



Artificial Intelligence

The new recruiting era

Valmir Hajzeri

SCHOOL OF ECONOMICS, BUSINESS ADMINISTRATION & LEGAL STUDIES

A thesis submitted for the degree of

Master of Science (MSc) in Management

June/2019

Thessaloniki – Greece

Student Name: Valmir Hajzeri
SID: 1102170010
Supervisor: Prof. Korina Katsaliaki

I hereby declare that the work submitted is mine and that where I have made use of another's work, I have attributed the source(s) according to the Regulations set in the Student's Handbook.

June 2019
Thessaloniki – Greece

Abstract

This dissertation was written as part of the MSc in Management, at the International Hellenic University.

The purpose of this study was performed with the aim to gain further insight, understand and explain Artificial Intelligence, and how it can be applied in today's world.

This paper presents the results of qualitative and quantitative research as article analysis, literature review and surveys done in artificial intelligence (AI) and respectively focusing on the effect it has in the human resources departments, particularly in recruitment.

The theoretical framework of the study is more focused on the past, present, and future of AI, and how it can change the fight for talent acquisition in this fast-growing market.

In this study the HR department is not discussed as a whole, but the thesis focuses more on the recruitment process. The thesis shows the effects of AI and what the recruiting process can look like in the future with its integration.

Valmir Hajzeri

17/06/2019

Preface

As a passionate individual working within the human resources (HR) field, eager to learn more and have a better understanding of the system as a whole, I was motivated to work on this research paper to discover more about what is likely to happen with the launch of new artificial intelligence (AI) technologies and how their integration will affect established processes.

I tried to not just acquire information, but to also reach a conclusion on how the digital age will change this department as a whole by the use of qualitative and quantitative methods. By reviewing studies conducted on HR and AI, the effects on HR from AI technologies, and also reviewing literature and research papers on these matters I can only say that there will definitely be big changes on the HR workflow, but we don't know if those changes will be beneficial or detrimental for the human capital or for the company as a whole.

Truthfully told, it has been a very bumpy road for me in a personal matter, and I would have not been able to put an end to this treatise without a strong support group. Starting from my friends, who are professionally active in the field of HR continents throughout the world and who did not hesitate for a second to share their knowledge and expectations on the matter my dissertation talks about. Mt manager, Mrs Troubouneli, who was extremely patients with me and gave me as much space as possible to prepare for this research, Mrs. Katsaliaki, my mentor who was available and ready to offer her insight at any time patiently providing me with guidance and advice throughout the whole research and writing process. My strongest muse, my mum who stood by my side through-out this whole journey that was not easy at all. To all of those who in one way or another, contributed to this research. Thank you very much for your unquestionable support.

Table of Contents

Artificial Intelligence on the rise	1
How Authentic Is AI?	2
AI and automation	3
Automation	5
Disengagement and costly mistakes as results of repetition	6
Augmented workforce	8
Augmentation	8
Demographics irrelevant	12
The journey of augmentation	13
Amplify a long-term solution.	13
AI and talent	15
What AI means to recruitment.	17
Sourcing candidates, an automated solution	19
<i>Maya</i>	21
<i>Olivia</i>	21
<i>Beamery</i>	22
Candidate Rediscovery	25
What does the future hold	28
AI Today, AI Tomorrow	29
Conclusion	35
Bibliography	37

Introduction

What is Artificial Intelligence (AI)?

Artificial Intelligence or AI is an inescapable phenomenon that is affecting not only our work but personal life too. The idea of AI has *been* with us for a really long time, starting from the publication of Mary Shelly's 'Frankenstein' in 1818.

As a term, Artificial Intelligence covers many different technologies that are unified by a common characteristic; they are able to perform a task that is normally or was performed by a human being and can encompass additional capabilities as well. AGI (artificial general intelligence) NLP (Natural language processing) Face recognition, Self-driving cars, industrial robots, medical robots (operation robots, and tumour-detecting robots) are just some of the real-world examples technologies that right now are functioning with the help of AI. These applications focus on narrow tasks, but put together AI is reshaping business and industries where its use grows with the fact that the market is becoming more and more sophisticated. These technologies are affecting organizations in general, and it is obvious that there is pressure in most management areas, including Human Resources Management (HRM) from these information technologies. In help of these HRM challenges, rapid technological advances have provided new digital intelligent technologies to simplify and make HRM tasks easier and faster (Bondarouk & Brewster, 2016, 2650–2655). HRM should want to remain renewable, there should be a consideration for new technology-based solutions so that manual routine job tasks will be automated, and HRM will focus on value-adding work. (Biro, 2016)

“If HR wants to continue to play a critical role in helping businesses anticipate and manage organizational change, it must have technology at its core.” (Biro, 2016)’.

There is much confusion and uncertainty regarding the effects that HRM as a whole will endure with the application of these new technologies in their functions. It is still unclear if this new era will increase or destroy work related possibilities despite the fact that technologies can provide great opportunities. They do tend to create an uneasiness in people,

as they have a reasonably large amount of impact in people 's lives, leisure and work-related tasks. And as a result, rejecting conditions of change, uncertainty and risks are only reasonable at this point (Michie, 2002).

However, these technologies have come to stay. They are inevitably putting a great deal of pressure on the HRM field to adopt them and innovate in order to remain relevant and survive; keeping up with the fast growth of the industry and markets despite the fear of change and anxiety of new technologies - ‘‘Technophobia’’ (Brosnan, 2002). (Beckers & Schmidt, 2001) Core HRM activities such as recruitment have been drastically affected by these technologies. (Noe, Hollenbeck, Gerhart & Wright, 2003).

Artificial Intelligence on the rise

Artificial Intelligence is among us. It is present in virtually almost all major industries: advertising, healthcare, finance, transportation, and legal and is covering more than 30% of enterprises. It is now also present in the very heart of HRM.

Its presence and use in the construct of HRM may easily help us on a more efficient, seamless, flexible and user driven employee experience.

Having in mind the very basic use of AI for the moment, the transformation in our everyday life, personal and professional, is considerable and increasing day by day.

Let's have a look at the way AI is changing the rules of our day to day routine activities.



Figure 1 AI effect on everyday life tasks (Image is taken from PWC Consumer Intelligence Series)

Outsourcing these repetitive and tedious tasks to automated software or digital assistance will only help us in a way that will give us more time for thinking and creativity.

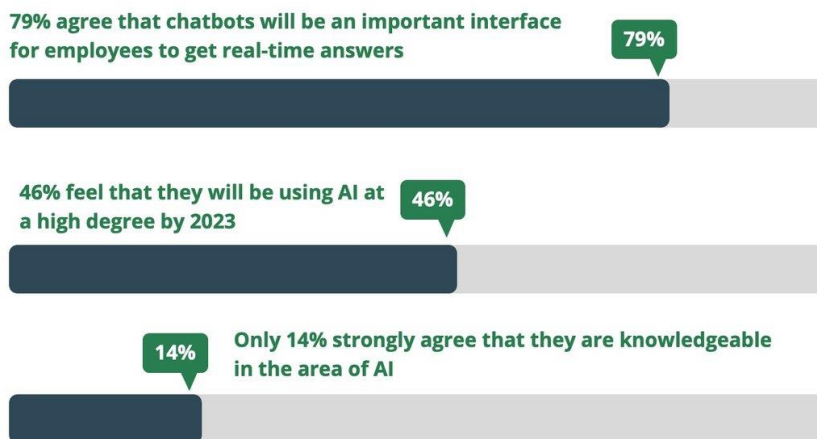
Cognitive technologies available in the market that leverage from AI mostly impact the augmentation of existing job functions, not eliminating job positions and replacing humans with machines. Being able to learn, interact and reason AI machines will continue replacing human forces in repetitive tasks. This will help individuals to capitalize on productivity and speed to better execute their jobs, and thus enabling them the opportunity to upgrade into more rewarding jobs.

How Authentic Is AI?

With the rise of AI, there is also lots of questions in regard to this phenomenon. Its natural that recruiters in their mind have it with question mark as to how authentic is AI in reality, and how reliable are TI recruiting software. Lots of research sufficient amount of tests, lots of hours spent from developers and testers on getting the most precise algorithm concerning this matter conclusion is that AI offers very strong predictors that makes it understandable and state that the manual way of recruitment should take a step back and leave the space for the new AI software that perfectly fit in and make the best out of the tasks. Having in mind the speed as element that manual recruiting lacks on, the fact that AI software's excels at and not only. Considering also the algorithms that are so detailly, exact, and to the point making it almost impossible leaving any space for bias in this process, its only understandable that there is no doubt on AI and its ability to find only the best fit for the job will enter the organization.

What is the current state of AI in HR?

myHR future 



© myHRfuture 2019. Confidential. All rights reserved

Source: HR.com (2018)

Figure 2 Current state of AI in HR (source HR.com)

The table above is taken from a survey conducted by HR.com on the matters AI and its state on HR. it seems around 80% of HR professionals could see a world where chatbox would do all the employee queries. Not that surprising discovery when having in mind the comfortableness we already have with chatbox in our consumer lives.

Nonetheless, 46% only were positive with the idea of AI being used highly in the next five years. A bit disappointing but also reflects the readiness of HR department to embrace AI technologies today. The most surprising part of the survey was the very high percentage of 14% HR professionals' who were not very positive with their understanding and knowledge in the field of AI.

This survey presents a opportunity to focus on extra training for better understanding of HR, and better understanding of these type of technologies that are around the corner and about to make huge changes. It also highlights the need to consider in what ways HR would come to the point and feel comfortable in accepting and embracing help from these technologies and implement them in the processes of the company where relevant.

