jamk.fi

Potential of AI Assisted Recruitment in Technology Businesses

William Lahti

Bachelor's Thesis
May 2020
School of Business
Degree Programme in International Business

Jyväskylän ammattikorkeakoulu
JAMK University of Applied Sciences

jamk.fi

Description

Author(s)	Type of publication	Date
Lahti, William	Bachelor's thesis	May 2020
	Number of pages 67	Language of publication: English
		Permission for web publication: (x)

Title of publication

Potential of AI Assisted Recruitment in Technology Businesses

Degree programme

Degree Programme in International Business

Supervisor(s)

Saukkonen, Juha

Assigned by

Abstract

The rapidly changing world of technology creates new innovative possibilities for modern businesses. Many industries can benefit from various technological solutions created by these innovations. A current hot topic amongst those technologies is artificial intelligence. The overall potential of artificial intelligence is widely acknowledged, alongside the challenges that might be faced through the development of fourth industrial revolution.

The goal of the study was to focus on collecting data on the current usage level of artificial intelligence in recruitment and the views on the future potential of artificial intelligence in recruitment from international technology businesses operating in Finland. The set objectives were to provide useful information for further studies and businesses to develop their understanding of current artificial intelligence systems in recruitment.

Methodological design was qualitative and exploratory in nature. Research approach was selected to be inductive and the data collected consisted of primary and secondary data. The data analysis was made with a thematic analysis.

The results emerged from primary data of 8 qualitative interviews that met the criteria of the set research questions. The main outcomes were the views of positive and negative influence of artificial intelligence might have on recruitment in the future and the reasoning behind deciding or refusing to adapt those features into future recruitment operations. As a conclusion the research was able to answer the set research questions in a comprehensive way regardless of the challenges within the research process and the limitations of the research. The research verifies what the past research from the similar fields has suggested that further study is still needed in the future.

Keywords (subjects)

Technology business, artificial intelligence, recruitment, future foresights

Miscellanous

jamk.fi

Kuvailulehti

Tekijä(t)	Julkaisun laji	Päivämäärä
Lahti, William	Opinnäytetyö, AMK	Toukokuu 2020
	Sivumäärä 67	Julkaisun kieli Englanti
		Verkkojulkaisulupa myönnetty: (x)

Työn nimi
Tekoälyavusteisen rekrytoinnin potentiaali teknologiayrityksissä

Tutkinto-ohjelma
Degree Programme in International Business

Työn ohjaaja(t)
Saukkonen, Juha

Toimeksiantaja(t)

Tiivistelmä

Teknologian nopeasti muuttuva maailma luo uusia innovaatiomahdollisuuksia nykypäivän yrityksille. Useat alat voivat hyötyä erilaisista teknologisista ratkaisuista, jotka ovat syntyneet näiden innovaatioiden myötä. Tämän päivän teknologioiden kuuma peruna on tekoäly. Tekoälyn kokonaisvaltainen potentiaali on laajalti tunnustettu, kuten on haasteetkin, joita saatetaan kohdata neljännen teollisen vallankumouksen kehityksen myötä.

Tutkimuksen tehtävänä oli keskittyä keräämään aineistoa tekoälyn tämänhetkisestä käyttöasteesta sekä näkökulmia tekoälyn tulevaisuuden potentiaalista Suomessa toimivien kansainvälisten teknologiayritysten rekrytointitoiminnassa. Asetetut tavoitteet olivat tuottaa hyödyllistä tietoa jatkotutkimusta varten sekä tietoa yrityksille, jotta he voivat kehittää ymmärrystään tekoälyratkaisujen käytöstä rekrytointitoiminnassa.

Metodologinen kehys oli luonteeltaan kvalitatiivinen sekä kartoittava. Tutkimus näkökulmana käytettiin induktiivista päättelyä, ja kerätty aineisto koostui primäärisestä sekä sekundäärisestä aineistosta. Aineiston analyysi toteutettiin temaattisena analyysina.

Tulokset kumpusivat primäärisestä aineistosta kahdeksan kvalitatiivisen haastattelun pohjalta, jotka olivat yhteydessä asetettujen tutkimuskysymysten kriteereihin. Selkeimpinä tuloksina olivat positiiviset sekä negatiiviset näkemykset, joissa tekoälyllä saattaa olla vaikutus tulevaisuuden rekrytointiin sekä perusteita olla ottamatta tai ottaa käyttöön kyseisiä ominaisuuksia tulevaisuuden rekrytointitoiminnassa. Johtopäätöksenä tutkimuksen nähtiin vastanneen asetettuihin tutkimuskysymyksiin kattavasti huolimatta tutkimuksen haasteista sekä rajoitteista. Tutkimus vahvistaa sen, mitä edeltävät samaa kenttää edustavat tutkimukset ovat ehdottaneet. Jatkotutkimukselle on edelleen tarve myös tulevaisuudessa.

Avainsanat (asiasanat)
Teknologiayritys, tekoäly, rekrytointi, tulevaisuuden näkymät

Muut tiedot

Content

Tables

Figures

1 Introduction

1.1 Background

World as we know it is on a rapidly accelerating phase of development, especially what comes to the technological leaps that has been taken in the past decades. Amongst the development of computing power in computer science, another form of its sub-sciences, artificial intelligence, has been developing fast. For the great audience the practical milestones of computer science have been seen in form of phones turning in to smart devices, desktop computers to laptops and internet to a platform where one can purchase basically anything instead of walking into a shop.

Artificial intelligence is already been seen having impact on various fields of sciences and disciplines. According to 9series Solutions (2019) major future potential can be seen in AI to enhance industries such as healthcare, manufacturing, senior care, retail, city planning, education and business intelligence. As the science of artificial intelligence itself keeps developing, more industries are going to be influenced by the leading changes in the era of digitalization.

Previously mentioned AI's future potential on business intelligence relates strongly to this study. O'Donovan (2019) states that since most technology related things are developing fast, the traditional ways of dealing with issues in business are being challenged. Human resources of a business are responsible of attracting talented personnel to work for the business and therefore it underlines the possibilities of the business' capabilities to be successful. Now, that today's job markets are weighted to online presence of employers and employees, human resources have shifted from time consuming and paper heavy duties towards faster ways of contacting possible talent. (75-110.) Based on the pictured current and future technological development, this study aims to map out current usage and future potential of artificial intelligence in human resources recruitment practices within technology businesses.

1.2 Motivation

The idea to produce thesis research from this topic came mainly from the author's individual interest towards adaptation between technological and traditional methods in the field of human resources. Partially, the interest rose due to the reason, that we are living the era of ever-accelerating phase of technology's exponential growth. Since technology was a word that stood out from both reasons, artificial intelligence and technology businesses were chosen to represent the technological aspect of the topic. Artificial intelligence playing the head role, since it is one of the trend topics amongst various technologies.

AI itself is an emerging technology and HR on the other hand is quite old-fashioned business segment. According to Fountaine, McCarthy and Saleh (2019) combining features from an AI trend to a traditional way of conducting operations in an organization might cause problems due to the challenges of change. Therefore, an additional aim for this study was that AI and its relationship to traditional processes, HRM and recruiting, would be one paper further researched.

AI is a very intriguing subject to do research from but at the same time it is a vast concept and strongly connected to other technologies. The field of AI is also commonly, intentionally or not, misused as a term. These features make it challenging to deal with but at the same time very rewarding, when done accordingly by the academic and scientific doctrines.

The author did search for similar research about the effects of AI towards human resource management and recruitment but did not find any match that would have the similar focus on technology businesses. Technology business was chosen to be the examined area of interest, because it is pragmatically oriented. Human resource management for the same pragmatic reasons and additionally, to study, if human resources in technology businesses are being the pioneers of adapting new AI technologies to their traditional processes.

1.3 Research problem and objectives

Previous research around the subject of AI in recruitment has been focusing on implications of AI in recruitment from different angles. To name few of these studies, there are Wold & Sandberg (2019) on candidate experience, Vardarlier & Zafer (2020) on overall pros and cons, Johansson & Herranen (2019) on impact on the traditional process and Albert (2019) on the usage level, rate and adoption areas of AI. Most of these studies emphasize that there is need for further research regarding the subject of AI in recruitment. The distinction in this study is that it concentrates on the AI's current overall status and the future threats and possibilities in the field of technology businesses recruitment processes.

Based on the search of the previous studies related to AI and recruitment, the research problem for this study was defined as:

T*he lack of knowledge regarding technology industries professionals' insights on future potential of AI in recruitment.*

There were two research objectives for this study. The aim was to reach these objectives as practical level of understanding as possible to produce useful information for further studies and businesses to develop their understanding of current AI systems. The research objectives were:

To measure the current level of impact of AI in recruitment processes in the field of technology businesses.

To clarify the estimated future level of impact and potential of AI in recruitment in the field of technology businesses.

1.4 Research questions

The focus of this research was on technology businesses, because the assumption is, that technology businesses should be more interested of integrating new technological solutions to their operative models than other fields of businesses. Another point of view is that the focused field of technology businesses have more likely interest towards this thesis' topic, because they are working on technological questions and solutions of their own.

Since past research has been focusing on setting the questions around overall pros and cons, candidate experience, impact on traditional processes and usage rate and adoption areas, this research targets the questions on the current and future potential of AI in recruitment. As the current status and potential has been examined, it is possible to estimate the future potential and make conclusions on its future features and forms of usage.

Based on the defined research problem, objectives and previously mentioned justifications there are two research questions for this thesis. These questions are as follows:

Research question 1: *At what extent is AI being used in recruitment processes in the field of technology businesses?*

Research question 2: *What are the future threats and possibilities for AI in recruitment in the field of technology businesses?*

1.5 Structure of the thesis

This thesis' design is qualitative in nature and it consists of methodology, literature review, personal interviews with technology business professionals, presentation and interpretation of results and discussion of future potential related to the findings. Methodology explains what and why certain methodological ways was used in this study. Literature review concentrates on clarifying and marking out the abstract nature of artificial intelligences relation to human resources recruitment practices as well as illustrating the latest literature about how artificial intelligence is used currently in HR practices. In the last chapters, the results are presented and discussed about how they managed to answer to the defined research questions. In the end of the paper, the author's challenges managing the study, reliability and validity of the study and suggestions for future research are provided.

2 Methodology

"*The term methods refer to techniques and procedures used to obtain and analyze data. In contrast, the term methodology refers to the theory of how research should be undertaken"* (Saunders, Lewis & Thornhill 2009, 3).

This chapter introduces the research purpose, research approach, data collection strategy and data analysis methods used in this study.

2.1 Research design

If a researcher selects a qualitative research design, it presupposes a world view that will define how sample selection, data collection and data analysis is made, and the ways how issues such as validity, reliability and ethics are dealt with (Merriam & Tisdell 2016, 191). According to Saunders and others (2009), "*The classification of research purpose most often used in the research methods' literature is the threefold one of exploratory, descriptive and explanatory.*" However, there is a possibility that

the purpose might change over time and even have more than one purpose. (139.) Research purpose for this thesis was chosen to be exploratory based on the qualitative nature of the formulated research objectives and research questions. Since this thesis does not have more than one research purpose there is no need to cover descriptive and explanatory research purposes in detail.

Exploratory research is particularly useful if a researcher wants to gain a better understanding over a problem. Especially, if the researcher is unsure of the nature of the problem. Exploratory research aims to answer to the question of what is happening. The researcher must be willing to change the direction in the research by the new data that appear and new insights that occur, to gain the advantage of flexibility and adaptability that exploratory research has to offer. There are three ways of conducting exploratory research. These ways are search of the literature, interviews with experts and focus group interviews. (Saunders et al. 2009, 139-140.) First two of the previously mentioned were used for this thesis.

The time dimension for this thesis process was limited due to the choice of conducting a qualitative future study with in-depth interviews, but at the same time, the future orientation of the study created undetermined time scope for the results of the study. The limitation of time in the thesis process was based on the evaluation of total time for writing the thesis in relation to data collection, contacting suitable participants, agreeing on the interviews time and place, extracting and analyzing the data. The participant profiles of the interviews concentrated on executives, HR and IT-professionals of international technology businesses that operates in Finland. From ethical point of view, it is worth noticing that the author was not dependent of the organizations which the interviewees represented. This enabled the author's openness towards the outcomes of the research.

2.2 Research approach

Saunders and others (2009) divides research approaches to two different categories of deductive and inductive. In deductive approach the researcher develops theory and hypothesis and tests the hypothesis (or hypotheses) with the research strategy. In inductive approach the researcher collects data and develops a theory by creating a data analysis. (124.) Figure below illustrates the different characters between both approaches (See Figure 1).

