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The Unconscious Socio-Cognitive Bias of Recruiters: Can Artificial Intelligence Help?
A Comparative Case Study.

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Abstract

Humans are biased. It is a natural response of our brain, that, when overwhelmed with information, categorizes individuals, habits, ethnicities and much more, in a stereotypical way. The bias pushes the individual to label a whole group with the same definition and can be activated by a multitude of factors. In this research my main focus is the socio-cognitive bias in the workplace, specifically in the corporate world. This type of prejudice is often unconscious; hence the perpetrators could be the most convinced supporters of fairness and equality but still be biased, without even realizing it. The sector in which such condition is most dangerous is Human Resources Management and in particular the recruiting branch. In fact, as humans, recruiters can be affected by bias, and this can ultimately lead to an inequality in the access to jobs. As we are going to investigate in the first chapter, a biased selection is usually more impactful for certain categories, as ethnic minorities, and this is why it is so crucial to find a way of getting rid, or more realistically, diminishing, such bias. Can the human be completely unbiased though? Perhaps not, and Artificial Intelligence might be of assistance in lending a neutral and objective "hand" to the human. This is what we will deal with in the second and third chapter: what is AI, how it is used in the corporate world (specifically in recruiting) and how it could theoretically help limiting the bias. Nevertheless, AI has its limitations as well, and if it is true that it does not get tired, distracted, or frustrated, it can still internalize the human bias and make it systematic. We will then attempt to find out practical ways of limiting the bias in the fourth chapter. This part of the research is an experimental one, that I conducted with the participation of HR professionals from two quite different companies: an Italian based head-hunting firm, and a multination specialized in consumer goods. What is shared by these two enterprises is their partial use of AI which allowed us to compare how technology and human interface with the selection problem. The goal is to answer the question: "Can Artificial Intelligence assist in limiting the unconscious socio-cognitive bias of human evaluators?". Through six semi-structured interviews I was able to collect a great amount of data, that went through open, axial, and selective coding, in order to understand what the theses of the respondents were.

This research is composed by both an extensive literature review and an experimental case study. Both were necessary to deal with this topic for two main reasons: the use of AI in the selection process is still at an embryonic level, hence we needed the theoretical part to assume determined processes, so that the respondents could give their informed opinion; at the same time, the respondents' contribution was crucial, as thanks to their honesty and awareness, we were able to gain a deeper knowledge and understanding of what the bias is, how it is triggered, and how it can be eliminated, with or without the help of Artificial Intelligence.

Chapter 1
Inequality in access to jobs

1.1 The Labour Market

We can define the labour market as an arena in which workers with specific characteristics are matched to positions requiring their specializations. However, the labour market is not only concerned with the matching process between workers and organizations but also with the determination of wages among classes of workers. Many labour market theories explain these phenomena, together with discrimination, unemployment, and poverty, and they try to propose solutions (McNabb 1987, 161). In fact, the labour market deals with giving value to an individual's economic services and then deciding whether to use such services or not. This can cause employment, namely the participation in the labour market on either the supply or the demand side, or unemployment, that results from a surplus of supply over demand.

Therefore, the labour market comprises two sides: the demand side, where the employer seeks workforce, and the supply side, where workers offer their services. There are different theories on how these two sides are matched: according to the neoclassical economic view, hiring decisions and inequalities in the access to jobs are given by the workers' human capital (their skills, competencies, experience), while the sociological view argues that workers are selected based on their perceived "trainability", hence how much the organization would spend to train them. Nevertheless, regardless of how employers decide to fill their vacant positions, this matching process is not always fair for all the categories involved. In the first part of this thesis, I aim to shed light on a serious phenomenon in the labour market: unequal access to jobs. Today we live in what is called a "new economy" (Wharton 2022, 113) that can also be referred to as a second Industrial Revolution. In fact, with the advent of globalization, we saw an increasingly dramatic shift from manufacturing jobs to service ones. In developed democracies, the standard working hours are around 35 to 44 hours per week, but in the USA for example, low-wage and black workers are more likely to work "nonstandard hours" than whites or higher-paid workers (Gerstel and Clawson 2018, 413). There is much reliance on temporary workers to minimize the costs of a permanent workforce, and such unpredictability is giving rise to extreme work hours (Burger 2020, 1071). This, of course, in the case one can manage to find a job. In this first chapter, I will primarily deal with inequality in access to professional or knowledge jobs, which are the ones where foreign-educated or immigrants are discriminated against more. *Professional services* are defined as those that require extensive training, like medicine, law, engineering, high-tech and others (Gorman and Sandefur 2011, 285). These occupations comprise a significant portion of the labour force, especially in developed countries. This expansion is causing an evolution of how workers relate to their job, colleagues and clients, especially considering the

cruciality that the organization has in the lives of every single individual. However, if, on the one hand, professional jobs reward workers with high-social status, they also cause much inequality (Grusky & Sorensen 1998, 1198), and I will deal with this significant issue in the following sections.
I am starting from one straightforward assumption: although the labour market should be a two-sided matching process, some groups, whether defined by gender, race or ethnicity, find jobs more easily than others. In this next section, I will test my assumption with three central studies, one that regards the issue of skilled immigrants in Canada (Oreopoulos 2009), another that deals with the exclusion of foreign-educated individuals in mainstream hiring (Chavez 2017), and finally one that is concerned with the relationship between hiring discrimination and ethnic penalty (Zwysen et al. 2020). I will then attempt to explain these phenomena through the study from Rivera (2012), where she explores the reality of hiring as "cultural matching".

1.2 The struggle of skilled immigrants

Oreopoulos study (2009) was conducted by creating and sending thousands of resumes in response to different job postings in Toronto. This research aimed to evaluate whether immigrants struggle more than Canadians in the labour market. Canada has one of the highest per-capita immigration rates in the world (Dolan and Young 2004). Despite the country's effort to attract skilled immigrants, they are not integrating into the high-skilled labour market. In fact, Canada uses a point system that is applied to more than half of the immigrants that enter the country nowadays, that rates individuals based on their language levels, age, degrees, work experience as well as whether their occupation is in demand and if they have a job offer (Beach, Green and Worswick 2006, 34).
Nevertheless, this system does not seem to have the desired effect. For this reason, Oreopoulos (2009) formulated some assumptions on why this gap occurs: perhaps employers value a foreign education less than a Canadian one, and the same goes for work experience. Moreover, cultural differences are deemed risky rather than being embraced as an asset (Oreopoulos 2009, 152). Therefore, the study was conducted by constructing thousands of resumes, part of which would represent recent immigrants from China, India, Pakistan and Britain. The others were non-immigrants with "English sounding" names. Other variables were randomized, such as where they got their undergraduate degree, whether they had Canadian or foreign work experience, and whether they were fluent in multiple languages. Overall, candidates with English-sounding names, Canadian education and experience were 40% more likely to receive a callback (Type 0). The other resumes were constructed as follows:

- foreign-sounding name with Canadian education and work experience (type 1)
- foreign-sounding name, foreign undergraduate degree and Canadian experience (type 2)

- foreign-sounding name, foreign education and some foreign experience (type 3) or all of it (type 4)

As I already mentioned, the call-back rate for type 0 resumes was 15.8% and changing only the name to an Indian one would decrease the rate to 12%, doing the same with a Chinese or Pakistani-sounding name, made the call-backs drop to 10.8 and 11% respectively (Oreopoulos 2009, 153). There was no difference between type 1 and 2 resumes, perhaps due to the Canadian experience, which is deemed more important than having a foreign education. As a matter of fact, when we switch from a type of resume with Canadian work experience to another with experience obtained in a foreign country, the difference is substantial. The call-back rate for resumes with almost all experience gotten in India, China or Pakistan dropped an additional 2.6% (from 11.4 to 8.8). In contrast, in the case of all foreign experience, the rate decreased by 6.2%. For what regards the resumes that list British experience, there is no significant difference between those and the type 0 ones (Oreopoulos 2009, 153).

We can draw two main conclusions from this study: for positions that require 3 to 7 years of experience, the latter plays a significant role, and it appears that Canadian employers prefer candidates with Canadian experience (ibid).; while this aspect can be to a certain extent understandable, as employers might want to save on training costs, that might be higher for someone who does not know how the Canadian workplace works, the second aspect is less excusable: this study reveals how the applicant's name matters significantly more than his education, language knowledge and extracurriculars; in fact for type 1 resumes (foreign-sounding name with Canadian experience and education) the call back rate still decreased. Moreover, no difference is recorded between applicants who attended prestigious foreign universities and those who went to less-known foreign schools, as if not having a Canadian higher education would represent an obstacle regardless of the university's ranking (Oreopoulos 2009, 155). In conclusion, this study found that 16% of resumes with English-sounding names and Canadian degrees and experience received a call-back, compared to 5% for Chinese, Indian, Pakistani sounding names with foreign degrees and experience (regardless of the prestige of the degree or the work experience). We can assume what could be the reasons behind such behaviours from the recruiters, but to be sure, one should conduct another experimental study through hundreds or thousands of interviews. A possibility for which there is a bias towards foreign names and experiences could be the impression that the candidate will not have the adequate language or cultural skills to fit in the organization. This is backed up by the fact that British resumes do not suffer the same discrimination, perhaps because they speak the same language and have a similar cultural background (Oreopoulos 2009, 158). However, this does not explain why second-generation immigrants with Canadian experience and education still receive fewer call-backs. An option that I find more adequate is that this bias is implicit, namely, unconscious. The volume of

applicants, together with the time restraints and the stress incurred by the evaluators, can push them to make "gut" decisions that perhaps do not mirror their real intentions. Nevertheless, this behaviour cannot be excused as it is discriminating and unjust. Moreover, in this globalized environment, firms should see differences as assets and opportunities to learn new ways of doing things.