AI and automation

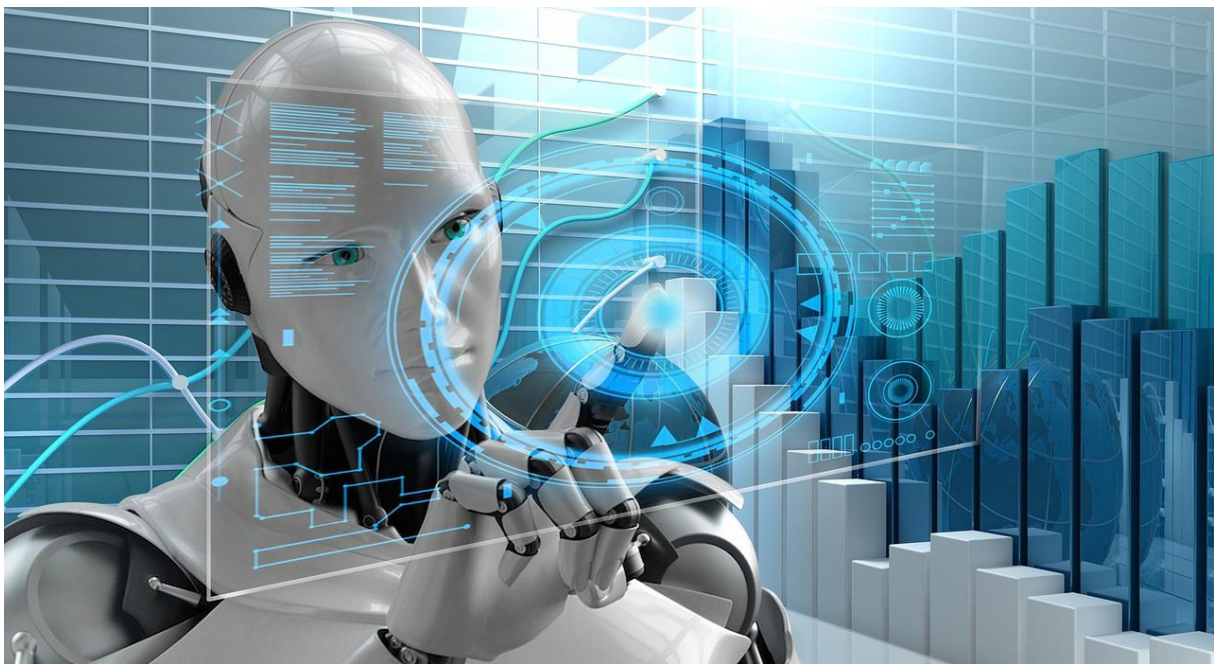


Figure 3 Automation (source www.google.com)

With increasing immersion in AI technologies and systems, the possibilities and aspects of the effects and changes it will have on our daily lives and the future of work flow are countless. For decades we have been affected by this growing phenomenon of Artificial intelligence (AI) but its presence is bigger today than ever. Many times without even realizing a new AI powered tech system, tool or product has begun changing our lives and outperforming human capacity.

The impact on human life is from all kinds of levels varying from Automation of repetitive/tedious and time-consuming task, Augmentation of human capabilities and, Amplification of human functions.

Automation and AI bring benefits that don't always come instantly. However, in this journey one can see the short, mid and long-term benefits through automation, augmentation and amplification of human activities or tasks.

The table below describes these benefits.

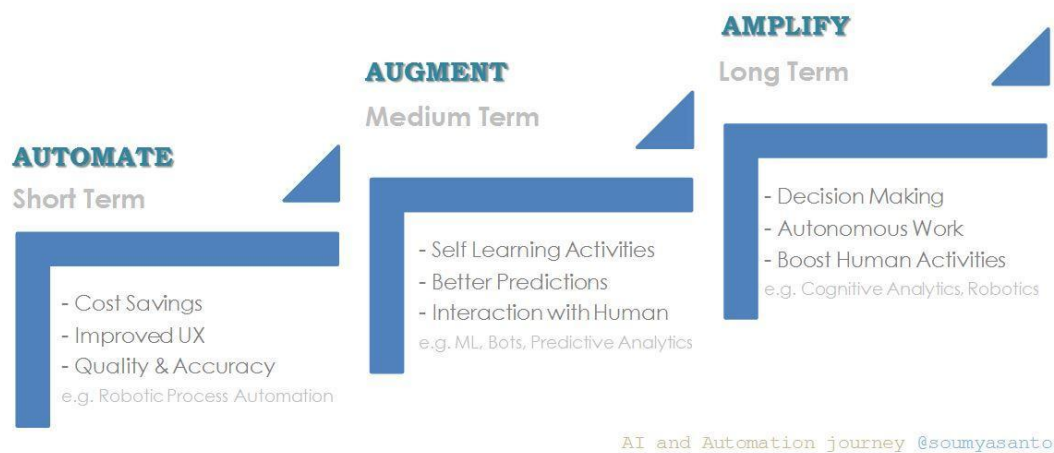


Figure 4 Automate, augment, amplify (source www.google.com)

Automation

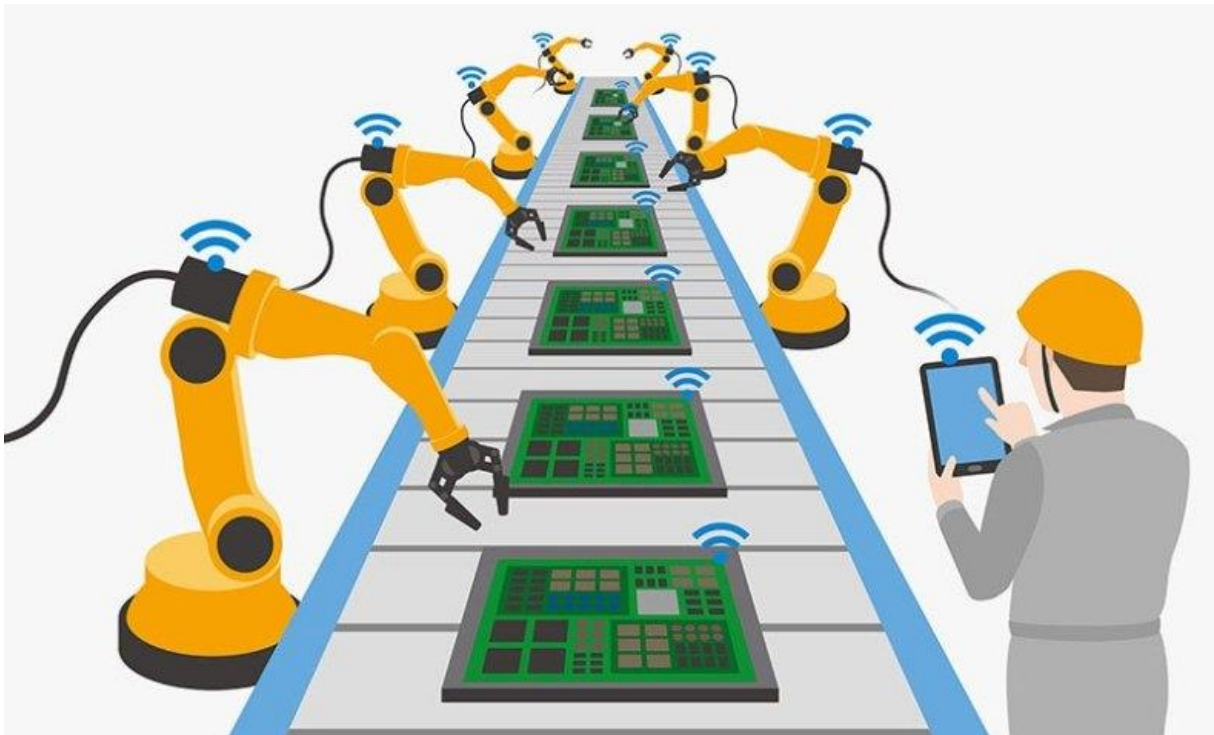


Figure 5 Automation of repetitive tasks. Source "www.google.com"

Workflow automations impact within HR begins with the earliest stages of the employee lifecycle. Recruitment workflow automation platforms are able to kick off a background check after an employee becomes a final candidate. Replacing manually written emails and messy tasks by automatically sending out follow up letters or information to candidates in regards to the state of their application status.

Nonetheless, executives must be open and understanding to the idea of workflow automation in HR. This includes the possibility of ripple effect where existing employees move up the ranking of the company where a hiring decision triggers a chain of events where hard-working employees from all levels will be rewarded for their effort. Furthermore, improves employee experience and design collaboration pathways both internally with HR and also externally between other business divisions.

Disengagement and costly mistakes as results of repetition

It certainly takes a lot of hands-on work to keep a business running. However, at no point is it necessary that all this work must be done by humans. Repetitive jobs like data entry, reporting, scheduling, file management, etc, are the biggest areas for error if performed by humans. A lot of money and time may be saved by streamlining some processes through automation. This can also have the benefit of positively impacting the overall experience for the customers and employees.

Lets stop for a second and talk about the old school way of doing office tasks like administrative jobs, invoices where everything was done manually by human hand, and it was time consuming. Those days are over, with automation of those tedious repetitive tasks there will be a lot of free time for developing skills that will truly add value for the company.

Automation technology, revolution for HR workflow

When we talk about automation of HR processes, we have in mind one thing. Make HR departments more efficient by automating tasks that will speed up time consuming processes, thus make time for important tasks that require soft skills that AI does not poses. Just like many other departments, HR also relies on document-driven processes for the purpose of getting work done. One very simple example is the employment contract that requires time on reading and signing by new employees during the process of on boarding. It is a process that requires a lot of time, especially when in a paper-based office. It requires a person to go through it, make sure it is done accurately, signed and received by the HR.

