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THE USE OF ARTIFICIAL INTELLIGENCE IN THE RECRUITMENT PROCESS

Bachelor's Thesis

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Abstract

The purpose of this bachelor's thesis is to present information on the use of Artificial Intelligence (AI) in the recruitment process. In addition to this, the research brings attention to the advantages and possible disadvantages of using AI, while probing the issue from the perspective of the job candidate. The topic is timely as AI is no longer an unfamiliar term and a number of organisations are beginning to adopt AI-tools in recruiting in order to more efficiently grow a talent pool of successful employees. In most cases, all prospective employees have to go through a recruitment process when applying for a job, in which case, they might experience the use of AI in recruitment.

This bachelor's thesis is conducted as a literature review. Based on the review, not many organisations have adopted the use of AI in their recruitment processes. The use of AI is currently favoured by larger corporations and recruiting agencies in an attempt to further streamline their recruitment processes. The level of implementation in these organisations remains unclear. When AI-tools are being acquired and used, CV and video screening software, task automation tools and chatbots are counted among the most popular AI implementations. The AI-powered recruitment process takes into account the candidate and offers an improved experience. Suggestions for further areas of research include the candidates' reactions towards the use of AI in the recruitment process and the level of implementation among specific companies.

Keywords Artificial Intelligence, Human Resources, Recruitment Process

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1. INTRODUCTION

Artificial Intelligence (AI) is no longer an unfamiliar term. It has shown to disrupt several industries and liberate us humans from performing tedious, repetitive tasks, thus allowing us to shift our attention towards more complex assignments. The Grand View Research (2020) valued the global AI market size to be a whopping 39.9 billion USD dollars in their 2019 market analysis report. Moreover, they projected it to nearly double in 2020. The Human Resources (HR) industry is also taking its first steps in what can be named the era of Digital Recruiting 3.0, which involves the use of AI (Black & van Esch, 2020).

Numerous tasks are performed by the HR department, making it a lucrative source for business process improvement (Tambe, Cappelli & Yakubovich, 2019). Not only will AI change the job description of HR employees, but perhaps more interestingly, it might bear significant implications for the experience of applying for a job from the perspective of a job candidate. Pertaining to this, Black and van Esch (2020) point out that AI has gone from a concept to a necessity in recruiting. To illustrate, Google has historically received up to 2 million applications per year (Torres, 2017). Consequently, only devoting human labour to process this increasing amount of applications becomes infeasible.

We have heard rumours of how AI is exploited in recruiting, but most of us are unsure of how it is actually used. Therefore, my aim is to explore the following question: How is AI used in the recruitment process? My motivation for studying this topic stems from the implications of the use of AI in the recruitment process for young adults entering the labour market. Organisations are realising the value of their employees in positively impacting organisational outcomes, which has shifted the focus towards a careful selection and retention of employees (Kulkarni & Che, 2019). Correspondingly, this makes the topic timely as a number of organisations are beginning to adopt AI-tools in recruiting in order to grow a talent pool of successful employees.

In most cases, all prospective employees have to go through a recruitment process when applying for a job. Hence, I center my attention on the recruiting and selection of candidates and how AI is applied during the different activities of the recruitment process. This bachelor's thesis is a literature review, the purpose of which is to present information regarding the AI tools and methods that are being used to enhance the recruitment process. I explore the possible impacts from the new technology endorsement, while also probing the issue from the

perspective of the job candidate. In addition to this, I will highlight the advantages and possible disadvantages of using AI in the recruitment process.

My work concludes that the adoption of AI in recruitment and selection is currently in progress. Based on the review, AI-adopters tend to be large organisations, tech- or innovative companies; it is estimated that the adoption of AI is still quite low, as companies are most likely piloting the use of AI rather than exploiting it actively in recruiting. When AI-tools are being acquired and used, CV and video screening software, task automation tools and chatbots are counted among the most popular AI implementations. (Albert, 2019) AI seems to offer an advantage screening, evaluating and interviewing candidates in terms of effectiveness (Black & van Esch, 2020), making it a noteworthy tool in recruitment and bringing benefits to both the recruiting company and the candidates. However, there are some ethical and discriminatory concerns.

The structure of this bachelor thesis is as follows: the following section discusses both AI and Human Resource Management (HRM) from a general perspective while also offering a discussion of their combination. The third section focuses on defining the recruitment process and its main purpose as one of the central tasks of HRM. The fourth section presents the tools and ways of how AI is used in the recruitment process. Furthermore, it introduces the advantages and disadvantages of exploiting the new technology. The final section summarises and concludes the findings of the research. In addition to this, the section includes possible restrictions of the research and suggests further areas of research for future reference.

2. ARTIFICIAL INTELLIGENCE IN HUMAN RESOURCE MANAGEMENT

2.1 The definition of AI

Artificial Intelligence seems to have no exact definition in literature (Vardarlier & Zafer, 2019). The Cambridge Dictionary (2020) defines AI in the following way: “The use of computer programs that have some of the qualities of the human mind, such as the ability to understand language, recognize pictures, and learn from experience.” In other words, AI is a variety of technologies that allow a computer to do assignments that have conventionally required human cognition (Tambe et al., 2019). As AI aims to simulate and augment human intelligence, it also seeks to extend and expand it (Shi & Zheng, 2006). AI is considered as a subfield of computer science (Shi & Zheng, 2006) while machine learning and natural language processing are

subfields of AI (Sipper et al., 2017; Kehl & Jackson, 2020). The connection and overlapping between the four is visualized in Figure 1.