In the following sections, I will present two more case studies that will bring us closer to understanding how and why this unequal access to jobs happens.

1.3 The social exclusion of the foreign educated

Another research was conducted by Koji Chavez, who studied the hiring process at a Silicon Valley high technology firm (InGen) following the substantial exclusion from mainstream jobs of foreign-educated high-skilled immigrants (Chavez 2017). The research was conducted by interviewing about 50 employees involved in the hiring process, observing 67 hiring deliberations over eleven months, and collecting data from all the in-person interviews from June 2011 to February 2014. How the interviews are conducted at InGen is in line with those of a traditional software engineering company: the candidate goes first through a technical screening interview, then four to five one-on-one technical interviews with different engineers; then, each of the evaluators assesses the candidate's technical knowledge and "cultural fit" (Chavez 2017, 2). At that point, interviewers rank the candidates on two 4-category scales (one for technical ability and one for fit). The scale goes from 1, would not recommend and would fight for rejection, to 4, would recommend and would fight for hire (Chavez 2017, 3).

It could be pretty intuitive that the technical interview is not the one that causes the discrepancy in hiring between skilled immigrants and non-immigrants. In fact, that is an objective process where the candidates are presented with a problem they need to solve. The evaluators may perhaps prefer a certain approach to another. However, ultimately if the issue is resolved on time, they do not have many reasons to prefer one candidate to another. On the contrary, the second part of the evaluation, which concerns the individual's culture and personal behaviour, can positively assess applicants whose characteristics are similar to the interviewer's. This company is based in the United States, which according to the Hofstede cultural dimensions model, has a medium-low power distance, meaning that members of the society do not readily accept a structured hierarchy, and a very high (90%) individualism rate, which means that people are very concerned with themselves rather than with the rest of society (Hofstede 2001). In the workplace, this could translate into informal communication that is shared between managers and employees.

Moreover, in the US, workers need to show initiative and not be shy to ask for what they want. On the contrary, in China, as well as in most Asian countries, these two factors are diametrically opposite:

the power distance is very high and individualism very low. Therefore, the unequal relationship between employer and employees is polarized and perfectly acceptable, in fact, workers should simply obey and not act above their rank. At the same time, China is a highly collectivist country, resulting in a low commitment to the organization as personal relations prevail (Hofstede 2001).

Keeping all this in mind, the results found by Chavez (2017, 5) will not surprise us. Foreign-educated Chinese, Asian-Indian and "other" Asian immigrants received lower cultural evaluations. This also resulted in fewer job offers. According to the interviews that Chavez conducted with the recruiters, the knot of the problem is that they respond more positively to candidates who show signs of American cultural membership: for example, engaging in conversation without being too submissive, but rather expressing their opinions; and being individualistic, namely, defending their ideas and being creative. As I already mentioned, these characteristics are distinctive of the American culture, while very far from the Asian one.

For this reason, immigrant Asian candidates are penalized due to what Chavez calls the "perceived cultural divide" (Chavez 2017, 6). This is due to the impossibility of recruiters to deal with a different cultural approach, which they perceive as a transgression from the standard cultural norms as well as a lack of individualism. Again, this is particularly true for Asian Indian and Chinese immigrants, as other cultures are more able to conform to American norms and behaviours. In a nutshell, foreign-educated immigrants pay more attention to the technical part of the interview without giving much weight to the following conversation. This gives the impression to the recruiters that they are shy or passive candidates, who will not be proactive once they get the job and will only do what they are told: *"I don't know if I can work with this person… They'll do whatever you tell them to do, but they're not going to…really contribute"* (Ryan, hiring manager) (ibid).

In conclusion, cultural fit is an important aspect to keep in mind when deciding whom to hire. Furthermore, this goes not only for the sake of the company but, most of all, for that of the candidate, who will be at ease working in a place that does not reflect his or her core values. Nevertheless, excessively prioritizing this idea of "fit" can lead to creating a far too homogeneous organization, where diversity is often avoided. Moreover, recruiters can use the cultural fit "excuse" to not work on their unconscious bias and might confuse personal connection with shared values. I would argue that we are getting closer to clarifying the decision-making process that pushes recruiters to make determinant decisions on whom to hire. Is this bias really unconscious, though? And is it a good enough reason why it should be acceptable?

1.4 Hiring discrimination and ethnic penalties

A study by Zwysen et al (2020) attempted to find the relationship between hiring discrimination and ethnic penalties in the UK. In fact, if high hiring discrimination is usually the result of ethnic penalties, the groups who face such discrimination do not always go through the same penalties. First, let me clarify the definitions: hiring discrimination is the phenomenon for which ethnic minorities have more difficulty being offered a job, even though they have the same credentials and resume as their "native" counterparts (Zwysen et al. 2020, 268). Existing literature (Bagley and Abubaker, 2017; Heath and Cheung, 2006; Heath and Di Stasio, 2019; Wood et al., 2009) already established that applications sent by ethnic minorities are discriminated against, as these candidates are less likely to receive a positive response. However, we cannot differentiate between minorities. In fact, as we saw in the first case study analysed, Oreopoulos, took into consideration immigrants from China, India, Pakistan, and Britain, only the first three were actually discriminated against. In the same way with Chavez, the recruiters' issue was mainly with Asians. So, we start to notice a recurring pattern where white minorities are treated more favourably than visible ones. In the second place, ethnic penalties deal with how ethnic minorities do in the labour market compared to the majority (Zwysen et al. 2020, 269). In general, there is variance among groups: white minorities do as good if not better than the UK majority; while Indian and Chinese outperform Pakistani and Bangladeshi (Li and Heath, 2008, 238). This study aimed at understanding the disadvantage that certain minorities incur in the labour market by linking data on hiring discrimination with that on labour market outcomes. The results confirmed that ethnic penalties reflect hiring discrimination, and it is very likely that groups who incur higher hiring discrimination are the same that suffer from hiring penalties in the work arena. This congruence finds the strongest values when we deal with black African, Middle Eastern and Pakistani/Bangladeshi minorities. On the other hand, Indian and Chinese minorities are characterized by a lower congruence as they suffer from high hiring discrimination levels but face fewer ethnic penalties (Zwysen et al. 2020, 274).

This study adds an essential tassel to our research, by confirming what was partly revealed in the previous sections: not all minorities are the same. Some, which are usually the same ones, have more issues integrating with Western culture. On the one hand, the candidate can choose to use a "strategic behaviour" to present themselves in a way they believe will be more acceptable (Hiemstra et al. 2013, 431), increasing the number of jobs applied to (Pager and Pedulla 2015, 1047), becoming self-employed, or relying more on the public sector where discrimination might be lower. On the other hand, evaluators should learn to acknowledge cultural differences in a way that embraces them rather than excluding them. They should also learn to check their bias when unconscious and put aside the limitation of "cultural fit" if it means excluding valid applicants on a null basis.

1.5 Hiring through cultural matching

In these past sections, we could pinpoint similarities in the treatment reserved for certain groups of immigrants in the job market. Overall, what we have learned is that there is a possibility that this bias is unconscious and that it originates from a difference in culture.

Lauren Rivera (2012) researched hiring in elite professional service firms to determine how cultural similarities make a distinctive difference in the employers' hiring decisions. By studying 120 interviews and observing the deliberations of the hiring committee, the researcher found that the selection happens not only based on the candidate's skills and competencies but rather through a process of "cultural matching" between applicants, employers, and organizations (Rivera 2012, 1009). If previously I described cultural differences and similarities as something embedded in a specific ethnicity (like power distance or individualism), now we move toward an idea of culture that is applied to the single individual and their behaviours: for example, their taste, hobbies, experiences, presentation styles (Bourdieu 1984). In fact, although usually hiring decisions are attributed to a mixture of candidates' human capital (their skills), social capital and demographics, there is much unexplained variance. Namely, other reasons must drive the deliberation. The bottom line is that hiring is not only a process that deals with individual, organizational, or institutional factors (Pager and Sheperd 2008, 183) but is also an interpersonal process, where employers become subjective in front of the applicant's characteristics. This subjectivity can become the most crucial factor of the interview and even have more weight than the actual qualifications written on the resume (Graves and Powell 1995, 88). This exchange of personal information is not an end in itself: the recruiter is not generally impressed by the candidate's habits, but they become so when such habits are similar to theirs. Similarity is one of the most potent drivers of evaluation in job interviews (Huffcutt 2011, 68). This is so because having things in common can work as a bonding factor that creates trust and comfort. In sociology, this is called "homophily", which is the tendency of individuals to get closer and more appreciative of other individuals that are similar to them in values and general beliefs. With this case study, I want to highlight how homophily can be dangerous when making hiring decisions.

