MASTER THESIS

IMPLEMENTATION OF CHATBOTS FOR THE JOB SELECTION: ADVANTAGES AND DISADVANTAGES

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"Opportunities to find deeper powers within ourselves come when life seems most challenging".
(Joseph Campell)

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ABSTRACT

Currently, in a highly competitive global market where “the war for talent” takes place, companies are always more looking for new and innovative solutions that strengthen their selection processes. This research wants to investigate and explore where it is more profitable designing and inserting chatbots considering the different stages of the selection process, focusing attention on chatbot’s advantages and disadvantages of its implementation. A qualitative research method was adopted, in order to identify and understand in which stages of the selection process chatbots are most suitable to be implemented. A certain number of interviews with multiple HR professionals from different companies were conducted and then codified through the software program ATLAS.ti. Interesting results emerged, given that none of these companies adopts AI tools. Indeed, each HR professional described the proper selection process of the company, hypothesizing the implementation of a chatbot throughout it, coming to different conclusions. Since the answer to the research question is not so obvious and predictable, the successful implementation of a new technology needs to be properly accepted by those who will get in touch with it, showing a positive attitude. In other words, it is not just a question of understanding in which stages of the selection process chatbots are most suitable to implement, but also whether the company feels ready for the change it will bring.

Keywords: Chatbots, Screening, Assessment, Coordination, Implementation, Selection process, Advantages, Disadvantages.

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1. INTRODUCTION

Nowadays, organizations increasingly rely on digitalization and consequently, they are more likely to implement innovative tools in several stages of their value chain (Xu et al., 2018). Particularly, the adoption of Artificial Intelligence (AI) solutions that support traditional methods in carrying out the business arises from the radical transformation of our surroundings towards an unpredictable business environment characterized by changeable and volatile occupations (Hmound & Laszlo, 2019). Consequently, navigating into an uncertain, dynamic, and highly competitive global market where "the war for talent" takes place, effective and successful recruitment and selection procedures are required (Hmound & Laszlo, 2019). A practical example of fusion between AI technologies and HR practices is e-recruitment, a new field of application of AI solutions that represents a non-traditional form of how to attract and retain potential employees through the implementation of internet functionalities in every facet of the hiring process (Dhamija, 2012). Indeed, today the web is a powerful tool that allows organizations to cover and achieve the labor market as a whole (Black & van Esch, 2020) but what makes the difference is how organizations make use of these new instruments that are accessible to all.

Moreover, hiring new people became more a strategic issue, no longer just an operational decision. This is because HR managers need to identify, at the same time, available and needed capabilities for realizing future goals, adopting a long-term approach (Diez et al., 2020). Particularly, through the identification of skills and abilities necessary to realize and concretize business strategies, HR managers evaluate whether it is the case to recruit and select candidates outside of the organization or simply forecast training programs, promotions, lateral movements for those who are already in the company, balancing demand and supply. Yet, guaranteeing workforce diversity is another aspect that today organizations need to take into account and AI solutions promise to achieve this goal, individualizing the necessary optimal level of diversity (Diez et al., 2020; Upadhyay & Khandelwal, 2018). Therefore, HR managers are more willing to adopt AI solutions for supporting the HR processes as well as to guarantee a successful job matching (Heric, 2018). Echoing this development, Black and van Esch (2020) define AI technologies as "necessary-to-employ", no longer as simply "nice-to-have".

Generally, Upadhyay and Khandelwal (2018) argue that AI with its potential benefits is empowering the employers to better address the recruitment challenges during the identification, attraction, selection, and screening of candidates, speeding up the hiring process without compromising the quality of it. In particular, chatbots are peculiar AI assistants that interact and communicate with future employees through a "Natural Human Language" (Lokman & Zain, 2018), with the aim to create a positive candidate experience and evaluate candidates' qualities concurrently, allowing a form of

interaction between a human being and a technological machine. This leads chatbots also to find out feelings and attitudes such as anger, frustration, and de-motivation from those who interact with them, keeping higher the human engagement (Sheth, 2018) and embedding cognitive information in the recruitment process (Mohan, 2019). Hmound and Laszlo (2019) talked about mechanical, analytical, intuitive, and empathic AI tools, where chatbots can be described by characteristics that belong to both last two categories. Thanks to its features, this AI solution is able to outline a profile of who is talking to it based on given candidates 'answers and also evaluate whether the match could be realizable. Definitely, to work properly, these cutting-edge technologies require, firstly, a clear picture of the perfect candidate that organizations would like to attract and hire, providing to them more and detailed information about the ideal candidate, reducing more and more the margin of making errors, i.e. hiring the 'wrong' individuals (Bach & Edwards, 2005). This implies a careful and rigorous "Chatbots Design" (Balachandar & Kulkarni, 2018).

Chatbots promise a number of benefits deriving from engaging them such as cutting down time and hiring costs (Balachandar & Kulkarni, 2018; Hmound & Laszlo, 2019; Mohan, 2019; Navaz & Gomes, 2019; Sheth, 2018; Wilfred, 2018). Particularly, chatbots are able to focus on each candidate giving them the right attention and the support they need, managing each application efficiently (Sheth, 2018). At the same time, it is argued that chatbots can play a key role in pre-screening candidates through asking questions and queries 24/7, evaluating resumes through text message, email, social media, etc., and as a consequence cutting the number of candidates fastly (Mohan, 2019; Upadhyay & Khandelwal, 2018). Unlike humans, recruitment and selection activities carried out by chatbots are assumed not to be distorted by cognitive biases and chatbots are more objective too. Indeed, Upadhyay and Khandelwal (2018) argue that AI systems can avoid primary biases, sourced on information about name, education, gender, age, and nationality. This means that chatbots can be particularly useful to prevent traditional human errors particularly during the pre-screening processes (Black & van Esch, 2020; Hmound & Laszlo, 2019; Upadhyay & Khandelwal, 2018). Moreover, through their artificial agency, chatbots learn and improve their ability to select and to screen candidates thanks to the essential interaction with humans (Black & van Esch, 2020; Hmound & Laszlo, 2019; Van Rijmenam, 2019).

Looking at the latest literature, multiple studies have focused their attention on the relationship between recruitment and selection (R&S) process and AI and whether their combination could work, both without making a clear distinction between recruitment and selection processes and activities, and without specifying from which steps are composed of. Just to list some of them, Balasundaram and Venkatagiri (2020) identify six wide HR areas that are appropriate for the implementation of the robotic

process automation (RPA), i.e. software that can mechanically perform business process' steps that are repeatable, where activities concerning R&S process fall in these defined HR areas: HR strategy, Talent Acquisition, Talent Development & Performance Management, Compensation & Benefits, HR Operations, and Employee Relations. Black and van Esch (2020) argue that outreach, screening, assessment, and coordination are specific recruiting and selection procedures where it is possible to implement "AI-enabled recruiting tools". In the Albert (2019) study, eleven AI tools that can be implemented are mentioned, to support and solve several problems that could arise along the R&S process. These are vacancy prediction software, job description optimization software, targeted job advertising optimization, multi-database candidate sourcing, CV screening software, AI-Powered psychometric testing, video screening software, AI-powered background checking, employer branding monitoring, candidate engagement chatbot, and automated scheduling. Another study, conducted by Nawaz (2019), suggests that it is not profitable and effective to introduce several AI solutions throughout the recruitment process: the best approach is to insert these kinds of solutions only during the earlier stages of the process, crucial in identifying candidates who can improve the organization' talent pool.

An outlined distinction between recruitment and selection processes needs to be provided, being central for our study. Bach and Edwards (2005) define recruitment as the process through which are attracted individuals who might meet the job description and competencies required. While, selection is the process through which differences among candidates are assessed in order to find those who have a profile which best matches specifications indicated by the job description (Bach & Edwards, 2005). Specifically, Black and van Esch (2020) argue that outreach, screening, assessment, and coordination are four general sets of activities where "AI-enabled recruiting tools" can be implemented, drawing a 4-step process. Considering both recruitment and selection processes' definitions and the features of each phase described by Black and van Esch (2020) study, we argue that only screening, assessment, and coordination are phases proper of the selection process, so drawing a 3-step process (Figure 1). This conceptual distinction between recruitment and selection processes needs to be done because this research will focus its attention only on the peculiar selection process' phases where the main purpose is to reach a job match between the delineated professional figure from the HR professionals and the recruited candidates' pool, with the support of AI tools such as chatbot. Consequently, the aim of this research is to investigate and explore which of these cited phases of the selection process are the most suitable for the application of chatbots, considering advantages and disadvantages of its implementation already identified by the literature. Therefore, the following research question needs to be answered: *In which stages of the selection process chatbots are the most suitable to be implemented?*

Answering this research question means providing more evidence about where it is more profitable designing and inserting chatbots considering the different stages of the selection process since little has been investigated, expanding existing literature on this topic. Particularly, highlighting chatbot's pros and cons, not only help HR professionals in evaluating its implementation along the selection process, but also support HR's evaluations about the adoption of this kind of AI tool along their peculiar selection process. As a result, this research could be eye-opening, providing indications and demos, for those companies who are thinking of implementing an AI tool as a chatbot throughout the selection process. Therefore, this research aims to provide food for thought to HR professionals to expand and enrich their knowledge about the implementation of AI tools along with the selection process, in particular chatbot's potential benefits and drawbacks.

2. THEORETICAL FRAMEWORK

2.1. Chatbot's implementation along the selection process

The implementation of a new technology is defined as its introduction and provision in the organization, creating the chance to increase organizational performance (Davis, 1989). Particularly, web-technology's implementation in the HRM context, that is e-HRM (Ruël et al., 2004), could bring several organizational benefits, e.g., increased efficiency, effectiveness, and HR service quality (Ruël & Van der Kaap, 2012), depending on the user's willingness to accept and actually use it (Venkatesh et al., 2003). Therefore, to create value the technology needs not only to be implemented but also to be accepted and properly used by organizational actors. Indeed, researchers such as Davis (1989) with the Technology Acceptance Model (TAM) argue that behavioral intention is the factor that leads actors to use the technology and it is positively related to their attitude toward it. In turn, their attitude is influenced by perceived usefulness, that is the extent to which people perceive that the use of the technology will improve their performance, and perceived ease of use, which is people's feeling that the use of a technology will require fewer efforts (Davis, 1989). Consequently, according to TAM, it can be argued that whether the e-HRM system is not easy to use and useful for them, employees' intention is affected negatively and technology will not be used at all. Therefore, ease of use and perceived usefulness are decisive, considering them as predictors of adoption intentions of employees. Moreover, Orlikowski and Scott (2008) with the sociomateriality perspective highlights that knowledge practices, that is how people employ knowledge in a specific work environment, and technology cannot be separated because these entities acquire their form and properties

through their reciprocal interactions, becoming part of the reality that we are experimenting. Balasundaram and Venkatagiri (2020) in their research elaborate the HR RPA Maturity Model through which organizations undertake a path of transformation by way of three crucial stages: Initiation stage, Industrialization stage, and Institutionalization stage. Moreover, here it is highlighted how it is crucial that the realization of the RPA potential requires creating awareness within the HR organization as well as in the organization as a whole, organizational adaptation to RPA, and requiring specific skills and capability, resulting in an entanglement of technology and humans.