Technology found solutions for many problems of this sort. Enterprise content management or ECM is a very helpful software that tackles this time-consuming issue in HR. Like ECM there are many other similar software systems that precisely improve the efficiency of work, increasing the time that can be used by employees for being creative and productive in others tasks. Something that industry experts agree on is the fact that by implementation of AI in recruitment processes there will definitely be more time and space for recruiters and hiring managers for gauging learning, critical thinking and problem-solving skills. No doubt anymore that AI will be the next big thing by redefining the overall process of recruiting.

Ensuring the presence of appropriate employee training, productivity, engagement and satisfaction in conjunction with resolving internal conflicts makes HR one of the most valuable business departments in an organisation. Therefore, there are expectations for internal departments to work closely together, regularly liaising with managers and employees across the business, conducting interviews with prospective employees, and contributing to the core strategy of the business.

One study case done by Elite HR departments; a rare case resulted where they were spending less than 10% of their time doing administrative work. Of course, for most HR departments, it does not seem realistic the idea that administrative work can take less than one tenth of their job, making it sound very idealistic.

It is more common for HR departments to find themselves drowning in administrative work; repetitive, tedious and time-consuming jobs. Here is when automation of some repetitive and time-consuming jobs like payroll, timesheet management, and filing paperwork comes in, and makes HR departments more productive and efficient, giving them time to focus on more valuable activities.

Examples as those previously highlighted are only some of the many others that application of automation will be just the right way to go. They show how useful automation is at multiple junctures in the whole HR process. The amount of time used in these processes could be significantly reduced, creating space for thinking, creativity, productivity from HR professionals, in more important jobs that bring a higher value to the business. Like this, they can focus their energies on the job they excel at, supporting the organisations talent retention and acquisition goals. AI is emerging to the point where it is about to make big changes, and humans are about to experience the biggest transformation in the history of the work.

The rate of advancement is dramatic, and one cannot ignore the thought of the impact it will bring to society, and the way human beings will remain relevant and useful in the automation era.

Augmented workforce



Figure 6 Workforce augmentation(source "www.google.com")

Human capability augmentation or in other words, a new world of work where humans and machines coexist. They will work together to enhance each other's abilities where machines will carry out all the traditional and repetitive jobs previously performed by humans for the purpose of workforce efficiency and effectiveness.

Research done by PWC in Australia, shows quite an alarming result. More than 37% of Australians are worried and uncertain about the effect and the impact AI and automation will have and the risk of being replaced by machines.

Augmentation



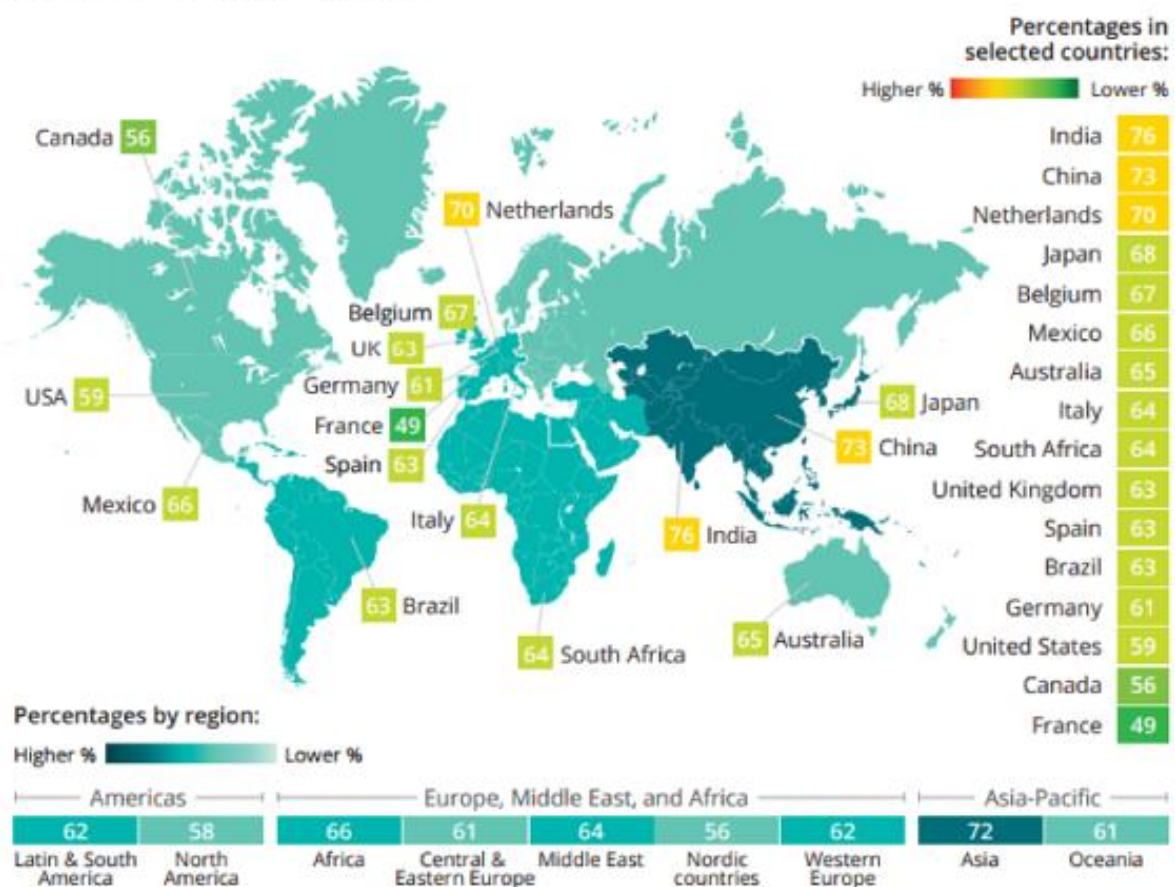
Figure 7 Augmentation of human capabilities. Source www.google.com

The nature of work is going through changes that are being affected by the acceleration of connectivity and cognitive technology. Just like Artificial Intelligent systems, cognitive tools and also robotics are going through advancements and sophistications and with that every job is being reinvented leaving space for the phenomenon called 'augmented workforce'. The speed of this trend is reshaping the jobs designed by companies, and future growth plans.

When we talk about augmented workforce, we talk about utilizing AI and cognitive technologies in that way that we can streamline processes to create more efficient workforce. We talk about the blend between human employees and technologies working together in tasks for the purpose of better results. Machine learning or the ability for computers to access data and learn by themselves is the key element for this process.

Deloitte in a recent research study about augmentation of workforce found that 41% of companies reported they have fully implemented or have made significant progress in adopting cognitive and AI technologies within their workforce. Another 34% of survey respondents are in the midst of pilot programs. But only 17% of global executives report they are ready to manage a workforce with people, robots, and AI working side by side—the lowest readiness level for a trend in the five years of the Global Human Capital Trends survey.

Figure 1: Augmented Workforce: Percentage of respondents rating this trend “important” or “very important”



Source: "The future of work: The augmented workforce," from "Rewriting the rules for the digital age: 2017 Deloitte Global Human Capital Trends." Deloitte University Press Copyright © 2017 Deloitte Development LLC. All rights reserved.

Figure 8 Augmentation workflow percentage by country.(Source www.Deloitte.com)

Work after augmented workforce

How jobs will change, adapt, or even disappear is an uncertainty, today, a new focus exists, the one on 'people aspects' of work. Deloitte in their research found that with the automation of tasks in jobs, the human essential parts of work are becoming more and more important. Empathy, communication, decision making problem solving etc. are becoming more valuable. These AI powered tools will create more jobs, boost productivity and also allow workers focusing on what really matter, the human aspect of work. But how can value be achieved through automation while balancing consequences.

The research discusses the positive impact on employee productivity, customer value and other positive effects that can come as a result of well balanced and careful implementation of automation throughout tasks and with the use of crowdsourcing.

Furthermore, this research also shows that about 31% of the companies participating in the survey 'Global Human Capital Trends' say that they are somewhere along the way of implementing AI and robotics while another 34% are only piloting particular and specific areas of the process. Only a 10% of those survey respondents said that they are fully automated, or they are highly advance in automation area.

Funny enough, when same companies were asked about the impact of the future of work scenarios, 20% will reduce the number of jobs, automating as much as it is possible. While the most of them, 77% will either preserve human capital or put them on duties of using technologies or the other scenario was to redesign jobs in a better way as to make use advantages human skills have to offer for a company

One thing is certain, while a mix of elements of the so called trend 'future of work' are well understood. There are still those parts that, for business leaders might be simple and understanding, but for other still an emerging stage of understanding.

What we already know is that this topic is seeing exceptional growth, and despite the 6% of participants who believe that the topic is the trend of the year, another group of 26% agree that this is only the beginning, and the importance of the topic will grow even bigger in the next three to five years to come.

Unsure about what areas of business can be automated, where a robot replaces people in their jobs taking over the position, or where augmentation of human capabilities can come in handy, expanding those human capabilities without affecting employment and improving individuals performance and productivity in their positions by taking their capabilities and abilities beyond to the next level, and all without influencing their colleagues job position and employment.

There is a thin line between augmentation and automation and it's a blurry one. There is arguing that all automation deep down it is augmentation for the only reason that even after automation there usually is people remaining at business, and usually those benefit greatly from an improved profit margin since theoretically. Productivity in these cases rises while costs fall.

The confusion begins where augmentation saves time of the employee. Isn't that the same as replacing people?