Rivera (2012) decided to analyze hiring in elite professional service firms in the US (banks, law firms, management consulting firms). These share some characteristics: they offer unmatched economic rewards to young employees, who find themselves going from fresh graduates to the top 10% income holders in the US; entry-level positions are extremely demanding, requiring more than 65 hours per week and quite a lot of interpersonal skills (Rivera 2012, 1002); these firms hire in bulk from prestigious universities, after a resume screen the candidates selected, participate to an interview which is conducted (and this is a focal point) not by human resources representatives, but rather by revenue-generating actors (Rivera 2012, 1004). These employees will have to spend the majority of

time with the new hire, but they have no training in interviewing. As a matter of fact, the interview's format is based chiefly on informal conversations aimed at evaluating the applicant's interpersonal skills (ibid). Thanks to the many interviews that Rivera conducted with managing directors, mid-level employees and HR managers, she noticed that similarity was often referred to in the evaluations, particularly those regarding extracurricular activities and leisure time, together with self-presentation styles. She identified three main ways in which cultural similarities affect the hiring process: organizational, cognitive and affective processes (Rivera 2012, 1008).

1.5.1 Organizational process

In the first case, the most critical aspect is the cultural fit; hence, the recruiter (or, in this particular case, anyone doing the interview) will look first and foremost for similarities between the candidate and the firm's already existing employee base. Evaluators who shared their opinions with Rivera (Rivera 2012, 1012), explained that fit is an essential aspect due to the long hours spent in the office and on the road constantly near other colleagues; therefore, spending that time with someone who is culturally similar can make it more enjoyable. This reasoning seems understandable, and perhaps it is also acceptable for a supervisor to interview a new hire that will be under their direct guidance (although I would argue that the applicant should first be interviewed by an HR professional who could then make a suggestion). However, a question remains: how can one measure fit? As I already mentioned, this concept is quite abstract, and it is easy to slip into discriminatory behaviours. In this case, a big part of the selection is already made by recruiting only in prestige universities; after considering all the good grades, the main differentiator is extracurriculars and general interests. Here, I believe the situation becomes dangerously far from having "shared core values" and too close to deciding who gets the job based on superficial and irrelevant factors. The best way to describe this phenomenon is to report some of the opinions expressed by the employers of the service firms: For example, legal hiring manager Mary (white, female) rejected a mock candidate based on his extracurriculars. She said, *"I'm looking at the interests [on his résumé]—lacrosse, squash, crew [laughs]. I'm sort of giving him a personality type here, and I don't think he's going to fit in well here... we're more rough and tumble…"*(Rivera 2012, 1009)

Attorney Paul (white, male) on how he makes his decisions *: "We don't really like people here to have outside interests. We're kind of a boring firm in that way. So, honestly, when I see people who have a lot of activities on their résumé, or if they seem to have a really strong passion for something outside of work, I'll usually take a pass because it's not going to be a good fit.";*(ibid)

And then manager Hans (white, male) on whether to call back for another interview a candidate *"He did well on the case and was very articulate. He's a very interesting guy with a good story. But I think he's too intellectual for [FIRM]. You know, he is very into 18th-century literature and avant-garde film… [sighed] I don't think he'd be a good fit."* (ibid).

This study was based on several elite professional service firms. To some extent, all of them care about cultural fit, but interestingly enough, not to the same degree: in fact, fit was deemed less necessary in firms that dealt with consulting, where work is highly interpersonal, while it was more crucial in law, where there is less need of interpersonal relationships (Rivera 2012, 1012). This could already signal us that fit is an arbitrary measure, not strictly necessary. In fact, technical business questions were used in consulting firms to evaluate rather than cultural similarities.

1.5.2 Cognitive process

Another method used by recruiters is to look for shared experiences and common interests, and eventually will guide their decision toward those candidates that most fit their own extraprofessional background. The research in fact, proves that people tend to penalize individuals who do not conform to their categories (Zuckerman 1999, 271). However, if before the phenomenon for which people tend to be "attracted" by similarities in an unconscious way, in this case, actively looking for common interests is a voluntary and intentional act. Namely, once the interview reaches a stall point due to abstract answers or to unpredictable ways of forecasting future performance, the recruiter uses its own merits and achievements as a model that must apply to the candidate as well; in fact, if the evaluator believes they were able to succeed in their life, the fact that the applicant followed part of the same path is a good indicator for possible success (Rivera 2012, 1012). The outcome is that the evaluator is influenced by their own experiences and creates a constructed "merit scale" that favours candidates similar to them. For example, evaluators who got high grades at university claimed that good grades were a crucial requirement, while those with less impressive results were more dismissive of that particular scale (Rivera 2012, 1013). The main issue here is that evaluators are not only influenced by their own experiences, but they are also unable to measure merit in a specific domain in an objective way. For example, very often, firms ask their recruiters to look for ambition and drive, which can be gauged by looking at leadership positions that the candidate might have had during its extracurriculars.

Nevertheless, this remains a quite abstract requirement that leaves to evaluators the power to decide what qualifies as a respectable extracurricular: for instance, former college athletes preferred candidates who participated in varsity sports to those who wrote in the journal or were president of a club, even if the firsts had lower grades (ibid). Moreover, recruiters would look at similarities not

only when they had to evaluate soft skills but also for hard skills: hence, if they came from a similar faculty, that would be a plus, or if they had the same reasoning process in answering business questions. This could often result in the exclusion of very valid candidates only because they attended a major that was not appropriate according to that one single recruiter. To conclude, I quote banking recruiting head Stephanie who declared: "You are basically hiring yourself. This is not an objective process" (Rivera 2012, 1014).

1.5.3 Affective process

We discovered through this fascinating study that cultural similarities could affect the hiring process in two ways: from the organizational point of view, namely the "cultural fit" of the firm; cognitively, that results in evaluators giving more value to those candidates similar to them; and now we will explore the affectively driven process, in which similarities produce a sense of excitement and complicity. This phenomenon lies in the human need to be validated, and the satisfaction one feels when this happens (Turner and Stets 2006, 28). For example, an employee of one of the firms declared that similarities exposed only on the resume (hence even before the interview) had the power to make a big difference: while checking the resume of an applicant, he noticed she played squash and proceeded with: "She plays squash. Anyone who plays squash I love" (Rivera 2012, 1015), and then put her first in the ranking. On the other hand, a lack of shared interests would discourage recruiters from interviewing a candidate, even if their achievements were valid. According to many evaluators, these feelings of excitement were a prerequisite of the cultural fit and, overall, a crucial aspect of building chemistry with the applicant. The danger of this process is brought to us by psychology: it is common for people who are experiencing excitement and positive feelings toward someone to exaggerate their strengths and disregard their soft spots. The opposite happens when these feelings of excitement are instead of boredom and disappointment. In that case, the candidate's weaknesses will be amplified while the strengths are not accounted for (Clore and Storbeck 2006, 128). This was reported by Rivera, as some of the evaluators admitted to lowering the bar for some of the candidates they "had sparks with"; for example, a banker confessed to Rivera: "You know, if I'm really hitting it off with them, I won't give them the numbers because I don't want to see them flounder. I want to be able to go back and say, 'Things went well' and pass them on" (Rivera 2012, 1015).

This last process confirms to us the presence of a bias. Sometimes it is unconscious, but other times as the latter, it is intentional and deliberate.

1.6 Implications

The case studies analysed before this one were primarily focused on the fact that candidates do not receive offers, often due to ethnical discriminations. This last study, instead, was mostly concerned with how and why evaluators choose one candidate instead of another. While the first three research wanted to shed light on the ethnic penalty and the social exclusion of immigrants in getting a job, Rivera's study did not deal with immigrant discrimination. To me, this is important for two main reasons: bias, whether unconscious or conscious, is an issue that regards the totality of the workforce. It must be acknowledged regardless of the categories it impacts most. Moreover, this means that discrimination cannot be easily recognized and therefore eradicated, as it does not only affect people of certain cultures. These studies proved that workers are excluded from the workforce based on their name, culture and even the ways they spend their leisure time or present themselves. The second reason is that even though the previous study did not focus on the immigrants' reality, we can still assume that a penalty is in place. In fact, evaluators would strongly consider cultural similarities and prefer those candidates whose attitudes and behaviours reflected theirs. Considering that most of the evaluators were white, we can already question whether this differentiation affected all the other ethnicities more. To back up this assumption we can also notice how they would highlight extracurricular activities generally associated with the white upper-middle class (sports, arts, travel), which necessitate a consistent investment of time and resources that are not available to everyone (Shulman and Bowen 2001). Hence, less affluent students which often also overlapped with immigrants or foreign students and had no chance at the game.

This resulted in classes of new workers that were extremely homogeneous with those already existing in the firm (Rivera 2012, 1015); hence once again, the strength of having a diverse workforce was dismissed to leave way to familiarity and security. However, as I already mentioned, workers who share many cultural similarities can even be trouble for the company, as they might reduce their focus on essential tasks and decision-making processes (Phillips et al. 2006, 475). Moreover, many of these American companies are highly demanding, and they profess their need for workers with solid job devotion (Blair-Loy 2003, 24), this could ultimately clash with the selection of candidates based on their frequent leisure activities. In the same way, letting evaluators choose according to their feelings toward the applicants could result in an incongruence between individual and organizational objectives. Plus, recruiters, moved by the fact that they will have to work with the new hires constantly, may be prone to hire based on their affinity with these individuals rather than on their competencies.

