.com/xyob73fx>

⁷⁸ <https://www.jobdisruption.com/xyob74fx>

⁷⁹ <https://www.jobdisruption.com/xyob126fx>

and cannot be compared in terms of costs with an almost free course of study at a public university here in Germany.

On the other hand, MOOCs also have great advantages. Students can repeat a lesson if necessary, and the quality of the lessons is often much better than in a normal lecture. In a video, the content can be edited so that the important points are highlighted graphically in the best possible way. At the same time, completed courses can be combined directly with a LinkedIn profile, giving HR staff the opportunity to filter for potentially interesting employees. This is usually not possible with a normal course of study. Although personnel managers can filter according to university degrees and field of study, they cannot filter according to which sub-areas the student was particularly interested in. Take a student who has completed a series of online courses on artificial intelligence, they will be interested in the subject and probably better suited than someone who only has a Master's degree in computer science.

Another advantage is that learning content can be worked through according to the student's personal schedule. While lectures always take place at certain times, you can watch the videos over and over again when it suits you. Such records prove to be advantageous, especially when preparing for the exam, because one's own notes are not always complete or self explanatory.

YouTube also contains a large number of different videos in which specific learning content is explained. In mathematics alone, the two most famous channels "Mathe - simpleclub" and "Mathe by Daniel Jung" together have well over a million subscribers. In numerous comments, students write there that without these videos, they would never have graduated from high school. For tutors, this free online competition is of course a great threat. Nevertheless, it must be borne in mind that this form of learning does not suit everyone. Many need a personal contact who can help with individual questions. But even here, digital solutions are also being developed for this purpose, where students and pupils can help each other with questions.

In summary, it can be said that the probability that teachers and professors in Germany will lose their jobs due to digital products is currently negligible. In the USA, where the universities are primarily financed by tuition fees and donations from former students, and where there is a great deal of competition, things may be different. There, however, the reason is more that students can no longer afford to study than that they prefer a digital product.

The situation is different for lecturers and experts whose job is to impart knowledge. They constantly have to acquire new customers and suffer from great online competition. They are also forced to constantly renew their knowledge so as not to be at a disadvantage vis-à-vis their competitors. Companies in particular can save a lot of money and resources through low-cost or free online courses. At the same time, they

can build the social environment in the company that is important for learning success, such as an entire team attending an online course. After each lesson, the participants can help each other so that everyone has the same level of knowledge.

3.15 Authors and publishers

Finding a publisher to publish your book is about as difficult as looking for a needle in a haystack. Anyone who has ever successfully published a book or is known in any other way has acquired a magnet that helps to find the needle. The authors who don't have a magnet are hopelessly lost to the big players, because the better known a publisher is, the bigger the haystack will be. This means that first authors have much better chances with smaller publishers.

The top publishers naturally offer many advantages. It starts with the distribution of the book: You have access to a large number of bookshops, which significantly increases the chance that a book will be sold more often. But here, one should be aware that in the majority of bookstores, only the bestsellers are truly displayed. Another advantage of large publishers is that they often pay an advance fee. This is a fixed sum that the author receives even if the book is not sold. Proofreading and editing are a matter of course for the big players. They won't let a book be published without quality assurance. But this is not always in the author's interest, because the editor can have a say in how the sentences are formulated, or even worse, whether certain passages should be potentially deleted from the book. In most cases, the author nevertheless benefits from the services and experience of the publishers. But this all-inclusive, carefree package has its price, because an author usually doesn't earn much from a book. Usually, their share of the selling price is somewhere between 2.5% and 10%.

Even among smaller publishers, the share of the selling price is still low. Editing and proofreading are often included in the services, but not always. There are so-called printing cost subsidy publishers who even charge money for their services, so that it is hardly possible for the author to earn anything from the book at all.

If the author has found a publisher, this does not mean that they can sit back, with the marketing just taken over for them. In the vast majority of cases, the author has to do any advertising themselves, as often the marketing budgets, especially those of smaller publishers, are minimal.

An alternative to handing over your rights to a publisher and receiving only a fraction of the revenue is so-called self-publishing. The author uses the services companies such as Amazon or Books on Demand and receives significantly more income from the sale of the book.

If the author sells an eBook on the Amazon website in Germany, they can decide whether they want to keep 35% or 70% of the revenue. Of course, if possible, any author would prefer to keep twice the proceeds of the sale, but the 70% option is subject to stricter conditions. At that rate, the price set by the author for an eBook must be between 2.99 euros and 9.99 euros, while for the 35-% option, they can charge up to 215 euros. An author can offer the book not only as an eBook, but also

as a printed edition. The book is not printed until the customer orders it. Which procedure and which service the author uses should be carefully considered beforehand, because there are also a number of regulations such as whether the publisher or publishing house requires an exclusive right, whereby the author may no longer distribute the book themselves via their website. If a customer chooses self-publishing, they have to take care of everything. This is comparable to the difference between an employee and a self-employed person. An employee receives a fixed salary and has less risk. In many cases, a self-employed person receives a higher salary, but also has a significantly higher risk. This is also the reason why many authors, despite the lower margin, prefer a publisher, because they have less to worry about and can concentrate on writing. But this inevitably leads to a downward spiral, as the majority of authors are rejected by publishers. Many understandably decide to publish their works independently, which in turn creates more competition. As a result, publishers sell fewer copies. Since they still have to pay their employees, there are only a few top publishers left. Of course, there are also publishers that are run as a hobby or out of love. These can of course continue to exist, but the publishers who have to work in a profit-oriented manner hardly have a chance.

As with music, only a fraction of authors can make a living from their works. This is not only due to the broad competition, but also to the fact that fewer and fewer books are being read. According to a German study by the Gesellschaft für Konsumförderung (GfK), the book market fell from 36.9 million buyers to 30.8 million between 2012 and 2016.⁸⁰ This is a reduction of nearly 17% within just four years. and the trend is continuing, because in the first six months of 2017, the book market lost another 600,000 buyers. All in all, digitization makes it possible to bring a book onto the market without a publishing house and with significantly less effort than was previously the case. At the same time, this increases competition. This makes it more and more difficult in this industry to generate a viable income.

3.16 Journalists

Like authors, newspaper publishers also have the problem that it is becoming more and more difficult to reach their customers due to strong competition. Ever since the "Frankfurter Rundschau" filed for bankruptcy, it should be clear to everyone that daily newspapers are faced with major problems as a result of digitization which in turn, has a direct influence on the profession of journalism. It is not for nothing that publishers are fighting for the introduction of an effective ancillary copyright law. In Germany, a law was introduced on August 1, 2013 to protect publishers and share the revenues of search engines such as Google. So far, Google has consistently refused to pay even one cent. Spain has also introduced such a law. There, the

⁸⁰ <https://www.jobdisruption.com/xyob75fx>

regulations are even a little stronger than in Germany and as a result, Google switched off its Google News service there. In Germany, publishers must agree to make their text excerpts available free of charge to Google for Google News; otherwise, they will not be displayed on that service. Axel Springer Verlag did not want to issue this permit at first, but when it noticed that their pages were less visited as a consequence, they decided to grant Google the free license after all. Had it not done so, the annual loss per brand (world, computer picture, etc.) would have been in the seven figure range.⁸¹ Negotiations are currently underway on whether such an ancillary copyright should be introduced at EU level. If such a law makes sense or not can be discussed. What is certain, is that the current business models are under threat - and so is the profession of journalism.

But why are these jobs threatened? Shouldn't it be much cheaper to reach customers via the more-profitable Internet? In a keynote speech, Christoph Keese, Executive Vice President of Axel Springer SE, explains why this is not the case: "During the transition from the printed newspaper to the computer screen, 90% of revenues were lost with the same reach. The transition from the desktop to the smartphone means that a further 90% of revenues are lost."⁸²

Getting customers to pay for journalistic content is a difficult undertaking. The problem is transparency. If a website charges ten euros a month for its articles, but another website offers an article at the same level free of charge, the customer rightly asks: Why should I pay ten euros?

Weak revenues though are only one factor that threatens the journalist's job. There are articles now that are not written by people, but by software. This is especially popular in the areas of sports, economy and weather, because these are exactly the areas in which many structured data sets are available. The number of sensors increases every year, and more and more data is generated. The larger the data pool, the more difficult it becomes for people to keep track of the flood.

It is not possible to generate automatic texts in every genre, but this is also not necessary. For those areas where it is not technically possible, a hybrid system would combine the best aspects of both sides. The editor creates a rough version with various text modules, and software searches various databases for further information and completes the article. Not only are fewer journalists needed, the articles are of even higher quality, because these software systems always keep the articles up to date.

Improving text sounds good, but wouldn't it be even better to constantly improve it? In order to realize this in practice, it is of essential importance to measure how well an article is received by a customer. For this, it is essential to measure, modify

⁸¹ <https://www.jobdisruption.com/xyob76fx>

⁸² <https://www.jobdisruption.com/xyob77fx>

and measure again - and all this in an endless loop. This is how it works: Reader group A reads variant X and reader group B reads variant Y of an article. The probability of termination is measured. Whether a user has finished reading an article can be determined by measuring whether the user scrolls to the end of it with the finger on the smartphone or with the mouse on the computer, at continuous intervals. Through this feedback, software can better recognize what the reader is interested in and which words they prefer.

The quality of text isn't the only thing that can be determined, but also the quality of the journalists themselves, which ones are particularly well-received and have a special talent for writing. Not only can the newspaper evaluate this - everyone can. Computer scientist David Kriesel showed which findings can be determined from meta-information alone. He collected the published articles from the Spiegel Online website for a year and was even able to determine which personal relationships existed within the newspaper editorial staff!⁸³

Even before digitalization hit, the journalist's job was not exactly a dream one from the outside. Irregular working hours and an irregular income, few permanent jobs, and of course, work on weekends and holidays. But with the coming changes, the conditions are likely to become even more difficult. It doesn't matter whether a journalist goes to the newspaper, to the radio or to television: the same changes are taking place everywhere. In China, the first artificially generated newsreader was introduced at the end of 2018. Even though it is still clear to every viewer that he is not a real person, this assessment, as the next chapter, "Actors and Musicians," will show, is likely to become much more difficult in the coming years.

⁸³ <https://www.jobdisruption.com/xyob78fx>

3.17 Actors and musicians

An industry full of glamour and a life in luxury? This only applies to the big names in the acting and music industry. For the others, it is a life full of uncertainties and existential fears. According to a study by the University of Münster, more than half of German actors earn less than 20,000 euros gross per year.⁸⁴ More than a third need additional jobs to make a living. It doesn't look better for musicians: composers, lyricists and music editors earn an average of 17,500 euros, while producing musicians earn only 12,500 euros.⁸⁵ Added to the poor economic conditions, rejection is also part of the daily struggle. If an actor wants to get a job, they usually have to go through a casting process in which many applicants fight for a small number of roles. For this, actors have to invest time for which they are usually not paid. But not even every casting is open to the public. Sometimes you have to apply before you can even audition for a casting. An application is usually made through a current show reel, where the producers can get an idea of the talents and abilities of the actor in advance. Clearly, a show reel should be as up-to-date and professional as possible and the artists have to pay the costs for its creation themselves. If an actor receives an order through an agency, part of the fee goes to the agency, which further reduces their earnings.