Augmenting the capabilities of people with AI tools and enhancing their writing skills, communication, judging, sourcing and many more of the kind, than we only augment their capabilities and abilities, but here we are not really replacing any people at their jobs.

Personally, I think this is the key difference between automation and augmentation, even though to date I am not sure it is really well defined or even understood.

Nonetheless, changes will be seen also when it comes to the candidates profile by making it only one pool of applicants by making diversification of applicants the only option available.

.

Demographics irrelevant

The augmentation process brings along some other trends and rules especially for the applicants profiles and skillsets needed. Maybe augmentation does not replace a human by taking his job, but surely changes the way jobs will be defined and shaped. There will be a world where there will only be two types of people, employable in the augmented workplace, and unemployable. A world where demographics will not play a role anymore, focus will be on passions and skills. Age, gender ethnicity nationality and so on will completely lose their importance in role fitment of individuals.

Constantly changing business models where there will no longer be a period of stable business with shorter product life cycle will become more prominent. Work in progress will be the only way for organizations to achieve operational efficiency. As one of the most important human needs is self-actualization, this will be responsible for driving productive endeavours and creating the need for Maslow's upturned hierarchy.

“In the augmented age, the desire to develop a deep mastery that is unique will be the critical driver of contentment”

Seeing only a glimpse of the power of AI, it composes a great deal of the impact and changes in the way work is organized and completed by their integration and the use of cognitive tools.

The journey of augmentation

For years now, scientists have been trying to build a machine that could be considered an equal when compared with human intelligence, an electronic brain bias and error free. The introduction of the first digital machine in the 1940s was a defining moment and a breakthrough. Since then, the capabilities of the digital computers and machines have evolved enormously, and with the rise of the digital revolution, the future of the working process has changed and is still changing.

With greater efficiency on tasks that are done by new technological capabilities, the traditional manual jobs are being reshaped and becoming obsolete. Replacement of human capital by machines on repetitive tasks is resulting in job reduction in these areas of work. For businesses, this means that investing in AI efficiencies leverages profits. So, it is easy to see why companies are investing so much in this technology and direction in their business models. Not anymore, a futuristic vision, augmented workforce is already among us, and on the rise. Deloitte in a study they did regarding AI implementation in HRM functions, found out that more than 41% have fully implemented or have made significant progress in adapting cognitive-AI technologies within their workforce.

Amplify a long-term solution.

Advantages of computers like effortless calculation, information storage, data-processing and retrieval makes it possible to outperform humans in these routine operations and similar functions (Danson et al., 2015). Now, for more than 50 years scientists are conducting research on creating Artificial Intelligence computers and software that will be capable of mimicking intelligent behaviours.

Amplification, the solution to effectively use IT in human intelligence augmentation, refers to the effective use of information technology in augmenting human intelligence.

Why replace humans with AI when we can make those two work together and offer better and more efficient results?

What we mean is the collaborative effort between AI and humans to overcome those repetitive, and time-consuming tasks. Systems that work as intelligent agents are there to assist humans in completing successfully effectively and efficiently tasks without wasting too much time. These agents are controlled, guided and supervised by humans.

AI and talent.

The new age of hire

First things first. Artificial intelligence, put simply, is a machine that is able to execute tasks that are usually carried out by human capital, such as decision making, translation, voice recognition, etc. For years recruiters have been using AI. It's fairly common that AI powered application tracking system (ATS) is used to scan through hundreds of curriculum vitae (CV) by looking for keywords or phrases that match the desired description.

Undercover recruiter in an article dedicated a research conducted in the matters of AI automation in HR, found that 16% of jobs across HR will be replaced in the next 10 years. Not necessary meaning that we will be out of position, it surely means more free time thanks to this technology integration. Ai can make recruiting easier, faster and more efficient. It can improve the overall process and cut off the boring, repetitive tasks that take forever to finish and kill the creativity of employees. Working closely with AI and allowing it to assist us in recruitment process, give more time for focusing on hiring the right candidate for the position instead of focusing on the endless tasks necessary to go through and take to make a hire.

Such an invention of course doesn't come as easy to the eye of applicants as we think it does. There are issues with AI in recruitment and there are issues with being recruited by one. The problem lies in the fact that job seekers argue that the way AI technology for recruitment work, scanning CV for keywords and phrases, reduces their chances of their application moving on to the next level and getting hired. They believe that individuals should be considered and hired based on quality of experience and personality traits. Not having in mind, the situation in which the list of applicant's numbers in the thousands. On the other side of the argument, research done by Deloitte shows that more than 52% of recruitment leaders believe that it is almost impossible to identify the right candidates from the pool of applicants just with people power alone.

AI is ancient, or at least the idea exists for long. Back to antiquity is where we will see traces of AI, but when it comes to the focus on AI role on recruitment, we can go back as far as 2017. The possibility of AI applications used in recruitment has become a seemingly unstoppable

storm that has flooded many HR conferences making it the latest trend in the war for talent acquisition. This has allowed recruiters to complete unified candidate profiles from massive unstructured data sets; matching required skill sets with the most compatible candidate profiles.

Automation of these lower-level tasks provides an opportunity that leaves the more detailed information decisions to be focused upon and made by an individual. This immediately reduces operating costs, time, and offers space for more productivity.

Tasks like the ones mentioned below are the first ones who went through automation in many companies by far, and we only see satisfaction and productivity from most.

Candidate screening, the very first step, involves heavy review of candidates' profiles by asking questions where the answers are analysed by HR professionals with a view to understand the candidate's various attributes.

Candidate engagement. Customizing and sending information as well as message to the applicant after they have applied for a job.

Re-engagement of candidates: automatic update of the candidate's qualification and duties once the requirements are met.

Customized training and development based on the needs of a candidate to improve and enhance their performance and productivity.

Automatic emails to candidates, maintaining communication and keep the candidate informed about the process and the status of the application. This helps in retaining employees by saving time and money on the recruitment process by decreasing how often an employee decides to move on to another organisation as a result of communication gaps between employee and employer during the notice period.

Familiarising new hired employees with the culture, policies, rules and processes of the company they are hired.

What AI means to recruitment.

With new, fascinating AI powered technologies and applications available for the recruitment process becoming more and more widespread; it might just be the best time to take a look into the AI possibilities and options that would be most helpful in optimizing the recruitment process.

The recruitment process can be a very tricky and hard task. Especially when faced with hundreds and thousands of applicants for a small number of jobs. In addition to the difficulty of this task, we shouldn't forget the very large time consumption of this task. This procedure is compared to the phrase 'Searching for a needle in a haystack'. With the economic fluctuations, graduate overflow with specific qualifications in specific sectors within the market, the recruitment process is begging for help, and AI has made the lives of recruiters much easier and their jobs more manageable.

Taking the world to a completely new recruitment level, AI was the new 'Trend' for some years now being discussed in articles, research studies and blog posts. In some form, more and more recruitment software are making use of AI, and improving the speed, quality and efficiency of the procedure with better results.

It is safe to say that AI in recruitment is seen as the most present and accurate trend that will be dominating in this field for a very long time.

There is already a long list of applications that are recruitment-orientated, and so far there is nothing bad to say about the way it's helping in the tasks, and surely there are a few things to say about this phenomenon.

Recruitment market is a fast growing and innovative one. The applications, advancements and benefits that this development brings have only just kicked off.

At this point, there is already at least one AI powered solution for every part of the recruitment funnel, and thus justifies perfectly why recruiters and hiring managers should embrace this technology and AI applications. Besides reducing bias, it also improves candidate experiences and focuses on the human element in HR to other tasks which promotes further productivity.

Impact of AI in recruitment



Figure 9 Impact of AI in recruitment (source www.google.com)

The impact of Artificial intelligence computers and machines on workforce and recruitment is one of the hot topics lately. With the rapid pace of improvement from technology companies are finding way more ways of efficiently accomplishing basic tasks. And soon, technology will be able to do way more than just work faster and stronger compared to humans. Rise of AI will continue to rise and the capabilities of computers will enhance by becoming smarter, and able to do way more complex work.

Job advert writing.

The very first task of a recruitment process is writing the perfect job advertisement. Something unique, that will make people want to apply. We want to leave as little as possible to chance in this fierce competition for talent. That job advertisement will be the very first thing candidates will see from the company.

Textio is a great example of a company that really understands the importance of a good eye-catching online add. Creating a good ad, not only will attract a higher number of applicants, but also will attract diverse and qualified applicants too. But that's not all.

Textio also has a language pattern analysis that will make sure that some posts will succeed more than others and will get better exposure, thus securing a higher applicant's rate.



Figure 10 Textio AI powered text writing tool (source www.google.com)
Textio leverages an extensive database to help you write better

Sourcing candidates, an automated solution

Challenging and quite time consuming is the process of finding talents. Even when we know where to search for candidates, job boards, social media, newspapers etc, it will still take a lot of time. The latest development in AI for recruitment has made this process a very easy one with an application that automates the sourcing process and extending the search to allow for the analyse more than 300 million social profiles at once, something that no human capacity can do in such a short time.

