Digital transformation on the example of the use of artificial intelligence in the human resource information system in the tension field of the GDPR

A Master's Thesis submitted for the degree of
"Master of Business Administration"

supervised by
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Affidavit

I, **ING. MAG. (FH) STEFAN EDER**, hereby declare

1. that I am the sole author of the present Master's Thesis, "DIGITAL TRANSFORMATION ON THE EXAMPLE OF THE USE OF ARTIFICIAL INTELLIGENCE IN THE HUMAN RESOURCE INFORMATION SYSTEM IN THE TENSION FIELD OF THE GDPR", 58 pages, bound, and that I have not used any source or tool other than those referenced or any other illicit aid or tool, and

2. that I have not prior to this date submitted the topic of this Master's Thesis or parts of it in any form for assessment as an examination paper, either in Austria or abroad.

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ABSTRACT

The aim of this master thesis is to discuss the usage of Artificial Intelligence in the human resource information system and in the tension field of the General Data Protection Regulation. A lot of companies nowadays use or start to implement artificial intelligence in order to gain competitive advantage. This as well doesn´t stop in human resource departments, quite the contrary happens namely the huge increase of predictive machines to fulfil the needs and reach the goals for HR.

Organizations face great challenges with the use of this new technologies because some side effects like privacy, discrimination or acceptance come up with AI and have to be handled. At the same time the call for privacy came up and was implemented in the European Union through the GDPR. Therefore, the use of personal data is only allowed if there exist a purpose and a legal basis (like e.g. a declaration of consent). It is a great challenge to comprehensively be in the possession of that, but on the other side big amount of data are necessary to train and operate AI systems.

This also apply for employees and their data. Here as well the usage of predictive software is very valuable and from a lot of companies already in use. But only if the purpose of the collection of data is disclosed it is legally allowed to process this data. A big issue in this context is also the acceptance of the affected persons – only if the aim for the collection of the data is transparent there is a chance that employees or applicants will agree with the conditions or the outcomes.

This thesis deals exactly with this field of tension – processing employee data in consideration of the GDPR and gives insights from literature and as well from field research. Eighty-two experts were asked regarding these issues and the results are shown and discussed in this thesis.

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List of Abbreviations

AI   Artificial Intelligence

ML   Machine Learning

DL   Deep Learning

GDPR General Data Protection Regulation

CFR   Charter of Fundamental Rights of the European Union

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1 Introduction

Nowadays gaining value out of collected data in order to remain competitive and to be able to sustain over time is one of the most important focus of companies. Businesses of all sizes analyse – or should analyse - their possibilities and benefits in deploying different types of analytics and determine their possibilities in deploying new business models to meet expectations rising out of the new society. Possessing goods is not that much of importance anymore, but therefore even more important to provide exactly the desired service at the right time at the right quality level in order to make sure that customer expectations are met and bind customers even closer to a business than it has been possible ever before. The same applies to employees and data from employees. The war for talents has long been under way and challenges companies to find the right employees as quickly as possible and then to maximize their satisfaction in the company so that they can perform well and stay in the company for a long time. In order to meet these requirements, HR managers and executives need tools that can ensure this. With the help of AI, software products are taken to the next technical level, enabling new solutions to be realized. At the same time, however, the call for the protection of personal data is growing stronger and has been implemented in Europe through the general data protection regulation. This diploma thesis deals with exactly with this issues and area of tensions.

1.1 Problem to solve, context of the thesis

At the moment different methods and systems are used to enable human resource managers and executives manage the workforce of companies. Especially a lot of reports, KPI´s and HR statistics are carried out to be able to make appropriate decisions. At the same time also in HR departments a huge transformation is going on – digitalization, creating an innovation culture, new methods to sustain in the war of talents. For example, software systems based on artificial intelligence came up to provide HR managers

with modern and efficient tools. On the other side the General Data Protection Regulation was established to give EU citizens fundamental rights regarding their personal data. Therefore a lot of questions came up and create a field of tension concerning the use of a big amount of data and the individual right to the respective personal data. So, answers have to be found in order to climb up the next level in technical development.

As AI becomes more mature and workplace software becomes more intelligent and predictive, new systems that provide employee nudges, wellbeing suggestions, training, coaching, and tips for time-management and expense management are exploding. Organizations find themselves with a continually expanding portfolio of applications while trying to figure out how to get them adopted and used by employees (Bersin, 2018, p. 4).

1.2. Objectives and research question

The goal of this topic is to find out if new systems, on the example of the use of AI for HR analytics, will help to be able to make better/faster decisions and bring therefore an advantage for HR managers and executives. This have to be in compliance with the GDPR to secure human rights at the already existing high standard – is this in contradiction to technological development?

Therefore the research question is: „**Can executives make better and faster decisions by using new technologies like artificial intelligence in the human resource information system and in line with the GDPR?"** Derived from this question further important questions came up which I want to discuss in this assignment: „Will these techniques also came up with new useful tools like automated career recommendations for employees for the HR managers?" as well as „Will new software systems (based on AI) also help to bring employees to a top performance e.g. by ensuring that employees are properly deployed?"

1.3 Course of investigation

I have been working in HR departments for seventeen years and always technologies are in use to support the work of different HR tasks. In recent years different trends and facts have faced HR managers with major challenges. On the one side there is a call for privacy, where citizens want to have the right to decide what happens with their own personal data. This demand was implemented in the European Union through the General Data Protection Regulation (GDPR). On the other side every company is confronted with the war for talents, but new in that context is the heavy shortage of qualified manpower with special knowledge. To gain competitive advantage, new tools are deployed to hire appropriate candidates as quick as possible and accompany with modern software products during the lifecycle of an employee. Therefore AI, or better to say predictive machines, are in use (and still at the beginning of development in HR-departments) to meet these requirements. This work deals exactly with this area of tension:
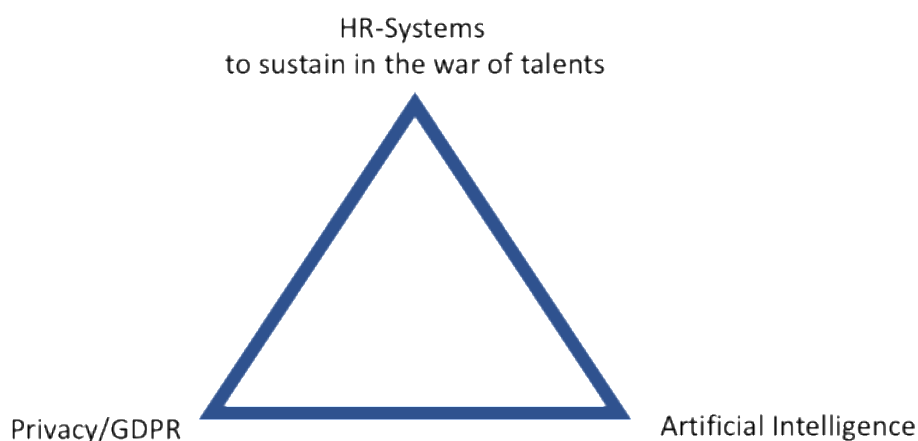
In order to achieve answers to the research question, following methods were used:

- literature research
- quantitative research

AI is not so many in use in HR department by now, so it will also be very interesting to generate an outlook with this work in which direction this topic will develop.

1.4 Structure of the thesis

The thesis is divided into seven chapters with Chapter 1 being the introduction. The remaining chapters are briefly described below.

Chapter 2 deals with Human Resource Information Systems, their goals and systems. The second part of this chapter speaks about Artificial Intelligence in human resource, the advantages and challenges which come up once predictive methods are used.

Chapter 3 deals with the literature analysis to general aspects of Artificial Intelligence, second in the use of human resource and third with contradictions towards privacy and the General Data Protection Regulation.

Chapter 4 relates to the issues of privacy, data protection and the GDPR. It talks about the special circumstances with regard to employee data and in the last part of requirements for Artificial Intelligence.

Chapter 5 shows the case study, how it was conducted, the results and the interpretations of the results.

Chapter 6 summarizes the key findings of the research and contains conclusions.

Chapter 7 interprets all results from this work and gives a view into the future.

2 Human resource information system

In today´s world any company can replicate the business model, the goods produced, or the offered services. The one thing that organizations cannot copy are the employees. People are the greatest competitive advantage. But how do organizations get the very best out of their people? This is what people analytics helps organizations do. It gives organizations the data and the insight they need to make people-related decisions. People analytics also empowers organizations to test ideas and run experiments (Morgan, 2017, p. 38).

Organizations today have lots of data from different sources about their employees including salary, tenure, ratings and reviews, performance and much more. The trouble is that few organizations have a way of putting all of this information together to understand their employees (Morgan, 2017, p. 39).

The human resource department faces a lot of challenges nowadays, which are

- Building a performance driven Culture
- Maintaining stability during times of change
- Being the enablers of engagement, innovation and feedback

In order to fulfil these requirements, IT tools are used from HR employees as well as provided to executives.

Requirements for analysis techniques are:

- Robustness
- Stability
- Transparency
- Reproducibility
- Comprehensibility

2.1 Goal for HR Systems

There are a lot of goals HR is facing and therefore HR systems should help to solve these challenges. What really hurts companies are unplanned exits, therefore let's start with this topic:

Top reasons why employees leave the company:

Figure 1: Psychology behind employee engagement,

research from the company mentorcloud

According to the Work Institute 98.5% of all common reasons why employees leave their job can be grouped into the above categories. What if every company know exactly the reason(s) why employee leave or stay? What if companies would know what makes employees most productive or when employees get burned out? These are just few examples of what people analytics can help to figure out. And people decisions in future could be based on data and analytics. The only way to find out the internal own truth in order to be possible to make substantiated business decisions, organizations must do their own internal research (Morgan, 2017, p. 42).

According to Bersin (2018), following Key Drivers are relevant for HR Systems:

- Work has become more complex, as people change roles and jobs more frequently than ever.
- Employees are overwhelmed and looking for a simplified, consumer-like experience at work.
- HR departments have organized themselves into service delivery teams but need tools to manage the flood of employee interactions.
- Employees want help with transitions and journeys throughout their careers.
- Managers want to give employees new and better benefits and services with innovative new programs on a regular basis.
- AI, big data, and cognitive systems can learn and predict what employees need and deliver an even more useful and enjoyable way to provide service.

People analytics function sits mostly in HR, which makes perfect sense because HR typically deals with people. The challenge today is that many HR teams don´t have this capability because it´s a rather new skill set. Today we are still at the early stages of what´s possible. Perhaps the biggest challenge for companies today is organizing, cleaning, aggregating, and standardizing data, a project that can easily take years, depending on the size of the organization. With technology advances and the integration of AI, one day it will be possible to use voice commands to ask a smart assistant things like "Who are the top three employees on my team at risk for leaving the organization?". People analytics is absolutely growing into a core business capability that every organization must invest in heavily (Morgan, 2017, p. 45).

2.2 HR Systems nowadays

Different tools are in use for different HR tasks to fulfil the challenges which human resources are facing nowadays. For example, employers

have long used digital technology to manage their hiring decisions, and now many are turning to new predictive hiring tools to inform each step of their hiring process (Bogen, et al., 2018, p. 1).