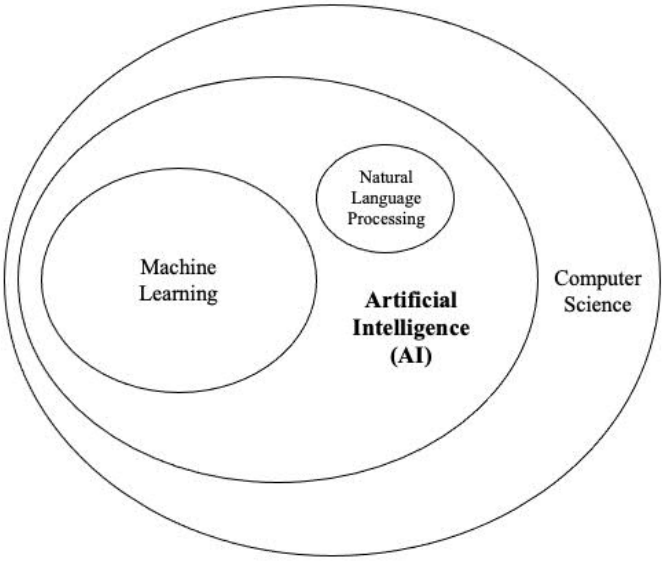

Figure 1: The connection

Machine Learning (ML), in simple terms, involves creating algorithms that learn from data and improve their performance after gaining experience (Overton, 2018; Acikgoz et al., 2020). An algorithm, defined by the Cambridge Dictionary (2020), is: "a set of rules or instructions that help to formulate a solution to a problem or task." The two most common ways ML can learn are by supervised and unsupervised learning. Supervised learning encompasses learning with training data that holds correct, predetermined answers for each record within the dataset (Desouza et al., 2020). Ergo, it involves learning to recognise certain patterns (Overton, 2018). An example of a simple supervised learning problem could be an algorithm predicting the selling price of a used car, while taking into consideration its condition and age (multiple regression model). In unsupervised learning, the machine runs unsupervised and uncovers new patterns or information in the data without having defined outputs (Desouza et al., 2020; Mehta & Devarakonda, 2018). Broadly speaking, finding new patterns and grouping observations is known as clustering. For example, Spotify utilizes unsupervised learning techniques such as clustering to suggest songs that one may find appealing according to the music one has listened to previously.

Natural Language Processing (NLP) allows AI to understand text, emails, spoken information in videos et cetera, with for example, word sense disambiguation to align the data and give a

meaning to words pertaining to each individual context. In short: NLP mimics human conversational abilities. Present-day NLP solutions such as Google search and language translations exploit ML. (IBM Developer; Chowdhary, 2020; Mehta & Devarakonda, 2018) NLP is also used in chatbots to handle questions and maintain conversation.

2.2 Key HRM functions

Subba (2009: p. 2) crystallizes the definition of Human Resource Management (HRM) into the following sentence: "In simple sense, human resource management means employing people, developing their resources, utilising, maintaining and compensating their services in tune with the job and organisational requirements with a view to contribute to the goals of the organisation, individual and society." Durai (2010) summarizes HRM as ensuring that the human resources of a company are leveraged to the best use so as to achieve the organizational and individual goals. In simple terms, HRM refers to taking care of the human resource of the organisation.

Durai (2010) categorizes HRM functions into two sets: managerial functions and operative functions. Managerial functions include planning, organising, staffing, directing and controlling. Operative functions include procurement, development, compensation, maintenance and motivation, integration and industrial relations. I will be focusing on the recruitment and selection activities of the procurement part of the operative functions of HRM, in order to further explore how AI is applied during the different activities of the recruitment process. Figure 2 maps out the many functions of HRM and illustrates where the recruitment and selection tasks stand.

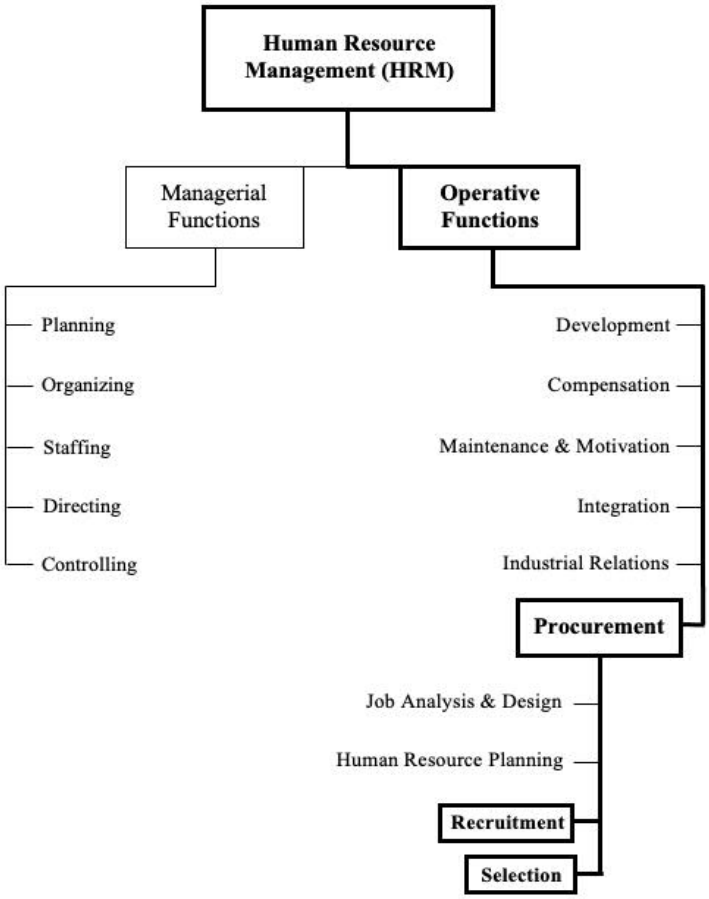

Figure 2, in reference to Durai's (2010) description of HRM functions

Procurement is a process involving a sequence of activities to fill present and future positions in an organisation. Procurement activities comprise job analysis and design, human resource planning, recruitment and selection. Job analysis includes making the decision of what tasks and responsibilities a role might hold. In addition to this, it involves identifying the skills, knowledge and abilities that the person should have in order to perform well in the aforementioned role. Human resource planning calls for determining the right person to the right job at the appropriate time. Recruitment refers to the activity of gathering a pool of candidates from which competent future employees can be picked from, whereas in selection candidates are screened, tested and interviewed and then possibly hired. (Durai, 2010)