HR Chatbot Landscape

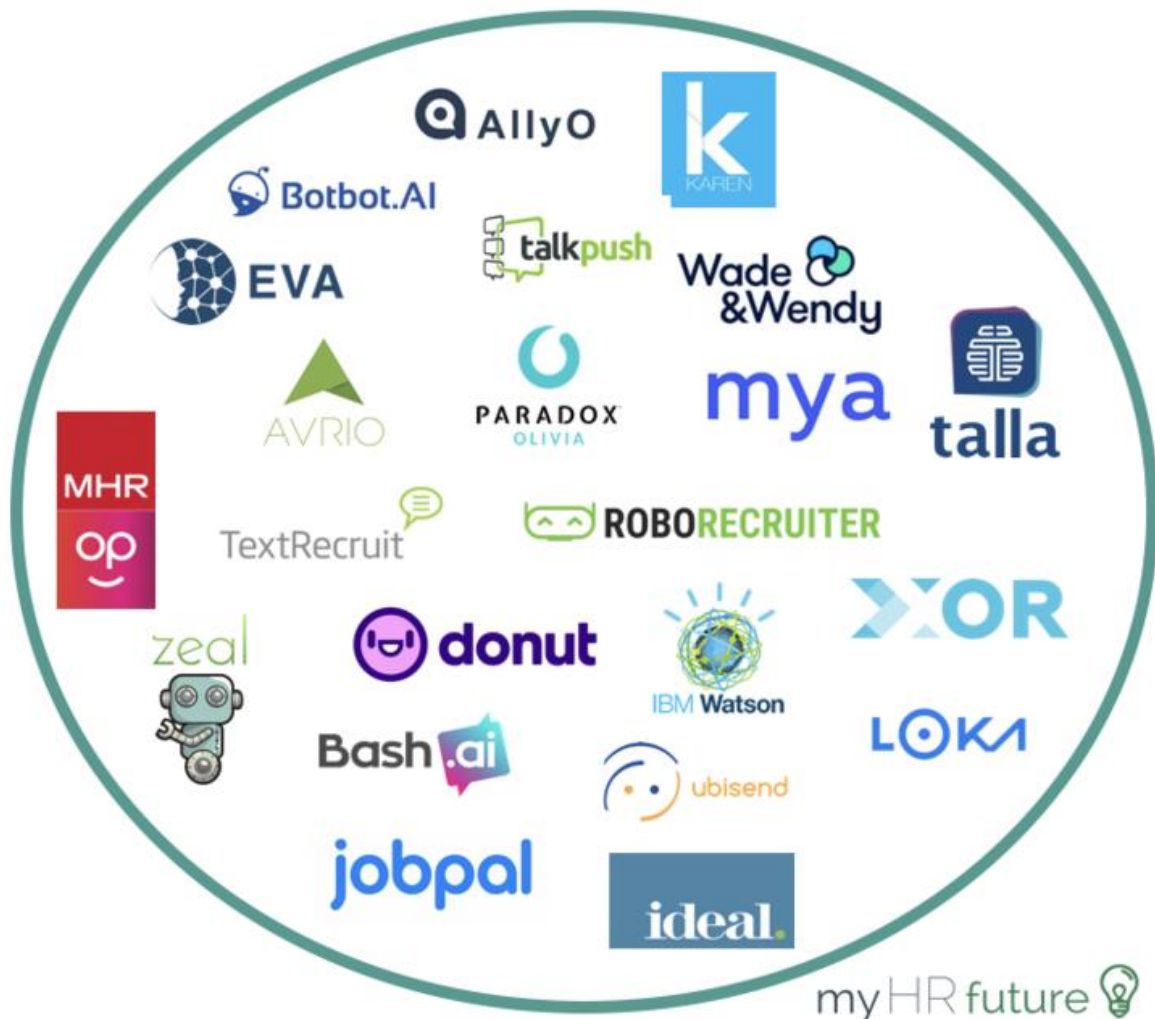


Figure 11 Chatbox tools available (source www.google.com)

From all that's out there, Chatbots is that one application that all HR tech experts agree on, and expect that this particular application will positively affect recruiting, employee services and employee development.

Used by many companies, AI powered assistance or particularly chatbots can among other things also reduce hiring time, increase the number of candidates who complete application processes, and effectively match applicants and requirements based on keywords.

We have all seen those pop-up boxes showing on the right side of websites usually with a similar message like ‘Hi, how may we help you’. If used wisely, these applications can make a big positive impact on the candidate experience.

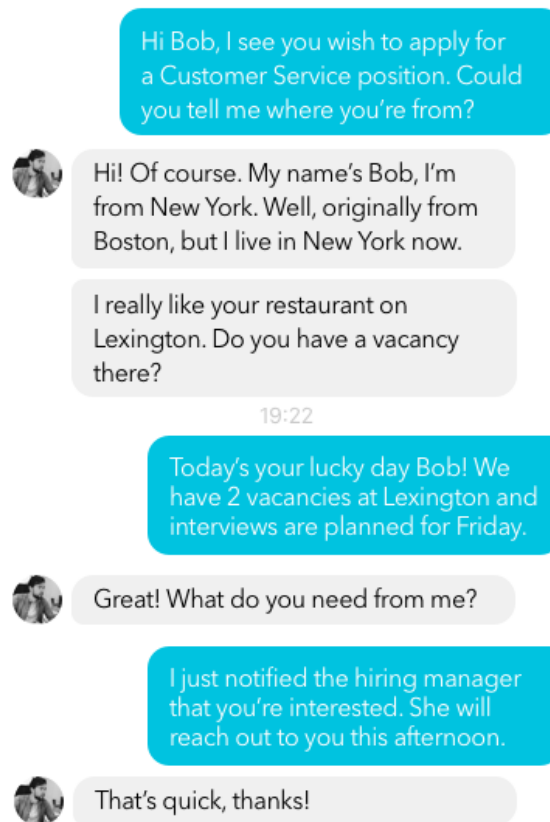


Figure 12 Maya, online chat box application

Maya

Another very useful application is Maya. Automates repetitive and humdrum recruitment process parts like sourcing screening and scheduling. Using natural language processing (NLP) as a tool to detect details from a conversation, Maya is powered by machine learning and she might just be the answer of the procedural hassle by creating candidate profiles, shortlisting and matching to requirements and so on.

Olivia

From Maya we go on to Olivia. Another AI powered application that mainly operates on communication and engaging candidates via web, mobile platforms, social channels and so on. Also using NLP, Olivia schedules parts of the recruitment process as well. Using these AI powered application has many advantages. Besides saving a tremendous amount of time for

recruiters and hiring managers, they also improve the candidate experience by regularly keeping communication with candidates, updating them in regards to their status of application, giving feedback and always being able and available to candidates for any questions they may have.

Beamery

While Maya and Olivia do the first step of recruitment processes, *Beamery* is another AI powered tool that focuses on candidates in a completely customer-oriented way and has even more work applications on building relationships with so called passive candidates. Identifying priority (passive) candidates and even suggesting the times best to reach out to them where there is a higher chance of getting through. Beamery would probably be the best example to take under consideration when trying to understand on how AI is being used for recruitment purposes by companies. Perfect tool for developing a better and more personalised ‘human’ relationship with candidates, and makes them feel appreciated by treating them more as customers.

Next level interviews

Already as an integrated part of recruitment, video interviews are making this procedure easier. It reduces the time spent by recruiters and hiring managers with organising, scheduling and taking part in physical interviews. This process also allows recruiters to have a better glimpse of someone’s energy and the way they present themselves, and gives a better overall impression of the candidate. As if that was not good enough, now AI developments for the recruitment process are taking things even further. AI driven specialized technical hiring platformed named Panna is able to provide ‘artificial intelligence hiring’ by making dynamic questions, recording interviews with voice and face detection and also expert evaluation.

This means that by using machine learning as a tool, we are able to verify the candidate’s behaviour and any other issues that might come up on their video interview. For example, where the candidate is looking, or if there is any other voice on the recording that may indicate cue cards or another person helping through the phone. Panna is able to easily and with great detail detect every single movement, and is aware of the surroundings.

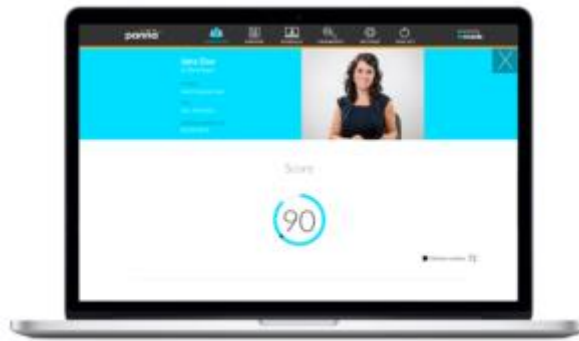


Figure 13 Paññā, AI powered tool with an intuitive interface (www.google.com)

But that's not all, this new interviewing way can also help us further. By being able to review the interview many times, we will be able to pick up on details like the way they present themselves, the candidate's energy, and body language which can tell a lot about a person's personality. With a bit of AI things get better, and more interesting. AI powered technology can also analyse candidates' facial expressions capturing their mood, feeling and assess their stress level and personality traits.

Companies that have adopted this AI powered application for interviewing seem to be very pleased with it, and also claim that for some of them it even has increased their ethnic and socioeconomic diversity. In many cases this is a good thing for a company and can have a positive impact on productivity. With proven advantages such as improving the happiness of employees, productivity and retention. Improving creativity and innovation. Positive impact on the employer brand and also increases the range or workforce skills, experiences and talents. All these are beneficial to the company.

However, this is not always welcomed from candidates. Sometimes the idea of being analysed by a machine can lead to self-consciousness which will make it harder for clear and accurate results.

Interviewer: how would you describe yourself?

Me: verbally, but I've also prepared a dance



Figure 14 AI video interview (www.google.com)

AI video interviews are still a bit of a shaky ground. Can the technology reliably analyse every face and form of expression?

Bias free process

As humans we are destined to make some sort of recruitment mistakes to our own bias. To some extent, we are all biased, but important to not let that impact our hiring judgment. As an issue that comes from human nature, emphasises the need for an AI powered application that will be able to make decisions based on pure results.