In conclusion, I argue that cultural signals or "lifestyle markers" should not be considered human capital and job-relevant skills. Moreover, the unconscious bias that we witnessed in the previous three

studies (Oreopoulos 2011; Chavez 2017; Zwysen et al 2021) are the cause of ethnic penalties and immigrant discrimination, which is unacceptable. A solution must be implemented in order to avoid this error. When the bias is not unconscious instead, managers should be reminded of the advantages of having a heterogeneous workforce. In particular, firms need to develop processes that maximize the advantages of having a diverse team while minimizing the disadvantages (Cox 1994).

1.7 What is the socio-cognitive bias?

Unconscious biases are often an intrinsic part of the workplace because as humans, we are all subject to prejudice; and although we might think that we are against discrimination and preconceptions, we might still have unconscious believes that exclude certain categories (Henneman 2014, 31). The bias originates naturally from stereotypes and social norms (Guynn 2015, 2), and can be "activated" by a multitude of external factors such as ethnicity, gender, level of education, marital status, use of leisure time and much more; basically, every human characteristic can be met with an unconscious bias (McCormick 2015, 2). The reason why bias is such a natural part of our essence, is that it is rooted in the brain: scientific research has in fact determined that the bias is found in the amygdala, which is the part of the brain that deals with threat and fear; the stereotype instead, if found inf the temporal and frontal lobes that have the function of gaining information about people and creating opinions and impressions (Henneman 2014, 32). Therefore, bias arises when the brain labels a certain characteristic as good or bad, and then such label is applied to a whole group. This method is used to simplify the myriad of information that we receive continuously, and it is also a "survival method" to determine quickly what is safe and what is not (Ross 2008, 3).

The issue is when these biases creep into the workplace: at Queensland University, a research found that blonde women's wages were 7% higher than brunettes', while at Duke University another study discovered that people with a "mature face" were more likely to climb the career ladder than those with a "baby face" (McCormick 2015, 3); moreover, even tall men seem to be advantaged, as they reach leadership positions more often than their shorter competitors (ibid). As we learned in the previous sections, bias can also be given by a person's name, and this was confirmed by research conducted by the MIT together with the University of Chicago: the study was set up in a similar way to the Oreopoulos' one, namely, 5000 resumes were sent to more than one thousand employers that were looking to hire. Each of them received four resumes, two of which presented a white-sounding name, and two other a black-sounding name, and for each couple one was above average, and one was average. The applicants with white-sounding names received 50% more call-backs (Ross 2008, 4).

An agreed-upon way of reducing bias is finding a way of recognizing it, acknowledging it, and this starts from categorizing it: there are more than one hundred unconscious biases, but the most common, especially in the workplace are:

- Affinity bias: preferring those similar to you
- Halo effect: since we like someone, all of their actions and ways of being are good and appreciated by us
- Perception bias: having stereotypical believes about a group which do not allow to have objective opinions about the members of the group
- Confirmation bias: looking for information that purposely goes to confirm a pre-existing assumption or belief
- Group think: trying to get into a group (for example a team at work) by annulling your own belief and opinions and mimicking the ones of the group participants (McCormick 2015, 6).

These biases, have the power to affect the way in which managers and leaders make their decisions, not only at the hiring level but also during the everyday deliberations. Moreover, these types of prejudices damage the company as well: for example, having a confirmation bias can result in a lower level of innovation, since the individual wants to simply confirm already existing ideas, and they will be close minded when it comes to hearing new opinions, that are perhaps different from their own (ibid).

1.8 How to reduce bias?

To say that bias is unconscious should not, in my opinion, be a way of downgrading the issue and presenting it as "inevitable", hence, with no possible solution. This also normalizes the bias as something that simply happens, due to our human nature. Nevertheless, HR practices need to evolve in order to avoid discrimination, and this is a complex process that cannot happen overnight. A starting point would be a partial restructuring of the interview process. In fact, firms should work on limiting subjectivity from the hiring process. This could be done in three main ways:

1. Evaluators should set objective criteria, namely, what skills and competencies are needed.
2. Standardize the interview process for all the candidates, without exceptions, hence asking the same questions and not favouring anyone based on feelings of excitement.
3. Eliminate informal chats or other inappropriate social interactions like "coffee break banter" and avoid gut feelings in the assessment.

These steps can perhaps help recruiters limit their bias and select candidates based on relevant human capital. Nevertheless, this might not be enough, as the recruiter is a human and has flaws, gets tired, demotivated, and commits mistakes. Therefore, three additional precautions could help in the process:

4. Provide awareness training: these types of training programmes should give the employees a chance to learn about bias, recognize it and understand how to avoid it every day (Henneman 2014, 40).
5. Categorize the bias: another way of reaching awareness is to give a name to said biases, in order to quickly realize when they are happening (Henneman 2014, 41)
6. Creating structures: it is important to confront with co-workers on the possibilities of having or perceiving a bias. To gain information, the organization could administer surveys to the employees to shed light on possible existing bias; or to previous employees to investigate possible issues they faced during their permanence in the company; it could also look for an exchange with the minorities inside the organization to determine whether they were subject to unconscious biases (Ross 2008, 8).

Nevertheless, this might still not be enough as human judgment is often inconsistent and blurry. These mistakes can compromise the quality of life of other individuals who see their qualified resumes rejected without acceptable reasons. Therefore, I will now introduce the second part of this dissertation: Artificial Intelligence.

As it was already mentioned, humans get tired and distracted, algorithms do not. They are objective as they apply the same rules to all candidates; plus, they allow companies to focus on relevant skills by inputting specific variables. In a nutshell, by taking over repetitive and time-consuming tasks as scheduling, the quality of the hiring process might improve as it will also eliminate human biases (Hmoud and Laszlo 2019, 24). On the other hand, algorithms can make mistakes, especially if they are based on historical data that is biased or reliant on irrelevant criteria. In that case, the algorithm will also be biased (I will propose the example of Amazon later on).

In the next chapter I will analyse the use that firms could do of Artificial Intelligence in Human Resources Management to not only limit their bias but to also save time and increase the quality of the work. I will not, however, neglect the possible disadvantages and downturns of this practice.

Second chapter

What is Artificial Intelligence?

2.1 The origin of Artificial Intelligence

The father of Artificial Intelligence is Professor John McCarty. Son of immigrants who struggled during the great depression, he was a child prodigy. When he went off to university to study mathematics (already with the intent to become a professor of the subject), he had the chance to meet and engage with other important figures like John Von Neumann, Alan Turing and Claude Shannon (Buchanan 2005, 56). Their discussions would mostly hover around the newest topic: computers. For McCarthy, the parallelism between computer and brain was immediate, and he wondered whether machines could have the ability to think like humans. After getting a PhD in mathematics, McCarthy collaborated with Shannon on a collection of papers, that would mark the first contribution to the realm of artificial intelligence, even though this name was not yet coined (Haenlein and Kaplan 2019, 6). That happened on the 31st of August of 1955 when together with Minsky, Rochester, and Shannon, he proposed a project for a Dartmouth research program on AI. In this proposal, McCarthy and the others offered to conduct a 2-month study on AI, starting from the assumption that since intelligence can be accurately described, a machine can imitate it. The project was authorized and gathered a team of researchers (Newell, Selfridge, Simon, McCarthy, Solomonoff, Minsky, Shannon), all of whom contributed in some way to the field of Artificial Intelligence in the following years (Haenlein and Kaplan 2019, 8).

In 1957, McCarthy cooperated with Minsky to put together an AI Lab at MIT. During these years, he developed a programming language, “LISP” (List Processing). This was possibly his greatest contribution. An even further step was explained in his paper “Programs with Common Sense” (1959), in which he argued that computers, in order to be considered intelligent, need to have common reasoning, a claim that received many critiques (Andresen 2002, 84).