Actually, tensions can arise because machines may replace humans in decision-making positions, causing discomfort and unwillingness to work with AI tools. Kaplan and Haenlein (2019) and Jarrahi (2018) highlight that the best results come from the collaboration of both humans and machines. There must be no debates about who is better in deciding between a human and a machine: both can support each other to maximize beneficial effects that can be produced through the collaboration.

Olivia, Xor, Mya, Hirevue, Wade and Wendy, Ideal, Symphony Talent, Eightfold, Brazen, Arya, Humanly, Expressive are declared to be the Top 12 Best Recruiting and HR Chatbots[1] as of March 2021. Showing some statistics, this article argues that chatbots can handle as many as 80% of standard questions within minutes, saving precious time. 23% companies[2] that are already using AI-powered technology, are successfully streamlining their recruiting efforts. Moreover, taking into account that over half of all applicants[3] give up on a company whether they haven't received a response from them within two weeks of applying, 31% of those candidates[4] expect a customized message, which chatbots are capable of curating as they leverage existing data, machine learning, and natural language processing to make interactions personalized.

2.2. Main stages of the selection process

Here, screening, assessment, and coordination that belong to the selection process are described in detail, making this distinction fundamental in our study since our attention is focused on evaluating chatbots' role along the selection process' steps. The selection process is the process through which differences among candidates are assessed in order to find those who have a profile which best matches specifications

[1] Retrieved from: https://www.selectsoftwarereviews.com/buyer-guide/hr-chat-bots
[2] Retrieved from: https://www.gartner.com/en/newsroom/press-releases/2019-06-19-gartner-identifies-three-most-common-ai-use-cases-in-
[3] Retrieved from: http://press.careerbuilder.com/2018-10-30-Job-Seekers-Are-Now-in-the-Drivers-Seat-and-Expect-Next-Gen-Recruiting-and-New-Hire-Experiences-Survey-Finds
[4] Retrieved from: http://press.careerbuilder.com/2018-10-30-Job-Seekers-Are-Now-in-the-Drivers-Seat-and-Expect-Next-Gen-Recruiting-and-New-Hire-Experiences-Survey-Finds

indicated by the job description (Bach & Edwards, 2005). The cited stages by Black and van Esch (2020) are described below and represented by Figure 2.

Screening. Recruiters argue that the most challenging part of the recruitment process is screening the right candidates from the large pool of applicants (Wilfred, 2018). Consequently, in the screening stage, the application of AI tools can help organizations to drop their time-to-hire and, at the same time, improve the quality of hire. Indeed, nowadays AI-enabled screening is conducted by highlighting keywords into received applications (van Esch et al., 2019; Nawaz & Gomes, 2019; Schildknecht et al., 2018). In this way, organizations are able to select and evaluate the CVs that match organizational requirements in the shortest possible time. Black and Van Esch (2019) reported that Unilever, employing HireVue, dramatically increased the speed and quality of the finalists who were subsequently interviewed in person and made offers.

Assessment. During this selection stage various methods are applied through which candidates' personalities, traits, and capabilities are understood and delineated by organizations. One possible way to assess candidates' skills and abilities is structuring a decision-making game where high performers are involved and patterns into responses are identified. Consequently, candidates play the same decision-making game and their answers are compared to well- performing employee responses (Diez et al., 2020). Also, motivational fit can be measured by simulating a "worst day" and, at the end, whether a candidate is still feeling energetic and motivated, this can mean that he\she is ready and suitable to join the company (Diez et al., 2020). In this context, chatbots can be designed to ask questions on specific themes in order to evaluate candidate qualities. Indeed, both Hmound and Laszlo (2019) and Nawaz and Gomes (2019) studies argue that chatbots can carry out short interviews and perform assessment tests.

Coordination. It refers to the general optimization of the process given by the harmony among practices embedded in each step. A higher quality of recruitment and selection practices create a positive candidate experience, increasing the likelihood that candidates will say 'yes' to the job offer at the end of the process. Equally important, it is to ensure a positive recruitment experience for those who are rejected: they could be future employees that today are not a good fit for available vacancies. Indeed, one of the main recruiters' challenges is to provide real-time feedback to applicants, particularly for those who were rejected. Chatbots can accomplish this task by reducing recruiters' duties and increasing a candidates' good experience and their engagement (Navaz & Gomes, 2019) for example carrying out typical activities of the onboarding phase. Indeed, a chatbot has a potential to improve the candidate's experience (Burgess, 2018) by providing consistent instantaneous updates throughout the application process which eliminates the communication gap between recruiters and applicants when dealing with a

large pool of candidates. Moreover, chatbots can support candidates answering questions and providing information in any missing and unclear stuff for both hired and rejected candidates, keeping their level of engagement higher (Navaz & Gomes, 2019).

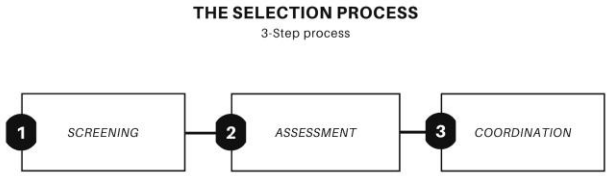

Fig. 2 Source: Adopted from Black and van Esch (2020)

2.3. Overview of anticipated Chatbots' advantages and disadvantages

In this study, Artificial agency of chatbots, Cutting down time and hiring costs, 'Natural Human Language' of chatbots, Feedback on candidates' applications, Cognitive biases, Chatbots and candidates' interaction, Performance simple and/or repetitive tasks, and Anxiety of automation phenomenon are the main categories of pros and cons about the implementation of chatbots during the selection process. In building these eight categories, it took a cue from Geetha and Bhanu (2018) and Mohan (2019) studies. Indeed, Geetha and Bhanu (2018) argued the importance of AI in recruitment, listing potential benefits and summarizing them identifying different categories: Time savings, Mapping of Talents, Costs saving, Hire with Quality, Query redressing, Unbiased recruitment, and Quality aspirants. Instead, Mohan (2019) study provided a shortlist of the main chatbot' benefits in addressing recruiter's everyday challenges, without creating defined categories. As a result, some existing studies individualized broad categories only when they are talking about advantages of implementing AI and/or chatbots along the recruitment process, without taking into account drawbacks. Therefore, in most categories explained below in detail, it is cited an advantage and a disadvantage that can be linked to the same broad category, shown by Table 1, given that for this research both pros and cons need to be considered in the evaluation of chatbots' implementation.

Artificial agency of chatbots. It is a well-known fact that chatbots, as other AI tools, improve their ability to select and to screen candidates thanks to the essential interaction with humans (Black & van Esch, 2020; Hmound & Laszlo, 2019). Their ability to make autonomous decisions and to change consequently to reactions of actors involved can be defined as their artificial agency which allows them

to improve their capacities to perform and integrate itself in the work environment (Van Rijmenam, 2019). But an insufficient amount of data and information can impact on the quality of chatbots' performance, slowing down the chatbots' learning process or even making it impossible, without optimizing the process itself (Schildknecht, et al., 2018).

Cutting down time and hiring costs. Generally, the most frustrating activities for those who are responsible for recruitment and selection procedures through the analysis of the myriad of resumes that they receive is screening and assessing candidates (Hmound & Laszlo, 2019). Chatbots can enable to reduce time-consuming and costs associated with recruiting and selection activities (Balachandar & Kulkarni, 2018; Hmound & Laszlo, 2019; Mohan, 2019; Navaz & Gomes, 2019; Sheth, 2018; Wilfred, 2018), for example evaluating and selecting more compelling resumes concurrently during these early stages of the process. In this way, recruiters and managers can turn their attention on issues that are strategically important. Additionally, Geetha and Bhanu (2018) in their study, talked about the "Mapping of Talents" activity through which HR professionals and chatbots can identify potential talents concurrently based on job vacancies that need to be filled into the organization, performing practices that aim to find talents for the right job. Black and Van Esch (2019) states that reducing time-to-hire represents not just an efficiency gain but also a potentially strategic advantage in the battle for attracting and hiring valuable human capital, especially in industries in which there is high competition and turnover.

'Natural Human Language' of chatbots. Chatbots are peculiar AI assistants that interact and communicate with future employees through a 'Natural Human Language' by using contextual words, shorthand, emotions (Lokman & Zain, 2018; Navaz & Gomes, 2019), with the aim to create a positive candidate experience and concurrently evaluate candidates' qualities. This also leads chatbots to find out feelings and attitudes such as anger, frustration, and de-motivation of those who interact with them, keeping higher the human engagement (Sheth, 2018). But, based on Schildknecht et al (2018) study, natural language's intelligence is a double-edged weapon: ambiguities of terms, irony, colloquial language or spelling mistakes can jeopardize chatbots' ability to interpret the answers' questions, influencing the whole process.

Feedback on candidates' applications. Notably, chatbots can provide real-time feedback on candidates' applications, both starting the activity of screening applications (Mohan, 2019) and increasing candidate engagement especially during the early stages of the selection process. Indeed, they can provide an excellent candidate experience by giving timely replies to candidates' questions, and offering regular updates about their application status. However, the level of engagement could decrease

when candidates do not receive any feedback from who was assessing and managing their own applications, bringing out negative feelings (Hmound & Laszlo, 2019). At the same time, AI assistants can also send feedback to recruiters about candidates' experiences, providing information to optimize the process (Upadhyay & Khandelwal, 2018). However, a lack of understanding, disrupting communication between applicants and the chatbot can manifest and this can result in a negative attitude towards it and to its future adoption and implementation from organizations (Schildknecht et al., 2018).

Cognitive biases. About human biases that can be involved, chatbots avoid the activation of these cognitive mechanisms resulting more trustfully and fairly than humans (Black & van Esch, 2020). Indeed, Navaz and Gomes (2019, p.3) stated that: "Chatbots are a great assistance to recruiters with their prompt replies and instant availability." Again, Black and van Esch (2020) listed some biases that can affect recruiters, influencing their judgments: Anchoring bias, that is the tendency to fixate on initial information and fail to adequately adjust for subsequent information; Confirmation bias, that is seeking out information that reaffirm our past choices and avoiding information that contradict past judgments; Similarity bias, that is the tendency to overestimate and prefer people who are similar to us regardless whether these similarities could produce positive or negative effects. Without a doubt, chatbots operate in relation to information that are in line with ideal professional figures suitable for available job vacancies and the success of AI depends on data employed and shared with them. Indeed, it is necessary to be careful about data used as input: if data input is biased, results could be affected by biases and chatbots transparency is jeopardized (Mohan, 2019).

Chatbots and candidates' interaction. Dimitriadis (2020) showed that, generally, people feel more confident when interacting with a chatbot, giving them a sense of control. Indeed, job seekers feel more free to ask questions that they would not ask to recruiters directly, e.g., about salary, parental leave, and workplace diversity (Kuksenok & Praß, 2019). At the same time, it can happen that those who are interacting with web-based HR tools, have not clear to what extent the provided information are stored and this could lead candidates to be unwilling to share sensitive personal information (Ruël, et al., 2004; Schildknecht et al., 2018).

Performance of simple and/or repetitive tasks. Digitalization phenomenon consists in the automatization of parts of brain labor that can be automated (Black & van Esch, 2020), teaching machines how to perform and AI innovations can be implemented to integrate and to support conventional processes. Chatbots are an innovative AI tool that HR managers can employ in supporting their activities throughout the selection process performing targeted queries during their interaction with candidates. Savola and Troqe (2019) claimed that chatbots can help HR professionals by dealing with activities as

asking and replying to frequently questions on employee benefits or company culture, and thus allowing human recruiters to concentrate on the later stages of the process, while AI increasingly takes care of the candidate selection, screening, and testing.