Mentioned above, Textio is one of those applications that will remove bias in job posting.

We also have the case of Harver that uses data and predictive analytics for predictions on the succession of an applicant at the position he/she applied, calculating a matching score for each candidate by taking under consideration specific job criteria and criteria that are directly linked to the cultural requirements of the company.



Figure 15 Harver, pre-hiring platform (www.google.com)

*With the Harver pre-hiring platform you can leverage
Data and Self Learning algorithms to make infallible hiring decisions*

Candidate Rediscovery

It's very often that in a company's candidate pipeline there are so many profiles that sometimes potentially talented candidates are hidden somewhere deep in the gutter.

The struggle for talent is real, especially in today's market, and it can happen that the best talent might be right there, just looking to be pulled out from the pile, and not spend money to get new talent and get them interested in the company. We might already have in the database what we are looking for. People that already know us

Nowadays lots of providers use AI technology for screening existing candidate pool for those candidates of the past who could be potentially strong and a good fit for the new position companies may have.

This application can rank those promising individuals and profile from months or years ago, that normally would have been forgotten deep in a database.

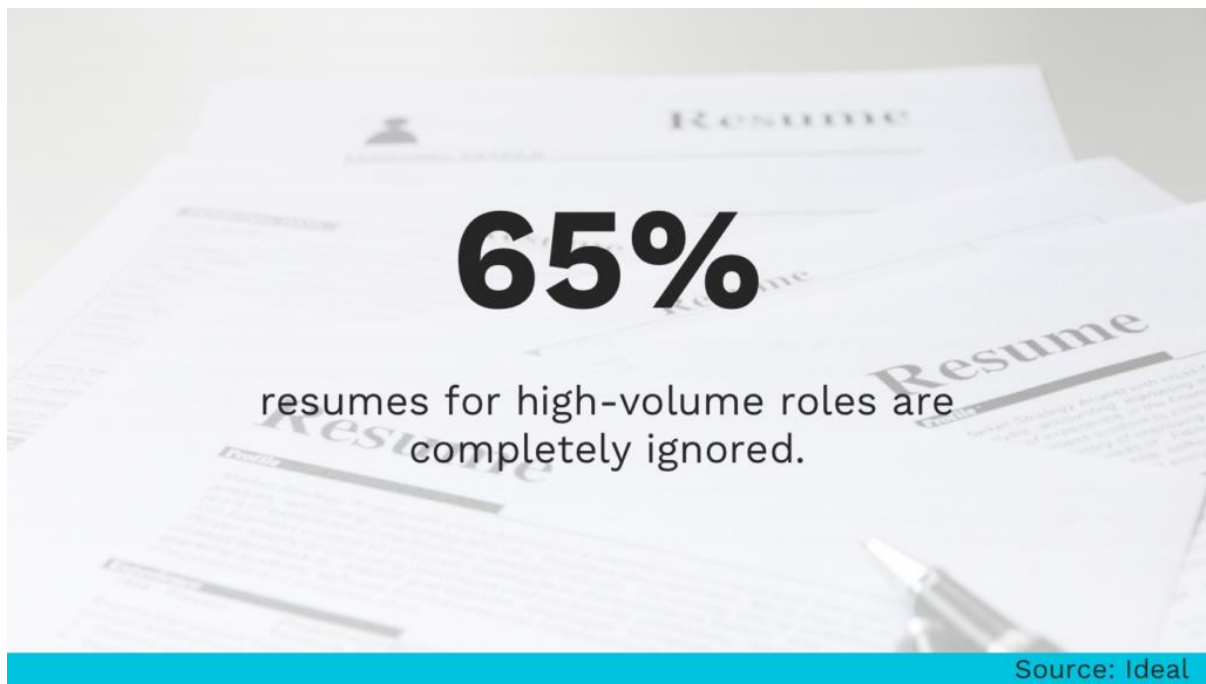


Figure 16 IDEAL survey on recruitment process and screening (source www.ideal.com)

When you're looking for talent, take a look into your own talent database. The best candidate for the role is probably there already!

AI beneficial and game changing for recruitment

There are many known benefits that we can think of when considering AI in the recruitment process. All of those play a very vital role in this process.

These applications are in title of way less, or no bias at all in the recruitment process. Machines are bias free when screening or selecting candidates.

With the help of AI in recruitment, we can also not only have quantity of candidates, but also quality. AI will make it easier to understand the attributes, competencies, skills and candidate knowledge, by providing recruiters with huge data and also unbiased candidate profile screening and selection improving the quality of hires.

Furthermore, AI also helps on better training and development of employees. This impacts positively the efficiency and productivity of the workforce.

And let's not forget it saves money and time, which are very important factors. By not needing the help of a third party for hire, as AI does the quality hire now, and also saves time by replacing human repetitive tasks.

Pitfalls and disadvantages

Sure, when correctly used, AI in recruitment can lead to great benefits and advantages. But considering the wide range of jobs that will be affected by AI and the way it will change the rules of workforce, it is very important to address potential pitfalls and disadvantages of these technologies.

Starting from the very obvious, the lack of human touch between an AI powered recruiting tool and the candidates. AI powered tools, as good as they may be for the workforce, lack in empathy and understanding human nature. Therefore, as a tool cannot fix people inside an organisation the way an HR professional can. AI is just a tool and as such it can only do as much work to save time and money, handling humans it's not one of the skills AI owns. Intelligent enough but no feelings, as such unable to understand humans.

Another major problem is the amount of data required to be able to understand the psychology of humans, as it is very complex and complicated.

Let's not forget the AI video interview case. Sure, it can help us detect certain things in a candidate's behavior. But, let's not forget the interview itself can be quite a stressful experience for lots of us, so who's to say that the applicant's behavior was not due to the stress caused by the interview and not to do with his personality?

Two things that are still unable to be replaced with software or technology are empathy and contextual understanding.

Or, the case where AI-driven recruitment tools choose a candidate as a perfect fit for a position, based on the experience and on the keywords set for the requirements. But what the technology will miss on the same candidate might have changed jobs over the past year more than four times.

The often-heard fear, that AI powered technology will replace humans and displace them from their positions. While true, there will definitely be an impact from AI, it's not as bad as we think it to be. Let's just think for a second. No jobs will be completely replaced, there will only be tasks, repetitive tedious and easy to automate tasks, enabling us humans to focus on more productive and important tasks that will bring value to the company.

What does the future hold?

Whether we like it or not, the future is uncertain. Looking at where we are now, with all of this tremendous AI driven applications out there, it's very likely that it will multiply, and the impact will be even greater.

Already seen as a big risk if trying to stay indifferent to change and look into the possibility of AI in organizations at this point. With the changes AI has done to recruitment so far, it is not the human capital replacement the risk companies will take not considering these technologies, but isolation of creativity, productivity and eventually becoming obsolete due to the fact that everyone around us will go through changes and we will keep the same paste and not able to follow.

The research methodology used in this thesis is divided in two types. Starting with a secondary data of research, such literature reviews, case studies and journals on Artificial Intelligence, AI experts are publishing their results sharing interesting results.

Among the companies which have been a benchmark for my research, are the conglomerates Uniliver, TOPBOTS, RALLYWAREM and IBM. Companies with excessive contribution to the subject with their research.

Starting with a company with more the 170.000 employees worldwide, Uniliver is one of the leading consumer goods companies in the world. The Dutch – British company for a while now has been using AI for recruiting purposes. Asking them about the benefits of AI in this particular area, the answer was simple. Increasing drastically diversity and cost-effective hire in entry-level employees. Instead of the known traditional talent acquisition way, where a representative is sent out to elite universities, collecting resumes and arranging the follow-up interviews via phone, or in person, Uniliver decided to go a step forward. They teamed up with the digital HR service providers, such as Pymetrics and HireVue, digitalizing the first steps of the process, and making it simple and less time consuming. But also, more efficient and cost effective. A candidate will only go through to an in-person interview if they pass the AI screening.

TOPBOTS, a leading research and advisory firm that connects Fortune 500 companies with emerging technologies in artificial intelligence has also published a survey on this matter. Results show that more than 60% of participants on their survey believed and agreed that AI's role in replacing those mundane and repetitive tasks in HR departments will only serve good by freeing time to focus on what really matter and what brings value for a company.

Rallyware – a workforce engagement platform also did a contribution to this field with their surveys that resulted on an increase in employee productivity as high as 32% in the companies that already have adapted AI for their HR departments and above 45% increase in employee retention.

Another interesting survey has also been conducted by IBM, an International Business Machines Corporation, the seventh-largest private employer in the United States (366,000 employees) with operations in over 170 countries. The survey was focused on the matters of ‘Impact of AI on HR’ and found that a high percentage of 46% believe that AI will have a huge impact on the talent acquisition and transform capability, while another 49% are of the opinion that AI will transform the administration process of payroll and benefits.

Following the secondary data above, the most suitable research method seemed to be a primary approach by phone interview. That method could assure an unstudied and honest response while I could guarantee a fast and concise questionnaire to the interviewees whose time is valuable. My target is a group of Human Resources professionals between the age of 28 to 40 years old, who are leading teams in different companies around Europe and further, in different sectors and markets such as finance, medicine, marketing, consultancy etc. These variables were set to help having an insight and determining the effects that might be caused towards business, and which could be the future expectations when it comes to recruitment process and automated workforce. 10 simple minded open-ended questions have been addressed to 30 participants, regarding the usage of AI in recruitment processes in their organizations, and the future expectations that will come along with AI developments.

Answers were noted and counted presenting them in percentage-based results.