Another pioneer of AI is Alan Turing. Not even ten years after having a decisive part in the victory of the second world war, by decoding “Enigma” the Nazi machine, Alan Turing wrote “Computing Machinery and Intelligence”, a dissertation that inaugurated the origin of AI. The 1950s paper started from one simple, revolutionary question: can machines think? The machine that was conceived by Turing and Welchman to decrypt the Germans' messages, was called “the Bombe”. It was based on the principle of “reductio ad absurdum”, namely, the number of possible settings of the Enigma machine was dramatically diminished thanks to a set of message transcriptions (Wright 2016, 328). This was a revolutionary discovery: a mechanic computer was able to break a code that was impossible to crack for the most talented mathematicians. This made Turing ponder the possibility of

these machines being intelligent. Hence, the 1950s paper. In this dissertation, Turing not only explained how to create such machines but also how to test their intelligence. In fact, he developed a test, called "the imitation game", or the "Turing test", in which a human interacts with another person and a machine and they have to understand what is the identity of each; if the individual is unable to distinguish the human from the machine, then the latter is referred to as intelligent (Turing 1950, 25). The following two decades after the Dartmouth Conference of above (with the first coining of the term Artificial Intelligence) were prolific for AI; the ELIZA program was one of the firsts to pass the Turing test and it consisted in a machine that could simulate a conversation with a human individual; a similar story was the General Problem Solver program created by Herbert Simon, Nobel Prize winner, which could solve simple problems (Haenlein and Kaplan 2019, 8). Thanks to these small but effective developments, the world of AI started receiving substantial funding; then came 1973 when the US Congress started to have its doubts regarding the high spending for the matter. Moreover, in the same period an important British mathematician, James Lighthill, published a paper where he demolished the hopeful expectations of AI experts, by claiming that machines would only get to the level of "experienced amateur" in games and that the idea of common-sense reasoning would never be reached by a machine. This report caused the cutting of funds first from the British government and then from the US one (Haenlein and Kaplan 2019, 9). This choice was not completely outrageous, as it was true that AI was not really making progress. The main reason for that was that these systems (like the Eliza or the General Problem Solver) were Expert Systems, based on the assumption that human intelligence can be delineated structurally and imitated through a series of "if-then" statements" (ibid). These systems can work very well when such formalization is provided, for example, the Deep Blue chess program that was able to beat the world champion Gary Kasparov in 1997, is an example of an Expert System. Nevertheless, these systems do not work in situations where this formalization is present: hence, they cannot recognize faces, or distinguish between different animated or unanimated objects (Haenlein and Kaplan 2019, 10). To reach that point, Artificial Intelligence systems need to interpret external data as well, and they should behave similarly to the neurons in our brain; in fact, in the 1940s this idea was theorized with the research on Artificial Neural Networks, which came to a halt in 1969 when Papert and Minsky claimed that computers did not yet have the necessary processing power (ibid).

Nevertheless, in 2015 there was a return of this concept with Google's program AlphaGo, which was able to beat the world champion at an extremely complex board game called "Go", way more complicated than chess. AlphaGo was able to reach this level thanks to a specific form of neural network called Deep Learning. This form of machine learning is characterized by a neural network with three or more layers, that mimic the behaviour of the human brain (Granter et al. 2017, 620).

Nowadays, deep learning is at the foundation of many AI technologies like face recognition, self-driving cars, smart speakers and more.

2.2 Key concepts

Before proceeding, I will clarify some crucial concepts to better understand the sections that will come.

- Artificial Intelligence: AI is the science of making intelligent machines, in particular computer programs, that are able to perform tasks that would normally require human intelligence (McCarty 2007, 2).
- Intelligence: This definition can greatly vary and there is not an agreed-upon idea of what intelligence truly is. According to McCarthy, intelligence is the computational component of reaching objectives in the world. There are different degrees of intelligence for people, most animals, and some machines (McCarty 2007, 3).
- Does AI simulate human intelligence? Not necessarily. Sometimes we can make a machine solve a problem by studying ourselves and our way of dealing with the issue, but in other cases, AI researchers prefer to study the complications that the world presents to intelligence (ibid).
- Main differences between Human and Artificial Intelligence: Humans use the computing capability of the brain, and they have a memory as well as the ability to think; computers mostly rely on data and specific instructions. Humans are able to learn from the past, especially from their mistakes, while computers do not. They can however be "trained" and acquire information. Machines are usually faster in resolving problems as they can handle more data, nevertheless, people are better at social interactions (Hill et al. 2015, 245).

2.3 AI Today

Artificial Intelligence is undoubtedly becoming a part of our everyday life, in fact, the question is not even about the role that AI might have but rather, about the role that it already has and how it will develop in the future. Moreover, the crucial point is to understand the new relationship that is forming between AI and human beings, and in this realm, it is important to understand which decision should be "delegated" to our artificial assistants. There are several kinds of AI today, and I will go through them in this section. It is worth pointing out that these categories are not all of them, as it is most likely that new ones still have to be discovered.

The four main kinds of AI are Reactive Machines AI, Limited Memory AI, Theory of Mind AI, and Self-Aware AI (McCarty 2007, 13).

- ◊ Reactive Machine AI: In this case, the machine will operate by only taking into consideration the present situation, hence it cannot make assumptions in order to decide on future action. For example, the IBM chess program that was able to beat the world champion is a type of reactive machine. This is the oldest and less developed form of AI, in fact, they do not have the ability to improve their performance based on their memory (Hassani et al. 2020, 145).
- ◊ Limited Memory AI: In this instance, the machine has all the characteristics of a reactive machine, but in addition, it is also able to improve its decision-making process by relying on past data. This memory is short-term and is used to evaluate future actions. The limited-memory AI is the most widely used nowadays, for example, self-driving cars, chatbots and virtual assistants are limited memory, and they use recent past information to make immediate present decisions (Joshi 2019, 3).
- ◊ Theory of Mind AI: This category of AI has still not finished its development and it is more of a concept; as a matter of fact, it is quite an advanced type and it represents the next step of AI. The aim is to study emotional intelligence and to understand human thoughts and beliefs (Hassani et al. 2020, 146).
- ◊ Self-Aware AI: This is the kind of AI that most of the human population wishes to never witness. For now, self-aware is only a hypothesis. The idea is that machines become so close to the human brain that they develop their consciousness and become "awake". However, we are still quite far from this step (Chatila et al. 2018, 3).

In addition to the different types of AI, we have to understand also its different branches, namely the techniques with which AI is implemented:

- ♦ Machine Learning: The science that gets machines to learn to decipher, process and analyze data to figure out real-world issues. This computer science uses algorithms to mimic the learning process of humans and improve its functioning (Janiesch et al. 2020, 686).
- ♦ Deep Learning: This branch is more evolved than the previous one, and it is used for the majority of AI nowadays. It is based on the implementation of Neural Networks (above-mentioned) on high-dimensional data in order to create solutions to solve more advanced problems. The presence of more than one neural network is what makes this technology more accurate (Janiesch et al. 2021, 685).
- ♦ Natural Language Processing (NPL): This system attempts to understand the natural human language to grow business. Hence, this branch of computer science aims at giving computers the capacity to understand words in written or spoken form, much similar to what a human

would do. Examples of uses of NPL are Twitter, which adopts this method to ban a specific language, and Amazon which uses it to get customer reviews (Chowdhury 2020, 603).

- Fuzzy Logic: This system aims at generating an output, following incomplete, ambiguous or inaccurate input. Hence, this method attempts to mimic the human process by taking into consideration all the other options apart from YES and NO (Fernandez et al. 2019, 71).

2.3.1 The current state of Artificial Intelligence in Global Governance

Although AI is not a recent phenomenon, it has been developing quickly and substantially in the last two decades. As we proceed to discover other kinds of AI and new applications to use these technologies we are also faced with some concerns: will automation take over any jobs (Bryson and Winfield 2017, 117)? Could AI be used for unethical reasons? Will there be a decrease in accountability and responsibility? And finally, what about the algorithmic bias (Dignum 2018, 1)? A way of dealing with these concerns is to have a system of global governance that can maximize the benefits while controlling for the risks (Butcher and Beridze 2019, 88). The administration of AI can be done through several solutions like implementing policies, promoting norms, raising awareness among all the stakeholders and creating regulatory bodies that can govern AI technologies (ibid). As things stand, AI governance has not yet developed much, and it is still in a quite unorganized state. This is mostly due to differences in stakeholders' wills: in fact, if on one hand, the private sector wishes to be left on its own, without the imposition of legal measures that could hinder its profit, on the other the public one, wants precautions to protect the citizens by the possible dangerous consequences brought by AI (Butcher and Beridze 2019, 89). Therefore, the framework is not clear, but some initiatives help gain information on AI and its developments: the AI Index, which is updated with all the recent progresses in AI, or the Government Artificial Intelligence Readiness Index that scores the governments of 194 countries following their capabilities of using AI in public services (Oxford Insights 2019). For example, Canada is particularly concerned with being transparent about its AI operations, and in fact, it was among the first to publish its national AI strategy plan. Plus, it started consulting on digital transformation phenomena and sustaining the ethical application of IA (Benay 2018). Similarly, the UK, created a center for Data Ethics and Innovation (Butcher and Beridze 2019, 90), and it was one of the first countries in the world to establish a center for safeguarding the ethical aspects of AI. Also, the European Commission shared a report regarding the approach that the EU should have toward Artificial Intelligence, and it is based on three pillars, two of which encourage the readiness for socioeconomic transformations and the implementation of a legal and ethical framework (EU Commission 2018). Since these proposals are all somewhat new, we still do not know which one is the most effective, nevertheless, it is encouraging to see

governments acknowledging the technological development and taking preventive measures to ensure its best possible development.

There are also non-governmental organizations that are active in the research for AI development, such as the Institute for Electrical and Electronics Engineers (IEEE) that in 2016 created a Global initiative regarding the Ethics of Autonomous and Intelligent Systems, to put ethical concerns paramount (Butcher and Beridze 2019, 91). The potential of new technologies did not go unnoticed by the UN either; the secretary general claimed during a General Assembly, that AI and other technologies could make a substantial difference to reach the Sustainable Development Goals. Moreover, he established in 2018, the High-Level Panel on Digital Cooperation to maximize the potential of digital technologies while taking care of all the possible negative consequences (UN 2018). In conclusion, the governance strategies that are being undertaken by governmental and non-governmental bodies are on a good path, but there is still work that needs to be done, for example, more specific regulation and transparency.