The adoption of AI in Human Resource Management has already begun. Kulkarni and Che (2019) mention that machine learning along with natural language processing have been utilized to drive the efficiency of software tools used in all of HRM functions. These tools are used, for instance, in the development and retention of employees. The company IBM states

that the application of AI in HRM could include, for example, enhancing the motivation of employees, helping in compensation management and in career development (IBM, 2018). IBM has benefited from AI in their own HRM operations, using it to increase engagement, improve employee education and obtain new talent (Verne, 2018). The research by Jia et al. (2018) supports this notion of AI exploitation in HRM. In their conceptual study, they suggest that AI can be combined with HRM functions by, for instance, collecting and analysing the work performance of employees as well as bringing fairness to the decisions made in compensation management. However, the literature points to the fact that the use of AI in HRM is more focused on the recruitment and selection functions of HRM.

3. THE RECRUITMENT PROCESS

The term recruitment process pertains to the process of identifying and classifying potential employees and making good use of this source (Durai, 2010). The purpose of the recruitment process is to find a match or a fit between the candidate and the position offered by the company (Miles & McCamey, 2018). It is believed that a competent workforce plays a critical role in determining the success of a company. As a consequence, one of the central tasks of HRM is choosing the right person for the right position within the company. (Durai, 2010) This is done through the recruitment process.

In terms of productivity, McKinsey's study reveals that the performance of high performers is 800% better than an average performer's when it comes to complex jobs (Keller & Meaney, 2017). This demonstrates the importance of getting the right talent and fit for the company. As a supporting statement to this finding and to Durai's (2010) above acknowledgement on the role of a competent workforce, Acikgoz et al. (2020) state that the right talent regulates the amount of knowledge, skills and abilities a company holds. Kulkarni and Che (2019) point out that companies are now noticing the worth in selecting and fostering good employees, as the carefully chosen workforce may positively impact organisational outcomes. No surprise companies are searching for the best methods in recruiting in order to form a competitive talent pool to further their businesses. The human capital becomes - and is - a strategic, intangible asset for the company.

There are a few ways to define the recruitment process. The International Organization of Standardization (ISO) defines recruitment as a process consisting of four key elements:

sourcing, attracting, assessing, and *employing* for an already existing or a new position in the organisation. The aforementioned four elements of the process are vital in determining the human resource outcomes. Their purpose is to filter the number of candidates until the suitable candidate has been hired.

The recruitment process begins with an *input*. The input can be, for example, an internal need for a specialist. This sort of a request is also known as a requisition. The first activity of the process, *sourcing,* includes identifying a group of potential candidates. *Attracting* encompasses the creation of interest among targeted candidates. *Assessing* refers to the action of discovering the skills, knowledge and abilities of separate individuals or a group of individuals. As for *employing,* it signifies utilizing the services rendered by an individual (candidate). The recruitment process ends after the candidate accepts the offer and becomes an employee: the requisition is closed. The *output* is the quality and quantity of the talent. (ISO 30405:2016; in article Miles & McCamey 2018) Figure 3 illustrates the ISO recruitment process. The figure is an adaptation of the figure found on the ISO website.

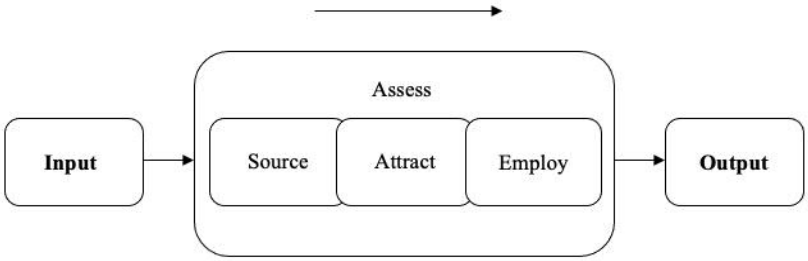

Figure 3, Adapted from the ISO (2016) illustration of the overall recruitment process

Another complementary approach for the ISO definition is Koivunen et al.'s (2019) understanding of the recruitment process as a matchmaking event including four stages. These four stages are: (1) formulating requirements for a match, (2) identifying and attracting alternatives, (3) comparing the alternatives, and (4) selecting the most optimal match from the filtered remainder (Koivunen et al., 2019: p. 8). Acar (2013, in article Vardarlier & Zafer, 2019) summarizes the process into research, selection and recruitment with certain requirements in mind. Black and van Esch (2020) do not specifically name *outreach, screening, assessment* along with *coordination* to be phases of the recruitment process, but instead use these to describe the sets of activities happening during recruiting.

We can identify that the recruitment process involves both of the two activities found in HRM procurement: recruitment and selection (section 2). The purpose of the recruitment activity is to prepare a candidate pool to be assessed during the phase of selection. Selection involves various tasks such as interviews, tests, reference checks et cetera, in order to check whether the candidate is suitable for the position or not. The selection process determines who will be hired. (Durai 2010) Building on these groundings, I will be using the term recruitment process to describe both the recruitment and selection activities together, as they are often seen as interchangeable in the recruitment process definitions. As established earlier, the process is only one of the many functions in Human Resource Management.