At each stage of the recruiting process (sourcing, screening, interviewing and selection) predictive technologies can have a powerful effect on who ultimately succeeds in the hiring process. The reason for using supportive technology is clear – employers want to reduce time and cost to hire as well as maximize the quality of hire and the tenure of future employees. Also, some employers have goals for workplace diversity, based on age, race, gender, religion or disability. They may be drawn toward hiring tools that claim to help avoid discriminating against applicants (Bogen, et al., 2018, p. 7).

This is not only a pious hope but instead to fulfil article 21 of the Charta of Fundamental Rights of the European Union: *1. Any discrimination based on any ground such as sex, race, colour, ethnic or social origin, genetic features, language, religion or belief, political or any other opinion, membership of a national minority, property, birth, disability, age or sexual orientation shall be prohibited.*

2. Within the scope of application of the Treaties and without prejudice to any of their specific provisions, any discrimination on grounds of nationality shall be prohibited.

But predictive tools can perpetuate biases for example when the training data for a model is itself inaccurate, unrepresentative, or otherwise biased, the resulting model and the predictions it makes could reflect these flaws in a way that drives inequitable outcomes (Bogen, et al., 2018, p. 8). Bias in this context therefore means "influence based on the past." Also, when predictions, numerical scores, or rankings are presented as precise and objective, recruiters may give them more weight than they truly warrant, which is known as automation bias.

Predictive tools affect equity throughout the entire hiring process and without active measures of the output, bias will arise in predictive hiring tools by default.

What we can say nowadays is that if we combine AI with strategic insights it will create new business opportunities and will transform the way HR contributes to an organization's competitive advantage (Guenole, 2018, p. 3).

3 Artificial Intelligence

3.1 In general

In order to understand Artificial Intelligence, it is important to know that AI is a discipline, machine learning and deep learning are subareas.
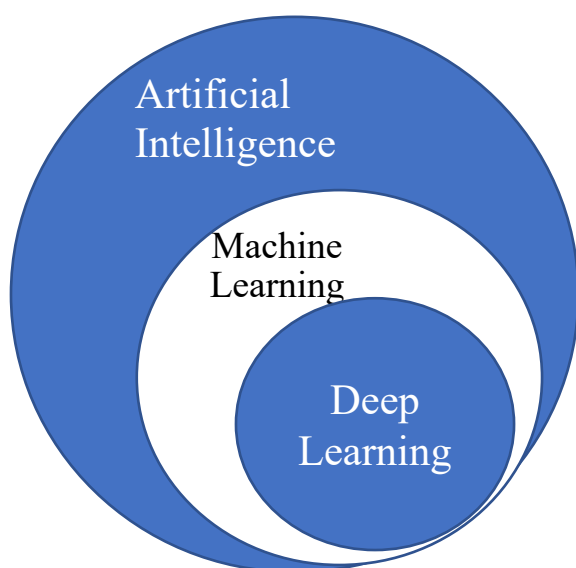
To understand the difference between AI, Machine Learning and Deep Learning the following explanations are important:

Artificial Intelligence

Artificial intelligence is a subarea of computer science that deals with automation. Basically, it is a discipline in which many different sciences pay. The term "Artificial Intelligence" was first defined in 1955 by John McCarthy.

It appeared in an application for a research project for funding from the Rockefeller Foundation.

According to Agrawal et al. (2018, p. 4) "AI is a prediction technology, predictions are inputs to decision making, and economics provides a perfect framework for understanding the trade-offs underlying any decision".

Definition Elaine Rich (1983): Artificial Intelligence is the study of how to make computers do things at which, at the moment, people are better.

The European Commission's Communication propose the following definition of Artificial Intelligence:

"Artificial intelligence (AI) refers to systems that display intelligent behaviour by analysing their environment and taking actions – with some degree of autonomy – to achieve specific goals. AI-based systems can be purely software-based, acting in the virtual world (e.g. voice assistants, image analysis software, search engines, speech and face recognition systems) or AI can be embedded in hardware devices (e.g. advanced robots, autonomous cars, drones or Internet of Things applications)."

The high-level expert group of AI, which was set up by the European commission, propose to use the following updated definition of AI (HLEG AI, 2019):

"Artificial intelligence (AI) systems are software (and possibly also hardware) systems designed by humans that, given a complex goal, act in the physical or digital dimension by perceiving their environment through data acquisition, interpreting the collected structured or unstructured data, reasoning on the knowledge, or processing the information, derived from this data and deciding the best action(s) to take to achieve the given goal. AI systems can either use symbolic rules or learn a numeric model, and they can also adapt their behaviour by analysing how the environment is affected by their previous actions.

Machine Learning

Machine learning is a subarea of artificial intelligence. It is based on the idea of learning from examples and experiences without being explicitly programmed. Instead of writing code, you pass data to the generic algorithm that builds a logic based on the given data. More technically definition is: „Machine Learning, which investigates and develops methods that provide computing systems the ability to automatically learn / improve from experience and to infer or recognize patterns using data, whether for exploratory purposes or to accomplish specific tasks. All areas of machine learning will be considered, covering theoretical foundations, systems, and enabling technologies for machine learning. Methods of interest include, but are not restricted to: statistical machine learning, supervised learning, unsupervised learning, reinforcement learning, deep learning, probabilistic modelling and inference, data analytics and mining, optimization, cognitive systems, neural processing. "

The following different techniques of machine learning exist:

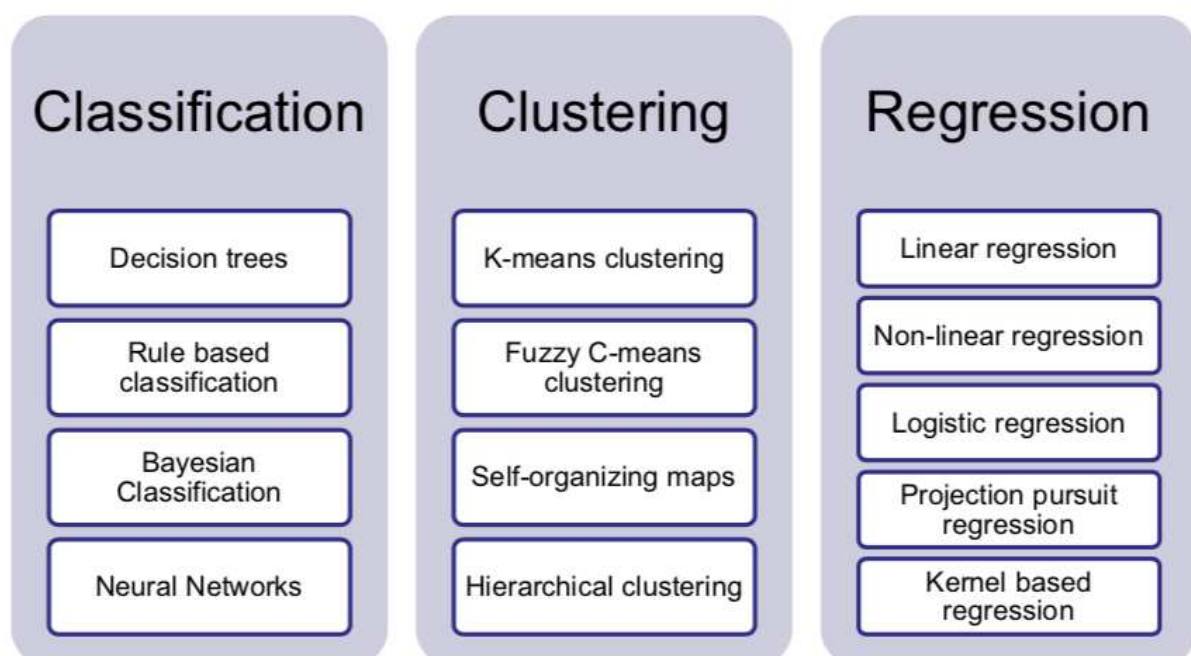| Classification	Clustering	Regression
Decision trees	K-means clustering	Linear regression
Rule based classification	Fuzzy C-means clustering	Non-linear regression
Bayesian Classification	Self-organizing maps	Logistic regression
Neural Networks	Hierarchical clustering	Projection pursuit regression
		Kernel based regression

Figure 2: Background of AI and ML, arithmetica.at

Examples of ML are face recognition, natural language processing, spam filters, medical diagnoses such as the analysis of X-ray images, weather forecasts, self-driving cars, smart home applications and personal recommendations in the applications of Netflix or Amazon have become possible through machine learning and facilitate the search for products and films.

Deep Learning

Deep learning is a subarea of machine learning that deals with algorithms which are inspired by the structure and function of the brain. Creation of a complex abstraction, namely by building a hierarchy in which each level of abstraction is created with knowledge gained from the previous level of the hierarchy. Similarly works an artificial neural network.

Because deep learning models process information in a similar way to the human brain, models can be applied to many tasks people do. Deep Learning is currently used in most popular image processing tools and speech processing software.

Besides the definitions it is important why so many institutions are concerned with AI related content. One big reason is „better prediction reduces uncertainty ".

Data

Agrawal et al. (2018, p. 44) claims that the data for AI plays three roles. To generate a prediction input data are need, which creates the algorithm. In order to exercise the AI, training data are needed. At the end feedback data will enhance the algorithm.

Important of course is the quality of data – but perfect data doesn´t exist in reality. What helps is always to check data regarding following criteria:

- Completeness
- Accuracy
- Validity
- Consistency

- Comprehensibility
- Objectivity

Nowadays we talk about massive volumes of data in our daily use, therefore the term „Big data "often is used, which can be broken down into five dimensions:
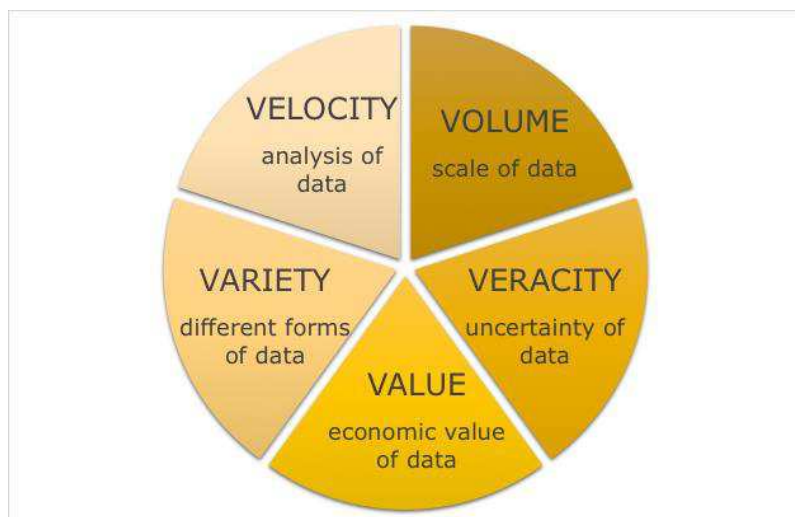
Machine prediction is extremely powerful but does not perform well with limited data (Agrawal, et al., 2018, p. 48). As data are that important when using AI, it is necessary to have a strategy to get it. As long as AI is not core to the company´s strategy, it is possible to buy data also from the market. In contrast, if prediction machines are to be the centre of the company´s strategy, then it is necessary to control the data to improve the machine, so both the prediction machine and the data must be in house (Agrawal, et al., 2018, p. 48).