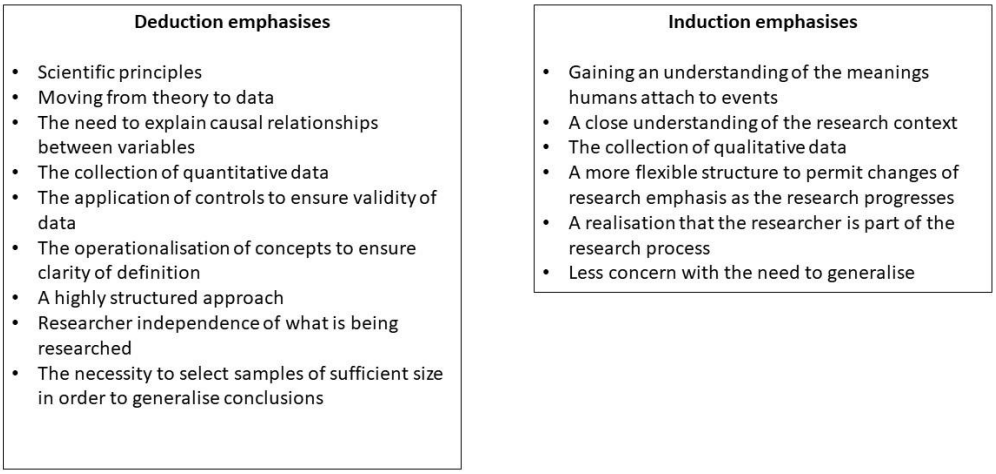


Figure 1. Differences in deductive and inductive approach (adapted from Saunders et al. 2009, 127)

Based on the exploratory nature of this study and the research problem and research questions, inductive approach was decided to be applied. According to Trochim (2000) qualitative research has special value in investigating complex issues and if a researcher really wants to gain a deeper understanding of a certain phenomenon, some type of in-depth interview is most likely needed to be conducted. As quantitative research with deductive approach concentrates on numerical data, measuring

and explaining causal relationships, it does not fit into this study's investigation of an abstract phenomena. Therefore, there was more justifications for applying qualitative measures in this thesis.

2.3 Data collection methods

Mainly there are two types of data, primary and secondary data. Both quantitative and qualitative measures can use primary, secondary data or both. As Saunders and others (2009, 256) states, primary data is new data collected for a specific purpose and secondary data is something that has already been collected for some other purpose. Based on the abstract nature of the topic and the research approach in this study, the focus was on collecting primary data with qualitative measures.

According to Seale, Gobo, Gubrium and Silverman (2004), the types of qualitative data collected vary with the aims of the study. The data samples collected are often small but might rise to hundreds depending on the study. The nature of these samples also affects to the collected type of data. This type of data often includes fieldwork diaries, observation notes and interviews, such as in-depth or unstructured, group discussions or individual ones. (297.)

Seale and others (2004), also state that avoiding participant sampling beforehand is important in qualitative research because otherwise representativeness might get compromised. In other words, sampling needs to be approached sequentially and in dialogue with discoveries. Qualitative research sampling is divided in two different units, a sampling unit and an observational unit. Sampling unit is the group that the individuals represent and observational unit the individual from the given group. There are also four different strategies for sampling. These are purposive sampling, quota sampling, the emblematic case and snowballing. (406, 419.) The latter was used for this study. It means selecting subjects that fit the needed characteristics and finding similar type of subjects through their recommendations (Seale et al. 2004, 419).

Saunders and others (2009), categorize interviews in to three-fold structured interviews, semi-structured interviews and unstructured interviews. Structured interviews are conducted by asking predetermined identical set of questions with the interviewer recording the answers on a standardized schedule. Semi-structured and unstructured interviews are both non-standardized in comparison to structured interviews. The difference between these two is that semi-structured interviews have a predetermined list of themes and questions to be covered with possible additional questions during the interview, where unstructured interviews does not have any and are referred as being informal. (320-321.)

As May (2010) describes, semi-structured interviews enable the interviewer to probe more beyond the answers that in other cases would appear prejudicial towards standardization and comparability. It also helps the interviewer to seek clarification and elaboration during the interview. This way the interviewer can construct a dialogue with the interviewee and record qualitative information about the topic. (134.) Since the research problem and the research questions are mainly future oriented, semi-structured interviews were chosen to be the data collection method to obtain subjective and comprehensive information for this study.

2.4 Analysis methods

Flick (2014), defines qualitative data analysis being "*the classification and interpretation of linguistic (or visual) material to make statements about implicit and explicit dimensions and structures of meaning-making in the material and what is represented in it.*" Qualitative data analysis is also applied to discover and describe routines and practices in different processes within fields and organizations. (5.) In data analysis the essence is to make sense out of the data collected. This means to consolidate, reduce and interpret the data that has been recorded. When analyzing interviews, this means what the interviewees has been saying and what the interviewer has seen and

read. Preferably, collecting and analyzing data in qualitative study is done simultaneously. (Merriam & Tisdell 2016, 195-197, 202.)

The overall process of data analysis begins with identifying segments in the data collected that are linked to the research questions. These segments, or units of data, can vary between size, from a single word to pages of field notes. Identifying the units of data is also called as coding. As the process of coding proceeds with each transcript, categorization of those codes can be seen to formulate. As the categorization expands, some of the categories are divided into subcategories. In time, this simultaneous process of collecting and analyzing data will lead to the point of saturation. The point of saturation means that the researcher has reached a point with the data collection that no new information, insights or understandings are forthcoming. After reaching the saturation point the categories are reduced and combined to manageable number, related to answering the formed research questions. (Merriam & Tisdell 2016, 202-216.)

One way to do the previously narrated process of data analysis is to conduct a thematic analysis. Shortly described by Guest, MacQueen and Namey (2011, 10), thematic analysis is the process of moving beyond details in the data to identify and describe themes that form out of the data. In the last part of the data analysis the researcher interprets the data by theorizing, which means explaining the findings practically and inferencing future activity. Visualizing, as part of the interpretation of data, is one of the best ways to illustrate links between the categories in a meaningful way. The whole process of qualitative data analysis is about finding the themes, categories, patterns and answers related to the study's research questions. (Merriam & Tisdell 2016, 202-216.)

In this study the previous principles were operationalized in the following way. First procedure was to transcript the interviews along the way the interviews themselves were conducted. Even though the interviews were recorded, field notes were made

to point out relevant sets of information and highlight the emphasized points from the interviewees. After the data set was collected and transcripts were made, the coding and categorization of the collected data started. This begun with the process of open coding proceeding with axial coding of the data. Axial coding was conducted by dividing the data from open coding to two different themes. Theme 1 represented codes related to *research question 1* and theme 2 codes related to *research question 2*. After this the interview data was processed to the point of categorization of axial codes. In practice this meant combining smaller group of theme codes under larger descriptive concepts. This was done by theme categorization with grouping similar theme code features and the most common answers. As a result, the author had clear documents presenting the answers to two distinguished themes out of the abstract raw primary data. These findings are explained and illustrated more thoroughly in the results chapter (Chapter 4.).

3 Literature review

This chapter provides information and understanding of technology business, human resource management, recruitment and selection, emerging technologies, artificial intelligence and AI in recruitment. Information has been taken from the past literature provided by academical research, books and journal articles.

In this thesis, technology business served as a business context area whose human resource practices were examined in relation to emerging technologies. This literature review concentrates on the current stage and future forecasts of emerging technology solutions, with the focus on artificial intelligence in recruitment and selection processes.

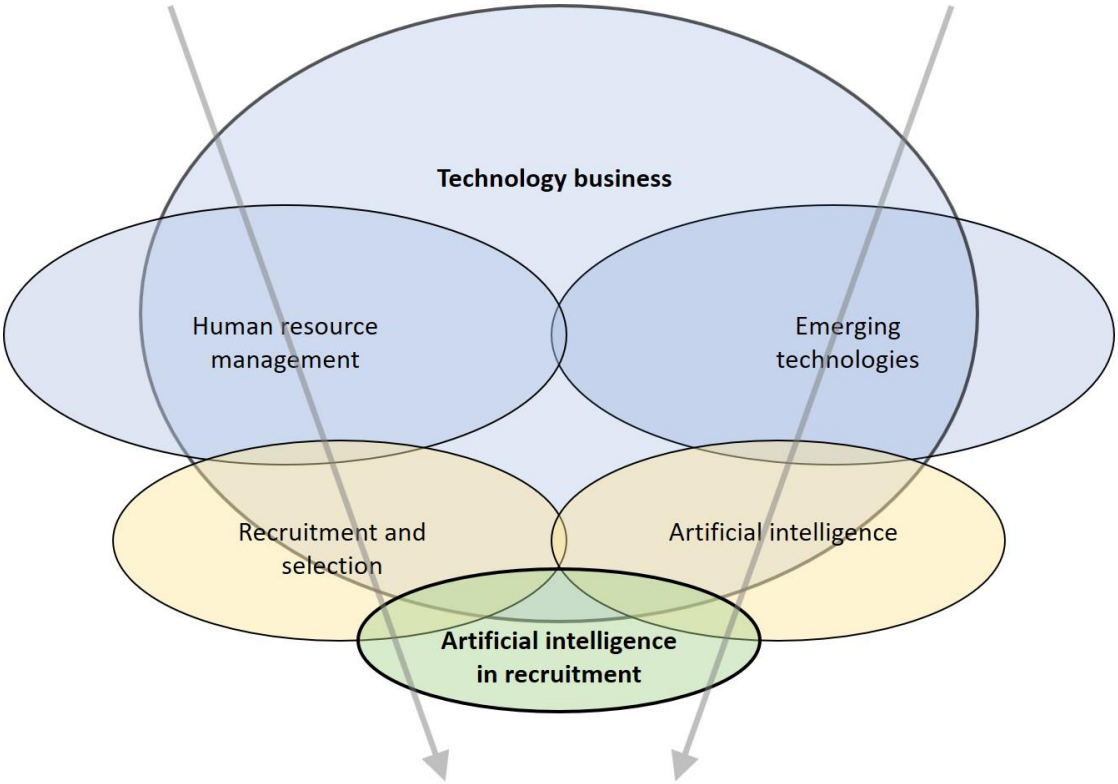


Figure 2. Parallel contexts

It is of high importance, to understand how above figure (Figure 2) illustrates this thesis' framework and acts as a guide to understand the relations between the focal points. This helps to understand how the picture under the umbrella of technology business narrows down towards AI in recruitment. The contexts in Figure 2 could be arranged in different order in different research context, respectively.

3.1 Technology business

Technology business is an abstract concept which does not have one single comprehensive and absolute definition. One way it can be described is to look for an explanation to the words of technology and business separately. Dictionary gives a following description. Technology can be described as the combination of knowledge and science which creates useful tools or solutions into practice (Your Dictionary 2019).

Business, on the other hand, is an occupation to sell goods or services to gain profits (ibid. 2019). When these two definitions are combined, it compiles to a model where the organization is trying to adapt to an existing or to a new technology and grow its sales or profitability through an innovative technological solution. This type of organization tries to make their core business operation and competitive advantage around the solution, while trying to identify possible threats related to it, alongside gaining profits out of these operations. (Linton & Solomon 2017, 196-197; Schiavi & Behr 2018, 338-339, 344.)

By the definition of Mohr, Sengupta and Slater (2010), technology businesses have three common characteristics. These are market uncertainty, technology uncertainty and competitive volatility. By this definition, the three factors are present all the time during the business' lifeline. (11-18.) Another, more descriptive definition, is made by Puentes, Ortiz and Rodriguez (2016), that technology businesses are organizations that have immersed themselves to high-technological solutions, which are based on innovation and research and development. Secondly, technology businesses work in project-based models, which produce goods and services, that are systematically based on technical and scientific knowledge. And thirdly, they usually characterize as organizations, that collaborate with research centers and universities, while having academic background of their own. (15-24.) Despite the abstract nature of the definition of a technology business there is not much contradicting information on how it should be described. Previously mentioned definitions are one of the ways to get a comprehensive understanding of technology business as a concept.

3.2 Human resource management

Unlike technology business, human resource management is more precisely defined in the literature. According to Dessler (2017, 39),” *human resource management is the process of acquiring, training, appraising and compensating employees, and of attending to their labor relations, health and safety, and fairness concerns.”* Meaning,

that it is the management process of human capital, aiming for the best possible performance by managing individuals to achieve larger context organizational goals and add value to the individual and organizations operations (ibid., 40).

Human resource management is defined as the keystone of organizations by which the organization itself either succeeds or fails. In other words, the level of an organization's performance is directly linked to its quality of human capital and the fit of that human capital into the organization's operations. (Shivarudrappa, Ramachandra, & Gopalakrishna 2009, 3; Subba Rao 2008, 34.) Well managed human resources fit the right level of need and supply of the workforce for current and future situations in the organization. This requires regular snapshots from the current workforce situation to be able to control organizations desired efficiency and resilience towards sudden changes in the operative environment. (Torrington, Hall, Atkinson & Taylor 2017, 96-100.) These definitions of human resource management are the broad descriptive level of the total concept but enough to explain its meaning in the context of this thesis. More focus is on HRM's processes of recruitment and selection in the next subchapter.

e-HRM

There is a reason to quickly go through a digitalized form of HRM that has been gaining more attention within the profession due to rapid technological advancements. Bondarouk and Ruël (2009, 505), broadly defines e-HRM as "*An umbrella term covering all possible integration mechanisms and contents between HRM and Information Technologies aiming at creating value within and across organizations for targeted employees and management*". Another definition is made by Strohmeier (2007, 20), that electronic human resource management is the practice of processing and transmitting digital information, which helps the personnel in networking and supports them with planning, implementation and application of information. Through more practical and simplified lens, Gaur (2019) describes the previous consisting of HRM

practices in electronic form, such as selection, performance management, learning, compensation and recruitment. e-HRM is one of the leading organizational systems in HRM and it has recently come popular for big companies and organizations. Practical benefits that the digitalization provides through e-HRM are less paperwork, more accuracy, better responsiveness, more transparency and improvements in the working culture. (80, 83.)