As Black and van Esch (2020) note, technology has changed the way recruiting is being done. Companies are now at the early stages of what they term Digital Recruiting 3.0, which heavily involves making good use of AI-enabled recruiting tools in recruitment and selection. They suggest two elements to have paved the way for Digital Recruiting 3.0: (1) the growth in number of applications per job along with (2) CEO's giving recognition to the significance of the role of human capital in promoting company value. They remark that digitalization has allowed the number of candidates to increase per position, but in turn brought in more unqualified candidates to apply. This has forced companies to take new actions in their candidate selections, hence making AI an interesting opportunity.

The current tools available for recruiters to be used during the recruitment process are found in one of the following software categories: job aggregator, candidate assessment and applicant tracking system (ATS) software. Job aggregator software, for instance, pulls job postings from numerous websites and makes them available in one location. Candidate assessment software involves evaluating the candidate with, for example, aptitude and personality tests (psychometric testing). As for ATS, it is an interface that helps manage the entire recruitment process with qualities such as collecting CVs, scheduling interviews, providing data on candidates and so forth. (Kulkarni & Che, 2019) Most of the work is carried out with ATS in the traditional recruitment process, which has required a human to provide the data and decisions (Niehueser & Boak, 2020).

4. EXPLOITING AI IN THE RECRUITMENT PROCESS

AI can be exploited in all of the recruitment activities mentioned by Black & van Esch (2020): outreach, screening, assessment and coordination. These activities closely resemble the International Organization of Standardization's recruitment definition of the four key elements: sourcing, attracting, assessing and employing in the recruitment process. AI seems to be exploited or can be exploited at some level (based on the reviewed literature regarding the use of AI in the recruitment process) throughout the recruitment process' key activities, up until the last element: employing. This, however, does not mean that companies are actually using AI in all the activities of the recruitment process, merely using a few tools to help in the process (Albert, 2019).

In a 2017 interview by a Finnish public service broadcasting company (YLE), Barona's CEO estimated that 40 000 people in Finland are recruited annually through processes that utilize AI (Nurmilaakso, 2017). Barona is the leading private employment agency in Finland (Barona). Thus, the use of AI in recruitment in Finland seems to occur at a small scale. However, some recruiting companies are embracing new AI-tools, thus paving the way for an increased utilization of AI in recruitment. For instance, TalentAdore and Barona are already making use of AI in their activities (TalentAdore; Barona). TalentAdore, a recruiting company in Finland, not only uses AI to screen candidates, but to communicate with them of their standing in the recruitment process and give constructive criticism for those who received a rejection (Uusitalo, 2020). Interestingly, Duunitori's (2020) national recruitment study discovered that 39% Finnish recruiting professionals disagreed with the statement that AI would handle most of the recruiting in 10 years. However, 87% of them believed that recruiting will change and be digitalized within the next 10 years. Duunitori is a Finnish job board and recruiting media (Duunitori). This study was conducted originally in Finnish and therefore I have translated the statements into English.

Due to the above-mentioned observations, I will explore the exploitation and use of AI in the recruitment process on a more general level.

4.1 How AI is used in the recruitment process

AI-tools can - and are used to - screen CVs, set up interviews and show candidates other potential job opportunities, thus streamlining the recruitment process (Mya; Albert, 2019; Black & van Esch, 2020). However, one needs to bear in mind that the level of adoption in companies

is uncertain. Companies have their own agenda and vested interest to signal larger utilization of AI to other stakeholders and competitors, with the purpose to portray themselves as being ahead of the game. Therefore, there is a higher risk of reporting bias and the reported use might not reflect the actual use of AI in practice. AI-tools might be used, or they might not be used at all. (Albert, 2019)

Kulkarni and Che (2019) categorize the capabilities of AI in recruiting and selection into three categories, which they have formed based on TalentSum (2018) and Sennaar's (2017) findings on AI-tools and their categorization. These categories include *candidate identification, candidate engagement* and *candidate selection* (Figure 4). The first of the categories, *candidate identification*, allows AI, for insance, to identify suitable CVs from the company database and bring them to the attention of the recruiter. This part of the process is governed by several attributes that have been chosen partly by the recruitment team as a result of their experience with manual screening. The process itself uses supervised machine learning algorithms (section 2). These algorithms are trained with training data containing the pre-specified attributes. It then proceeds to use its newly gained knowledge on the real company data. In addition to this, advanced algorithms are able to scan through the candidate's social media platforms with set criteria and keywords. AI is also able to assess whether the candidate's personality matches with that of the company by searching their social media data to receive hints on values and beliefs (Upadhyay & Khandelwal, 2018).