Anxiety of automation phenomenon. However, HR recruiters could feel anxiety about the automation phenomenon, manifesting, more or less clearly, their propensity to accept the new trend of automatization (Eißer et al., 2020; Pachidi et al., 2021). On the other hand, Balachandar and Kulkarni (2018) argued that this kind of AI solution is not able to completely replace human activities: chatbots have to be integrated into practices performed simultaneously also by humans. Indeed, intuition of managers is an aspect of the decision-making process that is required in recognizing decision situations and cannot be replaced completely by any advanced technology.

Table 1. Overview of anticipated Chatbots' advantages and disadvantages

Main topic	Advantages	Disadvantages
Artificial agency of chatbots	Continuous ability of chatbots to learn and improve (Black & van Esch, 2020; Hmound & Laszlo, 2019; Van Rijmenam, 2019).	An insufficient amount of data and information slows down the chatbot's learning process or makes it impossible, without optimizing the process itself (Schildknecht et al., 2018).
Cutting down time and hiring costs	Chatbots can reduce time-consuming and costs associated with recruiting activities (Balachandar & Kulkarni, 2018; Hmound & Laszlo, 2019; Mohan, 2019; Navaz & Gomes, 2019; Sheth, 2018; Wilfred, 2018).	
'Natural Human Language' of chatbots	Chatbots are able to find out feelings and attitudes of those who interact with them (Sheth, 2018), embedding cognitive information in the recruitment process (Mohan, 2019).	Ambiguities of terms, irony, colloquial language or spelling mistakes can jeopardize chatbot's ability to interpret the answers' questions, influencing the whole process (Schildknecht et. al., 2018).

Feedback on candidates' applications	It can provide real-time feedback (Mohan, 2019), increasing candidates' engagement (Sheth, 2018).	Lack of understanding, disrupting or even interrupting communication between candidates and the chatbot could result in negative attitudes towards it and to its future adoption and implementation from organizations (Schildknecht et al., 2018).
Cognitive biases	Chatbots avoid the activation of cognitive mechanisms resulting more trustfully and fairly than humans (Black & van Esch, 2020).	If data input from organizations is biased, results could be affected by biases and chatbots transparency is jeopardized (Mohan, 2019).
Chatbots and candidates' interaction	Job seekers feel free to ask questions that they would not ask to recruiters directly (Kuksenok & Praß, 2019).	Candidates are unwilling to share sensitive personal information if they are not clear to what extent the provided information is stored (Ruël, Bondarouk, & Looise, 2004; Schildknecht et al., 2018).
Performance of simple and/or repetitive tasks	Chatbots can help HR professionals by dealing with activities such as asking and replying to frequent questions on employee benefits or company culture, and thus allowing human recruiters to concentrate on the later stages of the process (Savola & Troqe, 2019).	
Anxiety of automation phenomenon	Chatbots have to be integrated into practices performed simultaneously also by humans (Balachandar & Kulkarni, 2018).	Anxiety due to the automation phenomenon could affect organization propensity to adopt chatbots (Eißer et al., 2020; Pachidi et al., 2021).

3. METHODOLOGY

3.1. Research setting

To identify and understand in which stages of the selection process chatbots are most suitable to be implemented, a qualitative research method was adopted. Indeed, the interviews can help to collect key information about respondents' attitudes, experiences, and opinions, gaining interesting insights about

the topic investigated (Rowley, 2012) leaving them a deal of freedom in answering and enabling flexible speeches. As a result, given the exploratory nature of this study, a qualitative research method enables researchers to have an in-depth understanding of phenomenon, collecting interviewees' opinions and thoughts through better interaction with them, gaining more details of a topic and finding new ideas, problems, and opportunities. Actually, establishing direct contact, interviewees feel to be involved and central in achieving the research's goal, sharing and providing honest and detailed information essential for answering the research question (Hurt & McLaughlin, 2012), by using an emphatic approach.

By most of previous studies about similar topics, such as Nawaz (2019) who investigated how AI impacts on the recruitment process, a quantitative research method was adopted, without exploring the social aspects of the phenomenon, drawing general conclusions on observable, measurable, and objective facts that hold for all. Instead, adopting qualitative research means encouraging interpretivism, arguing that knowledge and truth are subjective and dependent on people's experiences and understandings, providing new and interesting insights and enriching existing knowledge (Jiang et al, 2021). As a result, a certain number of interviews were conducted with multiple HR professionals from different companies to understand in which step of the entire selection process is better to place a chatbot in order to benefit from unquestionable advantages that this solution can bring to organizations and also to discover how they better work and interact with humans.

Interviewed HR professionals were selected based on two criteria: they are working for large companies with more than 5000 employees managing big number of CVs, and belong to sectors highly specialized and easily affected by technological advancement and implementation of AI tools, i.e. research and selection of personnel, mechanical or industrial engineering, industrial machineries, IT and services, human resources, and ecosystem services. Indeed, the size of the company and the kind of business sector are two factors that can influence the adoption and the choice of AI solutions. Indeed, Albert (2019) through his study showed that large companies and/or organizations that operate into sectors that require the use of innovative technologies are more propense to adopt these cutting-edge technologies. Moreover, multiple HR professionals belonging to different sectors allow to have a more representative sample and to explore whether the implementation of a chatbot throughout the selection process changes from one industry to another.

3.2. Data collection

Semi-structured interviews were conducted with Italian HR professionals, given that only Italian HR professionals were contacted. Questions are to some degree predetermined based on the topic of interest

but, at the same time, it ensures flexibility in answering because of their open-ended nature. In this way, there is a room for discussion and respondents are not affected by binding questions (Longhurst, 2003). All interviews were transcribed with Microsoft Word through its functionality of transcribing, anonymized, and made available in the form of digital documents. In total, of forty-two HR professionals contacted, eight semi-structured interviews were conducted in July 2021 each lasting about thirty-five minutes. Nevertheless, eight-interviews allowed the research to reach a theoretical saturation.

Interviews with HR Recruiter (HRR1, HRR2), a Talent Acquisition Recruiter (TAR), a HR Manager (HRM), a Junior HR Specialist Intern (JHRSI), a Learning Business Partner (LBP), a HR Organization & Development Manager (HRODM), and a HR Consultant (HRC) were performed. Specifically, in Table 2 are shown more precise characteristics of the eight interviewees and their companies, specifying interviewees' role in their company, how long they are employed in their company, company's industry, company's size, whether the company operates at international level, and an approximate number of job vacancies per year. About this last item, some of the interviewed HR professionals did not provide this information because of privacy concerns. Moreover, this information was asked when interviews were already completed, and for some HR professionals was hard to obtain due to the high number of available job vacancies during the year.

Respondents were contacted through LinkedIn, sending to them a message, and selected based on criteria defined in the above paragraph. Interviews were conducted by phone, due to the COVID-19 pandemic that limited face-to-face interactions, and the transcripts were subsequently sent to the interviewees through an email in order to guarantee the trustworthiness of the gathered data. Moreover, it was worthwhile to add the text of the message to the interviewees, the interview guide, and interview questions to strengthen the reliability of the research and provide more detailed information about how the qualitative research was conducted. In the Appendix A, it is shown the text of the message to get in touch with them both in Italian and in English. Based on Menzies et al (2016) guidelines, the text message is structured as follows: introduction of myself, explaining my role; provide a clarification of the goal of the research and how conducting an interview with them will help accomplish that goal; inform interviewers about how long the interview will last. From what can be perceived from the text message, at the beginning the main goal of the research was specified. As a result, those who replied to my message knew what a chatbot is and how it is structured. In the Appendix B, both the interview guide and interview questions are provided. Particularly, a list of the topics that are investigated in the interview with questions to answer under each topic is provided. Indeed, creating a guide can help to focus and organize a line of thinking and therefore right questioning (Menzies et al., 2016).

Table. 2 Characteristics of eight interviewees and their companies

	Interviewee role in the company	Experience in the company	Company's industry	Company's size	Type of company	Approximate number of job vacancies per year
1	HR Consultant	10 mouths	Research and selection of personnel	5.000 - 10.000 employees	Multinational	-
2	HR Manager	5 years and 9 months	Mechanical or industrial engineering	More than 10.000 employees	Multinational	35
3	HR Recruiter	3 mouths	Research and selection of personnel	About 5.000 employees	National	6 - 10
4	Learning Business Partner	4 years and 6 months	Human Resources	More than 10.000 employees	Multinational	-
5	HR Recruiter	3 mouths	Human Resources	5.000 - 10.000 employees	Multinational	10 - 15
6	HR Organization & Development Manager	19 years and 4 mouths	Mechanical or industrial engineering	About 5.000 employees	Multinational	20
7	Talent Acquisition Recruiter	3 mouths	IT and services	More than 10.000 employees	Multinational	-
8	Junior HR Specialist Intern	2 mouths	Ecosystem services	More than 10.000 employees	Multinational	-

3.3. Data analysis

About data analysis, interviews were codified through the software program ATLAS.ti. Preliminary code books were elaborated based on theoretical concepts above explained (Pearse, 2019), i.e. the selection process' steps and anticipated chatbots' advantages and disadvantages of their implementation. Moreover, during the process of coding, several codes were added (inductive) based on new input from interviewees. As a result, the used approach can be seen as a combination of deductive and inductive

approaches, a method that is acknowledged by many scholars and extensively described by Grodal et al. (2020).

Using faithfully respondents' own terminology, twenty-eight open codes have been elaborated with exemplary quotes and discussed in detail during the findings section of this work. Then, twelve subcategories were identified based on pros and cons emerged during the interviews. Some of the subcategories were taken from the literature, such as *Artificial agency of chatbots*, i.e. continuous ability of chatbots to learn and improve, *Cutting down time and hiring costs*, i.e. chatbot implementation to reduce time-consuming and costs associated with selection activities, *'Natural Human Language' of chatbots*, i.e. ability to find out feelings and attitudes of those who interact with them, *Feedback on candidates' applications*, i.e. timely replies to candidates' questions and offer regular updates about their application status, *Cognitive biases*, i.e. chatbots are assumed not to be distorted by cognitive biases and are more objective too, *Chatbots and candidates' interaction*, i.e. interaction between humans and a chatbot, *Performance simple and/or repetitive tasks*, i.e. automatization of parts of brain labor that can be automated, and *Anxiety of automation phenomenon*, i.e. chatbots integration into practices performed simultaneously also by humans.

Since other interesting inputs emerged during interviews, it was necessary to codify them and add new subcategories, namely *Strengthening the organizational image*, implementation of a chatbot along the selection process can provide a successful candidate experience, improving organizational image, i.e. *Reliance on activities carried out by chatbot*, i.e. trust of human beings on results provided by AI, *Features of chatbots' questions*, i.e. kind of questions that a chatbot can ask to candidates in order to grasp right information, *Unpredictability of human beings*, i.e. a factor that characterize human beings and hard to forecast by an AI, and *Providing a complete feedback*, i.e. multiple elements need to take into account when a feedback is provided.