A total of 30 companies spread all over Europe and not only, contributed to this research by phone interview.

Results are as follows,

Are you familiar with the term Artificial Intelligence?

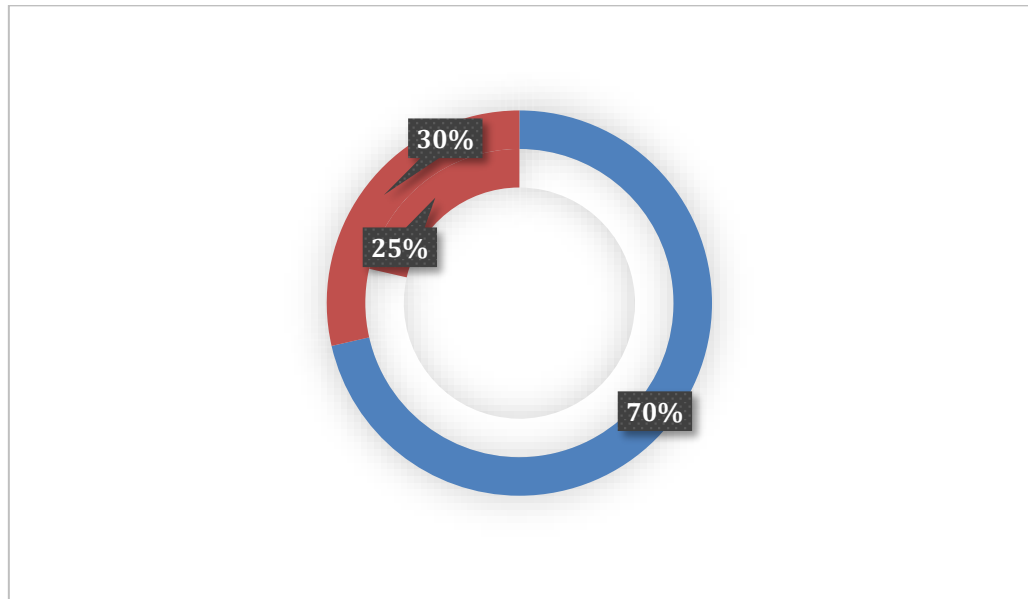


Figure 17 familiarity with AI term

In the pie chart above we will see percentage based on the answers from correspondents regarding familiarity with AI technology. While no negative replies were given on that question from any of the companies' representatives, only 70% of those offered a confident definition on what they believed the term covers. From the rest 30%, 25% seemed to hesitate to define further the term.

Do you believe that AI could replace human workforce?

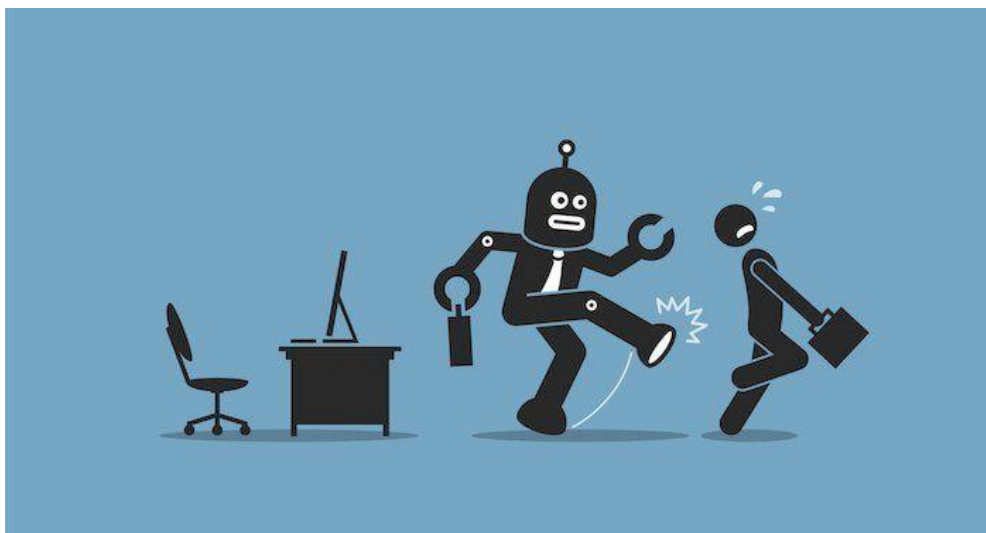
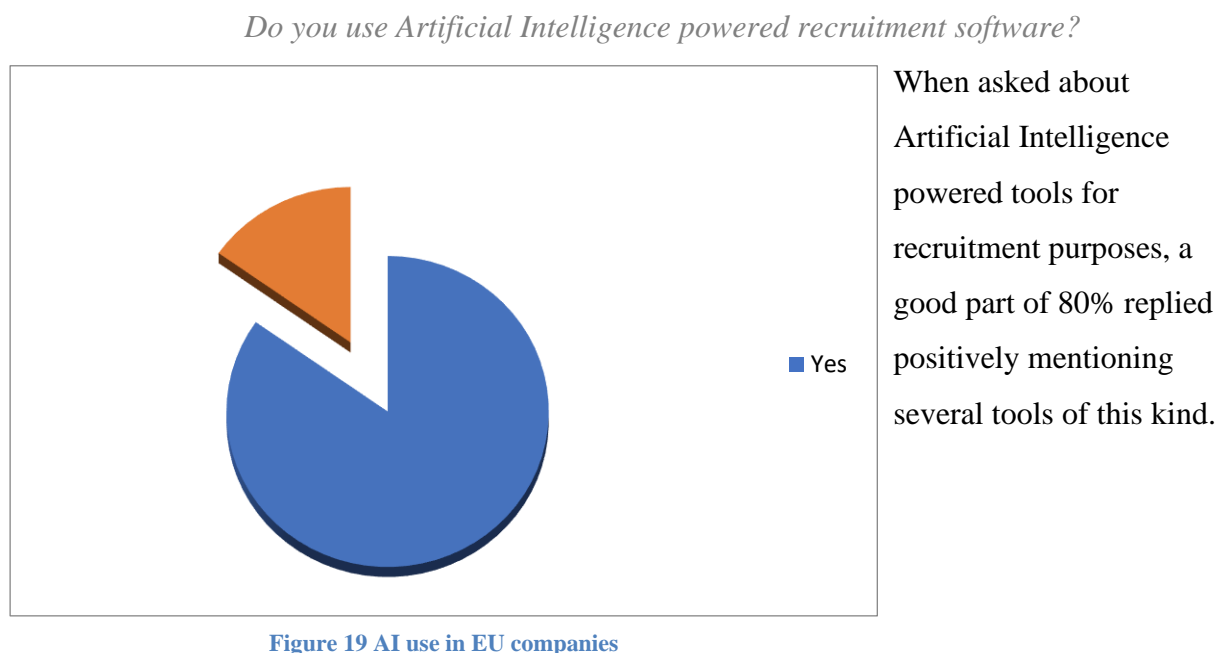


Figure 18 Fear or replacement by AI

Fear not. We want be replaced any time soon, if ever, at least based on the research respondents believes. Mundane and repetitive tasks are, and will be automated though, or rendered obsolete,

and recruiters are happy to delegate this matter with their new machine colleagues. In the years to come we will witness a talent landscape evolution, from the data driven methods, to the intelligent driven ones.

About 67% of research participants do not feel nervous or fear being replaced by AI machines. On the other hand, 7% fear losing their job to an artificial intelligence powered machine, and the remaining 26% believe that Ai will transform the role of recruiters and reshape it by giving more time for important soft skills development, and leave the time consuming, repetitive and tedious tasks to robots.



A 20% was unsure for tools of such kind. However, when examples of such tools were given the 15% also replied positively.

Where does AI take place in your recruitment process?

Front end of the hiring process is probably the most automated task in recruitment. Automating administrative tasks to free up time for more strategic work is how recruiters are managing and embracing AI in recruitment.

According to our research respondents, more than 90% of screening process is automated, sourcing is automated around 80%, and also scheduling results at 70% automation.

To what extent is the recruitment process in your company automated?

With a long way to go before being fully ingrained in the daily operations, recruitment automation presents a very good opportunity, agree most of recruitment professionals. Study respondents had different things to say about the automation process, but at the end, results were as follows. About 60% of the companies whose representatives participated in this research have a 90% automated sourcing and screening process and 70% of communication and interview scheduling.

Automate jobs, or augmentation?

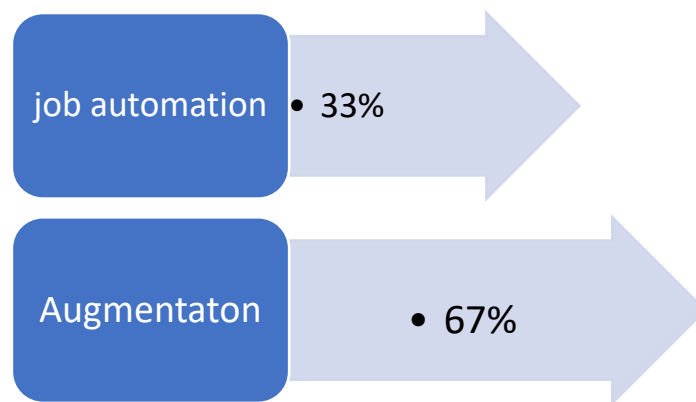


Fig. 20 Automate or Augment

While 67% of participants believe that augmentation is the way, they also believe that in some cases is better to automate the job then try and augment or automate specific tasks. 33% are of the opinion that some jobs should simply be automated to save further costs and risk further mistakes.

What are the benefits of AI powered tools for recruitment?