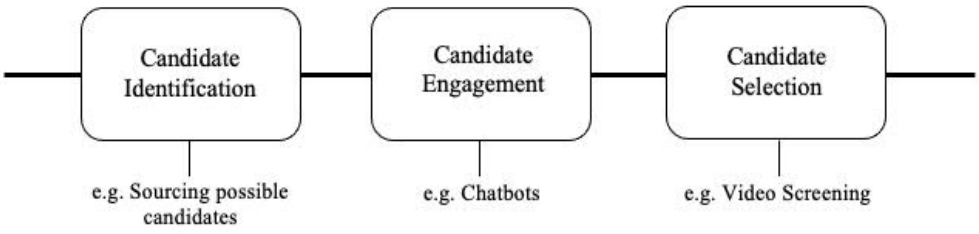

Figure 4, In reference to Kulkarni & Che (2019) three categories

The second of the categories, *candidate engagement*, seeks to boost candidate engagement and improve the experience of the recruitment process as a whole. This is done by incorporating AI-tools that use natural language processes and machine learning to interact with candidates. Chatbots are a good example of AI-tools used to improve candidate engagement. (Kulkarni &

Che, 2019) Black & van Esch (2020) describe the possible functions of AI chatbots to be: informing the candidates of their current position in the process and describing the next steps to come, answering any questions during the process along with asking questions from the candidates to acquire any missing information. Chatbots are available 24/7/365 for the candidates. They can also communicate with candidates via text messages, emails or dialogue boxes (Upadhyay & Khandelwal, 2018).

The third category introduced, *candidate selection*, can involve tools that use machine learning in the interest of, for instance, executing video interviews with candidates, then breaking the video into segments and analysing them in parts. These AI-based tools assess the candidates' facial expressions, voice and tone and use the information retrieved from the video to compare with measurements of other candidates or well-doing employees currently working in a similar position. (Kulkarni & Che, 2019) In other words, it searches for characteristics that could lead to success (Black & van Esch, 2020). Not only does AI focus on the content of the response, but is able to detect moods from the video (Talview) and analyse the word choices of the candidate (Black & van Esch, 2020). The candidates are ranked and given a score based on their performance in the video interview (Kulkarni & Che, 2019).

Albert (2019) finds 11 AI-tools that can be used in recruitment and selection activities that have been reported to be used by a few companies. He describes the purpose of the tools alongside with some benefits gained from utilizing them. These tools seem to fall into the categories Kulkarni and Che (2019) mentioned and are commonly found in the literature. Tables 1,2,3,4 and 5 are succinct adaptations of Albert's (2019) original table and showcase the AI-tools, mention the purpose of the tool and name some of the companies that have reported the adoption of the tool. In addition, I have divided the AI-tools into the separate tables according to the four activities introduced by Black & van Esch (2020): outreach, screening, assessment and coordination, to help visualise what part they play during the recruitment process. These four activities were mentioned in section 3. Table 5 contains miscellaneous tools that mostly benefit the company who adopts them and can be seen as being independent of the recruitment process.

TABLE 1: Adapted from Albert's (2019) Table of AI-tools

AI-Tool	Purpose	Company
Job description optimisation	Provide recommendations to optimise (and customise) job descriptions	e.g. American Express, Johnson & Johnson and Evernote
Targeted job advertising	Target job recommendations to relevant candidates with a greater accuracy	e.g. YouTube and Netflix
Multi-database candidate sourcing software	Scan through multiple databases to reach untapped potential of passive candidates	e.g. Accenture, Warner Bros and Intel

TABLE 1: OUTREACH

Job description optimization gives suggestions for customized job descriptions to different candidates to enhance candidate engagement and improve diversity. This can be for instance, specific language recommendations to individuals. It can tailor and adjust the wording and the job description to reach various candidates (Black & van Esch, 2020). In other words, the job posting one candidate sees might look different for another candidate in spite of the fact it is for the same job. *Targeted job advertising* helps avoid marketing the wrong message to the wrong audience. The tool assists in targeting the relevant candidates through the right channels thus minimizing advertising costs, providing higher candidate engagement and improving their experience. That is to say, candidates receive relevant postings for them. AI will learn to connect and advertise the right way to the passive candidates with the best potential - flashing job opportunities in the form of emails, texts et cetera, to receive responses from them (Black & van Esch, 2020). *Multi-database candidate sourcing software* enables the reaching of passive candidates by going through various databases including LinkedIn and social media profiles et cetera, to help sourcing new talent.

TABLE 2: Adapted from Albert's (2019) Table of AI-tools

AI-Tool	Purpose	Company
CV screening	Screen, filter and rank a large quantity of CV's to determine the best candidates	e.g. IBM, Amazon and Goldman Sachs

TABLE 2: SCREENING

CV screening filters, ranks and scores the CVs based on the predetermined attributes (criteria) decided by the recruitment team. The process determines the best candidates according to how their CV's match with the given selection criteria. It speeds up the process, reduces cost and improves diversity. Thus, recruiters can shift their focus to tasks requiring human cognition. As an example, L'Oréal began to use AI to screen and conduct interviews, which saved the company 40 minutes per CV at the end when compared to the initial situation (Sharma, 2018). In that sense it can be said that each CV receives a fair consideration.

TABLE 3: Adapted from Albert's (2019) Table of AI-tools

AI-Tool	Purpose	Company
AI-powered psychometric testing	Produce engaging tests to assess candidates whilst improving the candidate experience	e.g. PwC, Unilever and Accenture
Video screening software	Analyse pre-screening interviews to determine whether candidate fits the organisation and role	e.g. IBM, Hilton and Unilever
AI-powered background checking	Scan through multiple databases to check criminal record, references and credit ratings	e.g. Fortune 500 firms, Financial firms and Uber
Candidate engagement chatbot	Chat and give prompt answers whilst improving the candidate experience	e.g. Sephora, Ebay and H&M

TABLE 3: ASSESSMENT

AI-powered psychometric testing produces more engaging tests to improve the candidate experience, while evaluating the candidates in a standardised manner. This tool is said to improve the candidate to hire ratio and further allows recruiters to prioritize more important tasks. Psychometric testing can be, for instance, an aptitude test. *Video screening software* analyses pre-screening interviews to assess whether the person fits the organisation or not, while reducing bias and improving the candidate experience. *AI-powered background checking* scans through multiple databases with ease, checking information such as the candidate's criminal record, credit ratings and references. *Candidate engagement chatbot* uses natural language processing to be able to maintain conversations and answer questions quickly, thus engaging the candidates during the recruitment process and improving the employer brand. Some of the chatbots are capable of scheduling interviews (Kulkarni & Che, 2019).