2.4 The human-AI relationship

What can we expect then from the future? We established that AI will have an always more prominent role in our lives, and perhaps, with the right regulations, we will be able to coexist in harmony. One of the first developments will most likely start from a closer relationship between humans and AI. In this dissertation, I do not want to stress the superiority of one of these two subjects; AI could be a way of solving the bias problem, but as we know, algorithms can be biased as well. Hence, the solution could lie in the collaboration between humans and AI, a sort of teamwork. Let us take into consideration the example of chess: of course, AI has a far broader cognitive capacity than a person, and it can process many more probabilities of outcome, therefore when the IBM Deep Blue machine defeated the chess champion, Kasparov, many thought the game of chess reached its end (Jarrahi 2018, 579). But when the same Kasparov developed a variant of chess that was more “freestyle”, the best player was neither a machine nor a man but a partnership between the two. This winning partnership was not used solely in chess: a study that investigated the detection of cancer in lymph node cells pictures (Wang et al. 2016) discovered that Artificial Intelligence had a 7.5% error rate, and pathologists a 3.5%. When the two worked together, the error dropped to 0.5%. So, can humans and machines be complementary? A way of addressing this question is to analyze the differences between the two main decision-making approaches: analytical and intuitive (Jarrahi 2018, 579). In the organizational literature, analytical and intuitive approaches have been separated and studied based on how managers and other members of the organization come to a final decision (Dane et al. 2012, 189). With the analytical method, information is gathered and analyzed, using rationality and

logic; in fact, AI and its problem-solving capability are quite useful for this kind of approach as it can manage huge amounts of data and conduct precise calculations. Nevertheless, most of the processes used in decision-making, are not necessarily a consequence of gathering and processing information but are rather guided by intuition (Dane et al. 2012, 190). Intuition is the capability of deciding without the need to use rationality and logic, but rather by trusting one's gut instinct (Sadler-Smith and Shefy 2004, 77). This approach involves the use of sensitivity, imagination, creativity and intuitive intelligence. Hence, the individual who chooses this method will have to rely mostly on past experiences while with an analytical approach, the main factor is the collection of information. AI cannot be extremely helpful with this kind of decision-making, because as we know, these technologies are still not much capable of understanding common-sense and unpredictable situations (Guszcza 2017, 12). However, AI can help with situations of uncertainty, namely, those where information is not available, by using predictive analytics (Jarrahi 2018, 580): With this method, AI can create new ideas through statistical inference and most importantly, new information. However, there are instances in which not even AI can come in aid, which occur when the ambiguity is consistent and there is no precedent to guide the decision, in this case, the most powerful asset of a manager is intuition (Ransbotham 2016). Humans can display more capability in this field as they rely on their experience and judgement. AI instead, is not capable of "creative" decision-making leaving a competitive advantage to humans in this realm. Therefore, in situations of uncertainty, humans have the upper hand. The same does not stand in "complex" instances, characterized by a great number of variables and elements that needs to be processed quickly (Jarrahi 2018, 581). In fact, AI has exceptional computational and analytical capacities and is able to simplify problems through the identification of causal relationships (Marwala 2015, 24) and ultimately make decisions of high quality. Finally, in situations of "equivocality" when the wills of different stakeholders clash, the decision-making process is not merely an analytical one, but rather a "political" one (Jarrahi 2018, 581), where the manager has to make the best decision to maximize the utility of all those involved. In this case, subjectivity, emotionality, and consideration of the context are key aspects; AI is not able to deliver such a mixture of approaches and therefore humans should take charge in this instance.

Of course, many times a decision-making process is characterized by all three features: uncertainty, complexity, and equivocality (Koufteros et al. 2005, 102). Hence, a winning partnership could see paired with the quick and accurate AI capability of gathering information and analyzing data, the human's intuitive gut feelings, namely a mix between analytical and intuitive approaches. This section is particularly crucial to keep in mind in this dissertation: as we go on, we will investigate how AI is used in the corporate world and Human Resources Management. Perhaps algorithms can be used to decrease the socio-cognitive bias of recruiters, which I dealt with in the previous chapter,

but they also carry the risk of bias themselves. Hence, a collaboration between an algorithm and a human evaluator could be the answer to our problem.

2.5 The future of AI

What does the future of Artificial Intelligence look like? It is important to foresee what we are going towards, to understand whether issues that we have nowadays will be resolved in the future. Apart from an always closer collaboration between humans and AI, there will probably be an advancement in NPL (Natural Language Processing), a shift from specific AI to general AI, an improvement in predictive maintenance and the final development of AI-powered Healthcare.

- The future of NLP: as we know at this point, Natural Language Processing is the method by which machines mimic human communication, narrowing down the distance between individuals and computers. This technique is widely used in AI nowadays. The main challenge with NPL is that the system is still not able to understand our natural language, but rather it is we who have to communicate through the language that the computer commands (Surabhi 2013, 2). This is because the natural language is full of ambiguities as same words for different meanings. Perhaps then, the future of NLP will consist of further development in language knowledge, given by more data, and advancements in deep learning (Hirschberg and Manning 2015, 262).
- Going from specific to general AI: Narrow Artificial Intelligence or specific AI is characterized by limited cognitive abilities, that allow it to work on one specific task at a time; for example, Alexa or Siri. ANI has some limitations, like needing a great amount of data to perform accurately, which is not always possible, moreover since it is so specific it is hard to get acquainted with it (Davidson 2017). Differently, general AI represents the future of this science, and its peculiarity is the capability of using its skills and knowledge in different contexts; an example would be R2-D2 in “Star Wars”. To reach the full development of AGI computers would need to have an extremely powerful computational ability, which they are still far from attaining. As a matter of fact, the next step in the path toward AGI will be the use of quantum computers, which can have the ability of processing exponentially more data than conventional computers (Davidson 2017).
- The future of predictive maintenance: predictive maintenance is quickly becoming a precious asset for firms as it helps reduce unexpected events. AI can be of aid in this field because its algorithms can be used to analyze data and understand when maintenance is needed. This is not only useful, to avoid incidents and unwanted issues but also to lengthen the lifespan of the equipment (Paolanti 2018, 2). Therefore, an intelligent use of AI in this realm can revolutionize the way firms operate.
- AI in Healthcare: The healthcare system is subject to struggle every now and then, due to increasing costs, lack of access and waste (Shaheen 2021, 2). The Covid-19 crisis like the HIV one in the 1980s

shed light on issues and flaws of this system: erroneous diagnostic tests, overworked doctors, lack of equipment, and information flow. Medical Artificial Intelligence can represent a transformation of the healthcare system in several ways: it can be used for drug discovery, clinical trials and patient care.

It is quite interesting to dive into the future of AI, because these next challenges, which represent only a portion of the next years of development of this science, make us understand how IA is malleable, changeable, and bendable to our needs. We need to start thinking of Artificial Intelligence as an ally, not a threat. Progress is inevitable and absolutely necessary and it has always been in the history of humans. In the next chapter, we will go on to analyze the interesting phenomenon of AI in the realm of corporations. Hence, we will see how it is applied inside the more innovative firms. Afterwards, I will go into the specifics of how algorithms and Artificial Intelligence are used in HRM, and whether they can be of aid in limiting bias.

Third chapter

Artificial Intelligence in the corporate world

3.1 Different applications of AI in the corporate world

We confirmed how Artificial Intelligence is bound to gain an always bigger role in the world. In this chapter, I will investigate what are the functions that AI has in the corporate world. The main reasons for which AI is adopted inside the firms are three: workers are spared from routinized and boring actions that can be delegated to AI, in fact, the AI's capacity of automation allows to have a more precise and fast operation; AI can analyze data in an unmatched way, which gives the company precious information for future paths; and finally, and as we already mentioned, the Natural Language Processing system makes AI more evolved and communicative.

Therefore, it is no surprise that many businesses found a way to incorporate AI in many functions: for example, customer support, sales, operations, marketing, accounting, and Human Resources.

- *Customer support*: it is a well-known fact that customers should be the number one priority for a business, as their satisfaction directly influences the well-being of the firm. Having a good customer support system can make the consumers feel more involved and truly like a part of the stakeholders. Nevertheless, it can be challenging, especially for big multinationals, to provide fast and accurate customer service, as the number of requests can reach a very high level. For this reason, Artificial Intelligence can help in many ways: the AI chatbots can answer the most frequent questions; they are responsive to consumers' habits and behavioural patterns, which are used to foresee what will most likely be the services desired by the customer (Expert Panel Forbes 2021); moreover, AI has of course, a much more rapid response time and it can use Natural Language Understanding, to comprehend the costumer's mood. This is only a part of the functions that AI can use to facilitate customer support for firms, for example, it can also pinpoint the most urgent queries and give them the right priority.
- *Sales*: Nowadays, salespeople are not as central as they were twenty years ago. Customers have now the ability to use the internet to choose which product to buy, and they can even compare it to other ones, in fact, salespeople's annual quotas are dropping (Dickie et al., 2022). Perhaps AI can help in closing this gap between the firm and the consumer and in re-empowering the figure of the salesperson. For example, AI can use the great amount of data at its disposal to give sales professionals precious information that allows them to make precise and specific recommendations to customers.
- *Operations*: Other than healthcare operations, AI is also used in manufacturing and retail operations. Manufacturing has undergone a transformational process that puts automation and computers at the

centre (Dogru and Keskin 2020, 68). Two main processes allow the development of this "Industry 4.0": digital twins and blockchains. The firsts are software models able to control performance and prevent unplanned equipment deficiencies (ibid), often used for predictive management; instead, blockchains have a broader use as they can be adopted across the whole industry for different projects. In retail, AI can represent a big helping hand, especially thanks to the advent of online shopping. This method of purchasing creates a substantial amount of data, like shopping and browsing habits which gives retailers an upper hand in the management of the supply chain operations (Dogru and Keskin 2020, 70). For example, Walmart uses an algorithm that recognizes images and can determine the freshness of a product and consequentially its expiration date (Weber and Schutte 2019, 3); Home Depot adopts deep learning to anticipate stock-outs and automate inventory replenishment (ibid). Moreover, data-driven models can also be used to decrease customer uncertainty.