While in the past, many musicians could live off the royalties of their songs, today they need other sources of income in the time of Spotify and other streaming platforms. That's why ticket sales for live events, fan articles, and cooperation are now an increasingly important part of a musician's income. Actors usually do not have this option. Although there are theatre performances, engagements at the theatre are usually full-time jobs. The actors are usually not involved in fan articles either, because they usually hand over their rights to the production studios. The only pleasing thing to report from the acting industry is that Netflix and Amazon are currently investing several billions in the production of new series and films. In 2018 alone, Netflix invested between 12 and 13 billion US dollars. And Goldman Sachs estimates that this figure could even rise to 22.5 billion in 2022.⁸⁶

Even though these figures are certainly encouraging for production studios and actors, this does not necessarily mean a positive development for actors in the long run. Because Netflix pumps a lot of money into the production of films and series, small productions have a harder time attracting attention; viewers expect a certain level of attention due to the many high-priced productions. At the same time, YouTube and Twitch create video content that is available to viewers around the clock free of charge. On the Twitch platform alone, the number of channels broadcasting a livestream at least once a month has risen from 2 million in 2017 to 4.6

⁸⁴ <https://www.jobdisruption.com/xyob79fx>

⁸⁵ <https://www.jobdisruption.com/xyob80fx>

⁸⁶ <https://www.jobdisruption.com/xyob81fx>

million in January 2019. The average number of viewers varies depending on the time of day, but is around 1.3 million. If individual companies gain a lot of market share, there must inevitably be losers on the other hand. In 2018, these included cinemas, which achieved their lowest revenues since 1992.⁸⁷ Traditional television too is also facing major problems. RTL and Pro7 fell to their worst values for decades.⁸⁸ For aspiring actors, this is bad news, because the market seems to be divided into high-priced productions, where actors get decent salaries, and low-priced productions, where money can hardly be earned.

We see actors often generating income through advertising deals and act as influencers. A typical example of a successful influencer is Miquela Sousa. She is nineteen years old, has Brazilian-Spanish roots, and lives in Los Angeles. Her single "Hate Me" was streamed over 3.5 million times, and on her Instagram account, lilmiquela, she has more than 1.5 million followers. There she advertises for numerous brands like Prada, Nike and Supreme. She is also politically active and advocates for the rights of African Americans and the LGBTQ community. Interestingly, Miquela is not a human being, but a computer-generated avatar.

So the general future prospects for actors are anything but certain. In 2014, Ian J. Goodfellow published a paper on Generative Adversarial Networks. This is a technique by which images can be created from nothing by two neural networks mutually improving each other. This technology received a lot of attention when researchers at the University of Washington made fake videos of Barack Obama.⁸⁹ The technology is already so advanced that it is almost impossible for the human eye to decide whether we are talking about real or artificially created humans. Certain attributes such as age, skin color or ethnic origin can also be changed at the touch of a button.⁹⁰ It only takes a little imagination to see that in a few years, the acting performance can simply be artificially improved or changed on the computer, as is already done in music. When "Rogue One" was released in December 2016 with a production budget of 200 million US dollars, the actress Carrie Fisher's younger self was brought back to the big screen using the latest visual effects. How high the cost was to create this special effect is unclear, but certainly it was much higher than the cost a Reddit user invested to create his own version using a tool called Deep Fakes. According to him, he used a normal computer, which took about twenty minutes to create the ten-second sequence.⁹¹ The special thing about this technology is not that someone can reproduce high-tech CGI effects on their home computer, but that old images from the Internet are used to create them. These images often do not have good resolution and are far from the level of those taken by professional film studios. In a few years,

⁸⁷ <https://www.jobdisruption.com/xyob82fx>

⁸⁸ <https://www.jobdisruption.com/xyob83fx>

⁸⁹ <https://www.jobdisruption.com/xyob84fx>

⁹⁰ <https://www.jobdisruption.com/xyob85fx>

⁹¹ <https://www.jobdisruption.com/xyob86fx>

it will probably no longer be distinguishable for the human eye whether the current scene was really played by the actor or whether the face was simply put on afterwards.

Artificial intelligence is also used in the field of music, which it can already compose. But since musicians are shifting their business model more toward events, the impact is likely to be less than for actors. Of course not every actor plays in movies. There are also a host of artists who only perform in the theatre and these will be less affected by the changes. Whether the theatre suffers from a decline in the number of visitors comparable to that of the cinema has not yet been conclusively clarified. Last year, the number of spectators fell from 21 million to 20.5 million, but according to Marc Grandmontagne, the managing director of the German Stage Association, this could also just be normal fluctuations.⁹²

⁹² <https://www.jobdisruption.com/xyob87fx>

3.18 Translators, interpreters and voice actors

Even if there are worlds between the job description of a translator and that of a voiceover artist, they are technologically close to each other. What sounds funny at first becomes obvious in the technical implementation. In science fiction movies and series, perfect automatic translation has always been a dream. But so far, we have not been able to develop programs that reach the level of human translation. One thing is clear though: machine translation has made enormous progress in recent years. Nearly all major players in the IT industry have invested a lot of resources in developing their own translation software. The reason is simple: the market for translation and language services is huge. According to the US market research company Common Sense Advisory (CSA), the global market volume for language services will grow to 56.18 billion US dollars by 2021.⁹³ If these translation services can be provided by software, this is of course a goldmine. Already, the translation programs are powerful. DeepL, currently the best translation software, runs on a supercomputer in Iceland and can translate one million words per second, a number a human translator could obviously never come close to.

The fact that translations are optimized every year by better and better data sets makes it more and more difficult for less proficient translators. The only way for them not to get into the fight with translation programs is to specialize more and more. The more specialized the subject area, the greater the chance that the work of human translators will be significantly better than the translations of software. But, in addition to translation software, there is also global competition. On platforms such as www.upwork.com, several thousand translators offer their services at far lower prices than German translation agencies.

Interpreters suffer from the same problems. We now have various software solutions that simultaneously translate spoken language into other languages. The task of interpreting is broken down into various activities and implemented using different software components.

The first step is to convert the language into text. Here, natural algorithms of artificial intelligence are used. As early as 2017, Google and Microsoft had mastered the 95% hurdle. As with image recognition, the human error rate is 5%. This means that out of a hundred words, about five words are incorrectly recognized. These can also be small errors, such as an "s" at the end of a sentence that is overheard. In image recognition, this hurdle was already broken in 2015, so that the error rate is now only 2.3%. This suggests that the error rate in speech recognition will be further reduced. Voice Assistant systems such as Alexa, Google Assistant and Siri play an important role here, because they generate a mass of data. If a user asks Alexa for the time and is misunderstood, there is a good chance that the user will repeat the question until

⁹³ <https://www.jobdisruption.com/xyob88fx>

the system has understood them correctly. In this case, Amazon will of course get good examples to improve the system.

After a sentence has been translated into text by the software, this text is translated into the desired target language by another system. As a final step, the translation is transferred to another program, which generates a natural language from the words.

There are two different approaches for generating human language, which are called "concatenative" and "parametric" in English. "Concatenative" is easy to describe. A person goes into a recording studio and speaks thousands of words and sentences. These are saved as sound snippets. The only thing the software has to do now is to select and assemble the sound snippets for the words in a text. No artificial intelligence is required. The approach called "parametric" is different. This method generates words by combining parameters such as fundamental frequency and magnitude spectrum and processing them to generate speech. Which approach is better depends on the language to be translated into. In the English-speaking world, text listeners prefer the "concatenative" approach, whereas "parametric" is preferred in Chinese.

But no matter which system is used, both have disadvantages in that the products lack the right emphasis that can actually trigger emotions. However, in this area in particular we are experiencing strong improvements. Artificial intelligence is used to recognize accents and articulations from existing audio files and to model them in the generated language. In a comparison test with conventional methods, listeners perceive this emphasized language as significantly more pleasant. Although it is still below the level of professional speakers at present, the gap has narrowed considerably in recent years. Should these values continue to improve, this would signal the end for the profession of dubbing voiceovers, because the automatic generation of speech has another major advantage in addition to the obvious cost and time savings. These systems can adapt perfectly to the needs of their listeners. One listener likes a neutral male voice, the other prefers a calm female voice, and another prefers a deep, dark male voice. To offer an article in a variety of language styles is no problem due to automatic language generation. Even adding accents is easily possible with this technology, as the Chinese search engine company Baidu already demonstrated in 2017.

The combination of systems for text recognition, text translation and language generation shows that even synchronous interpreting is successful today. That does not necessarily mean that translators and interpreters are no longer needed, especially in regulated areas, such as translations for courts, in politics, or in medicine as these jobs will be indispensable in the coming years. But there will also be many areas of application where translations can be handled completely by automatic systems. It looks even worse for dubbing actors. From the moment systems like Alexa or

Google Wavenet are judged to be more pleasant than a human speaker, there will be few exceptions where a human is preferred.

3.19 Consultants, Experts and Coaches

This industry is flexible and inherently characterized by a major lack of transparency, which naturally calls for disruptive approaches, but the matter is more complicated. First and foremost, a distinction must be made between consultants from large management consultancies and independent coaches. Because many technologies affect both jobs in a similar way, they are summarized in this chapter. While management consultants concentrate on advising companies, coaches often focus on a mix of companies and individuals.

Companies hire consultants, experts and coaches when their internal resources are at a standstill. But how does a company find a good management consultant or a good management consultancy? This all depends on the individual area for which an external consultant is sought. Here are a number of categories:

- Management and strategy consultants
- Process and IT consultants
- Personnel and organizational developers
- Auditors and tax consultants

Auditors and tax consultants have to pass an exam to be allowed to call themselves that. With the other job titles in management consultancy, there is no such hurdle; anyone can use them. Because there is no quality seal, it is difficult to recognize from the outside who is good or bad.

One possibility is to go to top consultancies such as McKinsey, Boston Consulting Group or Bain. While just the company name alone carries weight, there is also a large network of expertise behind it. The customer has to dig deep into their pocket for this. If the budget is not sufficient for the elite of management consultancies, it becomes more difficult to make the right choice, because two important conditions have to be met. The first and most essential condition is confidentiality. Particularly in the case of strategic decisions, which are often discussed at board level, it is absolutely necessary to have a partner who is trustworthy. The second important condition which must be fulfilled, is professional competence. Ultimately, the problem should be solved by the client. Large consulting agencies have concentrated these competencies in a pool of experts who are assigned to respective projects. Smaller, generally oriented management consultancies, which do not possess specialized know-how, are at a disadvantage, not only to the large agencies, but also to the smaller ones, which concentrate only on a special field. Because a management consultancy that is only active in one special field is considered to have a higher level of competence than a management consultancy that does everything.

For specialized as well as generally oriented management consultancies, it is crucial to present their knowledge to the customer in a credible manner and to make an advance payment through an open information policy. This applies equally to coaches, independent consultants and other experts. Otherwise, it is not clear to the customer from the outside how good these experts are in their respective fields. The less information a customer has, the more they have to rely on less valid information. This can be, for example, the price of a management consultancy, according to the motto: If it is so expensive, it must be good.