TABLE 4: Adapted from Albert's (2019) Table of AI-tools

AI-Tool	Purpose	Company
Automated scheduling	Automate admin tasks such as scheduling interviews, meetings etc.	e.g. Disney, Coca-Cola and Walmart

TABLE 4: COORDINATION

Automated scheduling consists of automating the scheduling of calls, tests, interviews or meetings, therefore streamlining the recruitment process. Candidates are able to progress faster in the recruitment process, since AI is more expeditious to get back to the candidate than a human recruiter.

TABLE 5: Adapted from Albert's (2019) Table of AI-tools

AI-Tool	Purpose	Company
Vacancy prediction	Interpret employee behavioural data to establish the likelihood for an employee to resign	e.g. IBM, Facebook and Goldman Sachs
Employer branding monitoring	Scan through public data and evaluate feelings towards the company and discover weak points of the recruitment process	e.g. McKinsey & Co, Oracle and HP

TABLE: 5 MISCELLANEOUS

Vacancy prediction software estimates the likelihood of an employee leaving the company by interpreting the employees' behavioural data. Its focus is on reducing costs caused by spontaneous resignations. *Employer branding monitoring* is able to scan through public data and evaluate the overall feelings towards the company and discover any weak points in the recruitment process. This avoids a bad reputation and builds a stronger employer brand - improving the quality of talents that may want to apply. The recruitment process is also developed with the information retrieved from the monitoring, thus benefiting the candidate by offering a better experience during the recruitment process.

4.2 AI in recruitment: promoting efficiency and a positive candidate experience

Candidates, alike companies, invest a great deal of time and effort in seeking a match via the labour market (Miles & McCamey, 2018). Due to improvements in data mining algorithms, not only are candidates able to receive real-time CV feedback but are also advised on their profile compatibility with the vacancy and the company (Apatean et al. 2017). This helps candidates in the search for suitable companies to work with. Data mining is a term to describe the extraction of useful data patterns from extraordinarily large sets of data (Ye, 2013). Additionally, it allows the company to eliminate any candidates not worth pursuing and selects those with desired qualifications (Vardarlier & Zafer, 2019). Candidates save time as they receive long-awaited answers swiftly regarding their progress in the recruitment process and avoid the frustration and uncertainty of not hearing from the company for a long period of time.

Interestingly, for HR employees, it can be argued that some of these new AI applications add labour rather than replace human efforts, while others decrease it. For instance, we take away time from task X by implementing AI but add time on the other end to analyse and figure out how to use the results and answers that AI may give us. This highlights an important feature of the implementation of AI across different business functions. (Ross, 2018) The process itself might not pose a deleterious risk to employment, but rather a shift in the everyday tasks that employees perform. Still, AI decreases the workload by automating tasks (Kulkarni & Che, 2019). In addition to this, it also helps in cost reductions. For instance, IBM states that the company has saved one billion USD dollars since 2011 - after deploying AI in its HRM operations (Aspan, 2020). However, we need to bear in mind that the reduction of costs is company-specific. Implementing AI brings its own costs and the investment repayment period differs in each company.

AI increases communication between the candidate and the employer during the recruitment process, which seems to be an area of development for many companies. Another recent study conducted by Duunitori (2020) discusses the feelings of job candidates towards the recruitment process in Finland. Over 3000 candidates participated in the study. These respondents were between the ages of 18 to 64 years old. No more than 10 percent of the respondents felt the communication between the candidates and the employers to be sufficient - suggesting that the other 90 percent felt that it was inadequate in some sort of way. The study highlights the fact that the candidates wish for more direct and transparent communication between the candidates and the employer. Examples include informing the current position of the candidate in the recruitment process, any postponement of the process or making an announcement immediately after the suitable candidate has been found and the search has ended. With some of the AI-tools mentioned in section 4.1, the communication between the candidate and the company can and is improved, tackling one of the above described targets for development during the recruitment process. The candidate is also able to receive a positive reply or a rejection within 24 hours of applying for a position (Upadhyay & Khandelwal, 2018) - allowing the candidate to move on faster without having to guess their situation in the process.

The desire to streamline the recruitment process is a topical issue and AI-tools assist in doing so. YLE's more recent article mentions that some Finnish companies have piloted a recruiting process that involves only three questions - without having to submit a CV or a cover letter. Both companies and candidates are looking for shorter recruitment processes. (Uusitalo, 2020)

Black and van Esch (2020) also demonstrate the urge to make the recruitment process more pleasurable: due to the era of Digital Recruiting 3.0 and AI applications, candidates do not have to upload their CV's or fill an application. Prior to this, ATS required CVs to be uploaded in a specific format. The authors mention Unilever as an example, which instructed their candidates to give in only their LinkedIn profile. AI then proceeded to fill their applications for them based on the profile - making the experience and job hunt easier for the candidate. The above-mentioned Duunitori's (2020) study involving the job candidates' sentiment towards the recruitment process reveals that candidates want to get rid of filling electronic applications and wish for increased and more effective communication as well as an accelerated (streamlined) recruitment process overall. AI-tools would in this sense fulfil the job candidates wishes.