Finally, those subcategories were linked to a particular stage of the selection process, identifying pros and cons of implementing a chatbot in each stage. But some of these subcategories are not specific enough to connect them to a particular stage of the selection process. As a result, besides *Screening*, *Assessment*, and *Coordination* it was added another category that is called *Entire selection process* where are linked subcategories that refers to pros and cons of implementing a chatbot along the selection process as a whole.

A data structure in Appendix C is provided, where open codes, subcategories, and categories are shown. Building a data structure means providing a graphic representation of the progress through which

raw data become “terms and themes” guaranteeing the accuracy of this qualitative research (Gioia et al., 2003).

4. FINDINGS

Results from data analysis are illustrated in the following section. Since interviews were in Italian, then key points, crucial for the research, were translated in English.

4.1. Considerations about implementation of a chatbot along the entire selection process

First of all, no AI tools are adopted along the selection processes in the companies described by the interviewed HR professionals. Some of them argued that the implementation of whatever AI tool has never been considered so far also because they do not know as much about AI tools and their possible benefits and drawbacks. They only talked about databases adopted to conduct an initial screening, with the aim of analyzing the received CVs through the search of keywords based on the perfect candidate’s characteristics for each selection process. Moreover, it is highlighted that the implementation of these new technologies depends also on the organizational context in which the HR function operates, and whether a real necessity needs to be filled. Nevertheless, they were able to make some considerations about the implementation of a chatbot along the selection process, thinking about where it is more profitable to implement it.

4.1.1. Anxiety of automation phenomenon

When it is asked to HR professionals whether they feel anxiety and fear about the automation phenomenon, they are curious in investigating upgraded and pioneer solutions in order to enrich and improve HR processes where they are involved. Indeed, they recognize the chatbot’s implementation along the selection process as an efficient solution for the HR world in improving and strengthening the effectiveness of this process, showing an open-mind attitude and positive judgment about its implementation. Indeed, they argued that it is part of their job to look for new and innovative solutions contributing to improving the whole business.

The world is moving towards automation, trying more and more to automate processes. I think it is also the task of HR to look for solutions that are more efficient for their world. And these solutions, in addition to being efficient and therefore reducing costs and times, must also be functional to the

business. Personally, if it worked, I would not feel like risking my job. On the contrary I would like to try to streamline processes as much as possible, because I think it is also part of my job. [HRODM]

It is argued that, in the near future, a chatbot could revolutionize or even replace some simpler and faster selection processes. For example, selection processes conducted to hire professional figures such as receptionists and waiters in the tourism sector are easier to evaluate than other professional figures in the same sector, and a chatbot could be able to perform proper activities in this process, asking questions about the knowledge of languages and past experiences given the little discretion by both parties in communicating.

Paradoxically, in the near future chatbot could almost revolutionize or even replace some simpler and more immediate selection processes. If I think, for example, of the profile sought in tourism or public establishments by large hotel chains, figures such as receptionists or waiters where objectively there is little to ask. Knowledge of the language, past experiences specifying in which types of reality one has had experience. In this case, there is little discretion from both parties also because the role is a little easier to evaluate. [HRR2]

4.1.2. Strengthening the organizational image

Moreover, there are increasingly opportunities and possibilities into the nowadays globalized labour market, where companies are involved in a "war for talent" more and more intense. Companies' aim is to guarantee a candidate experience that is satisfying and suitable for the 21st century in order to attract and retain the best talent available into the labour market. Consequently, implementing a chatbot along the selection process can contribute in improving and providing a successful candidate experience strengthening the organizational image.

Nowadays, opportunities and possibilities are more and more, so every company has to differentiate itself from competition. It is necessary to guarantee a candidate experience that is satisfying and suitable to the 21th century. It is equally important for both candidates being hired and those who are rejected from the selection process, in any case it must absolutely be returned with feedback. [LBP]

4.1.3. Chatbots and candidates' interaction

Candidates' attitude in interacting with a chatbot also needs to be considered in chatbot's implementation. HR professionals argued that candidate willingness and approach in interacting with this kind of AI tool depends also on candidates' personal characteristics, revealing this as a crucial point during the selection process. A candidate that is more extroverted could ask questions without any deal of stress while a candidate that is more introverted could behave in a different way, without expressing thoughts and doubts. In this last case, a 'non person' could help to interact with the recruiter that is behind the chatbot.

I believe that it depends a lot on the type of approach that the candidate has, because there is someone who likes interacting with people, who doesn't have any problems, asking questions, in order to have right explanations about the work position to be filled, expressing doubts about it, without any deal of stress. Instead, the most introverted candidate could have a lot of difficulties if it is in front of a human, and a 'non-person' could help to interact. According to me, what I can tell you is that, sometimes, candidates do not realize that behind those artificial intelligences, there is always a person, the recruiter. [HRR1]

An interesting example of how a warehouse worker of forty/fifty years old and profiles that are more administrative and familiar in managing emails/pc could behave differently in front of a chatbot is provided. Specifically, it is argued that the former could be less propense to interact with a robot while the latter may be more ready to communicate with it, making a distinction between different people with different backgrounds.

A warehouse worker, an average forty/fifty years old, a person very accustomed to manual work, does not spend much, for example, with technology; this kind of worker is unwilling to interact with a robot. Other profiles, that are more administrative, used to working inside the office, mostly familiar to manage emails/pc, maybe have a completely different approach and are more ready to communicate with it. [HRC]

Moreover, it is highlighted that the lack of knowledge about this AI tool can create a sort of confusion in the candidate who is interacting with it causing stress, given that it is a tool still little used during selection processes.

I honestly don't know how much the candidate could be relaxed, maybe because the lack of knowledge of the AI tool creates a sort of confusion, different from the usual selection process. It also depends, however, how the individual candidate approaches it. [HRR2]

4.1.4. Artificial agency of chatbots

The increasing ability of a chatbot to learn and improve is considered an important advantage to take into account in the implementation of it along the selection process. Indeed, the more the quality of AI improves, the more the work of those behind the selection process improves. However, an HR Recruiter wondered: why do we have to wait for AI improvements in order to have the best results? In this way, the selection process' results of tomorrow will be better than the selection process' results of today only because AI is upgraded, risking losing the perfect candidate of today due to missed improvements.

I think that, the more the quality of artificial intelligence improves, the more the work of those behind the selection process improves, too. But, why do we have to wait for the improvements of artificial intelligence in order to have the best results? Suppose the candidate is selected today through the AI tool; after a year, perhaps, the artificial intelligence has improved and its result may be different and, then you have probably lost the perfect candidate. [HRR1]

4.2. Screening

Some HR professionals argued that the screening phase is the optimal stage in implementing a chatbot.

4.2.1. Cutting down time and hiring costs

Multiple interviewed HR professionals highlighted some advantages to using a chatbot during the screening stage: faster CVs screening, saving time, and lower hiring costs are some of them, recognizing to the chatbot the function as a first filter along the selection process.

I feel like saying that maybe the chatbot could act as a first filter in the selection process. It is as if there were someone in our shoes who carries out the initial screening activities, maybe. So why not? It could definitely be a useful thing! [HRC]

Moreover, by asking some questions, a chatbot can skim candidates who are not in line with the job description, speeding the selection process and saving precious time, proceeding with the assessment only with those who are considered valid for the position that needs to be filled.

There are certainly some advantages to using it in the screening phase. If I were the recruiter in Romania, in terms of time, I think that instead of looking at 1000 resumes you could look at less through direct screening by a question like: "Do you have an advanced English level?" You can answer only yes or no. In this way, you can reject CVs much faster. Well, I think it saves time and costs. [HRM]

Faster CVs screening, optimization of recruiter time, faster process to get to a pool of candidates, as much as possible in line with the job profile you are looking for. Clearly, when you asked key questions, consequently you skimmed the people who are not in line, so you are much faster, you save time, and you focus on talking only with the people who are in line with the job description. [LBP]

Moreover, when certain positions are made available, lots of applications arrive recognizing that intermediation activities carried out with a chatbot might be useful, making HR work easier.

Well, I think it could be useful as a tool alongside the activities that, as HR, we carry out. Nowadays, when you make certain positions available, lots of applications arrive and the intermediation activity carried out with a chatbot might be useful, making your life easier. [JHRSI]

4.2.2. Features of chatbots' questions

Some possible questions that a chatbot could ask to candidates during this first step of the selection process are provided as examples, to perform screening activities successfully. Questions should have two fundamental features: be objective and pointed, in order to grasp key information about those who are evaluated.

So, I would try to ask questions as objective and pointed as possible, for instance: if the candidate has got foreign languages and/or management systems certificates, what the level of autonomy is and/or what management experience the candidate has got. [HRR2]

Questions about the English knowledge, employment or unemployment status, years of experience in performing a role, can be put into an usual social platform, such as LinkedIn, when someone is applying for a position. The same kind of questions can be asked by a chatbot during this initial stage of the selection process. Of course, these two described scenarios provide different experiences. Particularly, implementing a chatbot could trigger the same feelings when candidates are face-to-face with a recruiter.

Do you know English? What is your level of English? Are you unemployed? How many years have you been doing this job? These are some of the questions the recruiter would ask, putting them on a normal social platform, such as LinkedIn. Instead, when someone interacts with a chatbot, both I can receive real time information and also the candidate feels like talking with a human; in this way the type of experience provided changes. [LBP]

A chatbot could inquire only about some of the technical competencies of candidates (hard skills) rather than their soft skills, given that the former are more objective to measure, investigate, and gather to. The knowledge about a particular legislation and/or whether a candidate is able to manage a specific software regards technical skills of candidates.

So, I would like to ask the most technical questions and not about soft skills. I would like to insert this type of artificial intelligence for evaluating technical competencies. For example, to verify that the candidate is able to use a particular management software, and/or perhaps, more specifically, if there is knowledge about the legislation sector. [HHR1]

Moreover, it is claimed that a chatbot could be less propense to capture and analyze candidates' softs skills than technical skills, given that the former are more objective to gather. On one hand, it can be easier for a chatbot to detect objective elements as technical skills of a candidate. On the other hand, what a chatbot could fail is in grasping what can be perceived through sensations and/or a way of doing. Also, body language could say somehow about a person and his/her reactions to certain situations. As a result, these are some aspects that a robot is not able to analyze.

Chatbot could be less inclined to analyze the soft aspects of people's personality. These are aspects mainly and deeply linked to a knowledge inborn in humans. In my opinion, perhaps that remains the main disadvantage. Because, maybe from a technical point of view, a robot could be able to analyze

them, right? He says: "Ok, he can do this business, he has this kind of background". But then, from an aptitude, motivational point of view, maybe that could be a limit in conducting its activities? (...) On one hand, it can be easier for a chatbot to detect objectivities. On the other hand, what could fail is certainly what can be perceived later through sensations and/ or a way of doing. Body language could also say somehow a lot about a person and how she/he reacts to certain situations. And this, maybe, it could not really be perceived by a robot. In my opinion, there are pros and cons, of course. [HRC]

4.2.3. Reliance on activities carried out by chatbots

On the other hand, a Talent Acquisition Recruiter did not agree with what was claimed above, thinking that there could be the risk of rejecting potential candidates and their CVs only for a missed word. Although it is argued that a chatbot could help out in carrying out this kind of activity, it is preferred to have a look at each CV received.