But even after a consulting service has been provided, it is often difficult to subsequently measure how good the consulting really was. If you take a look at the Praktiker furniture chain, which went bankrupt in 2013, you can see that more than 80 million euros were spent on consultants in the two previous years. Here it can be said with retrospective certainty that the advice was not the best. The case of the discount chain Lidl is similar; it worked with many consultants for seven years on the introduction of a new external merchandise management system, investing more than 500 million euros. In mid-2018, however, Lidl decided to discontinue the project and instead further develop its existing merchandise management system.

Another point of attack from which management consultancies will suffer in the future is the attempt to replace consulting services with automated data evaluation. The majority of companies could collect and evaluate the data themselves, but usually lack the resources to do so. Often each department has its own island solutions, and in many cases the data acquisition is still done in Excel. This will change solely due to statutory provisions. General data protection regulation forces companies to adopt a data strategy in which the company must always know exactly which data is stored where and in which format. At the same time, forecasts indicate that the volume of data will increase by a factor of ten between 2016 and 2025. In order to handle these large amounts of data and regulations, companies have no choice but to invest resources in data collection and analysis. In addition to the time-consuming development and implementation of such systems, someone is always needed to interpret the results and derive suitable measures for the specific company. The problem is that this know-how is usually not found in the company and is expensive to build up, making it often cheaper to hire a consultant. It is precisely in this area that IT giants such as Google, Microsoft, IBM and Amazon invest many resources in the development of their analysis tools. With Cloud AutoML, Google provides a product suite for machine learning with which even developers with little knowledge can train high-quality models that are tailored to the respective requirements. With this product, Google provides other companies with software that can easily build artificial intelligence to help them make decisions. In a positive case, such a system helps to save costs in various areas. For instance, Google gave control of the cooling of its data centers to an artificial intelligence company, which reduced energy costs

by up to 40%.⁹⁴ But giving control of a process to an algorithm can also have negative consequences. On Facebook, the algorithm is trained to strongly promote user engagement.⁹⁵ This means that posts are more likely to be displayed in the newsfeed when there are a lot of people interacting with them. But especially with false news, this is a considerable disadvantage. Those who don't realize the information is fake or misleading, share and comment on the post. The other side also reacts and comments under the post that the information is incorrect, creating intense and ongoing arguments. As a result, the so-called "Fake News" is displayed to a large number of people.

Whether an artificial intelligence or a consultant is preferable depends strongly on each case and the culture of the company - and not every company will consider an AI. This is particularly the case shortly after the market launch of such tools, when only very few companies would probably prefer such solutions to traditional consultants. In addition, smaller companies probably use such tools as if they were shooting at sparrows with cannons. But even for the smaller companies that want a better overview of their company, the range of software solutions is getting better and better. Tools such as Tableau, Looker or Qlik allow someone who is not a Data Scientist to create dashboards on customer lifetime value, exchange rates and ad strategies. Also, data from market research companies is easier to access than ever before. In the past, the experts still had a lot of secret knowledge that was built up through years of experience. But this information monopoly is crumbling, because more and more valuable knowledge is freely available on the Internet.

How something like this looks almost in perfection can be observed at the law firm Wilde Beuger Solmecke. Almost nine years ago, they opened a YouTube channel, and have since released well over 2,000 videos. In these videos, the firm answers legal questions free of charge. Users can post their legal questions under the video, and the questions that have most likes are researched by the law firm and presented in a video. The firm does not receive a cent for the preparation and research. They do not advertise on their videos either. At first glance you might think that this is a rather stupid idea, because they only have costs and get nothing in return. But that's not true. As of today (March 2019), they have more than 400,000 subscribers. Many of these subscribers watch the videos for free and may save themselves paid advice, but, there is always a small percentage that need additional legal assistance. Those who have already had good experiences with the videos in the past logically hire WBS instead of a law firm unknown to them.

By intelligently using different telephone numbers, WBS can track which acquisition channel the new clients come from. In addition, the request to post questions in the comments increases the engagement rate for the videos, so the YouTube algorithm

⁹⁴ <https://www.jobdisruption.com/xyob89fx>

⁹⁵ <https://www.jobdisruption.com/xyob90fx>

recommends these videos more. Due to the network effect, other lawyers have virtually no chance of establishing a comparable position.

What is worthwhile for WBS in this case is extremely bad for everyone else in the sector. This behavior cannibalizes an industry, whereby the information, and thus the legal advice, loses more and more value. Lawyers are very lucky that regulations protect them. When someone goes to court, they always need a lawyer. Because of this, consulting is often one of several pillars through which revenues are generated. But for consultants and coaches, advice is often the only pillar alongside personal support. There are currently around 118,000 management consultants in 19,000 consulting firms in Germany.⁹⁶ While large consultancies such as McKinsey employ several thousand consultants, there is also a large proportion of small consultancies that have few employees, sometimes only one. So how can a consultant or coach hold their own if a large part of their knowledge is available free of charge and well-prepared on the Internet? They have no choice but to develop new business models and to make most of their knowledge also available free of charge. But even that may not be enough if other experts or companies already make this knowledge available in a better and more engaging form.

⁹⁶ <https://www.jobdisruption.com/xyob91fx>

4 Data protection and privacy

Surveys on the importance of data protection leave no doubt: For the majority of Germans, their own privacy is a good worth protecting. But anyone who thinks that this chapter will show how privacy will be better protected by digitization in the coming years has not paid attention so far. This chapter shows the reasons why there will be no more privacy in the future.

The European General Data Protection Regulation (GDPR) and the E-Privacy Regulation are attempts to prevent previous interference with privacy. Unfortunately, certain details of the regulations lead exactly to the opposite result. As always, the devil is in the detail. For example, the basic data protection regulation allows every user to request their personal data from a company. Google, Facebook and a host of other companies provide online interfaces for this, with which every user can download all the data collected in a single file. Here, each user can select which data they would like to have. After this selection process, an archive is created with the personal data that the user can download.

What now prevents companies from requesting this data from customers, for example, if they want a reduced loan? Exactly, nothing. The more data the customer releases in the process, the better their chances of getting a loan. A well-known company that searches the private data of potential customers is Kreditech. In a credit query, this company pays attention to almost everything: location data, Facebook friends, Facebook pages or posts that the user has created or interacted with, what hardware is being used, even what fonts are installed on their computer. That even something as minor as a font can provide important clues is probably unknown to many. The founder of Kreditech, Sebastian Diemer, told a revealing anecdote about this in an interview with the world. He said, "We've found that people who don't pay back their credit have a very specific font on their computer" - a font used only by casino and poker programs. Kreditech is just one example among many for companies that use similar business models to check whether individuals are creditworthy. Other companies include ZestFinance, Kabbage, Wonga, Lenddo and Big Data Scoring.

The planned E-Privacy Regulation is also a double-edged sword, as it states that the user of a product must always be asked for their consent when personal data is collected. It also stipulates a prohibition of coupling. This means that a company may not deny access to a website if the visitor refuses to consent to the use of personal information. What sounds like a good thing might turn out to be a bad thing in hindsight. As with the GDPR, the detail is revealing.

According to the current draft of the E-Privacy Regulation, users should be able to revoke their consent every six months. This means a difficult implementation process for companies. The databases must be created in such a way that individual

entries can be removed at any time. Generally speaking, however, companies also have backup systems that back up data across the board. The data must also be removed from these. The effort that would be required for this is certainly beyond the limits of what is economically viable. As a consequence, companies have only one option in the last instance: to store the data anonymously. But anonymous data is the opposite of what many companies want, because they are seeking to find recommendations on how to improve customer relationships individually. This also explains why the majority of German companies reject this regulation. It could lead to companies that already have a monopoly position being able to consolidate it because they are less dependent on new data. It also makes it more difficult to develop innovative products. Alternatively, companies would have to come up with new, creative approaches - not only to the backup problem, but also to how they get user approval.

An obvious possibility would be to slay the user with requirements. It is true that the company must grant the user access, even if he or she refuses to have personal data collected. But there is nothing to prevent the provider from offering two options: allow the user access to the product only if they individually reject the innumerable different ways in which personalized data can be collected or alternatively, they would get immediate access if they clicked on the button to agree to everything with just one tap. A majority of users would probably choose the one-click option for convenience.

While the EU is taking a step backward and wants to put a stop to data collection, China is moving in the opposite direction and will introduce a national assessment system from 2020. Each person starts with the same number of points. This is corrected upward or downward over time on the basis of the individual behavior of the respective person. Desired behavior is rewarded, while unwanted behavior is penalized with a point deduction. Crimes should have a large influence on the score, but also smaller offences, such as crossing a road while the traffic light is red or behavior that does not conform to society. Positive effects would come from charitable commitment or the punctual payment of bills. If a person in China now has a negative value, this can also have noticeable consequences, such as a travel ban on express trains or airplanes. Also, the access to a fast Internet connection can be denied to them.

The chances of such a system being introduced in Germany by the state are slim. But this does not mean that companies do not resort to such systems. On the contrary, companies are already evaluating their users and adjusting prices for the specific individual. For example, the hardware used by someone plays a role here. Amazon assumed that users of Apple products could be shown more expensive prices because these users were considered more willing to pay. Amazon consistently denied this assertion, but did not provide a plausible explanation for why the NRW consumer

organization Verbraucherzentrale and the SWR investigation show Marktcheck had observed this behavior in their test.

Since December 3, 2018 it has been prohibited in the EU to carry out so-called geo-blocking. This means that a dealer from Germany may not give two customers from the country differing prices. Nonetheless, this does not apply to digital products. Anyone who deduces from this however that all customers would be shown the same price is mistaken. Online merchants can continue to set their prices and marketing activities freely, for example by targeting offers to specific customer groups. These could be, offers for young people. But when doing so, companies may not discriminate on the basis of nationality, residence or establishment.

As can be seen from the various examples, the processing of personal data is already subject to a number of different regulations which companies have to comply with. But anonymized data can be collected and used in Germany without restriction, as it cannot be traced back to the consumer. This data can also be easily purchased, exchanged or sold by other companies. It is a myth though that the removal of personally identifiable information such as name or address does not allow users to be identified. The legal text of Regulation (EU) 2018/1807 is clear: *“If technological developments make it possible to turn anonymized data into personal data, such data are to be treated as personal data, and Regulation (EU) 2016/679 is to apply accordingly.”*⁹⁷

Various examples from the recent past show that precisely this is possible. Scientists at the University of Texas succeeded in partially de-anonymizing an anonymized Netflix data set with the film ratings of 500,000 users.⁹⁸ This was done by comparing this anonymous data with non-anonymous film ratings from the Internet Movie Database. The identity of individual users could thus be determined by correlations. Placing two databases next to each other and looking at which matches exist is a typical procedure.

The content of the data itself also allows conclusions to be drawn in many cases which help to identify the persons. Reporters from Norddeutscher Rundfunk (NDR) succeeded in de-anonymizing a data set acquired from data dealers by means of a detailed analysis of surfing behavior.⁹⁹ Individuals were identified and subsequently interviewed. It turned out that the examined data had not been made available voluntarily by the persons, but had been secretly taped via a browser extension.

This reveals the root of an even greater problem. It is almost impossible to determine which data is processed and sent to third parties without the user's knowledge. Although the smartphone displays what permissions an app needs, it doesn't show what it does with those permissions. Communication usually takes place via an encrypted

⁹⁷ <https://www.jobdisruption.com/xyob92fx>

⁹⁸ <https://www.jobdisruption.com/xyob93fx>

⁹⁹ <https://www.jobdisruption.com/xyob127fx>

connection, so that the data stream cannot simply be read along with it. This encrypted connection can be broken by man-in-the-middle attacks, but only if the programmer has not separately protected the app against it. As a result, it is impossible for a normal user to identify which company owns which data of a person.