AI-tools pay attention to the candidate experience and improve it. Miles and McCamey (2018) point out that the overall candidate experience during the recruitment process has only recently been gaining more attention. As a candidate seeks employment, they use considerable amounts of their time and effort to be seen as desirable in order to land themselves a position at the targeted organisation. The organisations on the other hand center their attention with a singular end result in mind: to single out the best person to fill the vacancy. The singular focus may lead, if not well managed, to a situation where the rest of the candidates might be ignored. Candidates may perceive this kind of action as negative. At its worst, having a negative experience of the recruitment process can lead to a damaged employer brand. Consequently, desired talent moves to work for competitors and the candidates withdraw themselves as (potential) customers. Even worse, through word of mouth, they could discourage others from applying. (Miles & McCamey, 2018) AI chatbots, for instance, are designed to offer quick responses and actions during the process to improve both employer brand and the candidate experience (Nawaz & Gomez, 2019).

Using AI in recruitment has a positive impact on the completion of job applications. Candidates may feel anxiety towards the use of AI in recruitment, but it does not affect the completion of job applications and companies should not hide the use of AI in the belief of pushing away potential candidates. Research also indicates that candidates have a tendency to apply for a position with AI utilized in the recruitment process if it gives them benefits. In addition to this, candidates do not often receive feedback on their CV or cover letters. However, AI has the ability to do so. (van Esch et al., 2019) The feedback would undoubtedly raise positive feelings towards the company offering such a service.

A company conducting AI video screening interviews enables the candidate to perform the interview at any time, at any place - at their convenience. To top it off, hidden talent gets recognised during screening as the algorithm searches only matching qualities for the position (Niehueser & Boak, 2020). Despite the aforementioned benefits, AI interviewing assessment does however, raise the level of uncertainty within candidates on account of its newness, and candidates may be left with a feeling of not being valued as much (Acikgoz et al., 2020).

The use of AI seems to improve diversity in the recruitment process. To illustrate, Unilever was able to improve the diversity of the candidate pool, as the representation of different universities rose from 840 to 2600 (Wilson & Daugherty, 2018). Human recruiters are subject to cognitive biases, which can affect their judgement and choices (Judge, Cable & Higgins, 2000) and this can be seen to reduce diversity among candidates. AI aims to concentrate purely on the predetermined criteria of desired skills and abilities required for a role during screening - paying less attention to the gender, name or other characteristics the way a human recruiter might.

4.3 Ethical and discriminative issues of AI in recruitment

The literature implies that it is a common conception to believe AI to be more objective and neutral in the recruitment process than a human recruiter. However, AI algorithms are designed by humans and are subject to the data attributes they receive. Some of the attributes fed to AI might already possess bias and sometimes the algorithm cannot be influenced afterwards by its creators - let alone the candidate applying. The aforementioned may lead to situations where the algorithm does not behave ethically, nor in an appropriate manner in terms of fair judgement. This can make AI vulnerable to learn an attitude, which engenders to a distortion of how it, for instance, rates candidates during the CV screening process.

AI does not know what a bias is and does not know if it is learning one (Black & van Esch, 2020). It is less likely that the decision or result offered by AI is questioned to be biased than when coming from humans. This is a result of the inherent complexity of common CV screening algorithms. Companies should be transparent about the process of the algorithm development and the training of the program developers in order to deter unconscious bias. (Miller, Katz & Gans, 2018) Therefore, it is important for the company to think through the key capabilities and determinants they want in a future employee before applying a learning algorithm. The company should concurrently pay attention to what data they use in the development of the algorithm in order to practice ethical, non-discriminatory recruiting. This

can be problematic, as it is hard to define the characteristics, traits and the definition of being a good employee (Tambe et al., 2019). The quality of the recommended candidates is still in contemplation, with mixed views whether the outputs of AI should be trusted (Niehueser & Boak, 2020).

In 2018, Amazon built an algorithm to help automate their recruitment process and identify the top candidates from a collection of CVs. The algorithm was fed Amazon's historical employee job performance to determine the characteristics of high performing employees. In other words, AI looked at the determinants that lead to be a high performing employee at the company and applied it to search for similar future employees. This went horribly wrong. The majority of the high performing employees at Amazon were white men; the algorithm cut off any CV's with female designations on them. There was no simple way to fix the algorithm and the company dropped it. (Dastin, 2018) Despite the unfortunate situation with Amazon's algorithm, it is in fact achievable to code algorithms that are neutral when it comes to elements considering gender, religion, race and ethnicity (Black & van Esch, 2020). Still, Miller et al. (2018) state some sort of bias is inevitable in machine learning and Lee (2018) research implies that decisions made by AI were viewed as less fair.

AI infused CV screening has brought up ways to manipulate AI in an attempt to overcome the process and move to the next phase. The candidate ensures they use exact terms - the keywords - mentioned on the job description on their CV to 'algorithm optimize' it. The keywords describe the abilities and skills of the applicant and are listed on the job description. As previously explained in the beginning of section four, the CV screening process works in a manner of searching certain matching factors (keywords) from CVs, scoring the CV and ranking the candidate to a certain position in the competition. (Caprino, 2018) Using the correct keywords would, in this sense, rank the CV with a high score - having a better chance to move to the next phase. However, Black & van Esch (2020) mention in their research that AI can do more than just scan certain terms and synonyms. In particular, it can draw conclusions from a text, such as picking up persistence from sentences describing a situation of not giving up.

The rumour has it that incorporating the keywords with white font text on the CV or cover letter (CL) will help candidates pass the CV/CL screening phase. Safani (2010) describes that the idea is to have the text invisible for the human recruiter, but available to be picked up by AI. Adding all necessary keywords to the margins allow the candidate to have more room for

creative writing, while retaining the visual look of the CV. However, the author warns that not all AI can read white font text as a result of different configurations. In addition to this, Safani (2010) points out that even while passing the CV screening phase, the candidate might not pass the human recruiter if all the desired keywords are not visible for them. Furthermore, it is hard to believe that companies would not intervene to such a flaw, particularly as technology is fast evolving and offers improvements. Nonetheless, sharing tips and advice regarding the recruitment process is not a new phenomenon and the internet is full of recommendations of how to do a good CV or perform in a job interview. Candidates are simply adapting to yet another way of selecting and trying out different techniques to do so.