Agrawal, et al. (2018, p. 58) claims that AI often generates faster, better and cheaper predictions than humans can. Prediction is a key component of any decision, therefore AI will have the most impact at this issue. The other element of a decision – judgment, data and action – remain in the area of humans. Having better prediction raises the value of judgment which prediction machines are not able to provide. Only humans can express the relative rewards from taking different actions (Agrawal, et al., 2018, p. 65). People will focus more on the judgment role alone, because predictive machines will take over the part of making prognosis. More

possibilities for judgment are possible with these better projections. People will be able to make more decisions due to the higher quality of the prognosis. In future AI will make the predictions and people will decide what measure to take based on their understanding of the aims.

In case of a manageable number of decisions judgment can be transferred from ourselves to the prediction machine so that it can make the decision itself once it generates the prediction. This enables automating the decision. If there are too many combinations, it is too costly to code everything in advance. If this occurs, it is better that people make the judgment after AI is doing the prediction.

Machines are able to predict judgement of humans, but in this case enough data have to be available. If something happens seldom, people use patterns or analogies to make decisions. But in that case a software is not able to predict judgment because it would need situations which have happened some times in the past.

In case of implementation of AI, following process steps must be met:

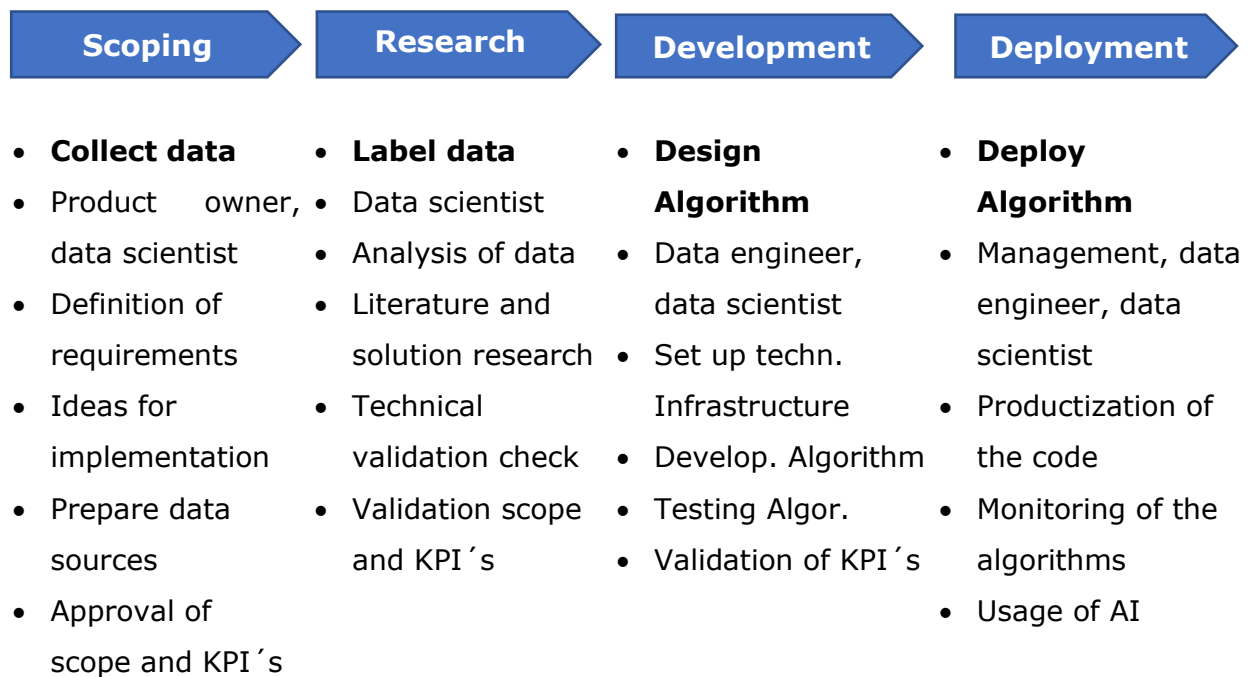| Scoping	Research	Development	Deployment
• **Collect data**	• **Label data**	• **Design Algorithm**	• **Deploy Algorithm**
• Product owner, data scientist	• Data scientist	• Data engineer, data scientist	• Management, data engineer, data scientist
• Definition of requirements	• Analysis of data	• Set up techn. Infrastructure	• Productization of the code
• Ideas for implementation	• Literature and solution research	• Develop. Algorithm	• Monitoring of the algorithms
• Prepare data sources	• Technical validation check	• Testing Algor.	• Usage of AI
• Approval of scope and KPI´s	• Validation scope and KPI´s	• Validation of KPI´s	

Figure 3: Implementation of Artificial Intelligence, abacus.ac

3.2 In the use of HR systems

AI can predict a candidate's suitability for the job as well as help recruiters and hiring managers on another level by cutting human bias out of the process.

Machines also can learn to predict judgment and in addition, may perform the action. Then the task is fully automated and humans are completely removed from the loop. But even when AI is able to work completely on its own, the need for human intervention due to ethical, legal or other reasons will limit the independence of these kind of software. As the prediction portion of tasks are automated, people will focus on judgement related skills, but these jobs are at lower level. AI and people have one important difference: software scales, but people don´t. This means that once AI is better at a particular task, job losses could be possible.

For making a decision, prediction is a main component, therefore predictive machines has this huge potential to make an impact to mostly all decisions. But, when using AI, it has to be ensured, that the algorithm doesn´t lead to racial, gender or other discrimination. To figure out if AI is discriminating, it is necessary to look at the output. Do men get different results than women? Do different results limit the opportunities for elderly or disabled?

Very helpful in this context are the "Ethics Guidelines for Trustworthy AI" which were created from an independent high-level expert group (HLEG) which was set up by the European Commission. The Guidelines list seven key requirements that AI systems should meet in order to be trustworthy (AI HLEG, 2019):

- Human agency and oversight
- Technical robustness and safety
- Privacy and Data governance
- Transparency
- Diversity, non-discrimination and fairness
- Societal and environmental well-being
- Accountability

The Guidelines also contain an assessment list that offers a tutorial for implementation an AI-System in order to be able to fulfil these requirements. Software vendors and programmers should use it to establish a system which will be accepted by employees and other stakeholders.

Like in other disciplines also in HR, AI will enable possibilities which are at the moment unimaginable. According to Guenole (2018, p. 7), there are five primary reasons for implementing AI in HR:

- To solve pressing business challenges
- To attract and develop new skills
- To improve the employee experience
- To provide strong decision support
- To use HR budgets as efficiently as possible

If we look at the professional life cycle of an employee within one company the usage of AI starts with identifying candidates and encourage them to apply for jobs if they fit to the required needs. One example are chatbots which offer candidates the opportunity to ask questions. Using skill matching algorithms are another possibility to match the skills of a candidate to the necessary requirement of a position. Then in the recruitment process, AI can be used in predicting how long a job requisition will take to fill based on historical data. AI than can filter candidates and therefore guarantee an effective recruiting process. After starting the job AI could help for example by sending out alerts regarding talents to the managers. This could help to make decisions about the staff based on a range of application that the tool has on each team member.

AI can also help when it comes to compensation planning. There are many more data points that need to be considered than a person can analyse without analytical support (Guenole, 2018, p. 14). For example, market rate for skills, how in demand the skills are, how is the performance of the employee and whether it is better to reward in base pay or in bonuses.

If we think about personalized learning, AI can help here as well, on the one side it can accelerate skill development at the level of the individual, and it can optimize learning at the level of the organization. For example, in providing personalized learning recommendations tailored to job role, skill set, and personal learning history will encourage continuous employee development and skill growth. Every organization needs to know what skills people have and on the other side what skills are needed for the organization. Here AI can help – even to find the "hidden gems" in the organization – the people with skills you didn´t even know existed.

A powerful solution for people development is a personal advisor in form of an AI assistant which interacts with employees who are thinking about future opportunities. This is already in use at IBM, where AI asks and answers questions to employees with natural language and integrating with historical information. Career coaching in this context is a powerful way to create more meaningful work experiences for employees and can lead to greater productivity and success for businesses.

In a lot of areas of HR chatbots are already in use. HR processes often generates a lot of questions from employees where chatbots, based on well-developed frequently asked questions, can help and give appropriate answers. Chatbots are a perfect example of where AI can improve the employee experience, because they provide real-time answers at any time, day or night. Chatbots also constantly learn from feedback, and improve the answers given. Many are used in the recruiting process, so called new-hire chatbots. The time saved can then be spent on experts answering more complex questions and problems about HR issues.

3.3 The benefits of AI in HR and measuring the return

Meanwhile different new solutions for business problems and regular improvements of processes in companies prove that AI has the potential for significant organizational benefits.   Measuring the return of AI is

recommended to ensure that each new solution is worth its implementation efforts and costs. Because of the variety of the use cases the measurements are different. For example, if you implement career development for all, you can measure the number of internal job applications and moves as well as career satisfaction survey scores.

In the best case, all proposals for building an AI application in HR require a business case. Once the AI applications are running in the business, a system to track the HR and financial metrics should be implemented. Companies like IBM has seen sizable increases in candidates applying for jobs on the basis of their candidate attraction AI applications. Faster time to hire candidates as well as better quality candidates are the results. For example, IBM claims that they had realized $107 million in savings as a result of AI in HR in 2017 alone.

One important thing every company has to think of is whether to build or to buy. Off-the-shelf AI solutions will bring results in term of ROI within the first three to six months. The more complex solutions will often begin with a minimum viable product (MVP), which have to be tested by a sample of your employee. These can then be quickly enhanced to bring even more value to the business. But achieving results with these new techniques requires a mindset change. Design thinking and agile working approaches will help to rapidly build prototypes and iterate towards improved versions in short periods of time.

The insights of IBM´s AI deployment in HR based on their gained experiences show that the starting process consist of 5 steps:
1) Start with a business case
2) Decide to buy or to build
3) Identify the skills you have and need
4) Implement MVP
5) Roll out enterprise-wide

It should be noted that some iterations are necessary and not only these steps can be executed linearly. For example, it could be possible starting to build your own solution but after a while you recognize that you not have the necessary skills you need. Therefore, you make a new decision and buy an AI solution from a vendor.

3.4 Artificial intelligence and privacy

"Artificial Intelligence" is currently being discussed intensively, as it promises new value creation in many areas of business and society. Governments from different countries have published an AI strategy with the aim of bringing their country to the top of the world in the development of AI. At the same time, the basic values and freedoms that apply in the EU continue to play a decisive role in our coexistence. The independent data protection supervisory authorities of the federal and state governments expressly welcome this approach to the constitutionally compatible design of AI.

A generally accepted definition of the term artificial intelligence does not yet exist. For some governments, AI is simply about "designing technical systems so that they can work on problems independently. These systems have the property of learning from new data. "

For example, AI systems are already used in medicine for support in research and therapy. Even today, neural networks are able to automatically recognize complex tumour structures. AI systems can also be used to detect depression disorders based on social network behaviour or voice modulation when using voice assistants. In the hands of doctors, this knowledge can serve the well-being of the sick. In the wrong hands, however, it can also be abused.

An AI system has also been used to assess application documents, with the goal of deciding against human prejudice. However, so far, the company had hired mostly male applicants and trained the AI system with their successful applications. As a result, the AI system rated women much

worse, even though gender was not just a given evaluation criterion, but even unknown to the system. This exposes the danger that discrimination depicted in training data will not be eliminated but solidified.