I'm not persuaded. I don't really like the ATS very much, indeed, we don't implement them. Of course, ATS systems are precisely these skimming systems, filtering CVs. But a lot of information that you don't read, could risk rejecting potential candidates and their CVs for a missed word. So, in this first initial phase I disagree, because I prefer to analyze each CV one by one. Chatbot could help me out! Then it goes against my work ethic. Actually, a CV is analyzed for 5 seconds. I'm aware that it takes time to look at all the CVs, but I prefer to do it by myself! That's it. [TAR]

As a result, not all seem to rely 100% on activities performed by this kind of AI tool. Indeed, an HR Consultant claimed that, looking into CVs selected by the chatbot, it is preferred to understand what kind of candidates it has selected by checking whether the criteria provided have been met or not.

I think that the chatbot is useful at the beginning of the process, but the human could always check the chatbot's results. For example, when it thinks that 50 applications are suitable to the ideal profiles' features, it is normal that, in any case, I would like to check them so that I can understand what kind of person it has selected for me. [HRC]

4.3. Assessment

Various considerations about the implementation of this kind of AI tool during this middle stage are made by HR professionals, arriving at the conclusion that it is not able to conduct activities properly at that moment of the selection process.

4.3.1. 'Natural Human Language' of chatbots

HR professionals claimed that a chatbot is not able to conduct activities proper to this stage of the selection process, given its limits in understanding what candidates did and how they behaved during past experiences. Moreover, to allow a chatbot to read and interpret answers from candidates, standard and straightforward messages must be provided to sum up what they did, how they behaved when they faced challenging scenarios, and why they made their choices. Through a chatbot, it seems complicated to achieve the goal at this moment of the selection process to evaluate candidates' abilities and backgrounds. The limited ability of a chatbot to communicate and grasp every single information emerges primarily during this stage where candidates tell their own stories to the recruiter.

Making an assessment, which is the result of experiential questions about experiences in the past, it is crucial and challenging to fully understand what people did, how they behaved when they faced challenging scenarios, and why they made their choices. Consequently, allowing a chatbot to read and interpret responses from candidates, it must be provided a standard and straightforward message. It seems to me complicated to imagine its implementation at that stage. [HRM]

Additionally, it is argued that a chatbot has limits in addressing candidates' answers during the interview. Misunderstandings from candidates about questions asked can be better clarified when they are interacting with a recruiter. A chatbot could not be able to perform this task as well, risking losing perfect candidates.

The disadvantage, in my opinion, is that chatbot cannot correctly drive the candidate's answer, limiting the possibility of being able to use it at later stages than the pre-screening stage. The downside is that, using a chatbot, you hardly understand what the candidate's answers really are. [HRM]

4.3.2. Unpredictability of human beings

Moreover, another factor that AI will never be able to pick up and perceive is the unpredictability that characterizes human beings, emphasizing that human judgment is always significant and crucial in conducting these kinds of activities. A chatbot labels a candidate as the best only because he/she answers correctly to all the questions? But, at the end of the selection process, the same candidate could reject the job offer, wasting precious time and energy to recruiters. In this scenario, this inconvenience could be avoided by establishing social relationships with the candidate, given that a chatbot is not able to do it. Since human beings are unpredictable and are not the bearer of objective information, this unpredictability an artificial intelligence system will never be able to grasp.

The subjective point of view of the recruiter is also important and it will always be more important. In selection, objectivity does not exist at all, because even a good recruiter can have cognitive biases and not have that pure objectivity that allows him to say: "Ok, I have chosen the right person for that type of activity". But I ask you a question: Is the human being the bearer of objective information? I can do a good research and selection process and I conclude by saying he is the person I liked the most because he answered all the questions correctly. But then, before proceeding with the job offer, this person could tell me that is no longer interested. The human being is unpredictable, so that unpredictability, probably an artificial intelligence system will never be able to grasp it. (...) Here's what I wanted to tell you, it's not so much to find the competent person, but then to find the person who actually at the end of all this more or less long search and selection process that you have structured, does not leave you the day before, telling you: "Look, I'm no longer interested to the position". You will always have that effect of unpredictability, both with the artificial intelligence system and with the human system. Perhaps, with the human system, creating connections and interactions you are able anyway to build a professional relationship and it should reduce this risk, that is, that a candidate at the last moment says: "No thanks, I'm not interested." [LBP]

4.3.3. Cognitive biases

Cognitive biases persist along the selection process, affecting also the AI tool results. Chatbot's messages are designed by recruiters with the help of engineers, without removing negative effects that cognitive biases can produce.

When you write the language of a chatbot, you already involve a distortion effect and the problem continues to persist too. So, if we recognize that the human being is imperfect, even an artificial intelligence system will be imperfect. [LBP]

Cognitive biases can affect judgments of human beings in a positive or in a negative way. For example, positively when everything is done to carry on a particular candidate during the selection process when emotions are involved. Indeed, human beings can go beyond their cognitive biases and fix mistakes while the AI is not able to redress itself: in these situations, emotional intelligence needs to be developed.

There are biases and they often happen. For example, when you connect with a person you do everything you can to carry them through the process. But even like negative bias, your judgment is conditioned. But the artificial intelligence stops there while the human can go even further. It is an advantage of artificial intelligence to be objective but always within the limits. This is one more thing but it must not be the reason why the actual interview can be replaced. There must always be emotional intelligence. [TAR]

4.4. Coordination

About the implementation of chatbot along this last stage, HR professionals were not unanimous regarding the ability of this kind of AI tool in providing feedback to candidates.

4.4.1. Feedback on candidates' applications

Some of them recognized the chatbot's potential in performing activities that are carried out throughout this last stage. Moreover, it is argued that a chatbot can provide updates about the evolving of the selection process, having a conversation with it. Even after the first interview with the recruiter, a chatbot could be useful to provide news about candidates' application status.

It could perhaps be useful to give feedback to candidates. Very often, they wait for an answer without real time feedback. Even after the interview phase, because usually there is not enough time to answer without a system/instrument that automatically helps you. Well, the technology could answer only the candidates who have been excluded, by saying: "Sorry, but you have been excluded. We don't need you now." Therefore, its application could be likely in a final rather than in an initial phase of the selection process. [HRODM]

4.4.2. Performance of simple and/or repetitive tasks

A Talent Acquisition Recruiter claimed that one of the main activities during this last stage of the selection process is to send candidates documents necessary for hiring. Sometimes, candidates do not know the reason why they have to sign all these documents. As a result, a chatbot can be useful also in explaining to them the reasons beyond these documents, given that it results to be the most tiring part of the selection process for this HR professional.

This final step, for me, is the most tiring part of the process, because not everyone knows the reason why they have to send all the documents to be signed. Sometimes, it happened to me: "For privacy, I won't send you the document." But if you don't send it to me, I can't hire you! So, a chatbot explaining to them the reason for these documents could be useful. [TAR]

4.4.3. Providing a complete feedback

On the contrary, other HR professionals stated that a chatbot is not able to provide complete feedback given that too many different factors need to be taken into account in its elaboration, agreeing that they would not leave this role to the chatbot.

I wouldn't leave this type of role to the chatbot. Different items and evaluations must be put together to provide complete feedback. We have to consider so many factors that the chatbot, in my opinion, is not able to consider and put them together too. [HRR1]

An HR Recruiter stated that less than 20 minutes are needed to provide feedback, both positive or negative. At the same time, it is also important to obtain counter feedback about those who received the feedback provided, whether the feedback returned by the company corresponds to what candidates think about themself and how the selection process went for them. Maybe, a chatbot is lacking in performing this activity.

When I transfer feedback, it never takes me less than 20 minutes, on average it takes me 30 minutes to build feedback. Whether it's positive or negative. It is much faster when it is positive. Unfortunately, when it is positive, you focus on the candidate who participated in that particular selection process, but not on how the candidate handles the selection process in a broader sense. It would actually be the real purpose of the feedback. So, I believe and fear that the chatbot could be a bit reductive from this point

of view. (...) Then it is important for me to have counter feedback, so to understand if the feedback returned by the company corresponds to what the candidate thinks about himself, and also based on how the selection process went. I think the chatbot is unable to do it. [HHR2]

Findings are better discussed in the following section.

5. DISCUSSION

5.1. Implication for research and practice

In this research, the implementation of a new technology is defined as its introduction and provision in the organization, with the aim of increasing organizational performance (Davis, 1989). Web-technology's implementation in the HRM context, that is e-HRM (Ruël et al., 2004), could bring several organizational benefits, that are increased efficiency, effectiveness, and HR service quality (Ruël & Van der Kaap, 2012), depending on the user's willingness to accept and actually use it (Venkatesh et al., 2003). To create value the technology needs not only to be implemented but also to be accepted and properly used by organizational actors. From literature emerged that HR professionals could feel anxiety about the automation phenomenon, affecting their propensity to accept this trend and new technologies that it implies (Eißer et al., 2020; Pachidi et al., 2021). On the contrary, when it is asked to HR professionals whether they feel anxiety and fear about the automation phenomenon, they are curious showing an open-mind attitude in investigating upgraded and pioneer solutions. Indeed, they talked about the chatbot's implementation along the selection process as an efficient solution for the improvement and development of the HR world, always keeping in mind that it is part of their job to look for new and innovative solutions to make smart processes where they are involved, contributing to rising the company's value as a whole.

Reducing time-to-hire represents not just an efficiency gain but also potentially a strategic advantage in the battle for attracting and hiring valuable human capital, especially in industries in which there is high competition and turnover (Black and Van Esch, 2019). Indeed, interviewed HR professionals argued that, in the near future, a chatbot could potentially revolutionize or even replace some simpler and immediate selection processes, conducting fast queries in which are asked questions about the knowledge of languages and past experiences. Also, companies' aim is to guarantee a candidate experience that is satisfying and suitable for the 21st century in order to attract and retain the best talent available into the labour market. Consequently, implementing a chatbot along the selection process can

contribute in improving and providing a successful candidate experience strengthening the organizational image.

Dimitriadis (2020) shows that, generally, people feel more confident when interacting with a chatbot, giving them a sense of control. But this is not always the case. Candidates' willingness and approach in interacting with this kind of AI tool also depends on their personal characteristics, revealing this fact as a crucial point in the selection process. A candidate that is more extroverted could ask questions without any deal of stress, while a candidate that is more introverted could behave in a different way, without expressing thoughts and doubts. Therefore, a 'non person' could help introverted candidates to interact with the recruiter, that is behind the chatbot, feeling more free to ask questions that they would not ask to recruiters directly, e.g., about salary, parental leave, and workplace diversity (Kuksenok & Praß, 2019). Also, an interesting example of how a warehouse worker of forty/fifty years old and profiles that are more administrative and familiar in managing emails/pc could behave differently in front of a chatbot. Specifically, the former could be less propense to interact with a robot while the latter may be more ready to communicate with it, making a distinction between different people with different backgrounds. Moreover, lack of knowledge about this AI tool can create a sort of confusion in the candidate who is interacting with the chatbot causing stress, given that it is a tool still little used during selection processes.