But apps and browser extensions aren't the only ones spying - companies do the same with their employees. In August 2018, the Federal Labor Court ruled that video recordings of openly mounted cameras, such as in shops, do not have to be checked daily in order to serve as proof of an employee's grip on the cash register. With this basic decision, video data can easily be stored for longer periods of time. Video recordings can not only be used to detect theft, but also to check how well an employee does their job. This can be done by people who evaluate the videos, but an artificial intelligence can also be trained to classify the employee's activities and generate a performance report. Is uninitiated video surveillance allowed in Germany? No, it definitely isn't, but, this has not prevented companies from doing just that in the past. The most famous scandal is probably that of Lidl, who spied on their employees for several years.

The introduction of a video surveillance or a similar surveillance system in a company must not take place to monitor employees, but must have economic reasons. This also applies to positioning systems such as GPS. Here, too, the aim should not be to monitor the employee, but to focus the system on improving the company's products and services. One valid reason could be to improve route planning in order to be able to accept and process more customer orders. It is advantageous for companies to obtain a declaration of consent, as otherwise the data collected may not be personal. This means that the vehicle gets its own designation and that information is not stored about which driver used which vehicle at which time. If this personal data is not recorded, it is not personal data, and therefore does not fall under data protection. This makes it possible for the company to exchange information with external companies without restrictions, but only as long as there is no possibility to de-anonymize the data. Today, the use of artificial intelligence already makes it possible to identify people just by their gait, meaning it is technically possible to determine afterwards from this supposedly anonymous data which driver drove which vehicle. Of course this would not be allowed, but how is an employee to prove in court that it was not an operational necessity, but an illegal performance measurement that led to the dismissal?

What can be read from apparently insignificant data was demonstrated by researchers at Münster University of Applied Sciences with investigations into so-called smart meters. These are intelligent electricity meters that measure and record the electricity consumption of an entire household every two seconds. The researchers were able to subsequently determine which television stations and which DVDs were watched

at which time by means of electricity consumption alone.¹⁰⁰ These findings date from the year 2011. The current state of the art technology, especially in the field of artificial intelligence, permits even more precise identification through the use of deep learning. MIT researchers demonstrated that it is possible to identify one or more people in a room even in darkness, by processing radio signals. Not only was it possible to identify the number of people, but it was also possible to identify their body movements, including those of their arms and legs. The system even worked through walls, and the radio signal used for the experiments was a thousand times weaker than that of a normal WIFI network.¹⁰¹ A research team led by Yanzi Zhu from the University of California at Santa Barbara has also shown that no special equipment is required for the location. They developed a positioning method that only needs the normal WLAN signals of the environment and a commercially available smartphone. This makes it possible to locate and track people just through the reflections of WLAN transmissions through walls.¹⁰²

With the introduction of the 5G standard and the increasing number of IoT (Internet of Things) devices, it is almost impossible to escape total surveillance in inhabited areas with radio masts. In the coming years, almost every appliance will be intelligent and have a transmitter/receiver unit, be it the refrigerator, the coffee machine or the toaster. With each additional device that emits a signal, the determination becomes more accurate.

Another aspect that is hardly taken into account in data protection today is the classification of persons into drawers. It should be clear that these are not always correct but nevertheless, they are often a useful indicator. In psychology, there are various models for classifying people into certain categories. The best-known models are:

- Five-factor model
- DISG
- Myers-Briggs type indicator
- Reiss profiles

Of these, the five-factor model, also known as the Big Five or OCEAN model, is the most common. In this model, the personality is broken down into five personality factors. These are:

- Openness
- Conscientiousness

¹⁰⁰ <https://www.jobdisruption.com/xyob94fx>

¹⁰¹ <https://www.jobdisruption.com/xyob128fx>

¹⁰² <https://www.jobdisruption.com/xyob95fx>

- Extraversion
- Agreeableness
- Neuroticism

Openness describes openness to experiences as well as the preference for variety. People with a high degree of openness tend to be inquisitive and curious, while people with a low degree of openness tend to be cautious and conservative.

Conscientiousness describes self-control, accuracy and determination. People who are particularly conscientious are careful, well-organized and forward-looking, while less conscientious people are more spontaneous and carefree.

Extraversion describes whether a person is more extroverted or introverted. Extroverted people are more sociable and approach other people openly, while introverted people prefer to be alone and independent.

Agreeableness describes how cooperative and willing to compromise a person is. People with high tolerance values are more compassionate and helpful, while people with low tolerance values are more competitive, suspicious and egocentric.

Neuroticism describes how a person deals with negative experiences and how emotionally stable they are. People with high levels of neuroticism are more anxious, nervous and insecure, while people with low levels are calmer and more confident.

None of these characteristics are good or bad in themselves. They are only intended to classify a person better.

The personality of the user can be determined not only by psychologists, but also by algorithms. An example of this is the work of assistant professor Michal Kosinski from Stanford University. His study involved 86,220 volunteers who filled out a personality test with 100 questions and additionally granted access to their Facebook account.¹⁰³ The result of the study was a computer model that could better predict a person's personality than a person's own partner if they had posted more than 300 "Like" comments on Facebook. A few weeks after the publication of this study, Facebook changed the visibility of "Like" information from "public" to "private."¹⁰⁴

Cambridge Analytica, a company that became known through the Facebook data scandal, uses precisely such data to determine the personalities of users and thereby influence political opinion in a targeted manner. The fact that this influence actually had an effect on the presidential elections in the USA in 2016 is highly controversial, but it can now be proven, beyond doubt, that a personality-based address in advertising makes a clear difference. In a study where three million people on Facebook

¹⁰³ <https://www.jobdisruption.com/xyob96fx>

¹⁰⁴ <https://www.jobdisruption.com/xyob97fx>

were exposed to certain ads, it was found that ads matched to personality-based features generated 50 % more sales than inappropriate or non-personalized ads.¹⁰⁵

Probably the most marginal study published by Michal Kosinski is called: "Deep neural networks are more accurate than humans at detecting sexual orientation from facial images." In it, he was able to show that in 81 % of cases, a neural network could correctly decide whether a man was homosexual or a heterosexual on the basis of a single photo of the face. For women, the correct detection rate was 71 %. For five photos of the person, the recognition rate rose to 91 % for men and 83 % for women. If people estimate sexual orientation on the basis of a photo, much lower accuracy is achieved: 61 % for men and 54 % for women. There are several reasons to be critical of this study, especially in view of the methods used. Namely, it was not possible to verify whether the persons from the heterosexual test data set were actually heterosexual. While only profile photos of persons who publicly stated that they were gay were used for the gay test data set. This public outing could result in these people wearing different make-up than homosexuals who do not make their sexuality public. On the other hand, there may actually be real differences in facial structure possibly be due to a different hormone level. At the moment, this is merely speculation. Either way, the research clearly shows one thing: year after year, the possibilities for classifying people are increasing.

A German start-up that offers such a classification in the field of HR is Precire. Large companies are in many cases attractive employers and naturally receive many applications. If Precire's software is used, the applicant must go through an automatic telephone interview. The software asks the applicants various questions and analyses the answers. Then, the voice, tone variance and filler words are analyzed, from which the software creates a psychological profile. The potential employer receives this profile and can decide whether to hire the person or not.

Of course, the government can enact laws that restrict such things or prevent the disclosure of data. But what happens when companies are simply bought? Here too, of course, there are provisions. Facebook had to agree not to share data when it acquired WhatsApp. Two years later, however, they changed the terms of use to be able to exchange the data. German data protectors understandably did not like this; they went to court - and won. Even so, with the introduction of a uniform European basic data protection regulation, the previous German ruling no longer applies. The data protection authority in Ireland is now responsible for data protection compliance, as Facebook is based there for European users.¹⁰⁶ Since then, WhatsApp has again transferred personal information to Facebook.

¹⁰⁵ <https://www.jobdisruption.com/xyob98fx>

¹⁰⁶ <https://www.jobdisruption.com/xyob99fx>

Even if governments succeed in regulating companies to the extent that data is no longer passed on to other companies, what happens if these companies are hacked and the attackers steal large amounts of personal information and then publish it? No regulation will help against this. If even government organizations such as the NSA in America fail to adequately protect their top-secret documents, it should be clear to everyone that it is virtually impossible to secure their own systems against a possible attack.

In summary, it can be said that more and more data is generated every year. It is predicted that in 2025 ten times as much data will be generated as in 2016.¹⁰⁷ This data contains small breadcrumbs that can be collected and extracted making it possible to create complete personality and performance profiles. Hiding from these algorithms is almost impossible as more and more devices become intelligent and record data even through walls. This can be rejected and perceived as a terrible future, but it will not be possible to stop it. There is no other option but to accept that there will simply be no more privacy.

¹⁰⁷ <https://www.jobdisruption.com/xyob100fx>

5 Survival despite the four apocalyptic horsemen

This book is not a first aid kit if digitization has already hit, because in many cases it is already too late. The development of new skills does not work overnight and is certainly not an easy path either. Instead, it should be started as early as possible. Looking at trends and developments, most experts arrive at the following scenario. In the future, there will still be two sectors with plenty of jobs: the low-skilled sector and the highly specialized sector. In the low-skilled sector, salaries are low and competition high. The opposite is true of the highly specialized experts in their fields, where there are few who can demand high salaries. But before an expert reaches that position, they have to assert themselves against a lot of competition. Especially in Germany, there is a broad middle class, which is facing enormous upheaval, because the four apocalyptic horsemen attack to a particularly high degree exactly those jobs in which the middle classes tend to be employed. A craftsman or data scientist doesn't need to fear much for their job in the next few years. But the classic middle-class jobs such as retail salespeople, financial advisors or public sector employees will be hit by major changes. In order to have the best chances of being one of the few winners, this last chapter gives ten strategies and recommendations for action on how to prepare for the coming change.

5.1 Building digital literacy

Apart from a few exceptions, every area is fundamentally changed by digitization. The more a sector is influenced by technology, the more it is affected by the winner-takes-all scenario. In the past, there were many different search engines; today, Google controls this sector in the Western world. The same phenomenon can be observed with smartphones, operating systems, social media networks and sales platforms. The reason: data creates a strong competitive advantage that grows over time. Companies must react to this and develop new digital business models. If they don't, they will disappear in the next few years or decades. But the digital skills needed to manage change are often scarce in companies. This does not necessarily mean that everyone has to learn programming, but it is of fundamental importance to know which current digital developments exist and how they can be integrated into one's own area of responsibility. This opens up opportunities for every employee who actively deals with the topic and looks at how their own skills can be combined with the new technological possibilities. Digitization workshops often cost several thousand euros, but in many cases it is possible to build up such skills free of charge. There are a large number of YouTube channels that report on current trends and developments. Knowledge about social media services can be built up even more extensively. There, interested users post current developments in their own fields of expertise.