These examples make it clear that AI systems often process personal information, and this processing poses risks to people's rights and freedoms. They also show how important it is to support the development and use of AI systems politically, socially and legally.

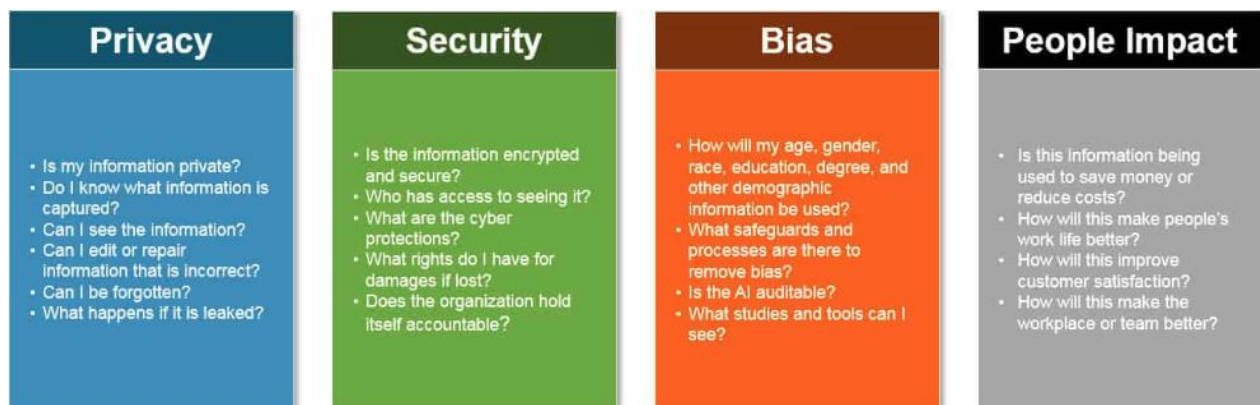According to Bersin (2018) there are four dimensions of trust:

Figure 4: Ethics in People Analytics: Four dimensions of Trust, https://joshbersin.com/2019/05/the-ethics-of-ai-and-people-analytics-four-dimensions-of-trust

Companies nowadays have a huge amount of data of their employees. But according to GDPR it is only allowed when a purpose (e.g. payroll) and a legal basis for processing personal data exist (e.g. consent is one of this six bases). Therefore, employers do not have the right to stock up with personal data in order to be able to train predictive machines in future.

If we look at security, it is clear that employers have to protect the data well. In the European Union employers are forced to design their IT-systems for data protection on the basis of the GDPR.

Predictions and recommendations will be biased if the data of the predictive machines are biased. What suppliers and operators have to do is to test the outcome of predictive machines, if these results are biased or not. The next step a lot of employers do is trying to understand why a certain prediction

was made. This allows to act on the results more intelligently (Bersin, 2019, www.joshbersin.com).

The last pillar talks about the impact the analytic tool will make. In this case it is very important to know and define the intention of the process of data. This have to be disclosed, on the one hand because it is required from GDPR and on the other hand employers would risk reputational damage if not revealing the purpose of processing.

According to Bersin (2019), trust is one of the most important business assets we have. This should be taken very seriously in order to convince employees and stakeholders that privacy is very high up on the agenda.

4 General Data Protection Regulation

Article 8 of the Charter of Fundamental Rights of the European Union talks about protection of personal data:

1. Everyone has the right to the protection of personal data concerning him or her.

2. Such data must be processed fairly for specified purposes and on the basis of the consent of the person concerned or some other legitimate basis laid down by law. Everyone has the right of access to data which has been collected concerning him or her, and the right to have it rectified.

3. Compliance with these rules shall be subject to control by an independent authority.

4.1. Characteristics in the context of Artificial Intelligence

The article 22 GDPR talks about automated individual decision making, including profiling:

   1. The data subject shall have the right not to be subject to a decision based solely on automated processing, including profiling, which

produces legal effects concerning him or her or similarly significantly affects him or her.

2. Paragraph 1 shall not apply if the decision:

(a) is necessary for entering into, or performance of, a contract between the data subject and a data controller;

(b) is authorised by Union or Member State law to which the controller is subject, and which also lays down suitable measures to safeguard the data subject's rights and freedoms and legitimate interests; or

(c) is based on the data subject's explicit consent.

3. In the cases referred to in points (a) and (c) of paragraph 2, the data controller shall implement suitable measures to safeguard the data subject's rights and freedoms and legitimate interests, at least the right to obtain human intervention on the part of the controller, to express his or her point of view and to contest the decision.

4. Decisions referred to in paragraph 2 shall not be based on special categories of personal data referred to in Article 9(1), unless point (a) or (g) of Article 9(2) applies and suitable measures to safeguard the data subject's rights and freedoms and legitimate interests are in place.

Artificial Intelligence (AI) systems pose a substantial challenge to freedom and democracy in our legal system. Developments and applications of AI must conform to fundamental rights in a democratic and constitutional manner. Not everything that is technically possible and economically desirable may be implemented in reality. This applies in particular to the use of self-learning systems, which process mass data and intervene by automated individual decisions in rights and freedoms of those affected. The preservation of fundamental rights is the task of all state authorities. Significant framework conditions for the use of AI are to be specified by the legislator and implemented by the supervisory authorities. Only if the

protection of fundamental rights and data protection keep pace with the digitization process will a future be possible in which people and not machines will ultimately decide on people.

One possibility to be on the safe side with the GDPR is to have your data not in a cloud-system, but in your own server. The disadvantage of this would be that the possible global development cannot happen because the further training of the predictive machine in this case would only be with internal data/processes.

4.2. Data Protection Requirements for Artificial Intelligence

For the development and use of AI systems in which personal data are processed, the General Data Protection Regulation (GDPR) contains important legal requirements. They serve to protect the fundamental rights and fundamental freedoms of natural persons. The principles for the processing of personal data (Art. 5 GDPR) also apply to AI systems. According to Art. 25 GDPR, these principles must be implemented by the responsible persons through early planned technical and organizational measures (data protection through technology design).

a) AI must not make people an object

The guarantee of human dignity (Art. 1 (1) Basic Law, Art. 1 CFR) requires that, especially in the case of state action by means of AI, the individual is not made an object. Fully automated decision making or profiling by AI systems is only allowed to a limited extent. Decisions with legal effect or similar significant adverse effects may not be left to the machine solely in accordance with Art. 22 GDPR. If the scope of application of Art. 22 GDPR is not opened, the general principles of Article 5 of the GDPR, which protect the rights of individuals in particular with the principles of legality, accountability and fairness, apply. Affected parties also have the right to intervene in the use of AI systems, to explain their point of view and to contest a decision.

b) AI may only be used for legitimized purposes and does not annul the principles of purpose

Also, AI systems should only be used for constitutionally legitimized purposes. It is also important to observe the principle of purpose limitation (Article 5 (1) (b) GDPR). Changes in purpose are clearly limited by Art. 6 § 4 GDPR. Extended processing needs to be consistent with the original purpose of the survey. This also applies to the use of personal data for training purposes of AI systems.

c) AI must be transparent, comprehensible and explainable

Personal data must be processed in a manner that is comprehensible for the data subject (Article 5 (1) (a) of the GDPR). In particular, this requires transparent processing in which the information about the process of processing and possibly also about the training data used is easily accessible and understandable (Art. 12 GDPR). Decisions made on the basis of the use of AI systems must be comprehensible and explainable. It is not enough to be able to explain the result, and it is also important to ensure traceability with regard to the processes and decisions taken. According to the GDPR, it is also necessary to provide sufficient information about the logic involved. These transparency requirements must be continually met when AI systems are used to process personal data. The controller (in this context the company) is accountable (Article 5 (2) GDPR).

d) AI must avoid discrimination

Learning systems are highly dependent on the data entered. Inadequate data bases and conceptions can lead to results that have the effect of discriminating. Discriminatory processing is a violation of the rights and freedoms of data subjects against certain requirements of the General Data Protection Regulation, such as the principle of good faith processing, the linking of processing to legitimate purposes or the adequacy of processing.

These tendencies of discrimination are not always apparent from the outset. Before using AI systems, therefore, the risks to the rights and freedoms of persons must be assessed with the aim of reliably excluding even covert

discrimination through countermeasures. Also, during the application of AI systems, a corresponding risk monitoring must take place.

e) For AI, the principle of data minimization applies

AI systems typically use large volumes of training data. For personal data, the principle of data minimization also applies in AI systems (Article 5 (1) (c) GDPR). The processing of personal data must therefore always be limited to the extent necessary. The necessity check may indicate that the processing of completely anonymous data is sufficient to achieve the legitimate purpose.

f) AI needs accountability

Participants in the use of an AI system must identify and clearly communicate the responsibility and take the necessary measures to ensure lawful processing, the rights of the person(s) concerned, the security of the processing and the controllability of the AI system. The responsible person must ensure that the principles are met. He must fulfil his duties with regard to the rights of the affected persons from Art. 12 ff. of the GDPR. The person responsible must ensure the security of the processing according to Art. 32 GDPR and thus also prevent manipulation by third parties, which have an impact on the results of the systems. When using an AI system in which personal data are processed, a data protection impact assessment will generally be required.

g) AI requires technical and organizational standards

In order to ensure processing in accordance with data protection, technical and organizational measures are taken to design and use AI systems to meet Art. 24 and 25 GDPR, such as Pseudonymization. This is not done solely by the fact that the individual seems to disappear in a large amount of personal data. There are currently no special standards or detailed requirements for technical and organizational measures for the data protection compliant use of AI systems.

5 Case Study

In the previous chapters, this thesis talks about the usage of AI within HR departments or for executives and if it brings advantages and as well if it is easier to make decisions, maybe based on a better base of data. It also talks about possible contradictions with regard to privacy and the GDPR. Therefore, it is obvious and necessary to ask HR managers and other executives about their experience with AI or their expectations regarding predictive tools.

5.1 Selection of Industry and Respondents

AI is a very particular topic and in HR-Systems in Europe not so much in use at the moment. Therefore, eighty-two respondents were carefully selected, which are HR managers or managers with staff responsibility. Some of them already have experience in their professional life with predictive software systems, but all of them have expectations regarding the use of AI. There are a lot of possible fields of applications but also some question marks in the practical use for example due to GDPR, discrimination or simply unknown effects of the use of "black box software".

## 5.2 Data Collection, Data Analysis

In order to get as most as qualified answers, eighty-two questionnaires have been sent out to HR managers and as well to executives in different hierarchies with staff responsibility. Thirty-four questionnaires returned back and was able to evaluable. The answers were analysed in Excel and the results are also shown in a graphical view. In order not to lose the interest of the reader directly afterwards each result was discussed and interpreted.

5.3 Research Results

In the next pages the results of the survey as well as the interpretations of each questions are shown. Some of them are depicted as graphic and afterwards discussed, the responses in form of text are clustered and subsequent discussed.