Let's face it. Recruitment process is full of those challenging tasks that not necessary require any particular skill. It is quiet of a humble process and as such there is so much space for errors when recruiters are juggling these tasks.

When asked about the main differences before and after the AI implementation in their recruitment process, we got few interesting insights.

More than 60% talked about the Time to Hire process and the fact that the rise of AI technologies and software for recruitment made this process shorter and easier. It has been a challenge for recruiters to keep low Time to Hire, and now with AI software this is possible with a drastic reduction on time used for this task. Investing in AI software has given the possibility to recruiters to streamline the process and cut down the headaches that came along with forever taking, high volume tasks. Another opportunity with the rise of AI recruitment tech, the ability to yield high-quality hires by making it easier to discover those applicants who might go overlooked or drown deep in the pool of applicants.

Furthermore, we have around 40% that talked about the goods that AI did for the overall candidate experience. Mentioning the frustration that was caused by the lack of interaction between the company and the applicant, which lead also to a general idea of how a company treats and values their people just by looking at the candidate experience.

AI frees recruiters time, and gives them the opportunity to be present more during the process of recruitment, and allows them for a more personal connection with candidates which is very important.

Conclusion

For years now, there is an ongoing debate whether AI will replace humans or will just work closely with them, supporting and improving the efficiency of workforce. An AI powered machine in itself has the ability to mimic human capabilities such as perception, learning, problem solving and decision making. In the HR department, this AI application will be able to streamline or automate some part of the workflow, the part that is repetitive, tedious and time consuming. It is important as a company to try out these tools, applications and AI powered machines to see the benefits it can bring for the company without fearing the change. To find the best way that works for the company for an automated recruitment process, that eventually will positively impact and improve the quality of the hires, applicants experience and most importantly the daily workflow of the recruiters.

We already know that many enterprises are using AI in their workforce, and it is increasing the percentage of companies adopting it over the years, with employees expecting that their job will be augmented to some level.

AI will Automate Screening and Reduce Human Bias

So, let's sum up what we think would be the benefits of AI as a recruitment software solution. We have already been through the possibility of bias free recruitment. AI software can be programmed to ignore any kind of candidate's background which normally would play a role if the recruiter would be a human. If we look back in 2015 when google began using internal recruiting tool called gDroid, which was programmed to provide more reliable interview questions to interviewers based on the position that a candidate applied for, and to completely ignore any kind of info from background. As AI powered software become more and more present in the recruitment segment, organisations seem to believe the biggest impact of AI in recruitment will be the idea that this way, the recruitment process will be bias free, less complicated with an automation of candidate screening process which will lead to less time-consuming processes.

Another promising benefit for companies using AI software for recruitment comes in the form of finance. With reduction of 71% in cost per hire and a threefold raise in the efficiency of recruiters. It also carries with it the potential of decreasing the bias caused unconsciously during

screening process just by ignoring age, race, sex and also applicant's demographic-related information.

Too good to be true? there is more ...

AI will be able to reduce errors and improve compliance fines by collecting and compiling data.

The biggest impact of AI in HR will be seen in corporate training and coaching augmentation. Using AI for coaching makes it easier for managers to understand the feedback that comes from the team and put it to use immediately without losing time. Furthermore, it can also replace delegation aspect of management, but will not be able or possible to replace the true leaders of a company. AI is indifferent and unable to replace soft skills to empower, motivate and develop employees. It's mainly technical what AI is capable of.

Through AI software, HR will become a strategic partner by adopting metrics and analytics. With the use of these mentioned features managers will have it easier to identify new hires, and have the best path figured out for them at the start. Starting from success probability, which will place the applicant with the right team, the right supervisor and recommend additional training opportunities that will bring the applicants skills to a more beneficial and higher level. It can also suggest career path options by flight risk and likelihood.

Another advantage that comes with AI is the capability of gathering more data on a candidate, and asses a lot of candidates *simultaneously*. One of the biggest challenges for HR departments was, and is finding the right candidates and selecting them from a large number of applicants. AI offers the possibility to automate a number of recruiting stages, and thus making it easier to screen the pool of applicants quickly and efficiently, and find the very best ones among all the others.

There are companies that provide AI recruitment solutions, such as GLINDER, for example. They use very sophisticated algorithms and make assessments of candidates' skill sets. Nowadays, with the help of AI powered software companies we are able to speed up the time of a hire, and not sacrifice the quality. Therefore, AI will reveal new insight on talent. Capable of providing insights on applicants that could open a new pool entirely just by identifying the diversity, abilities, experiences, mind-set that will be better success predictors for the new hires.

Bibliography

- Heene, A. and Sanchez, R. (Eds.) (1997), *CompetenceBased Strategic Management*, Chichester: John Wiley and Sons.
- G Liddon, (2006), "Forecasting a Competency Model for Innovation Leaders Using a Modified Delphi Technique. [Thesis.]Pennsylvania State University, 2006
- Bâra, A., Simonca, I., Belciu, A.& Nedelcu, B. (2016). Exploring Data in Human Resources Big Data. *Database Systems Journal BOARD*, 3
- Bellman, R. (1978). *An introduction to artificial intelligence: Can computers think?.* Thomson Course Technology.
- Bondarouk, T., & Brewster, C. (2016). Conceptualising the future of HRM and technology research. *The International Journal of Human Resource Management*, 27(21), 2652– 2671.
- Boydell, M. (2002). Internet recruitment helps HR careers. *Canadian HR Reporter*, 11 February
- Breugh, J. A., & Starke, M. (2000). Research on employee recruitment: So many studies, so many remaining questions. *Journal of management*, 26(3), 405–434.
- Chapman, D. S., & Webster, J. (2003). The use of technologies in the recruiting, screening, and selection processes for job candidates. *International journal of selection and assessment*, 11(2-3), 113–120.
- Charniak, E. & McDermott, D. (1985). *Introduction to artificial intelligence*. Reading: Addison-Wesley.
- Dhamija, P. (2012). E-recruitment: a roadmap towards e-human resource management. *Researchers World*, 3(3), 33.
- Haugeland, J. (1989). *Artificial intelligence: The very idea*. MIT press.

- KOPOULOS, A (2018) What Does Artificial Intelligence AI Mean for HR? <https://www.employeeconnect.com/blog/artificial-intelligence-hr/>
- Oracle (2015) AI at work https://www.oracle.com/a/ocom/docs/ytt-ai-at-work-report.pdf?source=:ex:pw::RC_APMK181112P00040:ANZInsideHR
- Indraneil, R (2015) Artificial intelligence will change recruitment <http://hr-gazette.com/artificial-intelligence-will-change-recruitment-2/>
- IGM 2016, Cognitive systems and the change in recruitment <https://www.ibm.com/blogs/watson-talent/2016/12/how-cognitive-systems-will-change-recruiting-in-2017/><https://dupress.deloitte.com/dup-us-en/focus/human-capital-trends/2017/predictive-hiring-talent-acquisition.html>
- Harver.com AI uses in recruitment. <https://harver.com/blog/uses-ai-in-recruitment/>
- Deloitte.com 2017. The future of work and recruitment <https://www2.deloitte.com/insights/us/en/focus/human-capital-trends/2017/future-workforce-changing-nature-of-work.html>

Appendix

The purpose of this research is to assess the condition and state of the effect of AI powered tool in recruitment, and map the abilities and predict future possibilities.

A survey has been conducted, a phone interview with the HR professionals in thirty companies across the globe operating in different markets. A total of six questions were asked and the results were collected and a conclusion was made based on these results combined with second hand data review.

Additional publications where this dissertation is based on will be linked below

Bradley, K., & Smyth, B. (2003). Personalized information ordering: a case study in online recruitment. In *Research and Development in Intelligent Systems XIX* (pp. 279-292). Springer, London.

Rafter, R., Bradley, K., & Smyth, B. (2000, August). Automated collaborative filtering applications for online recruitment services. In *International Conference on Adaptive Hypermedia and Adaptive Web-Based Systems* (pp. 363-368). Springer, Berlin, Heidelberg.

Färber, F., Weitzel, T., & Keim, T. (2003). An automated recommendation approach to selection in personnel recruitment. *AMCIS 2003 proceedings*, 302.

Kolbjørnsrud, V., Amico, R., & Thomas, R. J. (2016). How artificial intelligence will redefine management. *Harvard Business Review*, 2.

Rafter, R., Bradley, K., & Smyth, B. (2000, April). Personalised retrieval for online recruitment services. In *The BCS/IRSG 22nd Annual Colloquium on Information Retrieval (IRSG 2000)*, Cambridge, UK, 5-7 April, 2000.

Faliagka, E., Iliadis, L., Karydis, I., Rigou, M., Sioutas, S., Tsakalidis, A., & Tzimas, G. (2014). On-line consistent ranking on e-recruitment: seeking the truth behind a well-formed CV. *Artificial Intelligence Review*, 42(3), 515-528.

David, H. J. J. O. E. P. (2015). Why are there still so many jobs? The history and future of workplace automation. *Journal of economic perspectives*, 29(3), 3-30.

Bessen, J. E. (2016). How computer automation affects occupations: Technology, jobs, and skills. *Boston Univ. school of law, law and economics research paper*, (15-49).

Faliagka, E., Tsakalidis, A., & Tzimas, G. (2012). An integrated e-recruitment system for automated personality mining and applicant ranking. *Internet research*, 22(5), 551-568.

Holm, A. B. (2012). E-recruitment: towards an ubiquitous recruitment process and candidate relationship management. *German Journal of Human Resource Management*, 26(3), 241-259.

Girard, A., & Fallery, B. (2009). E-recruitment: new practices, new issues. An exploratory study.