5.2 Lifelong learning

Everywhere, one reads of the boring platitude of lifelong learning, but the supposed platitude turns out to be the wisdom of the hour. The world has never been as fast-moving as it is today and will probably never be as slow again. In the last ten years alone, industries have changed fundamentally. The most significant influencers reach far more people via social networks than traditional media such as TV and newspapers. YouTube was founded in 2006 and Instagram in 2010. These influencers have built their own success. While websites, videos and photos looked amateurish at the beginning, they became more and more professional over time. Influencers mostly taught themselves the skills needed to produce professional content through tutorials and instructions from the Internet. Not all at once, of course, but step by step. The will to try out new things and acquire the knowledge needed to do so is one of the most important skills for the future. Lifelong learning does not mean knitting, sewing or learning ancient Greek in one's spare time, but rather following current trends and how they change the world. If knitting, sewing or ancient Greek are the things you enjoy most, you can also find ways to combine your hobbies with the latest technologies or trends in these areas. On YouTube, you will find many channels that offer videos on exactly such topics.

The speed of innovation is now so high that it is impossible to deal with them all, but fortunately this is not necessary. Usually it helps to be open-minded and curious about what colleagues, friends and acquaintances are using. For many people, this is easier said than done, because we are creatures of habit. We like routines we're familiar with. To get involved in a new system first involves rejection. This often leads to innovations being set aside at the beginning with the sentence: "I don't need that." This usually worsens the prospect of being able to keep up, as innovations are usually less complex and easier to understand in the beginning. As time goes by, more and more functions and features are added, making it difficult to get started. With the first iPhone versions or the earliest Android smartphones, one could not do as much as they can today. Over the course of time, more and more apps and possibilities were added. The same can be said about the apps themselves. In the beginning, for instance, WhatsApp only had the important main function of sending messages from one smartphone to another for free. Now, there are a host of other features, like video telephony, status display and location transmission. If one compares these features with those of the Messenger app Telegram, WhatsApp even seems spartan in its functions. If you don't keep up here, you will lose the connection at some point, and then you will have to invest a lot more energy to catch up.

5.3 Recognize the importance of global communication

In communication science, there are two directions, one called individual communication and the other mass communication. Individual communication is about communication between individuals. This could be a simple conversation or an exchange of letters. The term mass communication is used when someone speaks to a crowd of people, such as the Federal President of Germany during the New Year's address. In recent decades, these communication types have been strictly separated. Almost all communication was individual communication, unless you went to media houses such as newspapers, publishing houses or television stations and could reach the masses through their channels. But this division no longer exists in today's digital world.

A good example of this is the American Justine Sacco. She was PR department head for corporate communications at the American company IAC. On December 20, 2013 she flew from New York to Cape Town to visit her family. She did not use a direct flight, but flew first to London. There, she had a stopover at Heathrow airport before her next plane took off for Cape Town. Shortly before she entered the plane, she sent a supposedly funny tweet to her comparatively small number of 170 followers. The content of this tweet was: "Going to Africa. Hope I don't get AIDS. Just kidding. I'm white!" Technology blogger Sam Biddle saw this tweet and shared it with the comment: "And Now, a Funny Holiday Joke from IAC's PR Boss" with its 15,000 followers. The tweet spread like wildfire and became a trending theme on Twitter. During the eleven hours Justine was on the flight, her entire life changed. Within those hours, hundreds of thousands of Twitter users sat in front of their devices and watched curiously as Justine's life was torn apart by people she had never met before. They wanted her to get AIDS and to be fired, and her employer ultimately did fire her.

This example clearly shows that the boundaries between individual communication and mass communication are fluid these days. Everyone has the opportunity to speak to millions of people every day through various social networks. A few years ago, only the most influential people on earth were able to do this. In addition, this story also shows that even people who do daily press work can greatly underestimate possible consequences and ruin their lives overnight with just one "witty" comment. If someone in today's world writes, comments on or shares anything on social media, it must be clear to them that they may not speak to a few, but often to thousands, or in a few cases even millions, of other people.

The most recent generation is currently known as Generation Z. Although the exact age band is being discussed, the majority of researchers classify it as the birth period from 1995 to 2010. This generation is often criticized for oversharing personal information about themselves, such as what they are thinking about, what they have just eaten, or other things that concern them.

While Generation Y produced the first Digital Natives, the generation that grew up with computers, Generation Z grew up with the Internet in a global world where distance does not matter. But is this generation really a narcissistic selfie generation, as it is accused of being, or has it just learned better than any generation before it to use the advantages of new means of communication?

Since the launch of smartphones, the number of days that teenagers leave home independently, i.e. without their parents, has demonstrably decreased.¹⁰⁸ Today's generation communicates with the global, networked world via the Internet. But not everyone likes this open, networked world. We see national movements for whom the world has become too "global". If one looks at the choice between Donald Trump and Hillary Clinton or the Brexit vote, one immediately notices the different voting behavior. Although it is not possible to say exactly which age group voted how because of the secrecy of the election, the estimates paint a clear picture. According to the market research company Ipsos, 75% of the 18-24 age group voted to remain in the European Union, compared with only 37% of the over-75s.¹⁰⁹ Baby boomers or members of older generations who had different experiences during their childhood perceive the world differently. It is therefore no wonder that 58% of adults over 35 think that today's children have more in common with their global peers than with adults in their own country.¹¹⁰ It is normal for today's teenagers to share their lives with other people through social media apps like Instagram and Tik Tok. This enables them to learn from an early age how mass communication works, which in turn gives them an information advantage over older generations.

Those who want to be prepared for the future have no choice but to acquire these skills. Career networks such as LinkedIn and Xing already play an important role in the employment market. Many companies require a link to the respective profiles when applying. In these networks, there are also many recruiters on the move who are actively looking for suitable personnel. The importance of such a profile naturally depends strongly on how many applicants are available on the labor market. There are areas where it is empty and others overflowing with potential applicants. The more competition there is, the more important the signals are.

The signal theory goes back to Nobel Prize winner Michael Spence and can be illustrated using a simple example. Suppose two students attend a university. Their average grade is the same and they miss only one exam in each subject to achieve their Bachelor of Science degree. But this subject seems to be extremely hard for both students. Student A just manages to pass with the minimum score on the third attempt, after having failed the exam twice. Student B is not so lucky, misses the minimum score by one point, and thus fails the exam a third time. Now it follows

¹⁰⁸ <https://www.jobdisruption.com/xyob101fx>

¹⁰⁹ <https://www.jobdisruption.com/xyob102fx>

¹¹⁰ <https://www.jobdisruption.com/xyob103fx>

from the examination regulations that Student B must be deregistered after three unsuccessful attempts. Student A receives their bachelor's certificate by passing the last exam. The achievements of the two students do not differ much, but Student A will probably earn considerably more money than Student B. The reason: the Bachelor of Science degree is a signal. HR managers have no choice but to look for, because they cannot tell from the expression on someone's face how intelligent, determined and conscientious they are. By completing a course of study, applicants have overcome a certain hurdle, where many people fail who have less of the characteristics mentioned above. This does not apply to everyone, but it is an indicator that helps HR managers. Another important factor is that human resources managers are responsible for making the right decisions. If the applicant turns out to be incompetent, they must answer for it. The slogan "Nobody Ever Got Fired For Buying IBM," written in the 1970s, sums up the dilemma.

Looking ahead it will not only be humans who decide whether someone is hired or not. We already have systems that make recommendations. In the USA, they even decide whether an inmate is released from prison on probation or not. Of course, these are only recommendations based on what the calculated risk is of a criminal becoming a felon again. But how many judges would decide against such a recommendation? For just as the recruiter has a responsibility for who they hire, so the judge has a responsibility for who they release into freedom. If a former offender commits a crime again, that judge must answer for why they agreed to a pardon against the system's recommendation. Why would a judge take such a risk?

Since these systems are usually so-called black box systems, it is not possible to understand from the outside the exact reasons as to why they make the decisions that they do. It is possible though to use statistical methods to draw conclusions about which values the algorithm prefers. It is often found that these systems tend to discriminate against certain groups of people. This can happen for a number of reasons, such as skin color, sex, age or race.¹¹¹

Amazon has developed an artificial intelligence for its internal recruitment process to assist in the selection of suitable candidates. With numerous different models, the CVs of former applicants were searched for around 50,000 key terms. Fed with this data, the system searched the Internet for potential candidates, who were then proposed to the recruiters. The artificial intelligence learned that men are preferable, because in the past, significantly more men were employed. The fact that this system comes to such decisions is not an error in the system, but rather, it working how it is intended to, despite negative consequences. It should ultimately determine the similarities of the good applicants as well as those of the bad applicants. Of course, gender is not an indicator of a good or bad candidate, but artificial intelligence cannot

¹¹¹ <https://www.jobdisruption.com/xyob104fx>

know this. The error was not in the system, but in the data with which it was fed. This data can of course be corrected in advance so that men and women occur in equal proportions, but there is a risk that the system will find other factors that would discriminate against other stakeholders.

Basically, recruiters and the automatic system do the same thing. They look for signals that help them make assumptions from limited information about whether an applicant would be well suited for a particular job. The more transparent a person is on the Internet, the better they can be assessed. This can be a disadvantage if the information that can be found draws a bad picture. Everyone though has the opportunity to change the picture in their favor. This could be done, by publishing articles on LinkedIn, Xing or Medium. The more interesting and helpful the articles are, the more often they are shared. If you don't like writing articles, you can create short videos or podcasts.

The members of Generation Z have a great advantage over those of other generations, because they learned necessary media competence from the very beginning. If you don't want to publish articles, videos or the like, you can still work on your signals, such as taking online courses.

The majority of online learning platforms like Coursera and edX make it possible to integrate verified certificates into one's own LinkedIn profile. The number of tools that help search the Internet and make good staffing decisions is increasing year by year. Of course, if a large proportion of jobs in certain sectors are lost due to digitization, the number of potential applicants will increase. The more information a human resources person can see about an individual and the more signals a positive picture draws, the higher their chances of finding employment in a competitive area.

5.4 The attention trap

Instagram, YouTube and the other social networks are designed to keep users on their portals as long as possible. This is in many cases a pleasant pastime, but often at the expense of productivity for important things. But these portals aren't the only thing taking up time. There are many different applications designed to attract attention. An e-mail program displays a pop-up message as soon as an e-mail has arrived. A messenger app makes the phone vibrate and the smartphone flash when a message is received. A study by Cary Stothart, Ainsley Mitchum and Courtney Yehnert investigated the effects of notifications on one's own performance. The results were clear: "Mobile notifications can, even if the messages are not read or responded to by the user, significantly affect the performance of an attention-grabbing task".¹¹² But it is not only notifications that have an influence on us; in psychology there are a multitude of effects that can have a bearing on our actions.

5.4.1 Random Rewards

In the 1950s, F. Skinner researched on the topic of how to reward pigeons to perform certain behaviors. For this purpose he undertook numerous experiments. The most effective method: to reward the pigeon only occasionally for certain behaviors. If the pigeon does not know when it will be rewarded for its action, it will continue to perform the trained action even without a reward. Sometimes, the bird performed the trained action up to ten thousand times without reward before it stopped the newly learned behavior. The same pattern is used in slot machines. Here, too, the user does not know when they will be rewarded. But it does not necessarily have to be material things like money, social rewards are also possible. If a user posts a post on Instagram or Facebook, the appreciation in the form of a like can be a random reward.