To what extent will AI be deployed in HR departments in future?
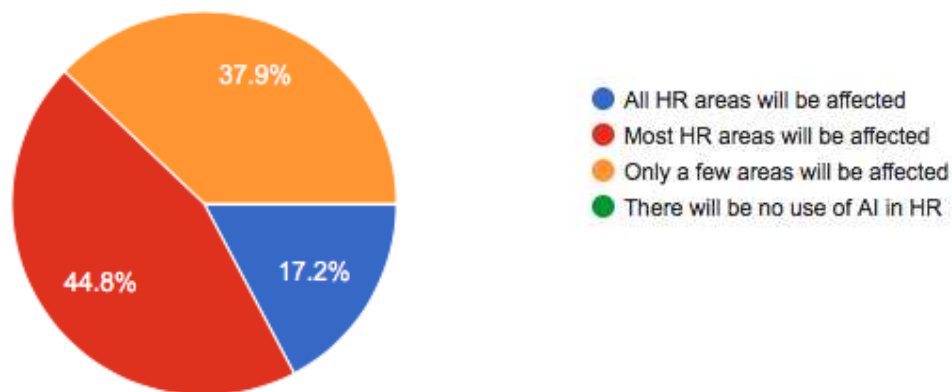
If we look at the answers of the first question it is noteworthy that clear more than half of the respondents, namely 62% answers with "all areas" and "most areas" of HR will be affected. And nobody answered with "no use of AI in HR". This gives a considerable positive picture about the use of AI in HR in future.

For which HR areas/tasks do you think AI-support would be helpful? Which advantages would you see?

Recruitment process
Recruitment, improve routine process and add intelligence to some decision making.
Specially: Performance & developement management, HR KPIs, Compensation & Benefits, Recruitment. Advantages in agility making decisions and more objectivity, cost reduction and more effective
Sourcing. Selection. Better results, less bias. Increased speed. Also in learning & development, reward. More personalisation. Using data in stead of intuition.
handling of big amounts of data, standard/routine processes

Individuelle Förderung und Weiterentwicklung von Mitarbeiter

CV screening, weniger personeller aufwand

Lohnverrechnung, diverse Admin, Trainingsangebote individualisieren auf Basis von Stellenbeschreibungen

Für Prozesse welche sich immer wieder wiederholen und oft verwendet werden

Alles, was Standardtätigkeiten automatisiert; damit mehr Zeit bleibt für persönliche Gespräche und Fehler vermieden werden.

- Intelligente Auswertung von Unterlagen von Kandidaten in Verbindung mit sozialen Netzwerken und sonstigen Informationen die allgemein verfügbar sind.
- Verbindung von sozialen Kompetenezen von Kandidaten Sie über sich denken zu haben, in Verbindung mit Antworten die Sie in Gesprächen/Video-Aufzeichnungen auf Fragen geben, welche nichts mit Zahlen Daten, Fakten zu tun haben.
- Private Leidenschaften Hobbies und Aktivitäten mit beruflichen Aktivitäten in Einklang bringen und welche potentiellen Stellenprofile sinnvoll für Kandidaten wäre.
- Personalsuche, Personalauswahl, Personalentwicklung und Employer-Branding auf Basis von persönlicher Stärken & Ansprüche von Menschen, welche im jeweiligen Kontext, besten falls danach ausgerichteten Unternehmen, zu einem gesamtheitlichen Erfolg beitragen.
- und noch vieles mehr... können gerne darüber gemeinsam nachdenken...

HR Learning & Development

Personaladministration, HR-Service Bereich, Personalcontrolling und -budgetierung, analytische Auswertungen, Vorselektion Bewerbungen

insbesondere in Personalberatungen, Recruiting, "Match" zwischen Person und Anforderung, Personalentwicklung

Standardisierte Abläufe und Prozesse

Bearbeitung von wiederkehrenden Mitarbeiteranfragen; automatisierte Durchführung von Recruitingprozessen; lernende Algorithmen, um Weiterbildungsangebote auf Kompetenzen/Aufgaben zu matchen

Recruiting, Controlling, Personalentwicklung

Recruitment und Administration

Reisepesen, Lohnverrechnung, Rekrutierung, Personalcontrolling

Administration, Recuruiting: Effizienzsteigerung, Beschleunigung, Qualitätsverbesserung. Aus- und Weiterbildung: für das Individuum angepasste Angebote, Qualitäts- und Effizienzverbesserung.

Administration - Effizienz; HR-Controlling - Basis für faktenbasiertere, (gender)gerechtere und zielgerichtete strategische Entscheidung; Suchmaschinen - bessere Erreichbarkeit von richtigen Personen; PE - Lernkonzepte, Förderung interner Mobilität; ...

Operative HR-Arbeit, Karrierewege

Recruiting, Mitarbeiter-Entwicklung

Lernen - zielgerichte Beratung und Auswahl hinsichtlich New-Skilling

Weiterbildung: nach den bisherigen gesuchten Begriffen warden weitere vorgeschlagen

reporting/ data collection/hiring (hire view...)e-learning etc

Talent Acquisition (CV checks, Erstgespräche), Reporting & Offer Berechnungen, Systempflege

Personalbetreuung und -Abrechnung

Recruiting, einfache Änderungen der persönlichen Daten.

Vorscreening von Bewerbungen. Vorteil (auch wenn in der öffentlichen Diskussion etwas anderes besprochen wird): Abbau von Vorurteilen. Bewerbungen werden gerne von Menschen nach nur einem Kriterium vorsortiert (u.a. Abschlussnote, Uni, ...). Algorithmen können helfen, besser eine Bewerbung in Gänze zu beurteilen

Recruiting, HR Administration

Mustererkennung in Fluktuationsdaten, Analyse von Bewerbereingängen, Empfehlung von Lernformen, Passung Bewerber + Arbeitsplatz

Personal Development, Recruiting

After clustering these answers, a very clear picture came up – there are three clusters which are mentioned much more often than others:

- Recruiting
- Routine process/Administration
- Learning & Development

Most respondents have at least heard about the help of AI in recruiting processes and also about the pros & cons in this issue. Also, to improve routine processes and add intelligence to some decision making is often discussed and of course a deep desire of all managers. What is very interesting is that a lot of aspects of learning and development are mentioned. There are obviously needs that can be met by using AI in the future.

Which challenges do you see in the use of AI tools in your company (data security, biases, acceptance...)?

Security

Ensuring it 'compliant' and non discriminatory

Acceptance, and cost reduction (less hr people could be)

Indeed: data security and ai biases are on the list. Also: the confidence of the users in the solutions.

acceptance within the HR community

Qualität der Daten

training der AI ohne bias

Vorurteile, dass nach Einführung die Prozesse nicht mehr durchdacht werden - Achtung vor sogenannten Selbstläufern - ähnlich dem "das war schon immer so"

Wichtig hierbei den Menschen und deren Ängste nicht zu vergessen

Vor allem den Datenschutz, aber auch Nichtakzeptanz, wenn vorgetäuscht wird, dass man Kontakt mit Menschen hat und nur ein Bot dahintersteht

- Datensicherheit ist einzuhalten und zugrunde liegende gesetzliche Rahmenbedingungen zu berücksichtigen
- Vorurteile sind normal bei nicht langzeitlicher menschlicher Erfahrung und gehören zum Prozeß
- Akzeptanz entsteht durch Erfahrung und damit verbundener Entwicklung... wenn KI/AI dazu genutzt wird um sinnvolles zu bewirken, wird der Erfolg und die Auswirkungen auf die Umwelt mit positiven Zweck schlussendlich zur Akzeptanz selbst bei den schärfsten Kritikern führen

Vorurteile bei Bewerberselektion (Kompetenzen richtig zuzuordnen zB, Querschnittsprofile zu erkennen, soziale Kompetenzen zu erkennen und zu beurteilen), Vertrauen in KI hins.Ergebnis zB bei Budgetierung: reine Analyse reicht nicht, wenn Marktumfeld nicht verstanden oder gekannt/vorab gespeichert wird. Subjektive Faktoren bei der Beurteilung von Themen entfällt. Datentransparenz als Gefahr!? Manipulationsmöglichkeiten?! Grenzen?!

fehlende Akzeptanz durch "Angst"

KI ist, sowie menschliche Intelligenz, auch fehleranfällig

Akzeptanz insb. im Hinblick auf rechtliche und ethische Fragestellungen, Datenschutz

Keine speziellen.

Verlust von Menschlichkeit

Widerstand der betroffenen Mitarbeiterinnen, an KI Projekten mitzuarbeiten, weil sie wissen, dass ihr Job betroffen sein wird.

Akzeptanz

vor allem in der Lernphase die richtigen Quellen zur Weiterverwertung zu nutzen, damit nicht Falsches gefördert wird; die Interpretation richtig gestalten; ein bisschen Zwischenmenschliches braucht es - Verständnis für und Umgang mit Emotionen - und das kann noch nicht ersetzt werden, vor allem bei schwierigen HR-Themen

Algorythmen verstärken automatisch gewisse Biases

Datenqualität sicherzustellen, Datenschutz zu gewährleisten ("Gläsener Bürger")

| |
|---|
| Mythen aufräumen |
| Transparenz für den Benutzer |
| wenig - es ist ein mind set change der dauert ein bisschen |
| fehlende Empathie |
| Akzeptanz und Nahbarkeit, fehlender persönlicher Kontakt |
| Alles drei :-) |
| Ethik: wie weit wollen wir gehen ? |
| Datenbasis muss gesichert sein, sonst Interpretation aufgrund falscher Informationen möglich |
| Akzeptanz, Knowledge |

After assorting these answers, one issue was seen as most difficult from the respondents - **acceptance**. The interviewed persons feel that the change - to a maybe black box – could lead to a loss in transparency which will be followed by a loss of trust and confidence. Therefore, the acceptance of predictive machines where algorithms are invisible and therefore the output is not comprehensible will be the biggest hurdle in implementing AI. This is not a surprise if we make us aware that we are talking about AI in human recourse, where decisions about human destinies are made which sometimes has a big impact on the person affected. In HR sometimes decisions have to be made also based on humanity and ethic. In Austria there is an example where before employers dismiss an employee at the age of fifty years or more, they have to look if there exist a younger employee who can be fired. Of course, this rule also could be taken into account from an algorithm, but really in every individual case where also other factor - like if the employee has children – have to be considered?

The next four issues, which each of them is five to seven times mentioned are

- data security and privacy
- data quality
- biases
- loss of humanity and empathy

The first three points are no surprise – there are a lot of discussions even in daily newspapers regarding privacy and data security. For the use of analytics, especially for AI, data quality is absolutely key. Biases as well are discussed in connection with AI a lot. Particularly interesting is the loss of humanity/empathy which was mentioned six times. Let's remember – respondents were HR managers and other executives, all persons who are responsible for people and therefore have to make decisions which affects to at least their employees. Let´s assume that they have made the experience that there are sometimes situations, where not only hard facts count, but also good intuition is necessary to clarify situations and push things in the right direction.