Chatbots, as other AI tools, improve their ability to select and to screen candidates thanks to the essential interaction with humans (Black & van Esch, 2020; Hmound & Laszlo, 2019). Their ability to make autonomous decisions and to change consequently to reactions of actors involved can be defined as their artificial agency which allows them to improve their capacities to perform and better integrate itself in the work environment (Van Rijmenam, 2019). But, an insufficient amount of data and information can impact on the quality of chatbots' performance, slowing down the chatbots' learning process or even making it impossible, without optimizing the process itself (Schildknecht, et al., 2018). From findings emerged that, surely, the increasing ability of a chatbot to learn is considered a prominent advantage to take into account in the implementation of it along the selection process. In this way, the more the quality of AI improves, the more the work of those behind the selection process improves. However, to achieve better results, why do we have to wait for AI improvements, given its ability to learn and increase its performance? For example, today, a candidate is not selected from a chatbot because it does not consider the candidate appropriate in performing a role. After a year from its first implementation, the AI tool has improved its ability and the same candidate that was rejected one year ago, now, could be the perfect candidate. It is important that humans and technology collaborate with

each other, finding a common ground. Indeed, Kaplan and Haenlein (2019) and Jarrahi (2018) highlight that the best results come from the collaboration of both humans and machines. There must be no debates about who is better in deciding between a human and a machine: both can support each other to maximize beneficial effects that can be produced through the collaboration.

From the literature, implementing a chatbot during the screening stage of the selection process can enable to reduce time-consuming and costs associated with selection activities (Balachandar & Kulkarni, 2018; Hmound & Laszlo, 2019; Mohan, 2019; Navaz & Gomes, 2019; Sheth, 2018; Wilfred, 2018). Particularly, evaluation and selection of the myriad of received CVs represent the most challenging part in screening the right candidates from the large pool of applicants (Wilfred, 2018). The findings of this research confirm that faster CVs screening and lower hiring costs represent the main advantages that a chatbot can bring into this phase, recognizing to the chatbot the function as a first filter along the selection process. Moreover, a chatbot that carries out intermediation activities, when job positions are made available and a lot of applications are received, might be useful making HR work easier. In this way, recruiters and managers can turn their attention on issues that are strategically more important.

In the screening stage, the application of AI tools can help organizations to drop their time-to-hire (Black and Van Esch, 2019). What emerged from findings is that, by ‘asking key questions’, a chatbot can skim candidates who are not in line with the job description, speeding the selection process and saving precious time, proceeding with the assessing step only with those who are considered valid for the position that needs to be filled. In this way, organizations are able to select and evaluate the CVs that match organizational requirements in the shortest possible time. From findings also emerged that questions about the English knowledge, i.e. “Do you know English?” “What is your level of English?”, employment or unemployment status, i.e. “Are you unemployed?”, years of experience in a defined role, i.e. “How many years have you been doing this job?”, are examples of questions that a chatbot could ask to candidates during this first step of the selection process. In particular, these questions have two fundamental features: be objective, i.e. questions that do not need to be interpreted by both the candidate, in elaborating answers, and the recruiter, and pointed questions that are designed to obtain specific information. This is the reason why from findings emerged that a chatbot could inquire only about some of the technical competencies of candidates (hard skills) rather than their soft skills, given that the former are more objective to measure, investigate, and gather to. As a result, a chatbot can be employed in supporting the screening stage performing targeted queries about the technical competencies of candidates.

Moreover, from findings it seems that HR professionals do not rely 100% on activities performed by this kind of AI tool. It is preferred to understand what kind of candidates the chatbot has selected by checking whether the criteria provided have been met or not, looking into CVs selected by it. Nowadays AI-enabled screening is conducted by highlighting keywords into received applications in order to streamline the process (van Esch et al., 2019; Nawaz & Gomes, 2019; Schildknecht et al., 2018). Unlike what literature said, findings argued that there could be the risk of rejecting potential candidates and their CVs only for a missed word. Although it is argued that a chatbot could help in carrying out this kind of activity, from findings emerged that it is always important to have a look at each CV received, recognizing the real value of each.

During the following selection stage, candidates' personalities, traits, and capabilities are needed to be understood and delineated by organizations. From other studies we know that, in this context, chatbots can be designed to ask questions on specific themes in order to evaluate candidate qualities. Indeed, both Hmound and Laszlo (2019) and Nawaz and Gomes (2019) studies argue that chatbots can carry out short interviews and perform assessment tests. By the way, different considerations about the implementation of this kind of AI tool during the assessment step are made, coming to the conclusion that a chatbot is not able to conduct activities properly at that moment of the selection process. Lokman and Zain (2018) and Navaz and Gomes (2019) claimed that chatbots are peculiar AI assistants that interact and communicate with future employees through a 'Natural Human Language' by using contextual words, shorthand, emotions, with the aim to create a positive candidate experience and evaluate candidates' qualities concurrently. This also leads chatbots to find out feelings and attitudes such as anger, frustration, and de-motivation of those who interact with them, keeping higher the human engagement (Sheth, 2018).

On the contrary, findings showed that a chatbot is not able to grasp and understand candidates' personalities, traits, and soft skills and/or what candidates did and how they behaved during their work past experiences. To allow a chatbot to read and interpret answers from candidates, standard and straightforward messages must be provided. Consequently, a candidate needs to sum up what they did, how they behaved when they faced challenging scenarios, and why they made their choices, in a message comprehensible to the chatbot. This is said because from Schildknecht et al (2018) study emerged that the natural language's intelligence is a double-edged weapon: ambiguities of terms, irony, colloquial language or spelling mistakes can jeopardize chatbots' ability to interpret the answers' questions, influencing the whole process. Moreover, for interviewees it is argued that a chatbot has limits in addressing candidates' answers during an interview. Misunderstandings from a candidate about a

question asked can be better clarified when interacting with a recruiter. During an interview, non-language communication also matters: a recruiter can better grasp crucial information from this kind of language, for example observing candidates' body language. A chatbot could not be able to perform this task as well, risking losing perfect and valuable candidates.

Anyway, existing literature does not talk about unpredictability that characterizes human beings' behaviours, highlighting that AI tools are not able to grasp it. Indeed, from findings emerged that another factor that the AI will never be able to pick up and perceive is the unpredictability that characterizes human beings' behaviours. A positive chatbot judgment about a candidate is related to only the fact that he/she answered correctly to all the questions, label him/her as the perfect candidate. But, during the last step of the selection process, the same candidate could reject the job offer, wasting precious time and energy to recruiters and the organization as a whole. In the described scenario, this inconvenience could absolutely be avoided by a recruiter establishing and alimenting a social relationship with the candidate. Therefore, subjective human judgments are always significant and crucial in conducting these kinds of activities. Since the human being is unpredictable, an artificial intelligence system will never be able to grasp this unpredictability, given that human beings are not the bearer of objective information.

From the literature we know that chatbots can avoid the activation of cognitive mechanisms resulting more trustfully and fairly than human activities (Black & van Esch, 2020). Indeed, Navaz and Gomes (2019, p.3) states that: "Chatbots are a great assistance to recruiters with their prompt replies and instant availability." But, chatbots operate in relation to information that are in line with ideal professional figures suitable for available job vacancies and the success of AI depends on the data employed and shared with them. Actually, it is necessary to be careful about data used as input: if data input is biased, results could be affected by biases and chatbots transparency is jeopardized (Mohan, 2019). From findings emerged that cognitive biases that affect human's judgments persist, also conditioning the AI tool results and involving a distortion effect. One of the HR professionals argued that cognitive biases can however affect judgments of human beings in a positive or in a negative way. For example, a judgment is affected positively when everything is done to carry on a candidate during the selection process. Black and van Esch (2020) argued that the similarity bias, as the tendency to overestimate and prefer people who are similar to us regardless whether these similarities could produce positive or negative effects, can affect recruiters' judgments. As regards AI tools, to correct their mistakes, human action is needed because they are not able to redirect themselves, while human beings can go beyond their cognitive biases and fix their mistakes. In these situations, emotional intelligence still needs to be developed.

Now, considerations made from interviewees about the last step of the selection process are discussed. Practices performed during the coordination stage are aimed at creating a positive candidate experience, increasing the likelihood that candidates will say ‘yes’ to the job offer at the end of the process. Equally important, it is to ensure a positive recruitment experience for those who are rejected: they could be future employees that today are not a good fit for available vacancies. To accomplish this aim is to provide real-time feedback to applicants, particularly for those who have been rejected. Indeed, a chatbot has a potential to improve the candidate's experience (Burgess, 2018) by providing consistent instantaneous updates throughout the application process which eliminates the communication gap between recruiters and applicants when dealing with a large pool of candidates. This is also confirmed by findings: chatbot's potential in performing proper activities that are carried out throughout this last stage are claimed. A chatbot can offer regular updates about applications status, having a short conversation with it. Even after the first interview with the recruiter, a chatbot could be useful to provide news about candidates' application status. Indeed, the level of engagement could decrease when candidates do not receive any feedback from who was assessing and managing their own applications, bringing out negative feelings (Hmound & Laszlo, 2019).

Savola and Troqe (2019) study claims that chatbots can help HR professionals by dealing with activities such as asking and replying to frequent questions on employee benefits or company culture, and thus allowing recruiters to concentrate on performing other activities strategically important. One of the HR professionals claimed that one of the main activities during this last stage of the selection process is to send candidates documents necessary for hiring and sometimes candidates do not know the reason why they have to sign all these documents. A chatbot can be useful also in explaining to them the reasons beyond these documents, given that results to be the most tiring part of the selection process for this HR professional. Indeed, from the literature we know that chatbots can support candidates answering questions and providing information in any missing and unclear stuff for both hired and rejected candidates, keeping their level of engagement higher (Navaz & Gomes, 2019).

During interviews, HR professionals argued that too many different factors need to be taken into account in the elaboration of a complete feedback when helping individuals to understand their strengths and weaknesses. Therefore, they agreed that they would not leave this role only to the chatbot. One of them stated that less than 20 minutes are needed to provide satisfying feedback, both when it is positive or negative. At the same time, it is also important to obtain counter feedback from those who received the feedback provided, checking whether the feedback returned by the company corresponds to what candidates think about themself and how the selection process went for them. In fact, Upadhyay and

Khandelwal (2018) argue that AI assistants can also send feedback to recruiters about candidates' experiences, providing information to optimize the process. However, HR professionals do not seem very convinced that the chatbot is able to perform this type of activity.

5.2. Limitations and directions for future research

Some limitations are identified. Due to the COVID-19 pandemic that limited face-to-face interactions, interviews were conducted by phone. Probably, without COVID-19 pandemic limitations, there could have been more time to dedicate to interviewees in order to deepen some arguments that emerged. Moreover, interviews made by phone did not allow to develop a more empathic relationship between interviewer and interviewees. Surely, this could be achieved by establishing direct contact with them.

The results of this research cannot be generalized to other industries with respect to those analyzed and their proper selection processes. HR professionals, taken into account in that research, came from sectors such as research and selection of personnel, mechanical or industrial engineering, industrial machineries, IT and services, human resources, and ecosystem service. Actually, HR professionals from sectors like food and beverage, hospitality, fashion and retail, pharmaceutical, audit and consulting were not interviewed. It could be interesting to investigate what HR professionals from these sectors think, where thousands of CVs are received for available job vacancies. This limitation can be addressed by enlarging the sample and varying sectors that are taken into consideration.

Finally, it would be interesting to examine whether a chatbot with its pros and cons could be inserted in a selection process conducted to hire candidates in the public sector. Unlike private organizations that aim at creating and maximizing economic value in response to market pressures, public organizations broadly seek to create and increase public value (Knies et al., 2017), operating in a political environment with a lack of competitive pressures (Bos-Nehles et al., 2017). Therefore, it might be valuable to investigate how a chatbot could be useful to achieve the goals that characterize public organizations.