3.3 Recruitment and selection

In the vast field of human resource management, recruitment and selection are one of the most challenging ones. Describing these processes Dessler (2017), Subba Rao (2008) and Torrington and others(2017) agrees, that before the actual recruitment process can begin, human resources need to define the need for specific workforce in the organization in terms of present and future amount of personnel needed. Once those needs have been determined, there needs to be effective ways of attracting the workforce's attention. After these steps the valuation and the actual selection process of candidates can begin. (43-44; 161; 164.) Previous process is illustrated in a figure below (See Figure 3). Recruitment is divided into two methods, internal and external as follows.

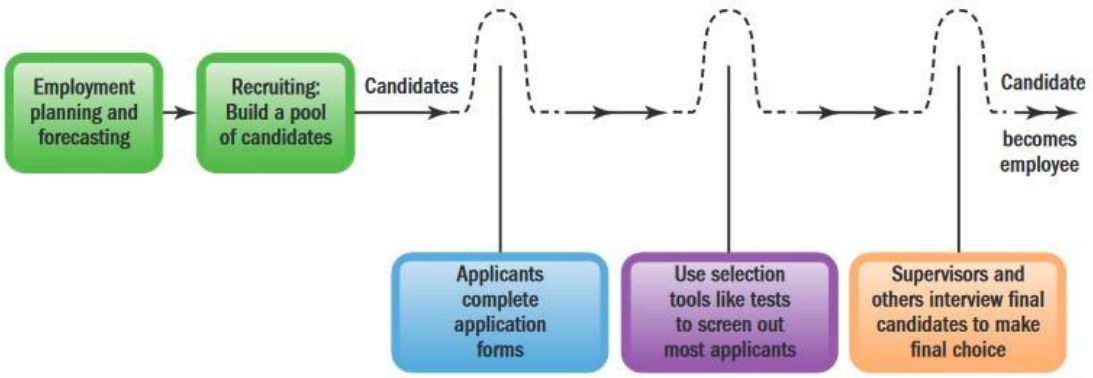


Figure 3. Recruitment and selection (adapted from Dessler 2017, 164)

Internal recruitment

Simply put, Subba Rao (2008, 44-45), defines internal recruitment as filling in vacancies from within the organization's resources. There are benefits for the employer using internal recruitment, such as cost efficiency and time efficiency. Cost efficiency comes from the alternative to not use any outsourcing or advertisement services to gain attention of the free vacancy. Time efficiency relates to the lighter process of informing personnel of the new vacancy and the adaptation of the new person to the position since he/she is already familiar with the organization's culture. (Torrington et al. 2017, 167-168.)

According to Subba Rao (2008), there are also disadvantages of using internal recruitment. Without new personnel outside of the organization, the organization's operations and processes might become inbred and thus affect negatively to innovation and new ideas. (46.) Another point of view from Torrington and others (2017) over disadvantages, is that organizations personnel applying for the vacancy have high hopes of landing the job. This means that in case they do not get selected over an external candidate it might cause negative feelings like antipathy, bitterness and low morale. These feelings could end up affecting the persons view of the employer and his/her capacity of working effectively. (167-168.)

External recruitment

This recruitment method is the second option of executing the recruitment process. Recruiting personnel outside the organization has its own benefits. As one might guess, they are as Subba Rao (2008) states, contrary to the negative effects of internal recruitment, such as gaining new ideas and possibility of more innovative operations. Other benefits include suitable and large candidate pool with knowledge, talent and skill, experience and expertise from other organizations flowing into the recruiting organization and diversification of human resources in the organization. (46.)

External recruitment covers multiple different ways of conducting the process as seen from the table (Table 1) below.

Table 1. External recruitment (modified from Dessler 2017, 174-186; Dessler 2020, 178-190)

Way of external recruiting	**Explanation/Example**
Informal recruiting	Word of mouth, direct approaches
Internet	Applications and websites such as LinkedIn, Monster, Twitter, Facebook
Printed advertisement	newspapers, alongside with sold products
Employment Agencies	Private, public and non-profits
Recruitment Process Outsourcers	Manpower, IBM
Headhunters	Persons who seek executives for an organization to hire and take percentage as a fee
Referrals	"Wanted" announcements within the organization, adds bonuses for a hint that leads to hiring
College recruiting	Sending representatives to advertise opening vacancies for graduating students
Internships	People training for the job and evaluated by the employer to see possible potential as permanent worker

One of the most reliable and effective ways of recruiting the right kind of personnel in external recruiting is through informal recruiting (Dessler 2017, 174-175). However, the trend in external recruiting nowadays is through internet. Alongside the trend of recruitment via internet most of the employers are using Applicant Tracking Systems (ATS). These systems help the employers with their recruitment processes, especially in gathering, compiling and managing applicants' applications. (ibid., 175-176; Dessler 2020, 179.) Therefore, previously mentioned trend of recruitment via internet is strongly connected to the potential of AI in recruitment.

Selection process

After the recruitment phase the organization's HR representatives need to start reducing the candidate pool to point out the best ones. This is done by evaluating individuals by person-job fit and person-organization fit. Former means how the individual's skills, abilities, knowledge and competence would fit to the vacancy to be filled. Person-organization fit means how the individual would adopt the organizations' values and integrate oneself to the organizations' culture. (Dessler 2017, 203.)

Conducting an effective selection process and selecting the right person for the job is highly important for the organization. It helps the organization itself to perform better, and save money and time, since one recruitment and selection process for a single vacancy is expensive. It also minimizes the possibility of legal problems when executed correctly. (ibid.) Therefore, successful selection is highly dependent on the quality of the preceding procedure of recruitment.

The proposed futures of selection process could include adapting analytical technological solutions such as AI, that can be employed in HR to assist with screening applications and selecting candidates. This would require HR to be willing to adapt technological solutions to their practices and deliver transparency by informing applicants of usage of e.g. AI based technology in their decision process. (Kaplan & Haenlein 2019, 15-25.)

3.4 Emerging technologies

Emerging, or also known as new technologies, are defined by Bai & Liu (2016, 1), to be something that "*improve productivity, create employment opportunities and significantly stimulate economic growth*", while developing towards a phase, where they could be taken into use as in professionalized technology. Commonly used tool to analyze business decisions and marketing efforts related to emerging technologies, is the Gartner's Hype Cycle. Bruun, Jensen, Kristensen and Kjeldskov (2017) and

Wiesniewski (2018), states that the Hype Cycle describes the level of hype upon a certain period of a time, over a technological solution (77; 64). It is divided in five different phases, which are technology trigger, peak of inflated expectations, trough of disillusionment, slope of enlightenment and plateau of productivity as the Hype Cycle design (Figure 4) illustrates. The given technologies are placed on the hype cycle in relation of expectations, time and expected years to mainstream adoption.

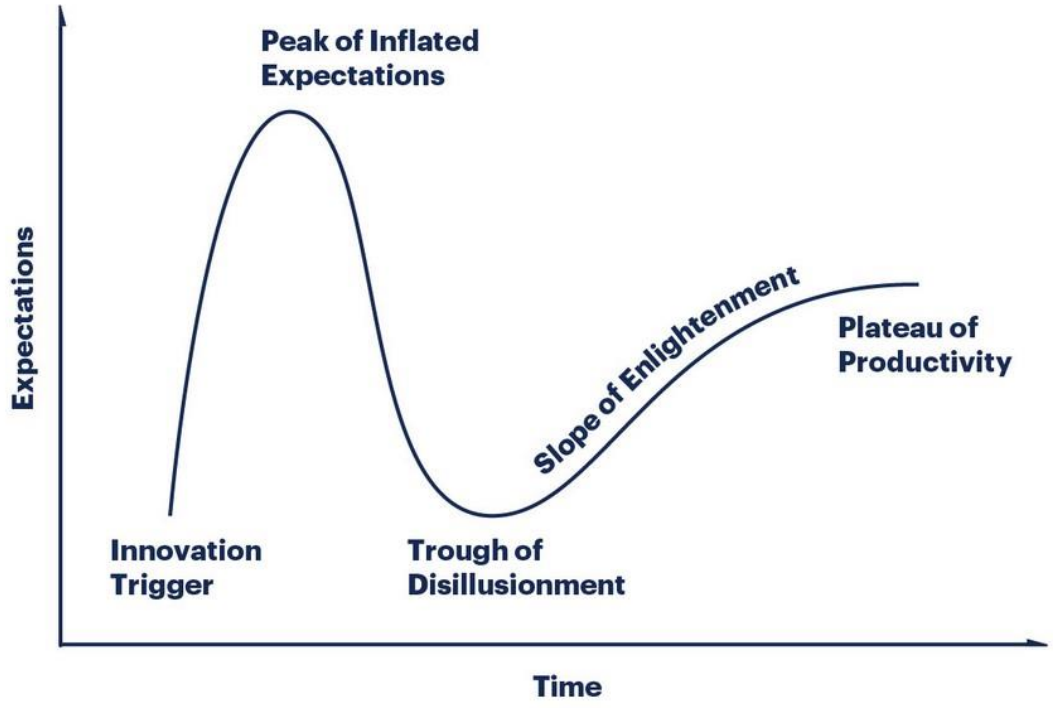


Figure 4. Hype Cycle design (adapted from Gartner Hype Cycle)

In 2018 Gartner's Hype Cycle placed AI related technologies such as AI PaaS (Artificial intelligence platform as a service), conversational AI and edge AI within innovation trigger phase. All three AI related technologies were given the position to be 5-10 years out of mainstream adoption. When examining Gartner's Hype Cycle, it is to be noted, that a single technology is always affected, positively or negatively, by other

emerging technologies and therefore the estimation of years to mainstream adoption should be examined critically. (Fenn & Blosch 2018.)

3.5 Artificial intelligence

Artificial intelligence as a science is a large concept and therefore it is important to understand the scope how and what extent it is included in this study. According to Shi (2011, 1), the short definition for AI is "*Artificial intelligence (AI) is usually defined as the science and engineering of imitating, extending, and augmenting human intelligence through artificial means and techniques to make intelligent machines.*" 'A' as in artificial, referring to something that is being simulated or made by humans, not by nature (Your Dictionary, 2019). While 'I' as in intelligence, meaning one's capabilities to understand and adapt to the environment and apply knowledge to solve problems (Shi 2011, 9).

Comparing natural human intelligence and artificial intelligence, AI tries to imitate extend and augment human intelligence. It tries to achieve this goal by artificial means and techniques to accomplish certain machine intelligence. AI as a model of science focuses to relieve human physical and mental labor and support humans with problem solving by utilizing computational models of intelligent behavior, develop computer systems with reasoning, learning and decision making and solve complex problems, that normally only human professionals can solve. (Shi 2011, 1, 9.)

These definitions serve as general introduction to overall tenets of AI. Within this study the discussion focuses on the relation of relevant dimensions of AI to HRM and recruitment. Just to understand where AI as in its own form of science takes place in relation to other similar scientific areas, please have a look on the Placement of AI on the next page (Figure 5).

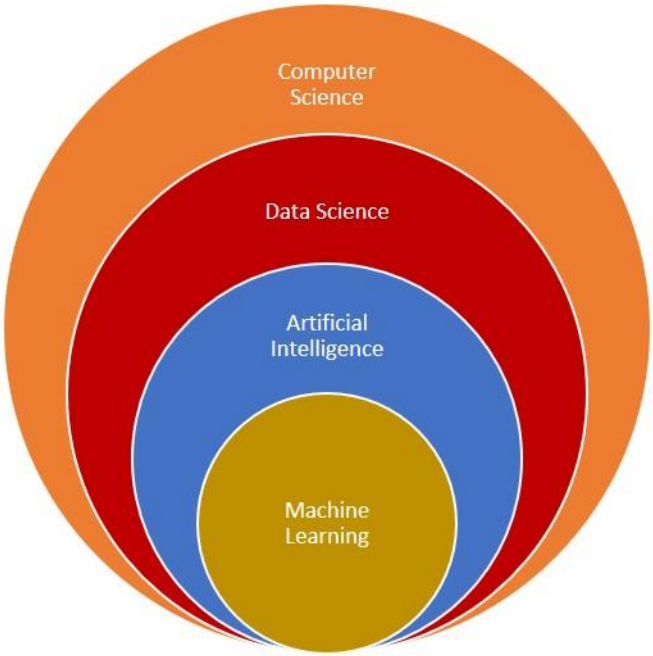


Figure 5. Placement of AI (modified from Elements of AI, 2018)

Above illustration (Figure 5) distinguishes AI from its sub science of machine learning and from umbrella sciences of computer science and data science. According to Aziz and Dowling (2018), Machine learning differs from AI in the way, that it concentrates more on the learning pattern techniques as a form of science. Machine learning usually involves human decisions in manual data identification and testing, done by the data scientist. AI on the other hand concentrates more on combining machine learning techniques and other requirements, while involving other additional techniques on the side. (35.) So, it could be argued that if the human interaction is extracted out of a combination of machine learning processes and it would operate and develop individually, it could rather be called an AI process.