5.4.2 IKEA effect

In a series of studies, subjects had to set up IKEA boxes, fold origami figures and assemble Lego sets. It turns out that, if a user invests time or energy in a product, the subjective value of the product increases for them.¹¹³ The researchers demonstrated in another experiment that this also applies to digital products. The aim was to find out how different bidding behavior in auctions influences the final price. It became apparent that those who had bid for the longest period of time, also tended to make the highest bids in the end.¹¹⁴ This means that if a user spends a lot of time and effort on an application or platform, this increases the subjective value of the

¹¹² <https://www.jobdisruption.com/xyob105fx>

¹¹³ <https://www.jobdisruption.com/xyob106fx>

¹¹⁴ <https://www.jobdisruption.com/xyob107fx>

product. So it's no wonder that influencers say in interviews that the worst hours of their lives were when their accounts were wrongly blocked for a few hours.

5.4.3 Stories

Our brain reacts to stories in a special way. In an experiment, two groups were told to remember different words. One group was instructed to remember the words in any order, while the other group was instructed to make a story out of the words. The result was that the group with the story could remember the words six to seven times better than the comparison group.¹¹⁵ Stories even influence a person's hormone level. If a story is told in which the protagonist finds themselves in a sad situation, the listener feels the release of the hormones cortisol and oxytocin. If this story has a happy ending, additional dopamine is released in the reward center of the brain, leading to a positive emotional experience.¹¹⁶ This is why many marketing experts rely on storytelling to bring their products to market.

5.4.4 Inquisitiveness

In series, so-called cliffhangers are often used at the end of an episode, where one or more open questions are generated for the viewer. The questions will be answered in the next episode or in the next season. Professor George Loewenstein of Carnegie Mellon University has a scientific explanation for why viewers at Netflix like to watch seasons in one day. He notes that a lack of information arouses curiosity, which the viewer wants to satisfy. Because whenever the viewer realizes that there is a gap between the current state of knowledge and the desired state of knowledge, the motivation to close this gap increases. The process of satisfying curiosity and acquiring the desired level of knowledge is perceived as pleasant.¹¹⁷

5.4.5 Shortness

In order to increase sales, the principle of scarcity is often used in marketing. Robert Cialdini describes the effect of scarcity in detail in the book "The Psychology of Persuasion" based on three studies.

In a study by Knishinsky from 1982, it turned out that if both the product and the information were artificially scarce, this led to significantly higher orders.¹¹⁸

The second study is based on an experiment by social psychologist Stephen Worchel. He found that if there were ten biscuits in one bowl and only two in another, then the biscuits, of which only two were present, were clearly more positive, more expensive and more desirable.¹¹⁹

¹¹⁵ <https://www.jobdisruption.com/xyob108fx>

¹¹⁶ <https://www.jobdisruption.com/xyob109fx>

¹¹⁷ <https://www.jobdisruption.com/xyob110fx>

¹¹⁸ <https://www.jobdisruption.com/xyob129fx>

¹¹⁹ <https://www.jobdisruption.com/xyob130fx>

The third study described by Cialdini was that of Zellinger, Fromkin, Speller and Kohn in 1974, in which students were shown an advertisement for a novel. A part of the group of students saw the advertisement with the addition "Released for audiences as of 21 years of age" The students who saw the ad with the addition were more interested in the book than the peer group who saw the ad without the addition.

Digital goods are usually infinitely available. An eBook can never be sold out unless the seller takes it off the market. On social networks such as Instagram and Facebook, there is content that is only visible for 24 hours - you have to log in at least once a day if you don't want to miss anything.

5.4.6 Collecting

Collecting objects is a hobby for many people. However, the objects are not limited to one field of application, such as stamps or Pokémon, but are usually strongly oriented to the interests of the collector. But collecting objects can also be pathological. In 2013, the excessive collection of objects was classified as a mental illness.¹²⁰ It is estimated that 2 to 5 % of the population is affected by a pathological collective addiction.¹²¹ Interestingly, genetics plays an important role here. According to a study by the Institute of Psychiatry in London, this applies to about 50% of those affected.¹²²

In addition to the strong interest in a particular area and the genetic factors, the ownership aspect also plays a role. In an experiment by Nobel Prize winner Daniel Kahneman, it was found that people value things more when they own them. In one half of the test, participants were given a coffee cup.. Then they were asked for how much money would they sell it again. In the other half of the test, participants were not given anything, but asked how much money they would buy the coffee mug for. The participants who owned the coffee cups wanted to sell the cups for at least \$5.25, while those of the other group were only willing to pay \$2.25 to \$2.75.¹²³

In many games, the protagonists are busy collecting things like objects or awards. This can quickly lead to several hours being spent chasing digital goods. The previously mentioned examples show that there are certain effects that have an impact on us humans. The characteristics of each are slightly different, so it is important to find out what one is receptive to in order to actively take countermeasures. One possibility could be to do without social networks and other "time wasters." But you pay a high price for this, because social networks are not only full of beautiful pictures and fun videos, but also offer a lot of useful information. In view of this fact, it is more advisable to see if there are other aids that can help to find a good balance. A simple

¹²⁰ <https://www.jobdisruption.com/xyob112fx>

¹²¹ <https://www.jobdisruption.com/xyob113fx>

¹²² <https://www.jobdisruption.com/xyob114fx>

¹²³ <https://www.jobdisruption.com/xyob115fx>

tip: Switch off notifications and set certain time windows in which you read e-mails or are on social media portals. Android has developed a new feature called "Digital Wellbeing." Unfortunately this is only available for smartphones with Android version 9 or newer. A similar feature called "Screen Time" has been implemented for iPhone users and is available from iOS version 12. On both operating systems, it is possible to define restrictions for certain apps. You might decide that an app can only be used for one hour per day. At the time of the publication of this book (beginning of 2019), however, the user was still able to remove the limitations after the time had expired. Those who hope that the smartphone will replace their own self-discipline will be disappointed. The user still has to decide for themselves whether to put their smartphone aside after the time has expired or deactivate the restriction and continue searching as before. Be that as it may,, changes in Android and iOS are definitely a step in the right direction, as they help to raise awareness of how much time one spends with digital devices.

5.5 The Speed of Technical Achievements

It is difficult to assess the speed of technological progress. Even technical luminaries are often wrong with their forecasts. For most people who saw the moon landing on July 21, 1969, it was clear that mankind would build a moon base in a few years, and a short time later the next milestone would be reached, when the first human would walk on Mars. And yet, almost fifty years later, we are far from visiting the red planet, let alone colonizing it, and have no such base. On the contrary, in recent decades, budgets have been reduced for many space projects, and the associated objectives are still far away.

Whenever special events occur related to the introduction of a groundbreaking new technology, we tend to overestimate the impact. When the first consumer 3D printers were launched in 2010, a revolution was predicted in which everyone would have their own and print spare parts or creations. But with just a few exceptions, only a small number of individuals own a 3D printer, the majority being used by companies.

When Apple introduced the first iPhone in 2007, the Nokia and Motorola bosses were anything but concerned, because they thought that the product was too expensive and nothing special. A few years later and both companies were history (Nokia was bought by Microsoft and Motorola by Google). They had dramatically underestimated how the smartphone market would develop. Telecommunications groups such as Telekom and Vodafone have also underestimated this development. In 2007, 23.1 billion SMS messages were sent in Germany every year. This figure rose to 59.8 billion by 2012. Five years later, only 10 billion messages were sent to telephones via mobile operators. Now more messages are sent than ever before, just not via the same route. WhatsApp alone sends 55 billion messages worldwide, every day! In any case, mobile operators would have had the chance to launch a messenger service on the market in time, but they did not do so and are now paying the price for it.

Throughout history, new companies have risen up and taken the butter from the bread of the previously established companies. There are many famous businesses that have made serious strategic mistakes, such as Kodak and Blockbuster. Kodak, once a pioneer of photography and inventor of the digital camera, went bankrupt. Likewise, Blockbuster,, although it had the opportunity to buy Netflix for only \$50 million, a relatively small value because Blockbuster was worth about five billion at that time. But how can it be that large companies, who actually know their industry inside out, are still so surprised by these developments?

The answer to this question is provided by Harvard Professor Clayton M. Christensen. He has compiled his research in the book *The Innovator's Dilemma*, where he describes why the failure of established companies is predestined. In a simplified summary, this book describes that companies face a dilemma. They have an operative core business for which they have to make decisions today. Because this part of the

company is responsible for its current revenues, it must be maintained and maintained. At the same time, companies must also develop disruptive approaches that can replace the core business. This is not about making one's own technology even better and extending one's lead, but about developing groundbreaking ideas that may have little to do with the original technology. Of course, these innovative branches generally do not bring in profits at the beginning, but rather cost money. This is particularly difficult for well-structured companies, because if one division makes a loss, while the other is constantly making a profit, it is often difficult for managers to explain why so much money is being burned there. Basically, those responsible for management cannot gain anything from these innovations. If things go wrong, they risk their job and reputation - and if the transformation succeeds, it is often such a lengthy process that the reward, if any, will only come in the distant future. As a consequence, this model is rarely used in practice.

There are positive examples though, such as Google. Google has founded its own business unit called X, which is focused on groundbreaking ideas and visions. This unit is independent of the rest of the company structure and does not have to take the existing core products into account. Waymo, has emerged from this business unit, also known as "Moonshot Factory." Today, Waymo is the pioneer for self-propelled cars and has an estimated market value of 175 billion US dollars. Not every company can invest billions and billions in new projects, especially in view of the risk of total loss. This is especially true in the case of companies traded on the stock exchange, as it reduces shareholders' profits. However, the Google founders foresaw this conflict and created two types of Google stock. Both classes have the same value, but different voting weights. The shares traded on the market have only one vote, while the shares of the Google founders count tenfold. As a result, shareholders have only limited decision-making authority.

If a company does not manage to develop a disruptive technology within the group, they have to buy up the competition, or sooner or later they will perish. When Facebook bought the start-ups Instagram and WhatsApp for \$1 billion and \$19 billion, respectively, many experts described this as absolute madness. How could a company spend so much money on such small start-ups that had previously only made a loss? Instagram had only thirteen employees at the time, and WhatsApp just fifty-five, but if you look at these investments in 2019, it was not only the best they could have done, but their only opportunity because Facebook itself hardly plays a role anymore for the younger target group. Mark Zuckerberg also wanted to buy Snapchat, but the founder refused to sell - so Facebook consistently copied the innovative features and pasted them into Facebook, Instagram and WhatsApp, causing Snapchat to lose popularity. Snapchat's share price at the current time (early 2019) is only 20% of the original stock market valuation at the IPO in 2017.

Facebook teaches many companies how important it is to recognize the potential dangers in time and to make the right preparations. For most companies, the step comes too late. Volkswagen is currently engaged in this process and has announced that it will invest 44 billion euros in electric mobility and autonomous driving by 2023. It remains to be seen whether VW's initiative will still have a chance to turn the tide. At the moment, Tesla and Waymo are clearly ahead in this area.

5.6 Courage to take risks

In our society, the word "risk" is usually associated with negative connotations. When someone comes to us and says: "Come on, let's take a risk," few people react with joy and enthusiasm. Instead, people often react with fear and hesitation. A large part of our society prefers to follow a path that is safe and where as little as possible can go wrong. On the other hand, there are a few who are opportunity-oriented. These are natural risk carriers who like to take chances, work fast, and think big, are creative and can't do much with the status quo. Many of them are self-employed or entrepreneurs, but even here there are differences. There are entrepreneurs who see a business model that has proven itself somewhere else and focus on implementing it better than the competition. Logically, this involves significantly less risk than launching a new product on the market without it being clear whether there is a market for that product at all. According to research by Clay Christensen, the companies that launch a new product are six times more successful and the profit potential is an astonishing twenty times higher.