Will executives and/or HR managers be able to make better/faster decisions by using AI in human resource systems?
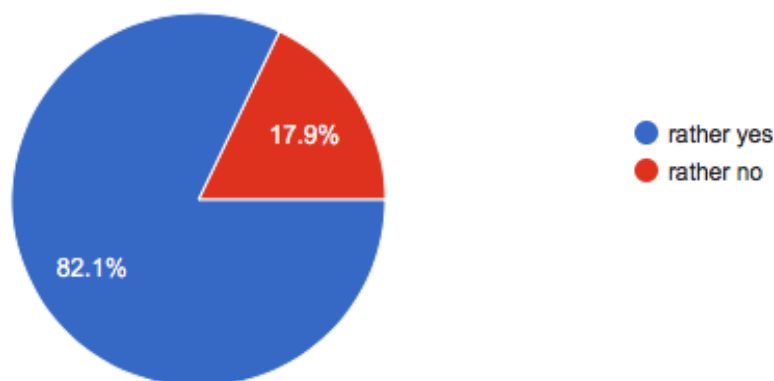
The core question of this master thesis was answered by more than 82% of the respondents with "rather yes". This can be seen as a very optimistic view, but yes, almost 18% don´t think so. To get to the bottom of this question its necessary to evaluate the mentioned reasons for this answer:

Reason:

More information to hand quicker
It will aid decision making, providing greater access to information
They will have more data, details and in an easy and usefull way
Both better and faster. Today the quality and speed of decisions is rather low. Humans + machine can be a very good combination.
AI should be able to not only make it faster, but provide the appropriate suggestions
Auch in HR gibt es Big Data, welches manuell / menschlich nicht ausreichend für Entscheidungen analysiert werden kann ... die KI wird dabei helfen
sehe das eher als zeitersparnis
Aufbereitung von Alternativen und Clustererstellung
Da, wenn Prozesse im Hintergrund von KI aufbereitet werden - sich die HR Leute mehr Zeit für strategische und kommunikative Themen haben
Analyse von vielen Unterlagen wird schneller möglich sein
- Schneller ja, besser vielleicht. - Ob Führungskräfte allerdings die notwendigen Grundlagen im Unternehmen bzw. für sich Selbst und Ihr ganzheitliches Umfeld schaffen ist durch KI/AI nicht sicher gestellt... darum wird KI/AI alleinge keine langfristige/nachhaltige Lösung bringen, ist aber sicherlich eine spannende Möglichkeit.
Data Analytics
Auswertungen, Analysen kann die Maschine schneller als der Mensch, diese zu interpretieren und sozial passend zu verwenden sollte Aufgabe des Mgmt.sein
Infos werden schneller verfügbar sein und dann können Entscheidungen schneller getroffen werden.
Es geht schneller, Ergebnisse sind exakter
Routineaufgaben werden übernommen. Aus großen Datenmengen können entscheidungsrelevante Informationen aufbereitet werden. Profitieren von Wissen und Entscheidungen von anderen Personen
schneller und zielgerichteter ja, aber man braucht die Phase des Interpretieren lernens und des Umgangs mit anderen KI-Logiken in Auswertungen; durch standardisierte Auswertungen werden Benachteiligungen minimiert (keine Bauch- oder Sympathieentscheidungen)
datengestützte Entscheidungen sind besser als bauchgefühl
Kann man nicht sagen. Wichtig wäre es die Führungskräfte umfassend zu schulen, was die Aussagefähigkeit solcher Analysen anbelangt. Ich bezweifle, dass das in ausreichendem Ausmaß getan wird.
HR muss mehr datengestützte Entscheidungen treffen
Informationen werden mehr effektiv filtriert
Sie müssen weniger Zeit in administrative, reporting Themen stecken. KI ist höchstwahrscheinlich wesentlich schneller in Berechnungen als wir Menschen
viele Entscheidungen sind individuell und erfordern eine Auseinandersetzung mit der Person und dem Einzelfall, gerade bei mittelständischen Unternehmen mit flachen Hierarchien sehe ich das weniger

Entscheidung, die von Managern getroffen werden, werden immer die Perspektive Mensch einbeziehen müssen.

Es können mehr Daten mit mehr Objektivität als Grundlage von Entscheidungen genutzt werden

KI zB im Recruiting kann anderen Blickwinkel reinbringen

Bessere Grundlage für Entscheidungen

Schnellere Auswertung

After clustering these answers very clear statements can be made. The most mentioned assertions were that AI clear will accelerate working processes. AI simply is **faster** than previous technologies and will bring a big advantage due to increased processing with it. AI can take over routines and therefore HR will have more time for strategic or communicative topics. The next big cluster can be named as the advantage of **big data**. A lot of respondent's argument that with AI it will be possible to analyse big amounts of data what brings some other advantages like more objectivity with it. Therefore, AI can also cluster and filter more effective or prepare alternatives due to analytic capabilities. Third it can be said that there will be a **higher quality** of results for example because standardization will reduce discrimination. With these kinds of technologies, it is possible to benefit of knowledge and decisions of other persons or organizations. So, some respondents argue that AI will **support decision making** and that decision making based on facts are better than those which are made only on gut feeling. Some see also the advantage in the combination of humans and machines, for example by preparing decisions through AI but the interpretation should be done by the management. Also, some requirements are mentioned like training of managers regarding deployment of AI is important as well as the perspective of humans also has to be considered.
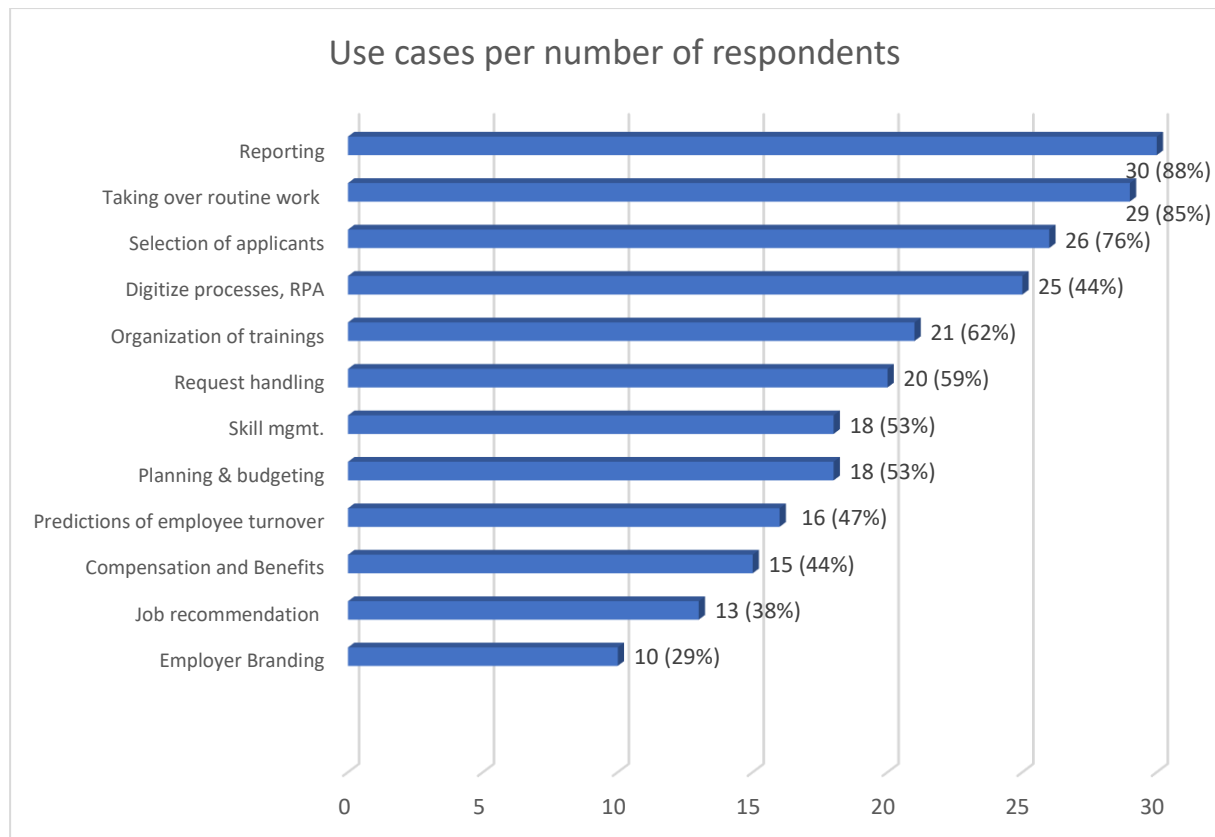
Will AI take decisions autonomous in future? If yes, to what extent?
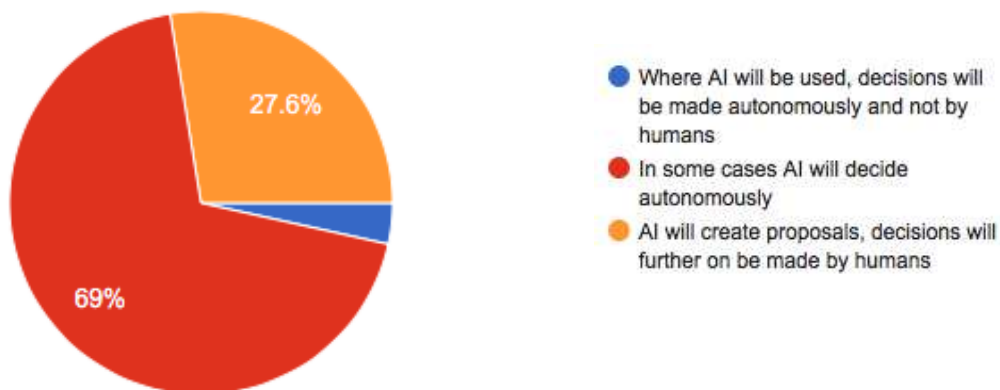
We know now about the positive attitude regarding the application of predictive machines in HR, therefore very interesting are that 69% of the respondents says that these decisions will be made autonomously in some cases. But more than a quarter claim that AI only will create proposals and that decisions will further on be made by humans. That remind us on shopping pages like amazon, where the algorithm based on past clicks and purchases recommend products to buy, but the decision, therefore the last click to buy, has to made by a human.

Which of the following use cases you think AI will be helpful in future?

Use cases per number of respondents

Use case	Value
Reporting	30 (88%)
Taking over routine work	29 (85%)
Selection of applicants	26 (76%)
Digitize processes, RPA	25 (44%)
Organization of trainings	21 (62%)
Request handling	20 (59%)
Skill mgmt.	18 (53%)
Planning & budgeting	18 (53%)
Predictions of employee turnover	16 (47%)
Compensation and Benefits	15 (44%)
Job recommendation	13 (38%)
Employer Branding	10 (29%)

From the twelve given possible answers "Reporting" and "Taking over routine work" were selected most often. Everything is about analysing data, cluster and filter them and represent the results in a manner which can be understood and therefore interpreted in the right way. This is a big need in business today because despite a lot of software tools nowadays used in companies to exactly fulfil this requirement, the acting persons or the target group which are getting the reports are not that satisfied with the current situation. Often nobody take care about the database or data has to be analysed manually with Excel, which lead to human failures. The hope therefore lays in prediction tools which really can improve quality and speed in analysing and reporting data.

As we already heard from the results of the second question, the respondents see also a huge potential for routine works and for digitization processes. This does not necessarily have to be AI systems, with robotic process automation (RPA) a lot of improvements can be made. In this

context here a some uses cases where also prediction software can help, and the first vendors already came up with solutions for that.

At the third most named place selection of applicants is mentioned. This is meanwhile a very well-known application of AI and often discussed. We now see that the possible users really think that in recruiting the use of prediction machines would be helpful. It's clear when we imagine not to look at e.g. fifty applications for one position but instead getting proposed the three to five candidates best suited for this job. But once more it confirmed use cases where a lot of data are in the background. There are often positions where in sum a company gets only three to five applications for one position – in this case the great support of prediction machines keeps within limits.