3.6 AI in recruitment

In this subchapter the very essence of this thesis is examined. AI in recruitment combines previously processed information of Artificial intelligence (Chapter 3.5) with Recruitment and selection (Chapter 3.3), while its emphasis being on external recruitment and selection. Like previously mentioned in Chapter 1.3, AI in recruitment is a rather new field in recruitment processes as past studies indicate. Despite its newness, general information and research upon AI in recruitment is constantly growing. To illustrate this pace of information growth the author decided to do a small google search experiment during the thesis process. Search was done in google and google scholar search engines with the same search word of "AI in recruitment". The table below (Table 2) illustrates the monthly search results from February to April.

Table 2. Google search results

18.2.2020	Google	38700
	Google scholar	46
18.3.2020	Google	44900
	Google scholar	51
18.4.2020	Google	52700
	Google scholar	56

In today's recruitment markets there are software's that use AI based solutions to help employers to scan for best possible candidates out of the enormous amount of applications. In-fact, this is one of the most used form of AI solutions in todays' recruitment. Couple examples of such software's are Textkernel and SAP's Resume Matcher. Textkernel can quickly scan through thousands of job applications and Resume Matcher compares applicants resume to given job description and Wikipedia entries of that job, enabling it to rank applicants by their person-job fit. (Dessler 2020, 180.) IBM's AI platform Watson is also used as a recruitment tool. According to

Zielinski (2017, 64-65), Watson assists managers to choose candidates more efficiently by estimating the difficulty of filling in a job, prioritizing positions, predicting candidate success rate and improving communications with the applicants.

There are also AI based chatbots that can help human resources in candidate screening and selection. According to Vardarlier and Zafer (2020), Mya is the industry leading AI chatbot which helps businesses and candidates with the job interview process. It asks realistic questions from the candidates to assess their appropriateness to the position by natural language processing and machine learning techniques. Mya can automate the recruitment processes by going through thousands of CV's and select the most suitable candidates out of them. (363.)

The current spread of AI based solutions in organizational recruitment is low. Recent study of Brazilian and multinational companies by Jatoba, Gutierriz, Fernandes, Teixeira, and Moscon (2019), with a dataset from 2000 to 2018, shows that the use of AI in companies is currently low and the concepts of AI applied to HRM needs to be clarified. According to their research, the reasons for low usage of AI are high costs, need of specialized teams and that the organizational culture is not ready for such changes. (96-102.) Another recent study from the United States supports the low integration rate of AI in recruitment. According to Tambe, Cappelli, and Yakubovich (2019), only 22% of firms use analytical tools in their HR operations. The research compares higher rates of advancements in different areas such as health care, automobile industry and marketing compared to management of employees. Reasons for this, was identified being data challenges from HR operations, fairness and legal constraints, employee reactions towards AI based management and overall complexity of HR phenomena. (1-16.)

Regardless of the early stage of development of AI in recruitment there are visions of the future benefits what AI could create. According to Zielinski (2017) and Vardarlier

and Zafer (2020), some features that AI already has in general, or is estimated to improve in the future, are things like facial recognition and voice recognition. By these means, the AI can scan the candidates for their facial expressions or tone of voice, to analyze their behavior during video interviews. (65; 363.)

There are contradicting estimates of what the practical use and benefits for AI supporting the recruitment might be, while on the other hand, there seems to be common ground upon the bias it might cause. According to Dessler (2020), Schatzker (2019) and Zielinski (2017), the AI will follow human based decision making from the data it scans, so if there have been regularities between the recruiting and selection, AI will keep emphasizing these features and repeat the decisions made in the past. This is what the human decision making needs to consider while utilizing AI based tools in recruitment. (180; 30; 64-65.) Tech trends (2020), agrees generally on AI that it is planned to be designed to overcome human error, but the reality is, that an algorithm is only as good as the data it has been trained on. In 2020, technology companies are expected to be more aware of bias problems related to AI. Therefore, it is likely for technology companies to manage AI bias by in-house or outsourcing their AI bias problem solving. Either way, public and government concern over AI bias is expected to grow so technology companies will need to adjust their AI strategies in order to stay competitive and compliant. (23-26.) No matter how the problem of AI bias will be dealt with, it is highly important for organizations to learn from past mistakes, such as the Amazon's AI biased recruiting case. Learning from history could create the possibility to seek for an answer to avoid biases and perhaps create even better diversity (Dastin, 2018).

3.7 Synthesis of the knowledge

As illustrated in Parallel contexts (See Figure 2), the theory context within this study is overlapping between the different focal points. To understand AI in recruitment as a phenomenon, it is highly important to understand its relation to other contexts from theoretical point of view. Though every section brings its own part of knowledge to the whole body of knowledge, technology business and AI in recruitment has been differentiated as their importance and relevance to this study.

By a recent scientific journal of Nawaz (2019, 488), it is pointed out that previously published academic journals have no systematic literature review on AI in recruitment. This information also supports that a holistic view over the literature within a single study dealing with AI in recruitment is important and needs to be examined carefully in relation to the study's purpose as well with methodological and theoretical environment.

Table 3. Relations of knowledge

	Primary knowledge	Secondary knowledge
Research question 1	• Chapter 3.3 • Chapter 3.5 • Chapter 3.6	• Chapter 3.1 • Chapter 3.2 • Chapter 3.4
Research question 2	• Chapter 3.3 • Chapter 3.4 • Chapter 3.5 • Chapter 3.6	• Chapter 3.1 • Chapter 3.2

The table on the previous page (Table 3), illustrates the important subchapters in this literature review from two different focuses, primary and secondary knowledge related to the two research questions. When examining the first research question of technology businesses current usage of AI in recruitment, the organizational culture comes in as a major factor. According to the Technology Adoption Life Cycle (TALC) model (See Figure 6), businesses that are more like minded, to adapt new technological solutions to their existing operations are so called innovators or early adaptors. Due to this reason, businesses that were more likely to be innovators and early adaptors were the preferred targets for this study, i.e. international technology businesses. Justification for the targeted businesses were the same when examining the second research question. The knowledge of the TALC model will be used for illustrative purposes to support the conclusions later in chapter 5.1.

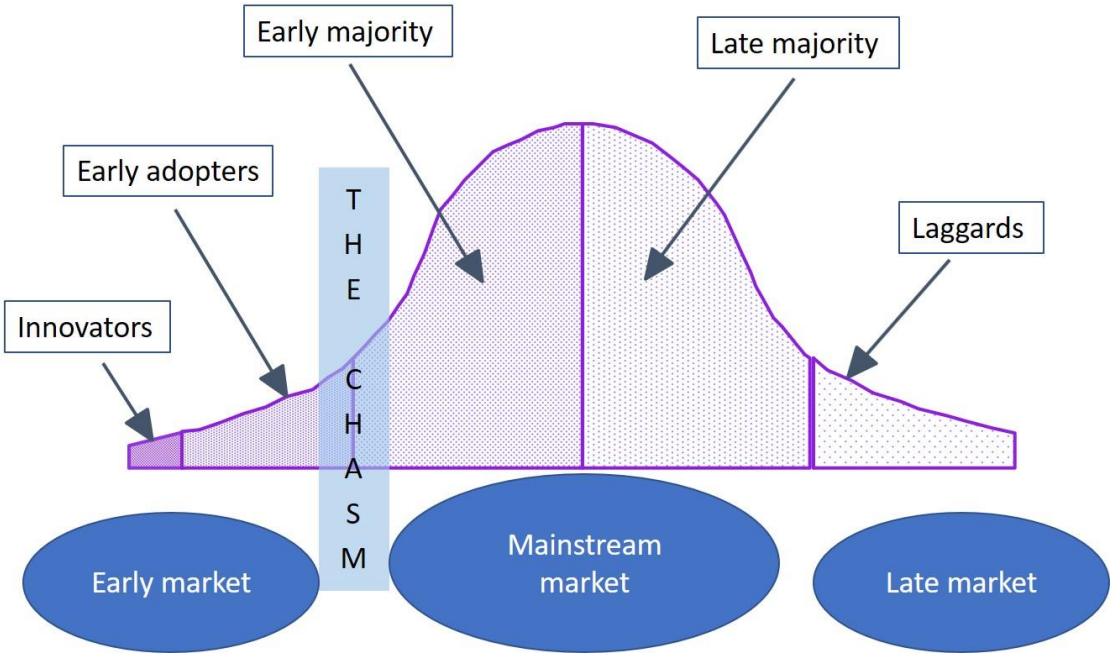


Figure 6. TALC model (modified from Moore 2002)

4 Results

This chapter provides information on the interviewee profiles, the questions that were included in the interviews and the summary of the results that were found after analyzing the data. Structure of the conducted interviews can be found from the end of this study (See Appendices 3 and 4).

Structure of the preliminary set of questions were divided into three parts having three different focal points. First part focused on setting up a picture of the participants awareness of the subjects discussed. Second part included questions about the current usage of AI solutions in recruitment and the reasons behind decisions related to the answers. Therefore, the second part was dedicated to give answers to *research question 1*. Third part was heavily focused on getting the subjective description from the interviewees about the pros and cons of the future recruitment related to AI solutions. Logically, the third part was meant to give answers to research *question 2*. As stated in the methodology chapter, collecting and analyzing the data in a qualitative study would need to be a simultaneous process for the researcher to be able to achieve a high-quality saturation point. This also refers to the researcher's ability to be credible with the analysis methods and findings related to the presented results. Therefore, after conducting and recording every interview the author made transcripts and coded the transcript data with open coding to point out the relevant sets of data. This enabled the author to adjust some of the additional questions to be asked from the next interviewee. Reason behind this was to find the most suitable questions that would enable the most relevant answers related to the research questions. This way the academical credibility of the forthcoming results was made possible. Previously explained process is illustrated in the figure on the next page (See figure 7).

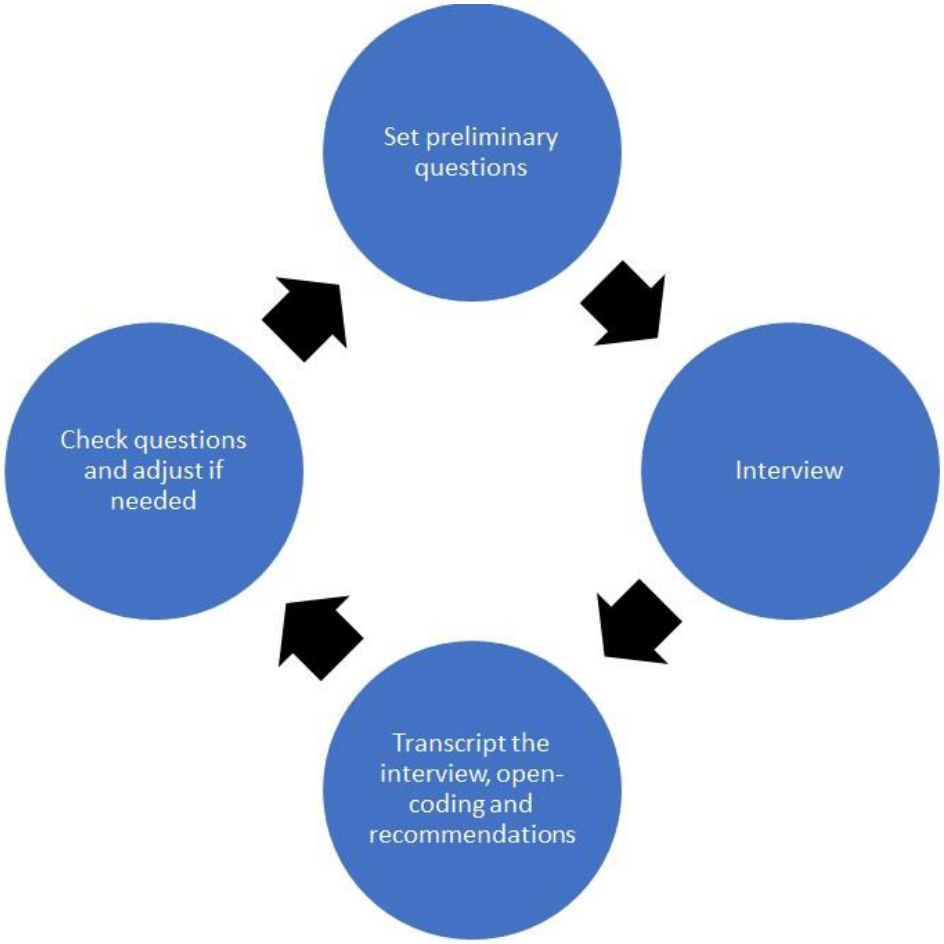


Figure 7. Data collection and analysis process

For the samples to be in line with the research questions the sampling unit for these interviews were international technology businesses and the observational unit the company's executives, HR or IT-personnel. First three interviewees were acquired by randomly e-mailing management from international technology businesses located in Finland. As the interviews progressed, the author was able to narrow down towards the most relevant participants based on the information obtained from the previous interviews. Sampling for the rest of the interviewees were acquired mainly by snowballing. Total amount and more detailed participant profiles are illustrated on the next page (See Table 4). Interviewees are numbered in chronological interview order.