- *Marketing*: Big data is used to analyze the way consumers make their past present and future decisions. Firms are becoming more and more responsive to this new information and as a result, they are also more competitive and productive. The use of AI in marketing makes the process automated and fast: namely, thanks to this technology the system knows how to connect with customers and creates tailor-made communications without the help of the human officer (Siau 2017, 10). Moreover, AI tools allow the firm to choose among different marketing strategies, thanks to the analysis of past data. Marketing is mostly about where and how the advertising takes place, and AI is able to make the best possible decision in this realm through data analysis. In the same way, machine learning identifies which users prefer a certain kind of message compared to another (Chintalapati and Pandey 2022, 39) and consequentially it can propose a customized experience to customers (like Netflix does with movies' artwork).
- *Accounting*: AI has a crucial part in this sector as well, as it can dramatically decrease the time needed by human officers while increasing the quality of the output. In fact, the majority of accounting tasks are now automated like payroll, banking or audits (Hasan 2022, 446). Moreover, the tools of machine learning and Robotic Process Automation (RPA) are used to forecast financial statements and complete repetitive tasks that are extremely exacerbating for humans (Chukwuani and Egiyi 2020, 445).

Overall, AI is finding a way to integrate its mechanisms into most corporate processes and as with every revolution it is bound to have brand-new consequences. However, we still need to analyze the sector that I am most interested in human resources. For this area I will take into consideration how Artificial Intelligence is used, especially in recruitment; what changes this approach implies; and most importantly, whether the use of AI can limit the socio-cognitive bias of the human recruiter.

3.2 What will happen to these jobs?

Oftentimes, the perception that the public has of these new technologies is that of innovations that will sooner or later steal "our jobs". After all, it is understandable, considering how in the previous section we listed many skills once in the hands of human officers and today the responsibility of computers. Although it can be a bitter truth for some, we need to keep in mind that the corporate world is extremely competitive and businesses need to stay afloat; the use of AI increases the accuracy and quality of output while reducing times and costs. This however does not mean that there is going to be a wave of unemployment, on the contrary, new jobs are being created: we are still at the initial phase of this revolution, and these machines can represent a threat rather than an advantage if they are not trained and supervised properly; here enters the human. Workers will need to teach AI programs how to function: for example, chatbots used for customer service need to be trained to understand the nuances of human speech; at Yahoo Inc. engineers are trying to teach the system sarcasm, as people do not always mean in a literal sense everything that they say (Wilson et al. 2017, 14). Therefore, one of the first crucial new elements is the role of "empathy trainer". Another actor that will be determinant in closing the gap between the technicalities of AI and the business leaders will be the "explainer" (Wilson et al. 2017, 15): not everyone is keen on the applications of these new technologies especially because they are often not very transparent. As a matter of fact, the EU's General Data Protection Regulation (2016/679) established a "right to explanation" that gives consumers the power to ask for clarifications on any decision that concerns them made by an algorithm (Wilson et al. 2017, 15), this decision resulted in the need for many employees whose function is to explain the mechanisms to non-experts. Finally, another "new" category, is one of the "sustainers" (ibid). The sustainers are those that help make sure every AI system is behaving correctly, and that unwanted consequences are taken care of. In particular, these individuals need to check that moral and ethical values are not discarded: sometimes algorithms can be biased (i.e. showing only pictures of white women under the search "loving grandmothers"), and the role of the "ethics compliance manager" would be to avoid that (Wilson et al. 2017, 15). Hence, we can argue that this advent of technology will cause a transformation in the workforce by introducing certain skills that machines are simply not able to perform as well as humans. Moreover, it should be clarified that not all occupations will face the same degree of change, but rather they will differentially be impacted in a transformative or destructive way (Fossen and Sorgner 2019, 10). In fact, there might be occupations that are strongly hit by the digital transformation, but this does not result in the substitution of human workers, while in other cases the need for human workers may become obsolete (Fossen and Sorgner 2019, 11).

3.3 The use of AI in Human Resources

Artificial Intelligence is starting to be adopted even in the most human-centric sector: Human Resources Management. In this instance, AI can be used in the talent acquisition process, by identifying the best applicant through a matching process between qualifications and requisitions; moreover, AI can make the candidate's experience more personalized and appealing thanks to the collaboration with Digital Assistants; plus AI can make intelligent job offers based on market data. Following the talent acquisition, AI can assist in the talent management phase by giving constant feedback, setting goals and helping employees in their career growth. AI can also free human employees from repetitive and obnoxious low-value tasks, like answering common questions, so that the human officer can focus on more crucial duties like mentoring (Ahmed 2018, 973). AI is also used to gather data and documents when litigation happens (i.e. lawsuits) and to make sure that pay equity is respected in the firm (ibid).

Finally, and most importantly for the scope of this research, algorithms can be used in the recruiting process: as we know at this point, humans tend to make gut decisions often based on looks, attire and way of speaking of the candidate, which is not always crucial characteristics that guarantee a favourable outcome for the candidate and the firm. In fact, in recent years the use of AI in the recruiting process has developed greatly and it is still expanding due to the complications that occur with the conventional "human" methods: HR is the foundation of a functioning firm, it is the sector that holds the competitive advantage and the growth potential of a business (Hmoud and Laszlo 2019, 23). The main objective of HR is to supply the firm with enough human resources at a limited expense while fulfilling all the requirements. This of course is not an easy task and hiring the wrong person could result in long-term and costly consequences. Therefore, AI can assist humans in dealing with this responsibility.

3.3.1 The use of AI in recruiting

The period that we are living in, can be recognized as a fourth industrial revolution: the advent of developed technologies, robotics, machine learning and AI is creating a digital era, where the relationship between manpower and machine power becomes blurry. In this realm, firms are in a constant battle for competitive advantage, and technological innovation is often the answer to obtain the upper hand. In HR recruiting can use AI in different ways:

- Chatbots: this technology allows the firm to conduct a conversation with the applicant that resembles the human one, in this way the applicant does not feel neglected and can receive all the necessary information. Moreover, chatbots do not need much computing power, which makes them cheap to develop (Tullier 2021, 5). For example, McDonald's uses this kind of technology to inform past

applicants that are turning 18, that they are now of age to reapply. Not having to use a specific person that would have to go through several resumes and figure out when each past applicant becomes of age, is very cost-saving. In the same way, other firms can use chatbots to update the applicants on whether they reached the next step of the selection process (ibid).

- Resume assessment: through AI, companies can skim through resumes at a much faster pace than through the hiring manager. Algorithms look for keywords to match the requisites of the company and choose the candidates that best fit what the firm is looking for. This implies that if on one hand, human officers might select following a gut feeling and personal preferences, on the other, the AI's decision process is completely fact-based.
- Finding the right personality: nowadays soft skills are deemed as important as hard ones and finding a candidate that is not only competent but also compatible with the company's values is of great importance. To do so, many firms are recurring to the analysis of social profiles (like Instagram or LinkedIn), in order to understand whether the applicant engages in appropriate online exchanges and therefore could be a good fit for the firm (Schellmann 2020, 2), and this task can be performed more accurately from an AI.
- Conducting interviews: in some of the most "avant guarde" companies, HR resorts to AI even in the interview process. Hence, not only for the screening of the resumes and their assessment but also, for conducting virtual interviews. In fact, in recent years AI has reached a level for which the system is able to recognize social expressions, voice tone, word choice and much more (Tullier 2021, 6). In this realm, an obligated example is one of HireVue, which is the leader in this sector. HireVue combines Organizational Psychology with Data Science to create a software that is allegedly more fair, consistent, and builds on data and experience (HireVue 2020). HireVue claims to be an answer to mitigate human bias, therefore I will expand on this topic in the next section.
- New hire onboarding: when an individual is finally chosen to join the team, several bureaucratic steps need to be completed, like explaining the policies, the procedures and the signing of the contract. In all these cases, AI can be a powerful tool that can answer pressing questions of the candidates and provide them with the necessary resources to complete the hiring process (Geetha and Bhanu 2018, 68).

These are the most crucial ways in which AI is used in recruiting, but there are surely many more such as career development and training, answering frequent queries and scheduling (Geetha and Bhanu 2018, 69).