Organization of trainings as well can be seen by and large as support in routine processes. Registration, preparation and analysing data afterwards (education controlling) require a lot of human effort and therefore the desire for this use case is clear understandable.

In HR departments a lot of inquiries arrive in daily, thereby a lot of them are the same. It would save a lot of time if AI can handle these requests.

A little bit surprise is that job recommendations and employer branding are the least often mentioned answers, especially when considering that the question (suggested use case) was stated as "*AI recommend next field of work (career step) for employees as information to HR managers".* HR also have to take care (or at least should) of the personnel development of their human resources. In big companies without support of useful software it is impossible to survey this issue, to fil jobs internally with appropriate employees and help them in their personnel development which often leads to a career step. Therefore, often HR also have to rely on that people look after themselves or that their managers as well have a look of the personnel development of their employees. This should be on the agenda of EACH manager, but often they don´t act selfless (which is understandable)

because sometimes staff development would mean (and therefore lead to) losing a (maybe diligent) employee to another department.

To remedy this problem a culture, a system or an incentive system has to be installed which encourage human resource development and also internal transfers. But with AI it would get one step further from the above-mentioned arguments: Nowadays there is a lot of movement in the world of employment – people try out a job, change to another company, attend on different training programmes, change their profession etc. Mostly nobody else than the person itself knows the motivation behind each step of their professional life. What, if a software can figure out the most suitable employee for vacant positions based on current data. This means that experience, education, performance, in the best case needs and desires of employees would be considered, and the prediction tool therefore come up with suggestions of candidates. For big companies probably this would be very useful. Nevertheless, the respondents rank this issue at the bottom, what could mean that to handle this topic differently than it is managed nowadays is not that necessary, or simply, this topic although important, cannot be imagined to be helped by AI.

To rank employer branding at the very bottom means that the respondents very less think that AI can help to put this issue into practice. The importance of the topic is undisputed – to have a strong employer brand to attract candidates is key if we think at the demographic change, the changing values of the generation Y or that nobody nowadays want to start for a "black-box-employer". Companies therefore put a lot of effort as well in social media and exhibit their culture and values by using articles, photos and videos. Here as well AI could be used to place the right content on the most appropriate sites and by measuring the reactions of the readers improve this procedure in future. But nevertheless, this use case was seen as the least imaginable with the help of AI.

All this have to occur in compliance with the general data protection regulation (GDPR) to ensure human rights at the already existing high standard. To what extent will AI be in contradiction with the GDPR?
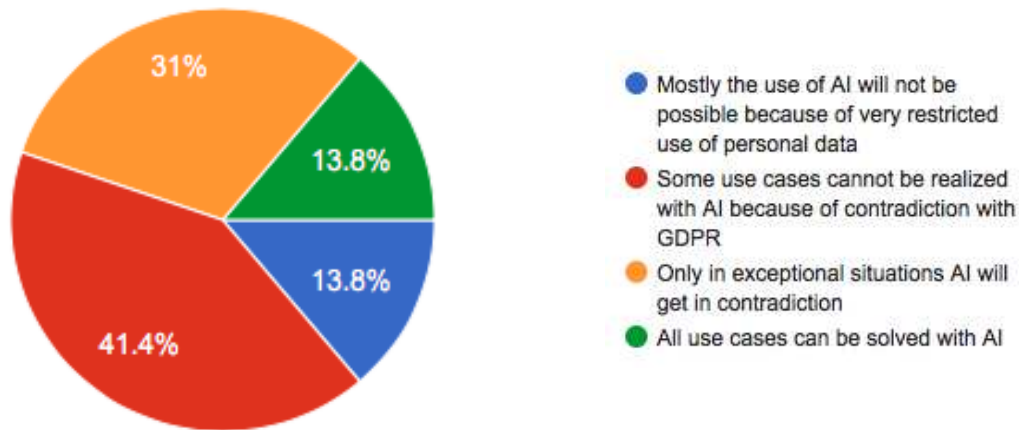
Very interesting is the inhomogeneous picture of the answers regarding contradiction of AI with the GDPR. While more than forty percent of the respondents think that there will be problems only in exceptional situations or rather all use cases can be solved with AI, another forty-one think that some use cases cannot be realized with AI because of contradiction with the GDPR. This is still optimistic, because some means that on the other side the majority can be realized. Only almost fourteen percent think that mostly the use of AI will not be possible. To see the reasons behind we have to look at the mentioned reasons of the next questions.

Where do you see contradictions and conflicts of AI towards the GDPR?

> sehe keine ...
>
> Wenn Daten erhoben werden, die Prognosen ermöglichen sollen, aber nicht essentiell für die Verwaltung sind.
>
> Ich vermute, dass die derzeitige Version der DSGVO bzw. des DSG nicht alle Belange von KI/AI abdecken werden können, da das Thema KI/AI im Jahr 2000 noch nicht in der Form berücksichtigt wurde.
> Genauere Angaben, als meine Vermutung kann ich dazu nicht machen, da ich weder das DSG noch die DSGVO inhaltlich genau kenne.
>
> Die Ergebnisse aus diversen assessment
>
> Nicht mein Fachgebiet
>
> Automatisierung versus Datenverarbeitung, dies wird sicher schwierig umsetzbar oder Dsgvo wird noch einmal überarbeitet.
>
> Wo Daten extern verarbeitet werden
>
> In den meisten Anwendungsfällen werden Daten bei KI dazu verwendet um die Aufgaben zu erledigen für denen sie erhoben wurde. Daher sollte kein Widerspruch entstehen.
>
> Wenn Einzelpersonen od. bspw. auch Betriebsrat kollektiv die Aufzeichnung definierter Themen untersagt (zB Leistungsbeurteilung), dann kann zB Skill-Mgmt. oder auch Performancethemen nicht vollzogen werden.
>
> DV ohne Einwilligung des MA, daher unwahrscheinlich, dass KI für Predictive zum Einsatz in HR kommt, wie Kündigungen vorhersagen
>
> das muss einfach gelöst werden - es ist die Zukunft
>
> Daten müssen evt irgendwo zwischengespeichert werden, man kann schlecht überprüfen wo die Daten hin übermittelt werden
>
> Ich sehe keine großen Konflikte, die nicht mit entsprechend gesicherten Prozessen reduziert werden können
>
> aktuell opt in Modell - dies macht Datenbasierte KI schwer anwendbar

To get a picture where the respondents think the problems lies, let´s start with two important statements: "*the collection of data for AI purposes tends to contradict the protection of one´s data*" and "*no contradiction as long as data will be used for the purpose of which they are collected*". We know from the chapter GDPR, that it is necessary to have a purpose and a legal basis to collect personal data. Only then further processing is allowed. Therefore it´s clear that you are only allowed to work with data which purpose you have disclosed before you collect the data. This is possible by collecting consents from all employees or applicants for this special purpose. But this works as opt in model (express permission to allow process of data), only when you get the allowance to process personal data from each individuum, you are legally able to do it. Even if you have all consents, everybody is able to withdraw his consent. In reality this will lead

to problems because delete someone's data out of million other data will be very difficult. It is easier if you have another legal basis like e.g. a legal obligation/law (e.g. allows processing of data for doing payroll), a contract or the basis "for the purpose of the legitimate interests". The latter is the most flexible option for organizations but cannot be taken for granted. Legitimate interests have to be identified and it has to be explained that processing data is necessary for the respective purpose. The rights and freedoms of the affected persons must not be violated.

An easier solution for that problem is to anonymize the data. Only *personal* data are concerned from the GDPR, which means all other data, and therefore as well anonymous data, are not comprised from this data protection law. That´s why many companies anonymize a lot of – before personal – data and work with them for example to train predictive machines. If patterns are found or algorithms are defined, the problem is that it is not possible to apply it directly to defined individuals, because the connection to concrete persons cannot be made (otherwise it would not have been anonymous data). But algorithms can be applied to special target groups. Just as a fictitious example - if you find out that for employees working in sales and aged 30-40 years, a company car is a much appreciated status symbol, you can use it as a retention tool for this target group and in return reduce their bonus system a little bit.

Further amendments („I would like to add the following: ")

Very optimistic about the future of AI within HR

AI and Big Data management will be part of our job in the future and be able to work with them and analyze the reports will be critical for our jobs.

KI muss transparent und erklärbar sein

Würde mich freuen, wenn MBA-Arbeit in eine sinnstiftende Möglichkeit/Software mündet um Möglichkeiten zur menschengerechten Mitarbeiterfindung und Mitarbeiterentwicklung zu entwickeln.

Es kann große Erleichterungen (und Verbesserungen) geben, es wird noch eine längere Phase brauchen als gedacht, bis die Anwendung richtig interpretiert und gemanagt werden kann, aber es wird nie ganz ohne Menschen funktionieren, sobald man mit und über Menschen redet/handelt/einbindet. Zumindest wäre das meine Wunschvorstellung.

6 Discussion and Conclusion

To answer the research question "if it is possible, to make better/faster decisions with the use of AI and in line with GDPR", we look at what was found out from literature and of course at the answers from the research group. 82% of the respondents answered this question with „rather yes ". In combination with the third question – 69% of the respondents answered that AI will take decisions autonomous in future – give a very optimistic picture about the use of AI in future. But as stated above, if we talk about AI in this context, we should rather use „predictive machines" because it gives a more specific term of what is it about. Therefore, in the beginning of the questionnaire AI was specified: "*In this context artificial intelligence (AI) is understood as machine learning (learn by examples/pattern recognition) or cognitive computing (computer models which simulate human thinking and learning processes)* ". As mentioned before, reasons for better/faster decisions with AI are seen from the respondents due to the big amount of data, on which basis higher quality of decisions can be made, as well as AI simply is predestined for supporting decision making and its faster than previous technology.

Answering the sub questions – "will AI come up with new tools like career recommendation" or "will AI ensure that employees are properly deployed" after received answers of the respondents is a little bit surprising: Proper deployment/skill management was mentioned in seventh place and career recommendation even in the penultimate position. But on the other side a very clear picture came up, where AI can help in HR:

- analyse and report data
- selection of applicants in the recruiting process
- routine processes and administration
- that part of development which deals with organizing of trainings

What also clear came out and was dealt before was that the respondents see the biggest challenge in the acceptance of AI. What has proven to be

very helpful in practice is when managers have the option to override the AI recommendations. Nevertheless, the main focus has to be placed towards this issue in the next years.

Possible contradiction with GDPR was discussed before, but to sum up it is mandatory to have a purpose and a legal basis (like a consent) for processing data. If that is not available, a solution is to work with anonymized data, which some companies do and with a little bit of work around works as well.

6.1 Contributions to Research

This thesis contributes to research on artificial intelligence in two ways: Firstly, it describes the effects of AI for HR and data of employees. Usually the focus is more on the side of the customers, because there the revenue comes from, but to have a deeper look into organizations to design processes more effective is as well important, not at least to keep the costs at a low level.

Secondly the thesis deals with contradictions with privacy and the GDPR. In the worst case some business cases which looks very lucrative at the first glance, but they could be at risk that they can not be realized because of legal requirements. Empirical research therefore can be extended to study the implementation of predictive software tools and their limits. As we know, in practice always methods were found to implement solutions which support success of business. Therefore, nothing is more obvious to ask practitioners how to deal with AI with all these bringing along challenges.

Finally, looking at the contribution of AI to create promising advantages constitutes and interesting field for both theoretical and empirical research.