A remarkable example where courage has been rewarded is the company SpaceX. One often hears the saying that this or that is quite simple, because it is not rocket science. So the general public seems to think that missile development is not that easy. This also makes sense, because so far only big governments have managed to develop missiles for a lot of money; that could actually penetrate into space. For Elon Musk, however, this was not an obstacle, although almost everyone thought he was crazy. He invested the millions he had earned by selling PayPal to eBay and built SpaceX. In 2006, he launched the first self-developed rocket, which got out of control after thirty-three seconds. In the following two years, he launched the second and third attempt; both failed as well. His money was only enough for a fourth and last rocket and this was finally successful on September 28, 2008. This was the first privately financed and developed rocket to reach Earth orbit. In 2011, SpaceX began developing a reusable rocket. After many failures, the first successful landing of a reusable rocket took place in December 2015. No government had ever succeeded in doing this before. For Elon Musk, his courage has paid off. Today he is named in a row with the most famous luminaries of history such as Leonardo da Vinci, Thomas Alva Edison and Albert Einstein. And who knows, maybe one day he will be the one who makes it possible to take the first people to Mars.

Having the courage for new things is something that everyone should try out. If there's a new platform that does something different, you should look into it. Perhaps this will open up the possibility of being one of the first on this platform and thus in the new niche. Many of today's successful YouTubers have followed this path, being the first to realize that hardly anyone had made videos about their favorite topic before. The same phenomenon could be observed with Instagram and Tik Tok. While young people are more willing to try out new things, it is generally the case

that with increasing age, the willingness to try out such innovations decreases. This is also understandable, because in the course of time, one has found out what one is good at and where one's own talents lie and therefore sticks to this path. But it is precisely when this point is reached that it is more important than ever to try out and be open to new things. If you stick to the old path, it becomes more difficult every day to keep in touch, because progress is moving so fast.

5.7 Limitations are your friend

Restrictions, regulations, boundaries: We humans don't like any of this. We would like infinite time, infinite money and infinite possibilities. But that is not the reality. Often, our daily routines are the opposite. Psychologist Adam Grant found that scarce resources and opportunities reduce a project's chances of success. No surprise so far. But he also noted: "If there are too many resources to choose from, it also has a negative effect."¹²⁴

One of the most common constraints in companies is the budget. But the lack of money can also be positive. In 2004, SpaceX needed a control device for its rocket and requested it from various manufacturers of space equipment. The price for this piece of technology was to be 120,000 US dollars, a price with which Elon Musk did not agree with at all. He instructed his engineers to develop this themselves, with a budget of only 5,000 US dollars. Nine months of development work later, the control device was operational at a production cost of just 3,900 US dollars.¹²⁵

Larry Page has made the "10x Thinking" philosophy his company's most important creed: Everything Google does must be ten times bigger, better and faster than anything it has ever done before. This promotes a new way of thinking, because if it is only a matter of improving existing things by 10%, we look at how the old structures can be optimized. But if something is to be ten times better, it must be completely questioned and redesigned.

In addition to the large companies, the success stories of many start-ups also show that the lack of resources in particular led to success. Ultimately none of these issues stop someone from having a creative idea.

Drew Houston was on his way from Boston to New York when he realized that he had left his USB stick with the necessary data at home. At that moment, he was so frustrated, because this had never happened to him before and said to himself that he never wanted the problem again. So he created Dropbox. Dropbox is worth billions of dollars today, but the success story began with a man who was annoyed that he had forgotten a USB stick.

Limitations aren't only an advantage for companies; every student also gets to know the advantages of limitations in the course of their studies. It doesn't matter whether the exam takes place in three months, three weeks or three days, the preparation for the exam starts exactly when there is just enough time. The limiting factor here is time. But there are also students who cannot cope with the pressure because they have overestimated their performance and set the timeframe too tight, which often ends in excessive demands. What is clear, is the importance of assessing the situation

¹²⁴ <https://www.jobdisruption.com/xyob116fx>

¹²⁵ <https://www.jobdisruption.com/xyob117fx>

correctly. If Elon Musk had instructed his engineers to build the radio for 500 US dollars, he probably would have failed. Put simply, limitations can be compared to a corset. They can provide support and stability, but they can also cut off the air if tied too tightly.

5.8 Agile Methods

A change is taking place in many companies, away from rigid structures and toward agility. Different methods can be used such as Business Model Canvas, Design Thinking, Scrum and many more.

Whereas in the past, a project was first developed in companies for three years before it was ceremoniously presented to the public, things are now different. Development is often customer-centric and it is important to find out which problem the customer has and which minimum requirements a product must meet in order to solve it. To find out whether a product really solves the customer's issue, it is not fully developed and only proposed as a solution. First, a non-functioning prototype is created and offered to the customer. Then they are asked if they would buy the product. Dropbox is a perfect example of a company that has done just this. The founder created a video that showed the features of Dropbox without a working version at the time. Interested persons could register for a test access on the website. This simple video increased the number of potential customers overnight from 5,000 to 75,000.¹²⁶ Of course, such an approach is not suitable for every industry, and it would certainly be wrong to say that every company should only be agile. At the moment, there is a real hype about agile methods, for which expensive certified consultants are brought into companies. These consultants teach employees how to convert processes to these methods and the companies hope that such restructuring will lead to better results. But following a specific process does not necessarily lead down that path. The purpose of agility is to be able to react flexibly to a rapidly changing environment but many companies have a corporate culture that does not provide for flexibility. If the culture resists, even expensive consultants will not be able to reorganize the business.

But why would the employees in organizations resist when innovative companies also use these methods? In many cases, there is a loss of power due to agile structures often being built up in networks and not in a pyramid structure like the classical organizations. The advantage with the networks is that information reaches the respective places faster and more precisely. A popular children's game that illustrates this is telephone. Here something is whispered into a child's ear, which the child has to whisper to the next one, and so on. Every further child must continue in this way until the end of the chain is reached. Often what arrives at the last child has nothing to do with what was whispered into the ear of the first child. This effect can also be observed in hierarchies: At the different levels, the information is repackaged and passed on to the next level. If an organization is to become more agile, this inevitably leads to a reduction in power and influence. This applies to many traditional companies where there is a clear structure, ordered by competence and built up over the years. Many employees are simply reluctant to give up control over their sphere of

¹²⁶ <https://www.jobdisruption.com/xyob118fx>

influence. The resistance is particularly strong when one's own self-image is coupled to the position.

History has shown that innovations seldom arise in large companies, but usually in small, start-ups that bring new innovative products to the market through their high flexibility and speed. Many large companies are aware of this and are seeking to give employees the chance to test new innovative product ideas, detached from the classic structures. This is an excellent opportunity for employees who not only want to be part of an innovative project, but also want to actively acquire fresh skills by familiarizing themselves with new areas.

5.9 The environment makes the difference

Seth Stephens-Davidowitz, author of the book *Everybody Lies: Big Data, New Data, and What the Internet Can Tell Us About Who We Really Are*, examined 150,000 Wikipedia articles about successful personalities in a study. He found that geographical environment makes a big difference in the statistical probability of someone succeeding. Those who grow up close to a large city have a statistical advantage, which increases even more when a university city is in the vicinity.¹²⁷ The environment also plays a major role in how someone deals with extremely bad influences. The study by Lee N. Robins provides a good example of this.¹²⁸ He interviewed soldiers who came back to the USA from the Vietnam War. 45% of the American soldiers interviewed stated that they had consumed drugs during the war. Heroin had been consumed by 34% of American soldiers and opium by 38%. In addition, 20% of soldiers stated that they were addicted to narcotics. Although almost half of all soldiers had tried drugs during the war, the number of soldiers who were addicted to drugs after returning home was only 6%.

The study had many critics, because the results appeared too positive. In his book *Irresistible*, Professor Adam Adler goes into this circumstance in more detail and explains why the unusual results of the study were nevertheless correct. He cites two experiments. The first experiment was conducted by engineer Peter Milner and psychologist James Old. They implanted a small probe into a rat's brain. This probe sent a pulse to the brain as soon as the rat pressed a button, but Milner and Old made a mistake with one rat. They did not implant the probe in the middle of the brain, but in the septum region. This mistake caused the rat to press the button until exhaustion. Milner and Old had accidentally found the reward center in the brain. Arey Routtenberg did follow-up experiments and implanted a probe into a monkey in the reward center. The monkey was trapped in a cage that contained a button that allowed it to send an electrical pulse to its brain. The monkey showed exactly the same behavior as the rat: it ignored the food and instead kept pressing the button over and over again. But if the monkey was removed from the cage, he went into rehab, recovered and behaved as before the experiment. However, as soon as it was put back into the cage, he immediately began to press the button. Even after the button had been removed, the monkey stayed where the button had been. Based on these two experiments, Adam Adler concluded that the Vietnam veterans escaped their heroin addiction because they had escaped the bad influence of the war environment. These studies support the hypothesis that the environment can make the difference in terms of whether someone succeeds and how great the success is. At the same time,

¹²⁷ <https://www.jobdisruption.com/xyob119fx>

¹²⁸ <https://www.jobdisruption.com/xyob120fx>

throughout history, outstanding personalities have repeatedly managed to be successful against all expectations, but these are the exceptions. For this reason, it makes sense to choose your environment in such a way that it optimizes opportunities.

Malcolm Gladwell describes many other examples of the influence of the environment in his book, *Outliers*. He found out that successful athletes were often close to each other in terms of their date of birth. The simple explanation for this is that in many sports there are deadlines for age groups - and at that time, the elders are often the most talented players. This gives them an advantage over the other children, who are not yet as physically developed due to the age difference.

The environment not only plays an important role for people, but also for companies. In the USA, most of the risk capital is invested in Silicon Valley. The same can be observed in Germany. Two-thirds of the risk capital available here is invested in Berlin.¹²⁹ Jeff Bezos quit his job on Wall Street in 1994 to start his own business. He told the moving company to head west and he would call them on the way to tell them the exact location. His choice fell on Seattle, and this was no more a coincidence than the decision to be the first to sell books online.¹³⁰

One often reads that the five people with whom one spends the most time shape what kind of person one becomes. Even though there is no evidence to support this claim, science shows what an extremely important role the environment can play.