Table 4. Participant profiles

Title	Responsibilities and experience	Company size (SME/Large) and internationality	Length of the interview (min)
Interviewee 1 **CEO**	CEO, CTO, CFO and COO responsibilities. 4 years of experience as CEO.	Small; Europe	41
Interviewee 2 **Talent acquisition manager**	Global recruitment. 15 years of HR experience.	Large; Global	39
Interviewee 3 **Talent sourcing specialist**	Global talent management and tech recruiting. 10 years of HR experience.	Large; Global	48
Interviewee 4 **HR Business Partner**	Management, executive support, recruiting responsibilities. 5 years of HR experience.	Large; Europe	44
Interviewee 5 **Project Manager**	Resourcing and recruiting responsibilities. 7 years of HR experience.	Small; Europe	55
Interviewee 6 **Talent acquisition manager**	EMEA recruitment. 16 years of HR experience.	Large; Global	30
Interviewee 7 **Business development director**	Sales management and CEO duties. 5 years of sales management experience.	Small; Europe	38
Interviewee 8 **Chief growth officer**	Product Owner, Business and tech business partnerships. Developer experience for 9 years and 15 years in the field of e-recruitment.	Small; Global	46

Previously mentioned phase of open coding generated so much information that it was decided not to illustrate open codes in total. Examples of open coding the transcripts can be seen from Appendices (See Appendices 5 and 6). Following subchapters present the findings in two different themes related to the research questions. These themes present the axial coding lists, categorization and the end results related to the theme. Direct quotations from the interviewee's views of the future recruitment process can be seen in the end of theme 2 results.

4.1 Theme 1: Current situation

After conducting and analyzing all the interviews and the transcripts related to them, the author was left with a lot of text documents labelled with small open coding notes on the side of the transcripts. As a logical next step, the number of codes were reduced by grouping and identifying those with strong relation to the research questions. The results of this part of coding with the citations and the corresponding codes from each interviewee are presented below (See Table 5).

Table 5. Axial coding list theme 1

Theme 1	Citation	Code
I1	We are going to outsource our recruitment because we know we do not have the resources to totally control it by ourselves.	Lack of resources
	The stabile state of the business. Therefore there has been no recruitment needs.	No need
I2	My hope is that AI could be included more in this job but then again we face the investment side of it and the question of affording them, is there even a possibility resource wise?	Investment size
	We are looking for lightening our manual work in recruitment through ERP systems. I have not heard of AI related recruitment system that would solve this manual workload problem. We are not against one but the question is that when it would be possible and when we would find one.	Decrease manual workload
I3	Main reason for not using AI for us has been our recent changes in recruitment. These internal issues have had influence on the decision of not executing all changes at once. What I have been discussing internally my understanding is that we relate to these issues positively.	Focus and investment related
	It is a hot topic. I have heard of some practicalities as well but my understanding is that it is in a quite early stage still. When talking about large recruitment volumes AI will have significant time and expense benefits.	Resource efficiency
I4	Our recruitment works well at the moment. We have thought about a chatbot but there are other goals of development at the moment so AI has not been a priority.	Traditional methods
	I have to say that I have not familiarized myself with AI in recruitment as well as I should. If AI would be taken in use it would need to be clear at that point what are we dealing with, because I have read texts behalf and against it.	Lack of knowledge
I5	At the moment we conduct our HR very traditionally. CV's to e-mails and so forth.	Traditional ways
I6	Usage of AI in recruitment varies a lot. I see that the rate of usage is a lot dependent of the organization. Based on the need, for some it might be more useful than for others.	Organization and need dependent
	At the current crisis situation (Covid-19) it is hard to tell are we going to pilot AI this or next year. Different possibilities are going to be tested. At the moment focus is a lot in other things.	Situation and need dependent
I7	In Finland the usage is quite low, even in parts of international markets. It is a hot topic but terms are often mixed that something includes AI but instead it is just ML based system.	Lack of reliable information
I8	It is a hot topic and there is a lot discussion how it can be utilized in recruitment. Most common cases propably relate to CV screening.	Screening
	In the international markets there are some suppliers of AI solutions in recruitment but not much in Finland. Propably the difficulty of purchasing and the thought of carefulness towards such solutions is one of the reasons why it has not had a good start. Uncertainty is propably a major factor.	Availability and adaption
	We use AI matching which is basically CV screening. Then we have a patented NLG (nature language generation) solution in use in our feedback system. Then we have also a "competence community" where an applicant can leave their contact information and CV.	Screening and matching, automated feedback, competence reserve

After the codes were grouped and identified to smaller numbers, they needed to be categorized into a simpler and more representative form. Therefore, the decision was made to use colors to group similar codes. After the grouping they were given a new category name that represented the codes in a new group. In the table below (See Table 6) the arrow points to the color-coded categories which match to a certain code with similar color.

Table 6. Categorization of codes theme 1

Theme 1	Code		Category
I1	Lack of resources		Pleased with traditional methods
	No need		
I2	Investment size		
	Decrease manual workload		Lacks the knowledge of AI systems
I3	Focus and investment related		Need and investment related decision
	Resource efficiency		Would minimize manual workload and optimize resources
I4	Traditional methods		Efficiency in form of screening and matching
	Lack of knowledge		Improvement of candidate experience through feedback automatization
I5	Traditional ways		Communication improvements through competence community
I6	Organization and need dependent		
	Situation and need dependent		
I7	Lack of reliable information		
I8	Screening		
	Availability and adaption		
	Screening and matching, automated feedback, competence reserve		

Last categorization was made between the current usage (*uses AI or does not use AI*) and the reasons behind current or possible usage (*reasons against, contemplating and reasons on behalf of*). This enabled to illustrate the findings of current usage from two different angles under one simple chart (See Table 7).

Table 7. Results theme 1

<table>
<tr><th></th><th>Does not use AI</th><th>Uses AI</th></tr>
<tr><td rowspan="2">Reasons seen against the use</td><td>Pleased with traditional methods</td><td rowspan="2"></td></tr>
<tr><td>Lacks the knowledge of AI systems</td></tr>
<tr><td>Contemplating between on behalf of and against the use</td><td>Need and investment related decision</td></tr>
<tr><td rowspan="3">Reasons on behalf of the use</td><td rowspan="3">Would minimize manual workload and optimize resources</td><td>Efficiency in form of screening and matching</td></tr>
<tr><td>Improvement of candidate experience through feedback automatization</td></tr>
<tr><td>Communication improvements through competence community</td></tr>
</table>

4.2 Theme 2: Future foresights

Same coding procedures were followed with results of theme 2 than what was done with theme 1. Meaning, the number of codes were reduced by grouping and identifying codes with strong relation to the research questions from the original transcripts. Due to the abstract nature of the questions related to future foresights of AI in recruitment, the answers were very informative and comprehensive in nature. Therefore, the coding is illustrated in two separate tables following the next two pages (See Tables 8 and 9).

Table 8. Axial coding theme 2A

Theme 2	Citation	Code
I1	History based recruitment has been focusing on concrete records. This might leave the gap of hidden potential unnoticed which AI could cover.	Hidden potential
	Grouping and profiling right personnel for the business would propably be faster and more efficiently done with AI.	Improvement in profiling
	If the decision making is at the point that the meeting with the candidate needs to take in place, I do not see that AI could be used in this situation.	Human contact
	If the company's operative environment changes or they are facing a threat, exceptional persons in the organization could be helpful. Therefore too optimized AI analysis could be a bad thing.	Lack of diversity
	There should be a background process of recruitment ongoing all the time that would not be similar to the present recruitment model which starts and stops. AI could have predicted the needs of the organization with this continuous background process in advance.	Predictivity
I2	Only motive that I can think of is that if it could release resources to something more important through reducing manual workload.	Decrease manual workload
	We could definitely teach AI to look for certain type of people. Then it could pick suitable persons based on their CV and when it notices some missing information from this person, it could possibly send some additional questions for these candidates and evaluate, if it would be worth to proceed with the candidate. After this it could send an invitation to interview or send a request to HR-personnel about HR-valuation.	Streamline the recruitment process
	Maybe partly some emotional interaction. What I understand about artificial intelligence is that we are still quite far away from that. Some kind of "human touch" is still needed for it. Many applicants could consider this still as quite cold approach.	Human interaction
	Time efficiency in the future that communication within the recruitment process would be automated.	Time efficiency and automatization
I3	Pragmatically we have a lot of work which will save a lot of time, effort and resources when automatized.	Resource efficiency
	I also see AI's benefits being on how are we able to predict the future. So predictivity is one thing that it bring to us.	Predictivity
	First screening of the applications and scheduling amongst other phases in the beginning of a recruitment process could be done by AI. This automation could enable the recruiters to focus more of their time for other important tasks.	Streamline the process
	Though, the last phases with valuations and interviews are still done through human interaction.	Human interaction
	There is always ethical questions related to recruitment. Many biases could be tackled with AI but on the other hand all ethical questions are not that linear.	Ethical issues
	The future recruitment process would include a feature where all routine-like tasks would be done by a machine. The kind where the recruiters expertise would not be needed.	Streamline the process
I4	Saving time when having large volumes and amount of applications . Also decreasing manual HR work when those resources could be saved for more important HR tasks.	Efficiency and optimization of work
	I mentioned earlier about that there has been research of AI discriminating some applicants, that could also be a possibility that it could decrease discrimination.	Discrimination
	Does the company have enough resources to take it in use when considering time and money issues?	Return of investment
	How companies think about the human contact, does it always need to be in there or not?	Human interaction
	Overall, I would describe future recruitment process in a way that it would be as easy as possible for the applicant. For recruitment processes, AI could seek for example based on CV's for the best possible candidates and at the same time take everybody equally into account. After this, it could give a recommendation whom to interview while this information being reliable.	Streamline the process

Table 9. Axial coding theme 2B

Theme 2	Citation	Code
I5	One of the motives that is possibly not even that far away in the future, would be to make recruitment process easier since it is not easy, quick or cheap at all.	Lighten the process
	Oh, threats and barriers could have something to do with data protection and personal data issues.	Data security
	The recruiter might think that the person needs to be seen face to face and not let the AI make decisions. Also the feeling about the person. They might be very valid on paper but then the recruiter gets the bad feeling about the chemistry.	Human interaction
	In future, recruitment will definitely be more efficient and targeted.	Efficiency and targeting
	AI could create a profile out of the previously targeted persons and make a comparison that should we use this or that method. So analyzing these chosen methods based on the information history.	History based analysis
I6	Some need the human contact that they can discuss face to face and others are fine with these anonymous, MeetFrank style solutions.	Human interaction
	It is difficult to estimate that does the culture change through future generations consumption behavior or does the current generations change their ways consuming.	Behavioral consuming
	Would the AI solution offer additional value and is that about enhancing candidate experience (transparency, speed etc.) or is it just answering more to the needs of the organization?	Added value
	Data security is a clear threat. GDPR issues and people seem to be more sensitive about these issues.	Data security
	Question of the future seems to be when consumers and candidates are ready to adopt a new software. Overall, automatization of the early phases of recruitment will be a no brainer.	Streamline the process
	Also what will be emphasized is the quality and success rate of predictivity.	Predictivity
	Lastly I would mention what relates to diversity is about anonymous applications. Meaning, that certain personal information is removed which aims to objectify manager's decision making to prevent prejudices and biases.	Ethical issues
I7	For technology businesses recruitment plays constantly bigger role since shortage of applicants and workforce is high. Still recruitment is seen as an expense in many organizations, so AI could be seen as a clear motive because it would streamline the process.	Streamline the process
	If the early phases of recruitment can be made easier the benefit is clearly financial.	Efficiency to value
	Laws might be breaking down the development pace.	Law issues
	As AI solutions become wider implemented and in its early stages there are problems related to it, people might not give it a second chance that easily and the development might slow down because of this.	Culture
	Especially through artificial intelligence, I believe that the recruitment process will be more weighted to conversational practices where the employer and employee will try to identify the match between each other.	Identification of fit
	Even though the human contact decreases from the early phases of recruitment its meaning towards the end of the process increases.	Human interaction
	In the future the potential is recruited with a larger vision. The AI solution that will break the bank will be very versatile.	Predictivity
I8	Applying will change from the world of CV's more towards of getting the information in an alternative way for example through gamification.	Candidate experience
	As a motive there is also predictivity and forecasting becoming more accurate through artificial intelligence.	Predictivity
	As a barrier I see law issues directly.	Law issues
	AI bias and human bias can be an issue.	Ethical issues
	Old traditional "person-culture fit" could go more towards "person-culture add" direction in the future of recruitment.	Culture
	AI could alarm if the personnel starts to be too similar to each other and inform if some personality or competence is missing. This sort of predictivity which would answer to "where are we going" and "where we should be going".	Predictivity

After the second round of coding the results still left a lot of messy data compared to theme 1 results. It is recommended that the number of categories should be manageable and that the less categories there is, the easier it is to communicate the results to others (Merriam & Tisdell 2016, 214). Despite this fact the author decided to stick with 8 categories due to the relevancy of the information provided by the interviewees related to the research question 2. To simplify the results into two clearly distinctive categories of positive (green) and negative (red) views, the codes and the corresponding categories were color coded. Categorization of the codes to a more manageable amount of information is illustrated in the table on the next page (See Table 10). To avoid confusion, no lines were drawn to point out the individual code to category match. Instead one large arrow was inserted to point out the change from codes to categories with the color coding like in Table 6.