6.3 Recommendations for Implementation

One outcome as well from the theoretical part and also from the research is that the development of AI requires control. The data protection supervisory authorities monitor the application of data protection law, enforce it and have the task of advocating effective protection of fundamental rights during further development. In view of the high dynamics in the development of the technologies of artificial intelligence and the diverse fields of application, the limits of development are not yet clear. Similarly, the risks of processing personal data in AI systems cannot be estimated as a whole. Ethical principles must also be observed. Science, privacy regulators, users and especially policy makers are required to accompany the development of AI and to control it in terms of data protection.

In order to see were prediction machines can be used, tasks need to be decomposed. So, it is possible to estimate the benefit and the cost of a prediction. As long as the ROI make sense and the legal and regulatory requirements are fulfilled, it is recommended to implement AI tools.

Sometimes, predictive hiring tools can be used to help reveal and measure biases that exist within an existing workforce or applicant flow, rather than imposing predictions on candidates. Employers should be encouraged to use analytical and predictive tools for reflection and analysis before deploying tools used to facilitate the hiring process itself. Predictive technologies can play very different roles throughout the hiring funnel, from determining who sees job advertisements, to estimating an applicant's performance, to forecasting a candidate's salary requirements. Understanding how these technologies work, and their specific roles within the hiring process, is critical to addressing their potential impacts on equity (Bogen, et al., 2018, p. 44). Employers and vendors must be more transparent about the predictive tools they build and use and must allow independent auditing of those tools. They should disclose information about the predictive features that play a role in their hiring processes (Bogen, et al., 2018, p. 45).

According to Guenole, IBM smarter workforce institute, there are some important tips which has to be taken into account for successful AI adoption in HR:

- Don´t wait until you have the perfect solution
- Empower people with AI
- Ensure transparency
- Consider language and culture
- Design each app with other apps in mind

Artificial Intelligence can add value to a lot of HR disciplines. HR managers should use the potential of artificial intelligence and the way it's changing the world of work. Artificial Intelligence has created a variety of opportunities for the HR function and empowers HR professionals to leverage this potential to improve efficiency and develop a productive and talented workforce (Eubanks, 2018, p.7).

6.4 Summary and Conclusion

Prediction is the process of filling in missing information. According to Agrawal, et al. (2018, p. 9), "all AI techniques is about prediction: using information you have to generate information you don´t have". The value of complements will increase because of the decline in the cost of predictions (Agrawal, et al., 2018, p.13).

There are often conflict of interests, therefore the only one best solution for predictive machines is not possible: More data means more effort on data protection, more velocity means less validity, more independency means less monitoring (Agrawal, et al., 2018, p. 5). So every organization has to think about each side of the opposites, weigh them against each other and then determine the alignment (Agrawal, et al., 2018, p. 5).

According to Agrawal, et al. (2018, p.11), "Some AI´s will affect the economics of a business so dramatically that they will no longer be used to simply enhance productivity in executing against the strategy; they will change the strategy itself".

The most significant implication of AI is that they increase the value of judgment (Agrawal, et al., 2018, p.12). Judgement quality is hard to specify in a contract and therefore will not be outsourced. Since judgment is likely the key role for human labour as AI diffuses, in-house employment will rise and contracting out labour will fall. Whereas companies will consider contract out capital equipment and labour that focuses on data prediction and action.

In this work objects of investigation are HR-Systems, use of AI and privacy/GDPR. What gets clear through this work is that in future this topic will not only become blurred but unified. HR-Systems will use predictive machines to fulfil their tasks and in line with privacy, which was implemented in EU with the GDPR. In future this subject will closely be intertwined because the gain competitive advantage companies will make use of AI in HR systems and to be allowed to do so of course in line with the GDPR.
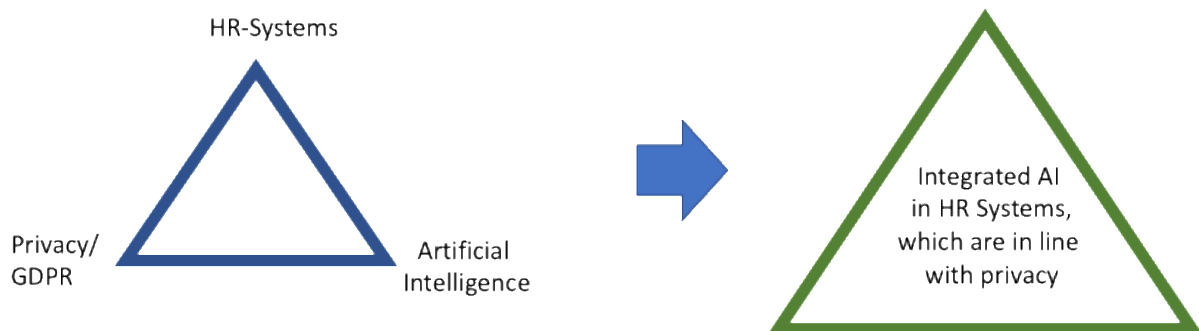
Some applications will show up as perfect example of disclosure their routines, but yes, there will be a little bit of grey zone where others will be a kind of black box, where it is hard to comprehend if data privacy and anti-discrimination really are taken that much seriously that tools are tested in every detail.

It already exists methods for bias detection and debiasing AI algorithms. In case of buying HR systems with implemented AI, managers should ask for these features. And of course, manager have to make sure to use the AI-tools well.

According to Amy Wright, Managing Partner at IBM Global Business Services, it is important not to use AI to instruct the actions of a manager. She said that you should share the results of the analysis and let them still make the decision. Their knowledge about the employee, their empathy, their knowledge of how a team operates is critical to making optimal decisions (Guenole, 2018, p. 19).

7   Interpretation, Future prospects

With the knowledge at hand, companies can focus resources on engaging employees by addressing their desire for achievement, recognition, growth, and advancement. The next level of IT systems will help managers as well as employees to outsource routine work and being faster. But this must not allow for the fact that the technical solutions replace the personal exchange of information, but conversational remains an essential part of the company, not least because it also represents a fundamental human need. AI will therefore allow more time for „Engage people through conversation".

People do not pay enough attention to statistical facts, but overrate outstanding attributes (Agrawal, et al., 2018, p.52). In the context of prediction humans and AI software have different strengths and failings. Organizations must adjust their staff division between machines and humans when AI improve. (Agrawal, et al., 2018, p.56).

Fully automated decision making will happen when the return to include people in the process is lower than the return AI handles all functions. Therefore, high returns for quick action responses to predictions are necessary and judgement is either codifiable or predictable.

Some jobs will exist as well in future but it will be necessary that people acquire new skills. Because a job is a collection of tasks, automation eliminates humans from a task does not necessarily eliminate them from a job.

AI will definitely change some business models. In order to benefit from the huge potential of the data from AI companies will have to change their

strategy. Powerful AI tools may result in significant redesign of workflows because prediction gets cheaper and minimizes uncertainty enough to change the nature of the strategy.

Attention has to be dedicated to the fact that when using AI, then the machines gets the experience, the humans might not. In this context automation could result in deskilling of humans. Therefore, AI should be in use e.g. for repetitive work and humans should assume complex issues.

Consumers and employees want control over their own data. The great opportunity for companies is to convince citizens and employees that they treat their personal data with great care and in no way pass it on. Or in short words „doing AI in a way that respects privacy ", will make customers, applicants or employees more likely to allow AI onto their devices.

AI will bring benefits, that's definitely clear, but the question is about how those benefits will be distributed. The income of the possessor of the predictive machine will rise, when the software will do more work than human, and therefore the income of the worker will drop. This means that the labour share of the economy will probably decline at the expense of capital. To decrease inequality we can follow Bill Gates's suggestion to tax robots, but therefore they will become more expensive and therefore less attractive to buy. So, organizations will invest less in AI, productivity will decelerate and therefore the welfare will slow down.

Technology often distort abilities. Salaries of highly educated people will increase, meanwhile the wages of less educated will reduce. It disproportionately increases the wages of highly educated people and might even decrease the wages of the less educated. Most of the employees have attended their education many years ago, what means that they should have a new training. But till now our system worked completely different. Education costs need to be paid, either by higher taxes or by businesses and individuals directly. Only if the costs could be covered, middle-aged people are willing to get an appropriate training.

The more data, so much the better for AI, which means probably at the same time that it comes with reduced data protection. In Europe citizens have the advantage to enjoy more data protection due to the implementation of the GDPR. That could disadvantage European companies compared to firms in countries where an easier way to data is possible.

What has to be reflected from humans is the fact that when we train algorithms to a large extent with historical data, then we risk to simply repeat the past. So, where is the innovation? From this perspective predictive machines are simply "algorithm-helpers" for use cases.

There are different forms of AI´s, or to say it in other words, „THE AI "don´t exist. But one is clear: AI will probably change all the rules of how companies operate. Therefore, we have to carefully consider all effects. The responsibility for the choice of data and methods bear humans – therefore we.

Every organization around the world is powered by people. The rising usage of AI and technology is finally forcing us to consider what a people-centric organization actually looks like. Companies have to create places where employees are able to bring their ideas, their dreams, and their aspirations. We all deserve to work for this type of organization, but the majority of employees around the world don´t. It´s time to fix that.

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9   Appendices

Questionnaire: Use of artificial intelligence in human resources

Empirical part of the master thesis, MBA Entrepreneurship & Innovation, Stefan Eder

In this context artificial intelligence (AI) is understood as machine learning (learn by examples/pattern recognition) or cognitive computing (computer models which simulate human thinking and learning processes).

Questions:

To what extent will AI be deployed in HR departments in future?

☐	All HR areas will be affected	☐	Most HR areas will be affected	☐	Only a few areas will be affected	☐	There will be no use of AI in HR

For which HR areas/tasks do you think AI-support would be helpful?
Which advantages would you see?

Which challenges do you see in the use of AI tools in your company (data security, biases, acceptance,..)?

Will executives and/or HR managers be able to make better/faster decisions by using AI in human resource systems?

☐	Rather Yes	☐	Rather No	Reason:

Will AI take decisions autonomous in future? If yes, to what extent?

☐	Where AI will be used, decisions will be made autonomously and not by humans	☐	In some cases AI will decide autonomously	☐	AI will create proposals, decisions will further on be made by humans

Which of the following use cases you think AI will be helpful in future?

☐	AI recommend next field of work (career step) for employees as information to HR managers	☐	AI ensure that employees are properly deployed (skill mgmt.)	☐	Retention Management (Predictions of employee turnover)	☐	Reporting, HR Analytics
☐	Selection of applicants	☐	Organization of trainings	☐	Request handling		Planning & budgeting
☐	Digitize processes, Robotic Process Automation	☐	Compensation and Benefits	☐	Employer Branding	☐	Taking over routine work (e.g. sample contract completion)

All this have to occur in compliance with the general data protection regulation (GDPR) to ensure human rights at the already existing high standard. To what extent will AI be in contradiction with the GDPR?

☐	Mostly the use of AI will not be possible because of very restricted use of personal data	☐	Some use cases cannot be realized with AI because of contradiction with GDPR	☐	Only in exceptional situations AI will get in contradiction	☐	All use cases can be solved with AI

Where do you see contradictions and conflicts of AI towards the GDPR?

Questions finished!

Optional - I would like to add the following:

Thank you very much for your valuable contribution!