6. CONCLUSIONS

The main purpose of this research was to understand in which steps of the selection process chatbots are the most suitable to be implemented. To achieve this goal, firstly, a clear definition of the selection process' stages was provided. As a result, a 3-steps process was drawn, adopted from Black and van Esch (2020) study. After that, pros and cons about implementation of chatbots along the selection process were detected from existing studies (Balachandar & Kulkarni, 2018; Black & van Esch, 2020; Eißer et al.,

2020; Hmound & Laszlo, 2019; Kuksenok & Praß, 2019; Mohan, 2019; Navaz & Gomes, 2019; Savola & Troqe, 2019; Schildknecht et al., 2018; Sheth, 2018; Van Rijmenam, 2019; Wilfred, 2018). Consequently, eight categories of advantages and disadvantages about the implementation of a chatbot along the selection process were built and illustrated in Table 1. A qualitative research method was adopted conducting interviews with eight HR professionals. Interesting results emerged, given that none of these companies, that the HR interviewees are part of, adopts AI tools. Indeed, each HR professional described the proper selection process of the company, hypothesizing the implementation of a chatbot throughout it, coming to different conclusions. Some of them argued that the most suitable stage where a chatbot can be implemented, given its features, is the screening stage. Unanimously, HR professionals argued that a chatbot is not able to perform activities that are carried out throughout the middle stage of the selection process. Others claimed that it is better to implement the chatbot throughout the last stage of the selection process, performing activities proper for this final part, providing updates about candidates' application. Indeed, the implementation of a chatbot along the screening stage can act as a first filter of the selection process by having a faster CVs screening, lowering hiring costs and gaining time where recruiters and managers can turn their attention on issues that are strategically more important. Consequently, a chatbot can be employed in supporting the screening stage performing targeted queries about the technical competencies of candidates.

On the contrary, a chatbot is not able to grasp and understand candidates' personalities, traits, and soft skills and/or what candidates did and how they behaved during their work past experiences, limiting its implementation along the middle stage of the selection process. Standard and straightforward messages must be provided to allow a chatbot to read and interpret answers from candidates about what they did, how they behaved when they faced challenging scenarios, and why they made their choices. Moreover, misunderstandings from a candidate about a question asked can be better clarified when interacting with a recruiter rather than with a chatbot, risking losing perfect and valuable candidates. A positive chatbot judgment about a candidate is related to only the fact that he/she answered correctly to all the questions, label him/her as the perfect candidate. In other words, other factors that could affect the final judgment about a candidate are not taken into account by a chatbot. Besides, as regards AI tools, they are not immune from human beings' cognitive biases, given that they are always designed by humans. To correct AI tools' mistakes, human action is needed because they are not able to redirect themselves, while human beings can go beyond their cognitive biases and fix their mistakes.

Actually, during the last stage of the selection process a chatbot can perform only some of the activities that are carried out throughout it. Reply to frequent questions on employee benefits or company

culture, explain the reason why future employees have to sign all final documents, provide instantaneous updates about applications status, are examples of activities that a chatbot is certainly able to perform, by having a short and simple conversation. Moreover, too many different factors need to be taken into account in the elaboration of a complete feedback when helping individuals to understand their strengths and weaknesses, not leaving this role to a chatbot.

The answer to the research question is not so obvious and predictable, since each HR professional came to a different conclusion about where a chatbot is more profitable to implement based on activities that are carried out along each selection process, arguing limitations and potential benefits of implementing it. Moreover, the implementation of a new technology mainly depends on the user's willingness to accept and actually use it (Venkatesh et al., 2003). Indeed, from literature emerged that HR professionals could feel anxiety about the automation phenomenon, affecting their propensity to accept this trend and new technologies that it implies. Positive outcomes that can be produced by the implementation of a new technology need to be shared with the business as a whole. Strengthening the organizational image and gaining a competitive advantage are examples of outcomes that could derive from chatbot's implementation from which all the organizational members can benefit, whether properly implemented and accepted. Candidates' willingness and approach in interacting with this kind of AI tool also matters, and this could be affected by both their personal characteristics, revealing this fact as a crucial point in the selection process, and their cultural and experiential backgrounds.

As a result, the successful implementation of a new technology needs to be properly accepted by those who will get in touch with it, showing a positive attitude. In other words, it is not just a question of understanding in which stages of the selection process chatbots are most suitable to implement, but also whether the company feels ready for the change it will bring. Consequently, both recruiters and chatbots have to support each other to maximize beneficial effects that can be produced through their collaboration, working together. Actually, tensions can arise because machines may replace humans in decision-making positions, causing discomfort and unwillingness to work with AI tools. Kaplan and Haenlein (2019) and Jarrahi (2018) highlighted that the best results come from the collaboration of both humans and machines. There must be no debates about who is better in deciding between a human and a machine: both can support each other to maximize beneficial effects that can be produced through their collaboration. As it is argued by Orlikowski and Scott (2008) with the sociomateriality perspective, knowledge practices that is how people employ knowledge in a specific work environment and technology cannot be separated because these entities acquire their form and properties through their reciprocal interactions, becoming part of the reality that we are experimenting.

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8. APPENDICES

APPENDIX A - THE TEXT MESSAGE BOTH IN ENGLISH AND IN ITALIAN

Hi, I'm contacting you for a short collaboration for my master's degree thesis. Let me introduce myself: I am Giorgia Marinelli and I am a student who is attending the last year of the Double Master's Degree in Management at the University of L'Aquila and the University of Twente, where I am completing a master in Human Resource Management. My degree thesis focuses on the implementation of Artificial Intelligence such as the chatbot within the selection process. In particular, my aim is to understand within which phases of the selection process it may be more useful to insert a technology such as the chatbot. I need the advice of some HR experts who can help me with my university research and I have therefore thought to contact you. In fact, I was wondering if I could involve you in my final work through a short interview of up to 30 minutes. Thank you in advance and I trust in your cooperation. Sincerely, Giorgia Marinelli.

Ciao, ti sto contattando per una breve collaborazione per la mia tesi di laurea magistrale. Mi presento: sono Giorgia Marinelli e sono una studentessa che sta frequentando l'ultimo anno della Doppia Laurea Magistrale in Management presso l'Università dell'Aquila e l'Università di Twente, presso la quale sto concludendo un master in Human Resource Management. La mia tesi di laurea si focalizza sull'implementazione di un Intelligenza Artificiale come la chatbot all'interno del processo di selezione. In particolare il mio scopo è quello di capire all'interno di quali fasi del processo di selezione può essere più utile inserire una tecnologia come la chatbot. Ho bisogno del parere di alcuni esperti nel campo HR che possano aiutarmi con la mia ricerca universitaria e ho quindi pensato a contattarti. Mi chiedevo, infatti, se potessi coinvolgerti in questo mio lavoro finale attraverso una breve intervista di massimo 30 minuti. Ti ringrazio anticipatamente e confido in una tua collaborazione. Cordiali saluti, Giorgia Marinelli.

APPENDIX B - THE INTERVIEW GUIDE AND INTERVIEW QUESTIONS

As highlighted, the selection process is composed of three main steps: selection, assessment, and coordination. Consequently, it is asked to illustrate how the selection process is structured, providing a description of the main steps of it to the interviewees. Subsequently, it is asked if along the selection process a chatbot is implemented. If it is the case, in which moment of the selection process is applied. If it is not the case, an explanation of why is asked. After that, some advantages and disadvantages of implementing a chatbot along the selection process are asked to explain. Particularly, some specific questions are asked based on the main categories that have been deeply explained in the second part of my work. Artificial agency of chatbots, Cutting down time and hiring costs, 'Natural Human Language' of chatbots, Feedback on candidates' applications, Cognitive biases, Chatbots and candidates' interaction, Performance simple and/or repetitive tasks, and Anxiety of automation phenomenon are the categories of pros and cons that this research aim to investigate. Interview questions are listed below.

Selection process, i.e. differences between candidates are assessed to find the person who has the profile which best matches specifications indicated by the job profile or description. "How is the selection process structured into the company? How many steps is the selection process composed of?"

- Screening, i.e. screening activities aimed at finding the right candidates from the large pool of applicants. "How is the screening phase conducted? Which are the activities that characterize this stage?"
- Assessment, i.e. various methods are applied through which candidates' personalities, traits, and capabilities are understood and delineated by organizations. "How is the assessment phase conducted? Which are the activities that characterize this stage?"
- Coordination, i.e. activities that are aimed to create a candidate's positive experience to ensure they will say 'yes' to the job offer at the end of the process and also for those who are rejected. "How is the selection process concluded? Which are the activities that characterize this stage?"

"Along the selection process is a chatbot implemented? If yes, in which step of the selection process is implemented? If not, why? Do other types of AI tools are implemented along the selection process? Which kind of AI tool?"

"What are the pros of implementing a chatbot along the selection process in your company?" "What are the cons of implementing a chatbot along the selection process in your company?"

- Artificial agency of chatbots, i.e. continuous ability of chatbots to learn and improve. “How can chatbots' ability to learn and refine their performance be considered an advantage? Why does an insufficient amount of data and information slow down the chatbot's learning process?”
- Cutting down time and hiring costs, i.e. chatbot implementation to reduce time-consuming and costs associated with selection activities. “How chatbot implementation along the selection process should reduce time-consuming and hiring costs associated with selection process activities? Why?”
- ‘Natural Human Language’ of chatbots, i.e. ability to find out feelings and attitudes of those who interact with them. “Are chatbots really able to find out and grasp feelings and attitudes of those who interact with them? Why? Can ambiguities of terms, irony, colloquial language or spelling mistakes jeopardize chatbot's ability to interpret the answers’ questions? Why?”
- Feedback on candidates’ applications, i.e. timely replies to candidates’ questions and offer regular updates about their application status. “How chatbots’ real-time feedback is an advantage? Could lack of understanding, disrupting or even interrupting communication between candidates and the chatbot, result in negative attitudes towards it and to affect its future adoption and implementation from organizations? Why?”
- Cognitive biases, i.e. chatbots are assumed not to be distorted by cognitive biases and are more objective too. “How does the implementation of a chatbot during the selection process reduce the negative effects of human biases that can be involved? If data input from organizations is biased, will the results be affected by biases, undermining chatbots transparency? Why?”
- Chatbots and candidates’ interaction, i.e. interaction between humans and a chatbot. “In your opinion, could candidates feel free to ask questions to the chatbot they would not ask recruiters directly? Instead, could candidates unwilling to share sensitive personal information if it is not clear to what extent the provided information is stored? Why?"
- Performance of simple and/or repetitive tasks, i.e. automatization of parts of brain labor that can be automated. “Which kind of selection activities can chatbots replace and/or simplify? Why?”
- Anxiety of automation phenomenon, i.e. chatbots integration into practices performed simultaneously also by humans. “How can the implementation of this kind of AI be perceived by organizational members?”