Table 10. Categorization of theme 2

Theme 2	Code	Category
I1	Hidden potential	Resource efficiency and optimization
	Improvement in profiling	
	Human contact	
	Lack of diversity	
	Predictivity	
I2	Decrease manual workload	Predictivity
	Streamline the recruitment process	
	Human interaction	
	Time efficiency and automatization	
I3	Resource efficiency	
	Predictivity	
	Streamline the process	
	Human interaction	
	Ethical issues	
	Streamline the process	
I4	Efficiency and optimization of work	Streamline and support the traditional process
	Discrimination	
	Return of investment	
	Human interaction	
	Streamline the process	
I5	Lighten the process	Consumption behavior and culture of adaption
	Data security	
	Human interaction	
	Efficiency and targeting	
	History based analysis	
I6	Human interaction	Ethical issues
	Behavioral consuming	
	No new categorial codes from here onwards	
	Added value	Data security and law issues
	Data security	
	Streamline the process	
	Predictivity	
	Ethical issues	
I7	Streamline the process	Human interaction
	Efficiency to value	
	Law issues	
	Culture	
	Identification of fit	
	Human interaction	
	Predictivity	
I8	Candidate experience	Resources vs. value
	Predictivity	
	Law issues	
	Ethical issues	
	Culture	
	Predictivity	

Lastly these categories were grouped under one simple chart like in theme 1 results. Here the large scale of different views on the future foresights of AI in recruitment is clearly to be seen. The amount of views can be seen from 8 distinctive descriptions of the possible future prospects seen from two different perspectives, positive and negative (See Table 11).

Table 11. Results of theme 2

	Future foresights
Possibilities	Resource efficiency and optimization
	Predictivity
Motives	Streamline and support the traditional process
	Consumption behavior and culture of adaption
Threats	Ethical issues
	Data security and law issues
Barriers	Human interaction
	Resources vs. value

The last question that was asked from all the interviewees was "*How would you describe the recruitment process of the future which includes AI-based solutions?*". Answers to this question had a lot of similarities with the answers to the questions of future positive and negative scenarios related to AI in recruitment. Some of the illustrated direct quotations were the same that can be found from the theme related coding lists. Answers that were described to have the most meaningful impact with AI in the future are listed next with the identification numbers of the interviewees.

I4: "*Overall, I would describe future recruitment process in a way that it would be as easy as possible for the applicant. For recruitment processes, AI could seek for example based on CV's for the best possible candidates and at the same time take everybody equally into account. After this, it could give a recommendation whom to interview while this information being reliable.*"

I6: "*I think that in the big picture the handling of CV's will disappear. The interviews in the first phase will be automatized and AI will be able to do strong recommendations based on those interviews.*"

I7: "*If we go to the future, for example 5 years from now, I believe that it is way different from what it is now. I think that the future artificial intelligence in recruitment will be a combination of things that are already in the market. This future AI could include virtual head hunting, a chatbot and perhaps some sort of recruitment assistant.*"

I8: "*I have seen that when the paper CV's went online the question was that can e-mail address be asked as an obligatory information? So, if this is the development curve, I would not believe that this is going to explode soon. Though this subject is sophisticating all the time and I think the gamification is an interesting thing in recruitment in the future.*"

5 Conclusions and discussion

This chapter provides the observation and discussion of how the research questions were answered and illustrative tools for conclusions that were generated from the end results. Further on, research quality and process are assessed with reliability and validity factors followed by limitations of this research. Lastly, recommendation for future research is provided.

5.1 Answering the research questions

As the title of this study describes, the focus of the study was on potential of AI assisted recruitment. It felt necessary for the author first to investigate the current status of usage of AI to be able to explore the future foresights by the given answers. Therefore, the author reasoned that the angle taken with the set order of the research questions was important when approaching future-oriented research. The

perception of the connection between the study's research objectives and questions, literature review and research results should become holistic at this point, as the importance of it was mentioned before in chapter 3.7.

Generally, the research objectives were met, and the research questions were answered comprehensively. The abstract nature of the subject created answers that were way more descriptive than the author could have anticipated. As the interviews progressed some patterns were instantly visible, and some were harder to detect. The saturation point started to show signs with the interviewee 6 as can be seen from the chapter 4.2 (See Table 10).

5.1.1 At what extent is AI being used in recruitment processes in the field of technology businesses?

Simply put, the great majority of the participants reported that the business they represent does not use AI in their recruitment processes. Only one participant reported using AI in recruitment and was able to provide information on the question of why it is being used. Since the field of AI in recruitment is rather new for any field of businesses, the results for research question 1 was not that surprising.

Overall, based on the research data it can be stated that the current usage of AI in recruitment processes in the field of technology businesses is low. Even though this result is based on a qualitative research with a sample of 8 interviewees, it confirms the information provided by Jatoba and others (2019) and Tambe and others (2019) in the literature review. After making the data analysis and illustrating the findings, the author decided to make two simplified figures (See Figures 8 and 9) to illustrate the results in a more practical way of answering the research question 1. First figure (See Figure 8) explains the reasons for AI usage in the representative's organization who uses AI in recruitment and the features that it enables for the organization. Second figure (See Figure 9) illustrates the rest seven representatives that reported not using AI in recruitment and their reasoning behind foreseeing AI usage in the future

or seeing it not worth of pursuing. Connectivity of the TALC model was attached to the second figure (Figure 9) to clarify the relationship between the results of status of usage, reasoning and the foresight of adapting a new solution.

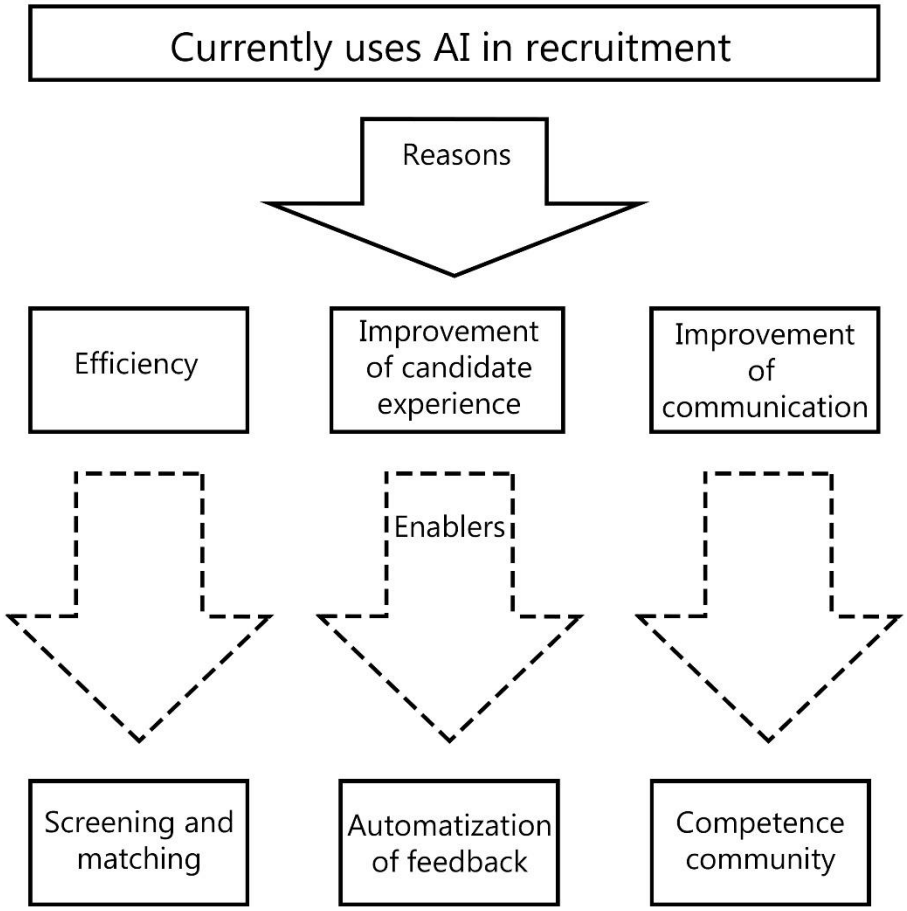


Figure 8. Using AI in recruitment

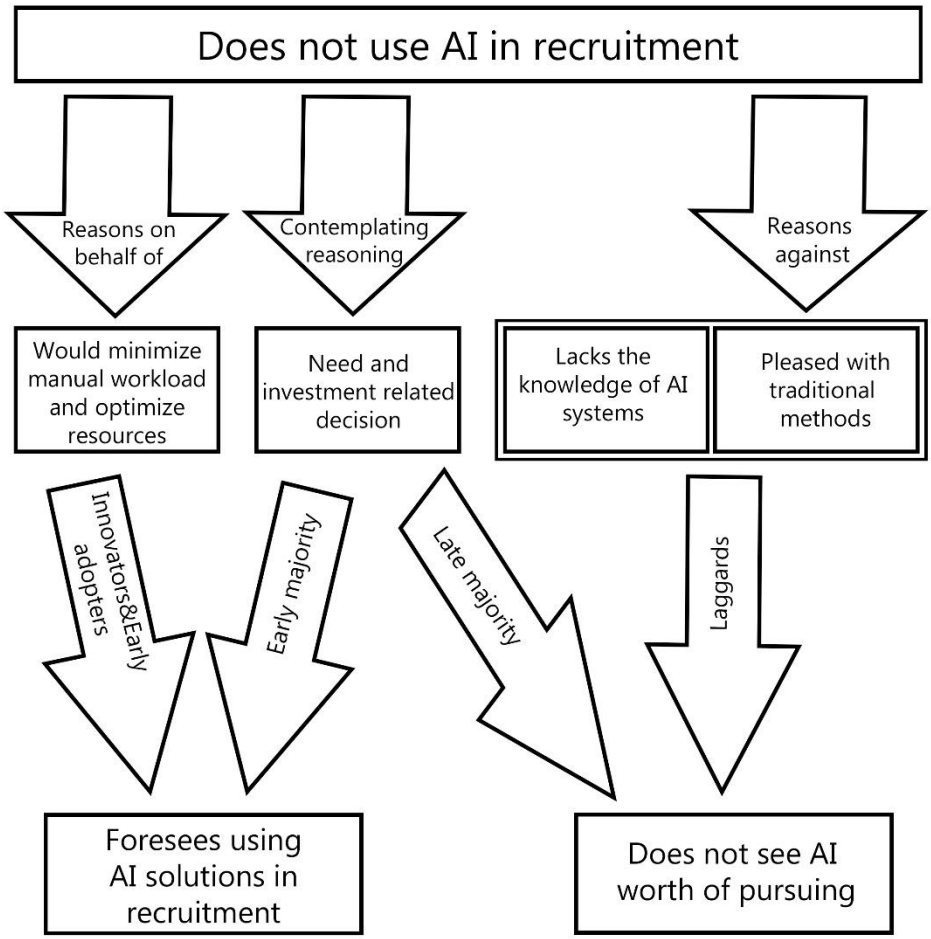


Figure 9. Not using AI in recruitment

The research questions were set at the beginning of the thesis process without any assumptions from the author about the outcomes of the results. When setting up the interview's preliminary questions the author wanted to cover attitudes and reasons behind these decisions, not just the fact that does or does not some technology business use AI in their recruitment. Answers to these reasons and attitudes related to the research question 1 were an additional research result of theme 1 (Figures 8 and 9).

5.1.2 What are the future threats and possibilities for AI in recruitment in the field of technology businesses?

According to the data, the future of the AI solutions in recruitment was seen by the representatives of technology businesses in a more positive than in a negative light. Resource efficiency and optimization of work was experienced to be the most important and likely possibility for AI to add into the field of recruitment in the future. Streamlining the traditional process was described to have the most meaningful impact for being the motive to change from traditional recruitment to AI based solutions. Data security and law issues were seen becoming the major threat and the lack of the human interaction as the most impactful barrier. The concern over the threats and barriers are in line over a recent webinar by Julin (2020), which is about the legal constraints concerning automated decision making and profiling. Based on the complexity of the legal issues they could indeed become a major threat for the broader adaption of AI assisted recruitment. Previous findings confirm the information provided by the literature of Kaplan and Haenlein (2019), about the proposed futures of transformation in the selection process (Chapter 3.3) and which can also be seen from relations of primary and secondary knowledge in the literature review (See Table 3) regarding the research question 2.

Overall, the future of the recruitment field was seen to be very different from what it is now. While the perception of the time span for achieving such future varied between the interviewees, as can be seen from the direct quotations (See Chapter 4.2). The traditional ways of conducting recruitment was seen to be stepping aside and the technological solutions reforming the HR-industry in the coming years. Technological changes were experienced to be massive in long-term, but it was emphasized that the human interaction and decision making was not seen to be going away totally. Additional human related focus was on candidate experience that was seen to be one of the major drivers of developing automated recruiting systems. Automatization of the manual processes were seen to be changing quickly and in the long-term predictivity was seen to be deal breaker.