¹²⁹ <https://www.jobdisruption.com/xyob121fx>

¹³⁰ <https://www.jobdisruption.com/xyob122fx>

5.10 Follow your heart or your dreams bullshit

Motivation trainers and videos show the easiest way of all: just follow your dreams, your passion, and you will automatically become rich and successful. This also makes sense, because if you watch videos of successful people, this is their story: don't let anyone tell you that you don't have what it takes to be successful, and never give up your dreams. One of them was Steve Jobs. In his famous Stanford speech, he said: *"The only way to be truly satisfied is to do what you believe is great work, and the only way to do great work is to love what you do. If you haven't found it yet, keep looking, and don't settle. As with all matters of the heart, you'll know when you find it. And like any great relationship, it just gets better and better as the years roll on. So keep looking, don't settle."*¹³¹

Of course these words sound inspiring and encouraging, but just because someone is burning for something doesn't mean they have the ability to become good at it. Any music casting show is such an example of a false perspective. Every year, thousands of people, all of whom have already imagined in their dreams how they will be celebrated on stage by the studio audience and millions of people in front of the television, apply. But mostly, they suddenly catch up with reality, because they don't have the skills to assert themselves. To become the best overnight without investing countless training hours rarely works. Those who are successful in their field usually simply have more stamina. This makes them a little better than most others, which gives them the motivation to improve further. A snowball effect develops from this, starting slow and small, but ending in an unstoppable avalanche. You can't expect to be well paid if you're not good at your job. But to be good, you have to invest a lot of time and resources. The right words should therefore be: follow your possibilities, not your dreams. It is far easier to develop a rare and sought-after skill than to put resources into developing a talent that few people will succeed with.

¹³¹ <https://www.jobdisruption.com/xyob131fx>

6 The last fortress

If someone had claimed twenty years ago that a company with well over two billion customers would need less than forty thousand employees in 2019, they would probably have been declared crazy. But these figures correspond to today's reality. At the end of 2018, Facebook had only 35,587 employees and yet at the same time there were 2.3 billion monthly users.¹³² Despite the major data scandals in 2018, the company shone with record profits. If you take a look at the figures for the global online advertising market, you can see why. For the year 2019, it is predicted that almost 300 billion US dollars will be spent in this sector. Facebook alone accounts for 18.7 % and Google for 32.3 % of this figure. This means that these two companies account for more than half of all sales in this sector worldwide. This is a typical example of a few winners and many losers in a sector. The more digital an industry or sector becomes, the more frequently such a distribution occurs. Over the past twenty years, technology has moved into more and more areas of life, and there is no sign that this trend is declining in any way, quite the opposite. During this period, digitization has led to more and more activities being taken over by machines and algorithms, which has resulted in increasing wealth for the manufacturers of these technologies.

In the past, there have also been technological revolutions in which the bottom line was that more work was created. This is not a law of nature, but only an observation related to the past. At one point, products were created by hand but with the industrial revolution, low-cost mass production began, and a large number of people lost their jobs. People did not remain unemployed, but rather developed new products and new skills.

At the beginning of the 19th century, probably nobody could imagine that people would work as social media managers in years to come. It follows that we cannot imagine today how people will work in the future. This argument sounds logical, but it is considered too little. In order to find out in which areas people have the potential to do new creative jobs, the strengths of the people have to be compared to the weaknesses of the machines. Today a machine is stronger, more accurate and faster in many fields. What remains for humans are the areas of intelligence and empathy. But it is precisely in the sphere of intelligence that such a blanket assessment can no longer be made. For the first time in the history of mankind, algorithms are capable of performing certain areas of mental activity better than humans. The world's best lip reader is not a human being, but a machine.

The developments of the last few years in artificial intelligence allow only one conclusion: more and more activities, which require a certain form of intelligence, will

¹³² <https://www.jobdisruption.com/xyob132fx>

be carried out in the future by machines. Although new jobs are being created that require greater intelligence than algorithms are capable of today, these are usually not jobs that can be performed by many people. Professions that fall into this category are those such as big data analysts or experts in artificial intelligence. These workers are so sought after that car companies have created new extra salary structures to pay this group of people much better.¹³³

So mankind has only one last fortress left: empathy. The argument is crystal clear. Machines have no empathy; they are cold, not compassionate. But especially today, there is a greater need for affection and compassion. In the last ten years alone, according to the World Health Organization (WHO), the proportion of people suffering from depression has risen by 18%. The increase in life expectancy is suspected to be the reason for the increase in depression, as older people in particular suffer more from the condition. Suicide rates also increase with age: 35% of suicides are committed by people older than sixty-five, although this age range represents only 21 % of the population.¹³⁴ Those who suffer from loneliness carry the greatest risk of committing suicide. A study by Harvard University, in which 724 men were accompanied, interviewed and medically examined for over seventy-five years, shows why this is the case. The groundbreaking finding of this study is that the quality of the relationships the subjects had with their fellow human beings was the most important factor in determining their life expectancy. Good relationships led to a happier and longer life. Poor relationships and loneliness led to sadness and early death¹³⁵. Now many millennials cultivate their relationships mainly through social media. Surveys in the USA have shown that the feeling of loneliness in this target group has risen sharply in recent years.¹³⁶ This suggests that virtual relationships have not yet been able to replace real ones.

¹³³ <https://www.jobdisruption.com/xyob146fx>

¹³⁴ <https://www.jobdisruption.com/xyob133fx>

¹³⁵ <https://www.jobdisruption.com/xyob134fx>

¹³⁶ <https://www.jobdisruption.com/xyob135fx>

6.1 Is the last fortress inaccessible to machines?

Science fiction films such as *Blade Runner 2049* show a future in which people have social and romantic relationships with machines.

But can emotions and sensations be triggered by machines? Naomi Eisenberger, Matthew Lieberman and Kipling Williams have proven this by developing a virtual game called Cyberball for their experiment.

During its setup, the test subjects were told that they would play this game with two other test persons. In reality, it was only a computer program.

During the first scan of the brain in the MRI scanner, the test leader told the subjects that due to technical difficulties, the connection to the other two players could not yet be established, and that the test person could only watch this round.

During the second scan, the subjects were told that the connection would now work and they could play along. But as soon as the respondent received seven throws, they were supposedly excluded from the other two players and saw them throwing the ball at each other forty-five times, while they were ignored.

On the images of the second scan, it could be observed that in this experiment, the dorsal anterior cingulate cortex (dACC) became active. This is the same region in the brain that is activated by physical pain.¹³⁷

This experiment shows that virtual social relationships also have an influence on our perception. These social relationships do not necessarily have to be relationships with people, but can also be relationships with computer programs.

Professor Sherry Turkle, who teaches at the Massachusetts Institute of Technology (MIT), has written several books on how virtual relationships work. In her book *Alone Together*, she writes: "*As it turns out, it's a small step from having your 'life' saved by a bot you meet in a virtual world to feeling a certain affection toward it - and not the kind of affection you might feel toward a stereo or car, no matter how beloved.*"¹³⁸ So there is some evidence that machines can trigger emotions and feelings. This does not mean that they are compassionate beings who can respond to people. Because that takes something called emotional intelligence.

In order to achieve emotional intelligence, there must be three abilities:

- Recognize feelings
- Understanding feelings
- Influence feelings

¹³⁷ <https://www.jobdisruption.com/xyob136fx>

¹³⁸ <https://www.jobdisruption.com/xyob137fx>

It's no secret that Facebook is working to influence the emotional state of its users. In 2014, for example, a study by Adam D. I. Kramer, Jamie E. Guilory and Jeffery T. Hancock was published in which the emotional state of users was deliberately influenced via Facebook. A total of 689,003 people were shown either some positive or some negative posts. It was found that the emotional state of the user can be changed by "emotional contagion."¹³⁹ Facebook even went one step further, and in 2015 filed a patent for the method of reading out the emotional state of a person using the front camera built into the smartphone and displaying content tailored to the user based on this information.¹⁴⁰

There are other companies working to measure and use users emotions. Affectiva offers this technology as a service that can be utilized by any business. The company has developed an algorithm that makes it possible to read feelings in real time based on a photo or video. The software recognizes various key facial features such as the tip of the nose or the corners of the mouth.¹⁴¹ The combination of these characteristics is then recognized as an emotion.¹⁴² At this time, the software can read seven emotions: anger, dislike, contempt, fear, joy, sadness and surprise. In addition, it is able to recognize twenty different facial expressions. According to a paper published by researchers at MIT Media Lab in conjunction with Affectiva, it is possible to assess the impact of advertisements and how well they are received using facial expressions.¹⁴³ This would make two of the three components for achieving emotional intelligence technically possible. So what remains is the understanding of feelings as a challenge. Since we have been experiencing different emotions every day since birth, it is easy for most people to understand the feelings of others although there are exceptions to this, such as those who suffer from autism.

Since a machine does not think and feel like a human being, it has no reference to it and will never be able to understand feelings. But the question is: does a machine itself have to have lived through everything to understand a person's feelings, or is the illusion that the machine understands a person sufficient?

Animal behavior researcher M. W. Fox found out that animals react to certain stimuli with a change in behavior. In his experiment, he made a turkey mother its natural enemy by playing a tape. We humans also react to such stimuli. Joseph Weizenbaum of MIT created a software called ELIZA as early as 1966, which was intended to simulate a dialogue with a psychotherapist. The software was written in such a way that it dealt with the emotional state of the test subjects and asked specific questions about them. One question could be, "Why do you feel so negative about your mother?" ELIZA had no idea what feelings meant - and the subjects who took part

¹³⁹ <https://www.jobdisruption.com/xyob138fx>

¹⁴⁰ <https://www.jobdisruption.com/xyob139fx>

¹⁴¹ <https://www.jobdisruption.com/xyob140fx>

¹⁴² <https://www.jobdisruption.com/xyob141fx>

¹⁴³ <https://www.jobdisruption.com/xyob142fx>

in the experiment knew this. Still, they wanted to be alone with the software and tell it their secrets.¹⁴⁴

All of these studies suggest it is possible that one day a machine will be developed that could be a substitute for human bonds for many. If people accepted this substitute relationship, the last fortress would also fall.

¹⁴⁴ <https://www.jobdisruption.com/xyob143fx>

6.2 What does this mean in the very last instance?

Philosophers like Richard David Precht see no alternative to an unconditional basic income for the future, because almost all activities will be taken over by the machines. This blanket solution to such an extensive problem is dangerous. For someone who is self-motivated to seek challenges, this may be an environment for a fulfilled life, but for many others, it may be the beginning of doom. There are numerous studies that show that an early retirement age can have a strong negative impact on health. The effects depend on the retirement age: the sooner someone retires, the worse it is for their health.¹⁴⁵ Professor Ross Andel also warns against the drastic consequences, such as an increased risk of Alzheimer's disease, associated with the pension.¹⁴⁶ He recommends looking for challenges in everyday life in order to avoid these risks, because daily work is like a corset that provides support. You have a structured daily routine, social contacts, a sense of achievement, and in the best case, something that fills you with meaning. For people who lose their jobs due to digitization, it is therefore of paramount importance to detach their own status from paid work and instead seek fulfilment and challenges in other areas. Otherwise, this could have drastic consequences.

¹⁴⁵ <https://www.jobdisruption.com/xyob144fx>

¹⁴⁶ <https://www.jobdisruption.com/xyob145fx>

7 Closing remarks by the author

I hope I have been able to show you in this book, from a variety of sources, that almost every sector will change as a result of digitization. All examples are snapshots showing the current state of the art. At the same time, research is being carried out into a number of developments, such as the quantum computer, which in turn could ensure that some industries will change significantly within a very short span of time. Ten years ago there were hardly any applications that used artificial intelligence; today, it is an elementary component in a flood of products. As soon as changes become apparent, this book will be updated in the relevant areas. The most recent version is regularly published on Amazon and should be the version of choice when purchasing the eBook.

I'm a big fan of feedback. Do you see something differently from me? Then please share it with me at www.jobdisruption.com/feedback. I am always happy to accept constructive negative feedback and suggestions for improvement.