APPENDIX C – DATA STRUCTURE

Open coding categories (with exemplary quotes)	Subcategories	Categories
Chatbot's implementation along the selection process as an efficient solution for the HR world: *"The world is moving towards automation, trying more and more to automate processes. I think it is also the task of HR to look for solutions that are more efficient for their world. And these solutions, in addition to being efficient and therefore reducing costs and times, must also be functional to the business. Personally, if it worked, I would not feel like risking my job. On the contrary I would like to try to streamline processes as much as possible, because I think it is also part of my job". [HRODM]*	Anxiety of automation phenomenon	Entire selection process
In the near future, chatbot could revolutionize or even replace some simpler and immediate selection processes: *"Paradoxically, in the near future chatbot could almost revolutionize or even replace some simpler and more immediate selection processes. If I think, for example, of the profile sought in tourism or public establishments by large hotel chains, figures such as receptionists or waiters where objectively there is little to ask. Knowledge of the language, past experiences specifying in which types of reality one has had experience. In this case, there is little discretion from both parties also because the role is a little easier to evaluate". [HRR2]*		
Implementing a chatbot along the selection process can provide a successful candidate experience, achieving a competitive advantage: *"Nowadays, opportunities and possibilities are more and more, so every company has to differentiate itself from competition. It is necessary to guarantee a candidate experience that is satisfying and suitable to the 21th century. It is equally important for both candidates being hired and those who are rejected from the selection process, in any case it must absolutely be returned with feedback". [LBP]*	Strengthening the organizational image	
Candidates' attitude in interacting with a chatbot also matters: *"I believe that it depends a lot on the type of approach that the candidate has, because there is someone who likes interacting with people, who doesn't have any problems, asking questions, in order to have right explanations about the work position to be filled, expressing doubts about it, without any deal of stress. Instead, the most introverted candidate could have a lot of difficulties if it is in front of a human, and a 'non-person' could help to interact. According to me, what I can tell you is that, sometimes, candidates do not realize that behind those artificial intelligences, there is always a person, the recruiter". [HRR1]*	Chatbots and candidates' interaction	

People with different backgrounds could behave differently in front of a chatbot: *"A warehouse worker, an average forty/fifty years old, a person very accustomed to manual work, does not spend much, for example, with technology; this kind of worker is unwilling to interact with a robot. Other profiles, that are more administrative, used to working inside the office, mostly familiar to manage emails/pc, maybe have a completely different approach and are more ready to communicate with it". [HRC]*		
Lack of knowledge about this AI tool can create a sort of confusion: *"I honestly don't know how much the candidate could be relaxed, maybe because the lack of knowledge of the AI tool creates a sort of confusion, different from the usual selection process. It also depends, however, how the individual candidate approaches it". [HRR2]*		
Increasing ability of a chatbot to learn and improve is considered an important advantage to take into account: *"I think that, the more the quality of artificial intelligence improves, the more the work of those behind the selection process improves, too. But, why do we have to wait for the improvements of artificial intelligence in order to have the best results? Suppose the candidate is selected today through the AI tool; after a year, perhaps, the artificial intelligence has improved and its result may be different and, then you have probably lost the perfect candidate". [HRR1]*	Artificial agency of chatbots	
A chatbot as a first filter along the selection process: *"I feel like saying that maybe the chatbot could act as a first filter in the selection process. It is as if there were someone in our shoes who carries out the initial screening activities, maybe. So why not? It could definitely be a useful thing!" [HRC]*	Cutting down time and hiring costs	Screening
For the beginning, a chatbot can skim candidates who are not in line with the job description: *"There are certainly some advantages to using it in the screening phase. If I were the recruiter in Romania, in terms of time, I think that instead of looking at 1000 resumes you could look at less through direct screening by a question like: "Do you have an advanced English level?" You can answer only yes or no. In this way, you can reject CVs much faster. Well, I think it saves time and costs". [HRM]*		
Speeding and saving precious time are the main advantages of implementing a chatbot during this initial step: *"Faster CVs screening, optimization of recruiter time, faster process to get to a pool of candidates, as much as possible in line with the job profile you are looking for. Clearly, when you asked key questions, consequently you skimmed the people who are not in line, so you are much faster, you save time, and you focus on talking only with the people who are in line with the job description". [LBP]*		
Initial intermediation activities carried out with a chatbot might be useful in making HR work easier*: "Well, I think it could be useful as a tool alongside the activities that, as HR, we carry out. Nowadays, when you make certain positions available, lots of applications arrive and the intermediation activity carried out with a chatbot might be useful, making your life easier". [JHRSI]*		

Chatbot' questions need to have two main features: objective and pointed*: "So, I would try to ask questions as objective and pointed as possible, for instance: if the candidate has got foreign languages and/or management systems certificates, what the level of autonomy is and/or what management experience the candidate has got". [HRR2]*	Features of chatbots' questions	
Examples of questions that a chatbot can ask during this stage: *"Do you know English? What is your level of English? Are you unemployed? How many years have you been doing this job? These are some of the questions the recruiter would ask, putting them on a normal social platform, such as LinkedIn. Instead, when someone interacts with a chatbot, both I can receive real time information and also the candidate feels like talking with a human; in this way the type of experience provided changes". [LBP]*		
Questions about technical skills rather than about soft skills*: "So, I would like to ask the most technical questions and not about soft skills. I would like to insert this type of artificial intelligence for evaluating technical competencies. For example, to verify that the candidate is able to use a particular management software, and/or perhaps, more specifically, if there is knowledge about the legislation sector". [HHR1]*		
Sensations, way of doing, and body language say always something more about candidates: *"Chatbot could be less inclined to analyse the soft aspects of people's personality. These are aspects mainly and deeply linked to a knowledge inborn in humans. In my opinion, perhaps that remains the main disadvantage. Because, maybe from a technical point of view, a robot could be able to analyse them, right? He says: "Ok, he can do this business, he has this kind of background". But then, from an aptitude, motivational point of view, maybe that could be a limit in conducting its activities? (...) On one hand, it can be easier for a chatbot to detect objectivities. On the other hand, what could fail is certainly what can be perceived later through sensations and/ or a way of doing. Body language could also say somehow a lot about a person and how she/he reacts to certain situations. And this, maybe, it could not really be perceived by a robot. In my opinion, there are pros and cons, of course". [HRC]*		
With a chatbot, there could be the risk of rejecting potential candidates and their CVs only for a missed word: *"I'm not persuaded. I don't really like the ATS very much, indeed, we don't implement them. Of course, ATS systems are precisely these skimming systems, filtering CVs. But a lot of information that you don't read, could risk rejecting potential candidates and their CVs for a missed word. So, in this first initial phase I disagree, because I prefer to analyse each CV one by one. Chatbot could help me out! Then it goes against my work ethic. Actually, a CV is analysed for 5 seconds. I'm aware that it takes time to look at all the CVs, but I prefer to do it by myself! That's it". [TAR]*	Reliance on activities carried out by chatbots	

Always a check needs to be conducted whether with the chatbot the criteria provided have been met or not: *"I think that the chatbot is useful at the beginning of the process, but the human could always check the chatbot's results. For example, when it thinks that 50 applications are suitable to the ideal profiles' features, it is normal that, in any case, I would like to check them so that I can understand what kind of person it has selected for me". [HRC]*		
Chatbot limited ability in understanding what candidates did and how they behaved during past experiences: *"Making an assessment, which is the result of experiential questions about experiences in the past, it is crucial and challenging to fully understand what people did, how they behaved when they faced challenging scenarios, and why they made their choices. Consequently, allowing a chatbot to read and interpret responses from candidates, it must be provided a standard and straightforward message. It seems to me complicated to imagine its implementation at that stage". [HRM]*	'Natural Human Language' of chatbots	Assessment
Misunderstandings from candidates about questions could not be instantaneously addressed by a chatbot*: "The disadvantage, in my opinion, is that chatbot cannot correctly drive the candidate's answer, limiting the possibility of being able to use it at later stages than the pre-screening stage. The downside is that, using a chatbot, you hardly understand what the candidate's answers really are". [HRM]*		
Unpredictability of human beings will never be able to grasp from an artificial intelligence system: *"The subjective point of view of the recruiter is also important and it will always be more important. In selection, objectivity does not exist at all, because even a good recruiter can have cognitive biases and not have that pure objectivity that allows him to say: "Ok, I have chosen the right person for that type of activity". But I ask you a question: Is the human being the bearer of objective information? I can do a good research and selection process and I conclude by saying he is the person I liked the most because he answered all the questions correctly. But then, before proceeding with the job offer, this person could tell me that is no longer interested. The human being is unpredictable, so that unpredictability, probably an artificial intelligence system will never be able to grasp it. (...) Here's what I wanted to tell you, it's not so much to find the competent person, but then to find the person who actually at the end of all this more or less long search and selection process that you have structured, does not leave you the day before, telling you: "Look, I'm no longer interested to the position". You will always have that effect of unpredictability, both with the artificial intelligence system and with the human system. Perhaps, with the human system, creating connections and interactions you are able anyway to build a professional relationship and it should reduce this risk, that is, that a candidate at the last moment says: "No thanks, I'm not interested" ". [LBP]*	Unpredictability of human beings	
Imperfections of human beings affects the chatbot's outcomes*: "When you write the language of a chatbot, you already involve a distortion effect and the problem continues to persist too. So, if we recognize that the human being is imperfect, even an artificial intelligence system will be imperfect". [LBP]*	Cognitive biases	

The AI is not able to redress itself when make mistakes, human beings can do it*: "There are biases and they often happen. For example, when you connect with a person you do everything you can to carry them through the process. But even like negative bias, your judgment is conditioned. But the artificial intelligence stops there while the human can go even further. It is an advantage of artificial intelligence to be objective but always within the limits. This is one more thing but it must not be the reason why the actual interview can be replaced. There must always be emotional intelligence". [TAR]*		
A chatbot can provide simple updates about the evolving of the selection process to the candidate: *"It could perhaps be useful to give feedback to candidates. Very often, they wait for an answer without real time feedback. Even after the interview phase, because usually there is not enough time to answer without a system/instrument that automatically helps you. Well, the technology could answer only the candidates who have been excluded, by saying: "Sorry, but you have been excluded. We don't need you now." Therefore, its application could be likely in a final rather than in an initial phase of the selection process". [HRODM]*	Feedback on candidates' applications	Coordination
A chatbot can perform the task of providing explanation of why sign some documents for hiring: *"This final step, for me, is the most tiring part of the process, because not everyone knows the reason why they have to send all the documents to be signed. Sometimes, it happened to me: "For privacy, I won't send you the document." But if you don't send it to me, I can't hire you! So, a chatbot explaining to them the reason for these documents could be useful". [TAR]*	Performance of simple and/or repetitive tasks	
Too many different factors need to be taken into account during the elaboration of a feedback: *"I wouldn't leave this type of role to the chatbot. Different items and evaluations must be put together to provide complete feedback. We have to consider so many factors that the chatbot, in my opinion, is not able to consider and put them together too". [HRR1]*	Provide a complete feedback	
It is also important to obtain a counter feedback from candidates who receive it: *"When I transfer feedback, it never takes me less than 20 minutes, on average it takes me 30 minutes to build feedback. Whether it's positive or negative. It is much faster when it is positive. Unfortunately, when it is positive, you focus on the candidate who participated in that particular selection process, but not on how the candidate handles the selection process in a broader sense. It would actually be the real purpose of the feedback. So, I believe and fear that the chatbot could be a bit reductive from this point of view. (...) Then it is important for me to have counter feedback, so to understand if the feedback returned by the company corresponds to what the candidate thinks about himself, and also based on how the selection process went. I think the chatbot is unable to do it". [HHR2]*		