The results also confirmed the commonly viewed future concern of possible AI bias that was stated the literature (See Chapter 3.6.). The second future foresight that was mentioned in the literature review was the progress of AI facial and voice recognition used in the video interviews. This was quickly mentioned by couple of the interviewees, but it did not stand out clearly from the emphasis they made. Therefore, this vision was neither confirming nor contradicting the information from the literature. In fact, there was no clear contradiction in any information provided by the literature review in relation to the results of the study's research questions. All together the amount of academical literature on the view of the future foresights was quite narrow and the results of this study gave a lot more insights to the possible outcomes of the future than it was anticipated. Based on the comprehensive and very descriptive answers by the interviewees, it can be said that the research question 2 was answered more thoroughly than expected.

5.2 Assessment of research quality and process

5.2.1 Reliability and validity criteria

In this study, the used methods were thoroughly explained in the methodology chapter and followed through the whole thesis process as such. The reliability of this study relates to the author not being dependent on the organizations representatives and the careful follow up of the scientific ethical guidelines when handling the extracted data. The data itself was as valid as possible with the business context area chosen for this study, since for example, arranging representative focus groups for technology business' executives could have been a challenge to be executed within the reserved timeframe for this thesis. The comparison of carefully done literature review with the reliable research findings create the foundation for the quality of the data in this study. Additionally, the author provided as transparent information as possible of the interviewee profiles and added thesis process related documents (See

Appendices) to the end of this study. Regardless of the previous justifications for validity, the technological environment changes constantly and therefore the validity of a future oriented study like this, is questionable.

5.2.2 Reflection of research process

Planning, conducting and transcribing the interviews in total took the most time and effort in this thesis process. The carefully planned preliminary set of questions for the first interview enabled the qualitative research process to evolve towards the end of the interviews. These preliminary questions were formed by creating three different categories before setting any questions, as mentioned at the beginning of chapter 4. On top of these categories it was easier for the author to come up with the actual interview questions and reform them if necessary, as the interviews progressed. The interviews themselves went through easily and the overall atmosphere during the discussions were positive and with some they could have been described to as enthusiastic in nature.

The author considered data analysis as the second most consuming, what comes to the time and effort towards the thesis process. The author should not bring any projections to the data since there is no professional links between the author and the participants or any occupational experience that would have influence on the author's data analysis. Though, the author's strong interest towards technological subjects might cause "pro technological" thinking that could have had a small influence on the choices of words. Protection against biases related to the data was done by simply looking only at the generated data and following the academical instructions for analyzing qualitative data.

The hardest part for the author in the thesis process was to transfer the information of the abstract concept into words and figures that they would be understood in the intended way. Therefore, the aim of producing information that would enable busi-

nesses and further research have value out of this study was challenging. While planning the interviews, finding the balance between ethical issues and representativeness and comprehensiveness was time consuming, since there needed to be the right type and amount of information about the interviewees to be presented in the results. Additionally, achieving enough diversity to the samples, added its own difficulty factor from the ethical point of view during the planning of the interviews.

5.3 Limitations of the research

An abstract future oriented study like this cannot be accurate to give specific results of a single future. What it can do, is provide few possible outcomes but not any truths or percentages of possibilities of a certain scenario. Therefore, the word future could have been used in plural form *futures* in this study, since there are usually many different ones, when examining the multiple future possibilities without any prejudices. The nature of a qualitive study's inductive approach investigating and describing the nature of a phenomenon therefore limits the possibility of generalizing the results and giving exact numbers or predictions of any possible future outcomes. As stated in subchapter 5.2.1 changes in the technological environment are rapid. Thus, collecting valuable data from the field professionals, the lifetime of the validity of that data is short and as a result the reliability of predicted futures questionable.

The generalization of the results with this type of qualitative research cannot be justified. This is because research question 1 would need to be conducted as a large quantitative research to get generalizable results. For research question 2, the problem lies with the future orientation of quickly developing technological solutions and the participant views over those potential solutions, which might change rather quickly as well.

Additional limitation of this study could have been the lack of experience of conducting an academical study since this is the first bachelor's thesis made by the author. It is to be mentioned as well that the author has not professional working experience

from the field of technology businesses and therefore the theoretical stance is purely based on the educational experience of the author's studies.

5.4 Suggestions for future research

The preceding discussion about assessment of the quality and process as well with the limitations of this study indicates that there would be a need for a broader study similar like this one or possibly one with quantitative in nature. Especially, research related to research question 1 would need to be investigated from the quantitative perspective to get a more comprehensive view on the total usage rate of AI solutions in recruitment regionally and globally.

Since this thesis provided estimation of current usage rate of AI systems in recruitment and provided foresights of the possible future of it, this study could be repeated as such in the future, to see if the field of technology business has changed regarding AI implementation to recruitment. Another simple way to repeat this study would be to replace the focused field of business and see if the results change. An action research could also be one option for future research to introduce AI systems broadly to the audience of technology business. By these means the possible future threats, barriers and prejudices of innovative technological solutions could potentially be tackled with a higher percentage.

References

Albert, E. 2019. AI in talent acquisition: a review of AI-applications used in recruitment and selection. *Strategic HR Review, Vol. 18,* 215-221. Accessed 15 January 2020. Retrieved from: https://www.emerald.com/insight/content/doi/10.1108/SHR-04-2019-0024/full/html

Aziz, S., & Dowling, M. 2018. Machine learning and AI for risk management. In T. Lynn, J. Mooney, P. Rosati and M. Cummins (Eds.), *Disrupting Finance*. Palgrave Pivot, Cham, 36. Accessed 20 November 2019. Retrieved from: https://link.springer.com/chapter/10.1007/978-3-030-02330-0_3

Bai, X., & Liu, Y. 2016. International collaboration patterns and effecting factors of emerging technologies. Accessed 20 January 2020. Retrieved from: *PloS one, Vol. 11*. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5135128/

Baraniuk, C. 2015. The AI headhunters. *New Scientist, Vol. 228, Issue* (3045), 20-21. Accessed 15 January 2020. Retrieved from: https://www.sciencedirect.com/science/article/abs/pii/S0262407915315049

Bondarouk, T., & Ruel, H. 2009. Electronic human resource management: challenges in the digital era. *International Journal of Human Resource Management, Vol. 20, Issue* (3), 505-514. Accessed 20 January 2020. Retrieved from: https://www.tandfonline.com/doi/full/10.1080/09585190802707235?scroll=top&needAccess=true

Bruun, A., Jensen, K. E., Kristensen, D. H., & Kjeldskov, J. 2017. Escaping the trough: Towards real-world impact of tabletop research. *International Journal of Human-Computer Interaction, Vol. 33, Issue* (2), 77-93. Accessed 20 January 2020. Retrieved from: http://web.a.ebscohost.com.ezproxy.jamk.fi:2048/ehost/detail/detail?vid=3&sid=b6624934-07a6-4c19-bbf8-0b42baeb0ea1%40sdc-v-sessmgr02&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d%3d#db=bsh&AN=120642393

Dastin, J. 2018. Amazon scraps secret AI recruiting tool that showed bias against women. *Reuters, 10 October 2018*. Accessed 25 March 2020. Retrieved from: https://www.reuters.com/article/us-amazon-com-jobs-automation-insight/amazon-scraps-secret-ai-recruiting-tool-that-showed-bias-against-women-idUSKCN1MK08G

Dessler, G. 2017. *Human resource management*. Global Edition. Boston: Pearson.

Dessler, G. 2020. *Human resource management.* Edition 16. Pearson international content.

Elements of AI. 2018. Online course by Reaktor and University of Helsinki. Accessed 20 January 2020. Retrieved from: https://course.elementsofai.com/1/2

Fenn, J., & Blosch, M. 2018. Understanding Gartner's Hype Cycles*. Gartner, Inc, 20 August 2018*. Accessed 24 January 2020. Retrieved from: https://www.gartner.com/en/documents/3887767

Flick, U. 2014. *The Sage handbook of qualitative analysis*. SAGE Publications.

Fountaine, T., McCarthy, B., & Saleh, T. 2019. Building the AI-powered organization. *Harvard Business Review, Issue* (July-August 2019), 62-73. Accessed 15 January 2020. Retrieved from: https://hbr.org/2019/07/building-the-ai-powered-organization

Gartner Hype Cycle. Page on Gartner's website. Accessed 6 February 2020. Retrieved from: https://www.gartner.com/en/research/methodologies/gartner-hype-cycle

Gaur, A. 2019. A paradigm shift from human resource management (HRM) to electronic human resource management (E-HRM) – A Review. *Journal of the Gujarat Research Society, Vol. 21, Issue* (11)*,* 80-88. Accessed 20 January 2020. Retrieved from: http://www.gujaratresearchsociety.in/index.php/JGRS/article/view/842

Guest, G., MacQueen, K., & Namey, E. 2012. *Applied thematic analysis*. SAGE Publications.

Jatoba, M., Gutierriz, I., Fernandes, P. O., Teixeira, J. P., & Moscon, D. 2019. Artificial intelligence in the recruitment & selection: Innovation and impacts for the human resources management. Proceeding paper. Varazdin Development and Entrepreneurship Agency (VADEA). Accessed 14 February 2020. Retrieved from: http://ezproxy.jamk.fi:2048/login?url=https://search-proquest-com.ezproxy.jamk.fi:2443/docview/2269012279?accountid=11773

Johansson, J., & Herranen, S. 2019. The application of artificial intelligence (AI) in human resource management: Current state of AI and its impact on the traditional recruitment process. Bachelor's thesis. Jönköping University. Accessed 20 January 2020. Retrieved from: http://www.diva-portal.org/smash/get/diva2:1322478/FULLTEXT01.pdf

Julin, S. 2020. Ajankohtaista tietosuojassa osa 1 –Automaattinen päätöksenteko ja profilointi [*Topical issues in data privacy part 1 – Automatic decision making and profiling*]. Webinar material. Berggren. Accessed 5 May 2020. Retrieved from: https://f.hubspotusercontent00.net/hubfs/3870108/Berggren%20Webinaari_GDPR_automaattinen_p%C3%A4%C3%A4t%C3%B6ksenteko_05052020.pdf?utm_campaign=Webinaari%20%7C%20Tietosuoja%20osat%201-

3&utm_source=hs_email&utm_medium=email&utm_content=87420354&_hsenc=p2ANqtz-9zl2_Ud5s8ZFTKOIpKQRxCU5di4ssxQVYQko8SOZ6JTlor-RB8ZBzqM2VCEJqY-sykJQmFYVATEo9AtPwuinFwFFldcpA&_hsmi=87420354

Kaplan, A., & Haenlein, M. 2019. Siri, Siri, in my hand: Who's the fairest in the land? On the interpretations, illustrations, and implications of artificial intelligence. *Business Horizons*, *Vol. 62, Issue* (1), 15-25. Accessed 15 January 2020. Retrieved from: https://www.sciencedirect.com/science/article/pii/S0007681318301393

Linton, J. D., & Solomon, G. T. 2017. Technology, innovation, entrepreneurship and the small business-technology and innovation in small business. *Journal of Small Business Management, Vol. 55, Issue* (2), 196-199. Accessed 20 November 2019. Retrieved from: https://www.tandfonline.com/doi/full/10.1111/jsbm.12311

Mark, S., Philip, L., & Adrian, T. 2008. *Research methods for business students*. Pearson Education: M.U.A.

May, T. 2011. *Social research: Issues, methods and process*. Fourth edition. McGraw-Hill Education.

Merriam, S. B., & Tisdell, E. J. 2016. *Qualitative research: a guide to design and implementation*. Fourth edition. Jossey-Bass, San Francisco, CA.

Mohr, J., Sengupta, S., & Slater, S. 2010. *Marketing of high-technology products and innovations*. Third edition. Harlow, Essex: Pearson.

Moore, G. 2002. *Crossing the chasm: marketing and selling high-tech products to mainstream customers*. New York: Harper Business.

Nawaz, N. 2019. How far have we come with the study of artificial intelligence for recruitment process. *International journal of scientific & technology research, Vol. 8, Issue* (7), 488-491. Accessed 10 January 2020. Retrieved from: https://www.academia.edu/40405993/How_Far_Have_We_Come_With_The_Study_Of_Artificial_Intelligence_For_Recruitment_Process

O'Donovan, D. 2019. HRM in the organization: An overview. In C. Machado and J. Davim (Eds.), *Management Science*. Springer, Cham, 75-110. Accessed 15 March 2020. Retrieved from: https://link.springer.com/chapter/10.1007%2F978-3-030-13229-3_4

Puentes, J. L., Ortiz, N. Y., & Rodriguez, J. I. 2016. The knowledge management into technology based firms (model proposal). In L. Uden, D. Liberona and B. Feldmann (Eds.), *Learning Technology for Education in Cloud – The Changing Face of Education*.

Springer, Cham, 15-24. Accessed 28 November 2019. Retrieved from: https://link.springer.com/chapter/10.1007/978-3-319-42147-6_2

Saunders, M., Lewis, P., & Thornhill, A. 2009. *Research methods for business students*. Fifth edition. Pearson Education.