Some AI-enabled tools are viewed as inequitable when compared to the traditional methods. People's attitudes are more favourable towards automation of mechanical tasks rather than tasks that involve interaction with humans, such as recruiting (Lee, 2018). For instance, Acikgoz et al. (2020) research suggests that AI-powered interviewing is considered to be more unfair than traditional interviewing as well as raising uncertainty among candidates. However, a study conducted by Suen, Chen and Lu (2019) indicates that even if candidates favour traditional video interviewing, AI-powered video interviewing does not evoke any fairness concerns among the candidates - proposing that either option is considered acceptable. Langer et al. (2019) study assesses candidate reactions on highly automated interviews, which involve for instance, algorithms that evaluate candidate performance. The findings of the study imply that the lack of social presence (e.g. recruiter) during the interview decreases organisational attractiveness. These findings do not exactly go hand in hand with the previously mentioned van Esch et al. (2019) research that discusses candidates applying in a process which utilizes AI. It seems that AI might pose discomfort to candidates but does not affect the completion of job applications. Unfortunately, the candidate reactions to AI in recruitment seems to be an under researched subject, having only a few studies relating to this theme.

5. SUMMARY AND CONCLUSION

In this bachelor's thesis, I have explored the use of AI in the recruitment process, its advantages and disadvantages, while also probing the issue from the perspective of the job candidate. The recruitment process is one of the most important tasks of HRM and crucial in determining the success of an organisation. When a new hire is needed, it is done through the recruitment process. AI has been characterized as the next factor in streamlining this process.

The main findings of my research are that the use of AI in recruitment is still in its early stages but can be exploited in several ways to enhance the recruitment process. AI is used in the recruitment process to source, engage and select candidates. Therefore, it seems that AI can be exploited at some level throughout the recruitment process' key activities, up until the last element: employing. The literature highlights the fact that when AI-tools are being acquired and used, CV and video screening software, task automation tools and chatbots emerge as the most popular AI implementations.

AI-adopters tend to be large organisations, tech- or innovative companies. In particular, AI-tools are favoured currently by larger corporations and recruiting agencies in an attempt to further streamline their recruitment processes. However, one needs to bear in mind that the level of adoption in companies is uncertain as companies have their own agenda and vested interest to signal larger utilization of AI to portray themselves as being ahead of the game. While the literature mentions many ways of how AI is capable of enhancing the recruitment process, AI implementation has been quite low and underdeveloped in organisations when it comes to recruiting procedures. It is still left unclear how many and at what level do companies use AI in their recruitment processes. This does not come as a surprise given that the implementation of AI technology brings costs and requires a certain know-how. In addition to this, as algorithms used in the recruitment process are of strategic value to the organisation, it is self-evident that the knowledge of how the algorithm functions is not shared. Therefore, the understanding of how the algorithms might work remains unclear. While the rhetoric used in the literature concerning the adoption of AI is certainly positive, the true state of affairs is probably less rosy. On the other hand, technology is rapidly evolving and the level of implementation will change in the years to come.

It becomes evident that when AI is used, it seems to be both cost effective and efficient as it shortens the number of days used in the recruitment process, decreases the amount of work needed, attracts relevant candidates and thus minimizes the costs associated with a new hire. In addition to this, it improves the candidate experience overall and helps the company avoid any possible monetary damages brought by bad company reputation (e.g. customer loss). For companies it also offers a possibility to process an ample number of applications simultaneously, while boosting profitability and controlling costs (Upadhyay & Khandelwal, 2018). For candidates it offers support for the job hunt and a much smoother and more pleasing interaction throughout the recruitment process. AI seems to fulfil the wishes of the candidates

by making the process easier and enhancing the communication between the employer and the candidates. They are provided with a quicker, more practical and simple recruitment process. It can also be argued that AI can make the process more personalised for the candidates, as it gives the attention they need and directs relevant information only for them (He, 2018). AI goes thoroughly through each CV, ensuring that every single candidate gets the chance to be assessed fairly. Focusing on the candidate experience improves the recruitment outcomes, builds stakeholder relationships and reinforces the employer brand on top of everything else (Miles & McCamey, 2018), which evidently lies in the domain of AI.

The results received from the use of AI in the recruitment process will most likely vary depending on the choice of algorithms and how companies are able to define the attributes they want to find in their future employees. This affects both the company and the candidate. However, this also raises the question of whether companies are focusing enough on the formation of the algorithm to ensure no discriminative or ethical problems arise from the use of it. Another concern is defining the successful characteristics of existing employees in order to extract the above-mentioned attributes. Organisations need to avoid unconscious bias and subsequently decreased diversity. Ethical considerations include thoughts about AI dehumanizing a process involving the selection of humans.

To my surprise, the research on the subject remains scarce. Based on the review, the literature does not take into account the perspective of the candidate in the recruitment process that uses AI. While there exists a few attempts at capturing the impact on job candidates from their perspective, the research outcomes are in conflict with each other. On the other hand, the research concerning the HR perspective is ample. Suggestions for further areas of research include the candidates' reactions towards the use of AI in the recruitment process and the level of implementation in specific companies. The latter can prove to be difficult, as companies have a vested interest in signaling larger utilization of AI, which can cause reporting bias.

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