Schatzker, E. 2019. How to put AI in team. *Bloomberg Businessweek, Issue* (4633), 28-30. Accessed 20 November 2019. Retrieved from: http://search.ebscohost.com.ezproxy.jamk.fi:2048/login.aspx?direct=true&db=bsh&AN=139045538&site=ehost-live

Schiavi, G. S., & Behr, A. 2018. Emerging technologies and new business models: a review on disruptive business models. *Revista de Administração e Inovação, Vol. 15, Issue* (4), 338-355. Accessed 20 Novemeber 2019. Retrieved from: http://search.ebscohost.com.ezproxy.jamk.fi:2048/login.aspx?direct=true&db=bsh&AN=133762395&site=ehost-live

Seale, C., Gobo, G., Gubrium, J., & Silverman, D. 2004. *Qualitative research practice*. SAGE Publications.

Shi, Z. 2011. *Advanced artificial intelligence*. World Scientific Publishing Co. Pte. Ltd.

Shivarudrappa, D., Ramachandra, K., & Gopalakrishna, K. S. 2009. *Human resource management*. Global Media.

Strohmeier, S. 2007. Research in e-HRM: review and implications. *Human resource management review, Vol. 17, Issue* (1), 19-37. Accessed 23 January 2020. Retrieved from: https://www.sciencedirect.com/science/article/abs/pii/S1053482206000829

Subba Rao, P. 2008. *Human resource management*. Global Media.

Tambe, P., Cappelli, P., & Yakubovich, V. 2019. Artificial intelligence in human resources management: Challenges and a path forward. *California Management Review, Vol. 61, Issue* (4), 15-42. Accessed 17 February 2020. Retrieved from: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3263878

Tech Trends. 2020. Annual tech trend report by CB Insights, 1-67. Accessed 25 February 2020. Retrieved from: https://www.cbinsights.com/research/report/top-tech-trends-2020/?utm_source=CB+Insights+Newsletter&utm_campaign=31db41a577-newsletter_general_Thurs_20200220&utm_medium=email&utm_term=0_9dc0513989-31db41a577-86486749

Torrington, D., Hall, L., Atkinson, C., & Taylor, S. 2017. *Human resource management*. New York: Pearson.

Trochim, W. 2000. *The research methods knowledge base*. 2nd Edition. Version current as of 30 January 2020. Accessed 19 March 2020. Retrieved from: https://socialresearchmethods.net/kb/qualitative-measures/

Vardarlier, P., & Zafer, C. 2020. Use of artificial intelligence as business strategy in recruitment process and social perspective. In U. Hacioglu (Eds.), *Digital Business Strategies in Blockchain Ecosystems*. Springer, Cham, 355-373. Accessed 14 February 2020. Retrieved from: https://link.springer.com/chapter/10.1007/978-3-030-29739-8_17

Wisniewski, J. 2018. Control-shift. Designing for the near future. *Online Searcher, Vol. 42, Issue* (3), 63-65. Accessed 20 November 2019. Retrieved from: http://search.ebscohost.com.ezproxy.jamk.fi:2048/login.aspx?direct=true&db=bsh&AN=129632298&site=ehost-live

Wold, E., & Sandberg, H. 2019. The role of procedural justice and entitlement in a new world of AI-controlled recruitment solutions. Master's thesis. Master of Science in Leadership and Organizational Psychology. BI Norwegian Business School – campus, Oslo. Accessed 22 January 2020. Retrieved from: https://biopen.bi.no/bi-xmlui/bitstream/handle/11250/2621919/2287699.pdf?sequence=1

Your Dictionary. Accessed 19 November 2019. Retrieved from: https://www.yourdictionary.com/

Zielinski, D. 2017. Robot Recruiters. *HR Magazine, Vol. 62, Issue* (3), 64-65. Accessed 20 November 2019. Retrieved from: http://search.ebscohost.com.ezproxy.jamk.fi:2048/login.aspx?direct=true&db=bsh&AN=122259403&site=ehost-live

9series Solutions. 2019. Impact of artificial intelligence (AI) on industries in 2019. *Medium, 21 May 2019*. Accessed 15 March 2020. Retrieved from: https://medium.com/@9series.solution/impact-of-artificial-intelligence-in-2019-18c00c6df875

Appendices

Appendix 1. E-mail for contacting the interviewees, English version

“Hello,

I am a second year International Business student from JAMK University of Applied Sciences, and my track is “Technology business and future foresight”. I am currently working on my thesis from the topic of “Potential of AI assisted recruitment in technology businesses”. The objective of the study is to map out the current usage rate of artificial intelligence-based solutions in recruitment as well as its future potential. For companies, depending on the viewed value, this study can offer insights on the benefits of artificial intelligence-based recruitment solutions, estimation of the current usage rate now and in the future and for reasons behind the decisions of not suing such solutions.

The intention would be to conduct a verbal interview with a person responsible of recruitment in Your organization or with a person who is strongly connected with it. This person could be for example a technology or HR professional. The interview would take about 20-40 minutes and it could be conducted in Finnish or English by the choice of the interviewee. The interview will be recorded. The results in the thesis will be published by following good academical ethics in a way that there is no possibility of identification of the participant or the company by their name. As the thesis is ready the interview material will be destroyed.

Therefore, I would like to ask You that would You or a person within your organization that would fit into the previously described profile have time to attend this interview between February and March 2020?

Regards

William Lahti, IB-Student

JAMK University of Applied Sciences”

Appendix 2. E-mail for contacting the interviewees, Finnish version

“Hei,

olen toisen vuoden International Business - opiskelija JAMK:ssa ja linjanani toimii "Technology business and future foresight". Teen tällä hetkellä opinnäytetyötäni aiheesta "Potential of AI assisted recruitment in technology businesses". Työn tarkoitus on kartoittaa tekoälypohjaisten ratkaisuiden tämänhetkistä käyttöastetta sekä sen tulevaisuuden potentiaalia osana rekrytointia. Yrityksille – arvonäkökulmasta riippuen – tämän opinnäytetyön tulokset voivat antaa kuvan tekoälypohjaisten rekrytointiratkaisujen hyödyistä, käyttöasteen arvioinnista nyt ja tulevaisuudessa sekä syistä tekoälypohjaisten ratkaisujen käyttämättömyyteen.

Tarkoitus olisi saada aikaan suullinen haastattelu yrityksenne rekrytoinnista vastaavan tai siihen vahvasti kytkeytyneen henkilön, esimerkiksi teknologia- tai HR-asiantuntijan kanssa. Haastatteluun kuluisi aikaa noin 20-40 minuuttia ja se voitaisiin käydä halukkuuden mukaan suomeksi tai englanniksi. Haastattelu tultaisiin nauhoittamaan tutkimuskäyttöä varten. Tulokset opinnäytetyössä julkaistaan hyvää akateemista etiikkaa noudattaen niin, ettei niistä voi identifioida henkilöä tai hänen edustamaansa yritystä nimeltä. Opinnäytetyön valmistuttua haastatteluaineisto tuhotaan.

Kysyisinkin nyt olisiko Teillä tai edellä mainittuun kuvaukseen sopivalla kollegalla mahdollisuus osallistua tähän haastatteluun Helmi-Maaliskuun 2020 aikana?

Regards

William Lahti, IB-Student

JAMK University of Applied Sciences”

Appendix 3. Interview questions, English version

Background:

- Title?
- Short job description?
- Industry experience?
- Company size and internationality?

Q1. How would you explain the concept of artificial intelligence?

Q2. How would you explain the concept of e-HRM?

Q3. How do you see AI being used in recruitment within technology businesses? What is the current usage rate?

Q4. Does your company or company's subcontractors in HR use AI in HR recruitment processes?

Q4.1. IF YES -→ Why is it used? What is the driver/advantage to no AI related past? (If technical -→ Practical)

Q4.2. IF NO -→ Are you planning to use it? When and how?

Q4.3. IF NO -→ Why have you (or someone else) decided not to use it? Are you fore-seeing it to be used in the future?

Q5. How do you see the possibilities and motives of AI usage as part of recruitment in the future?

Q6. How do you see the threats and barriers of AI usage as part of recruitment in the future?

Q7. How would you describe the recruitment process of the future which includes AI-based solutions?

Q8. Do you have anyone in mind that could be interviewed for this study?

Appendix 4. Interview questions, Finnish version

Taustatiedot:

- Titteli?
- Lyhyt työnkuva?
- Kokemus alalta?
- Yrityksen koko ja kansainvälisyys?

K1. Miten selittäisit tekoälyn konseptina?

K2. Miten selittäisit e-HRM:n konseptina?

K3. Miten näet tekoälyn käytön tämän hetken rekrytoinnissa teknologiayritysten osalta? Käsitys käyttöasteesta?

K4. Käyttääkö yrityksesi tai alihankkijasi HR-osasto tekoälyä osana rekrytointia?

K4.1. MIKÄLI KYLLÄ -→ Miksi sitä käytetään? Mitkä ovat tekoälyn edut aiempiin prosesseihin verrattuna? (Mikäli hyvin tekninen vastaus -→ Kuvaile käytännössä)

K4.2. MIKÄLI EI -→ Suunnitteletteko sen käyttöä? Milloin ja miten?

K4.3. MIKÄLI EI -→ Miksi olette (tai joku muu on päättänyt) päättäneet olla käyttämättä tekoälyä? Näettekö käyttävänne tekoälyä tulevaisuudessa?

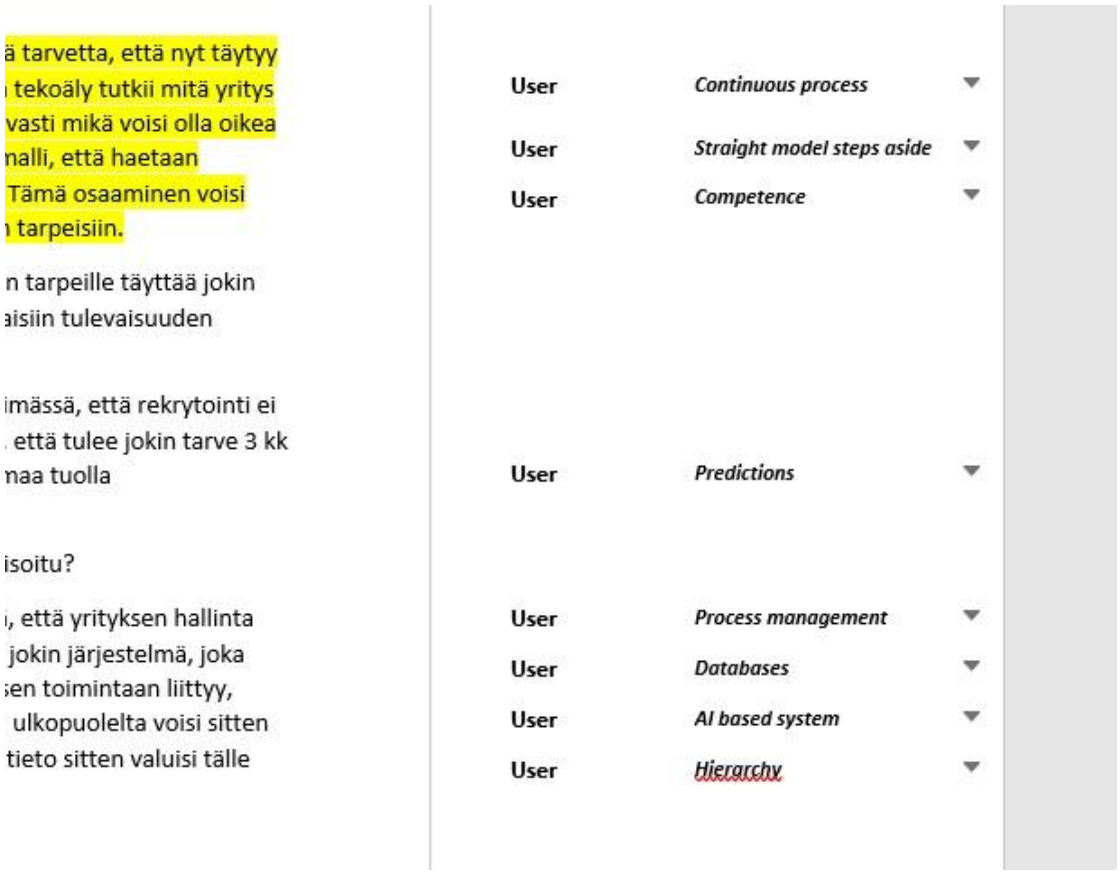
K5. Miten näette tulevaisuuden mahdollisuudet ja motiivit tekoälyn käytössä osana rekrytointia?

K6. Miten näette tulevaisuuden uhkat ja esteet tekoälyn käytölle osana rekrytointia?

K7. Miten kuvailisitte tulevaisuuden rekrytointiprosessia, johon liittyy tekoälyn hyödyntäminen?

K8. Olisiko Teillä ehdottaa sopivaa haastateltavaa tätä tutkimusta varten?

Appendix 5. Example 1 of open coding the transcripts



Appendix 6. Example 2 of open coding the transcripts