3.3.2 What are the advantages of these methodologies of recruitment?

- *Saving time*: as we already mentioned, the pace of an AI cannot be matched by that of a human being. Not only because the computational power allows it to work faster, but also because AI can store information and with that, it gets rid of repetitive tasks that are time-consuming and not necessary.
- *Finding talents*: Artificial Intelligence is of aid to the company as it finds the best candidate that fits the requirements; moreover, it places each candidate in the right position according to their competencies and talents (Geetha and Bhanu 2018, 70)
- *Saving costs*: needless to say, AI does not have to be paid, and it can work 24/7. The company does not have to outsource to a recruiting agency and human resources officials can focus on more valuable tasks (Tullier 2021, 6)
- *Query redressing*: AI can address most of the employees' questions rapidly and give immediate answers, which has several benefits: the employees are satisfied, engaged and less likely to quit their job (lower turnover) (Geetha and Bhanu 2018, 70).
- *Quality selection*: Artificial Intelligence has access to a great amount of data which leads to quality hires. The highly unbiased screening process results in new hires that present the right skills and competencies for the job (ibid).

Overall, where the human recruiter takes one to two weeks to make a recruiting decision, the AI takes around one or two days, and it yields a choice mostly fact-based and unbiased.

3.4 Are machines less biased than humans?

The issue of discrimination that leads to unequal access to jobs does not concern only the workplace, but also the rest of the world, as they shed light on injustice and inequality (Sanchez-Monedero Dencik and Edwars 2020, 458). Having a job is part of everyone's individuality and is almost always crucial to maintain an acceptable livelihood. The decision process on who gets a job and why is changing, and one of the main reasons, apart from saving time and costs, is human bias. Automated Hiring Systems (AHS) claim to be able to mitigate discrimination and maximize diversity and inclusion. Nevertheless, it is not a given that this kind of technology reaches this goal: after all, algorithms are a human product, and if humans are biased, they could be as well. However, there are some automated hiring systems, and leaders in the field, that declare to be able to address the bias issue. These are HireVue, Pymetrics and Applied.

- **Pymetrics**: This system produces a hiring technology aimed at conducting candidates' assessments through games that originate from neuroscience research (Pymetrics 2020). The AI in this case analyzes the candidate's behaviours and approach to the games, focusing especially on the cognitive,

emotional and social traits; then the results are evaluated via a statistical model that keeps into consideration the scores of the top performers for each role, in order to determine whether the candidate is in or out-of-group (Polli and Yoo 2019). This is called "fit to role" and is the sum of the scores of all the individual tests (Sanchez-Monedero et al. 2020, 460). To identify which are the characteristics to look for in each position, the system resorts to an algorithm that clusters the traits of reference workers. For example, two of the software developers' necessary values are "learning" and "delayed gratification" (ibid), and the algorithm takes them into account during the games. Moreover, Pymetrics is especially concerned with bias avoidance and to make the process as fair as possible it takes several measures: the AHS conducts statistical tests that compare the aggregate and individual scores of each candidate while accounting for age, ethnicity and gender (Sanchez-Monedero et al. 2020, 461). With ANOVA and T-squared tests, they were able to conclude that there was no statistical bias among the groups. To ensure the lack of discrimination, Pymetrics used a software, audit-AI, which is also adopted to check the compliance with the Equal Employment Opportunity Commission (EEOC) (US EEOC 1979): this commission requires that the ratio between the highest and lowest passing categories cannot be lower than 0.80. For example, if we have candidates divided into three groups and the frequency with which they reach the next step is 350 for the first group, 330 for the second and 320 for the third, we will check the ratio between the highest and lowest (hence the first and third), which is 0.91 (320/350). Since it is higher than 0.80 we can say that the hiring process complies with the requirements (Sanchez-Monedero et al. 2020, 462).

- **HireVue**: this software automates video interviews and, as for Pymetrics, evaluates the candidates through games. Hence, this hiring system can count on three main indicators to profile candidates: categorical, audio and video (Taylor and Larsen 2017). The objective of HireVue, as stated on their online site, is to limit bias while selecting the best possible candidates. Such selection is deemed to be accurate because the system compares the applicants to the best performers that are currently on the job (HireVue 2020). HireVue, is slightly more precise than Pymetrics, as it gives more information about the characteristics that are extrapolated from the candidates and it defines the bias in a more specific way (Sanchez-Monedero et al. 2020, 461). However, this system is similar to Pymetrics as it uses the US EEOC parameters to guarantee demographic equality. Moreover, HireVue detects bias in two ways: first, they attempt to remove all those indicators that are known to disadvantage certain protected groups. According to their website, the first step is the production of questions and performance standards to determine the candidate's capabilities. The system, however, does not only takes into consideration the simple content of the answers but also how the applicant talks (pitch, duration, intonation etc). The way in which bias is checked for is through the 0.80 rule mentioned before. When the ratio is lower, the characteristics that yield the bias are removed and the

algorithm is trained again until there is no more bias (Sanchez-Monedero et al 2020, 461). For example, top performers in technical roles tend to speak slowly, which is also a feature more commonly found in men, hence, when the testing discovers this correlation, it will be removed from the input of the model. The second method to detect bias is to change the learning algorithm: to do so, they account for the objective function, that in machine learning, is used to determine how well the model fits the data. HireVue, in their patent (Larsen and Taylor 2017), proposes to substitute the objective function with a corrected one that instead of summing the squared errors, sums the different errors for each protected group (Ecorrected= Ea+ Eb+ Ec…). Moreover, the patent also requires adding a penalty indicator to the corrected formula in order to account for the 0.80 ratio rule. Therefore, the new objective function would be Ewith_penalty = Ecorrected + P(x). In this way, the function integrates a fairness constraint that "forces" the algorithm to create a model that treats all the protected equally (Larsen and Taylor 2017).

- **Applied**: this platform puts ethics and bias reduction at the centre of its mission (Applied.com). It uses a platform, called Mapped, through which the candidates do numerical and analytical problem-solving while avoiding the perpetration of patterns that affect in a negative way protected groups (Mapped 2020). The difference with the other two Automated Hiring Systems is that it detects bias through the use of a "de-biasing guide" and demographic reports (Applied 2019). Another difference is that this platform does not conduct automatic assessments, but rather semi-automatic (Sanchez-Monedero et al. 2020, 462). For example, it makes the language more inclusive in job postings, it makes candidates anonymous and takes off group information among the three platforms this is the most concerned with discrimination and it claims to increase up to four times the ethnic diversity of candidates (Applied.com).

Overall, these three AHSs were selected in this dissertation, as they are among the few that not only declare their will to avoid bias, but also outline in a quite specific way, how they do it. There are also, many other Automated Hiring Systems that put in the first place the time and cost-saving aspects, but in this thesis, the core is the removal of biases.

These three systems pose three objectives to achieve fairness in job distribution: the first is "anti-classification", which is the removal of group characteristics that risk putting the candidates in different boxes, this is also called debiasing; in the second place, there is "classification parity", namely the passing rates should be quite equal for different categories; and third, "calibration", for which results should not depend on group variables (Sanchez-Monedero et al. 2020, 463).

3.5 Limitations of these systems

The main issue that these systems pose, has to do with the data used as reference. As a matter of fact, data is generally drawn from past employees, usually the ones with the best performances, and this can yield bias. In fact, creating a model based on only the hired employees can be limiting: perhaps the amount of data on the existing employees is not enough to create an accurate model; maybe not all employees took the assessment, and therefore the model does not represent the biggest part of the applicant pool (Raghavan et al. 2020, 472). Overall, deciding to select people who are very similar to those already hired can result in perpetuating bias and excluding minorities (Sidanius and Crane 1989, 178). A possible solution for these Automated Hiring Systems, could be, instead of creating brand new assessments for each new client, to build comprehensive assessments according to the type of position requested. In this way, they could benefit from a bigger amount of data, given from several clients (Raghavan et al. 2020, 474). Nevertheless, these methodologies are still not completely able to objectively identify certain "abstract" characteristics, such as 'openness' or 'perseverance'; hence, the drawback of these pre-built assessments is that, since they need to be more general to include more than one client, they cannot adapt perfectly to the client's necessities. This represents a sort of paradox: on one hand, having more data is surely helpful to make the model more accurate, but on the other, gathering information from several sources can result in a variety of different conclusions. Therefore, we can talk of "bias-variance tradeoff" (Raghavan et al. 2020, 475): a less tailor-made assessment, but less biased. Naturally, it is not an easy task to decide which way to go, and each company should ponder their decision according to its needs. A quite logical conclusion could be for bigger firms to choose the custom assessments, as they have a larger pool of hired employees to draw from, while smaller companies could rely on pre-build assessments (ibid). This, however, can be immediately objected to by looking at the amazon case.

3.5.1 Amazon's AI was biased

In a company such as Amazon, saving time and costs is a priority, and one way of doing that, as we know, is to automize the review of the resumes. Therefore, a team was put together in 2014 with and it created a hiring system that would rate the applicant on a scale from 1 to 5, to drastically reduce the number of feasible candidates (Dastin 2019, 296). Soon after, they realized that the tool had a marked preference for men. In fact, the model was trained to select by taking into consideration the resumes submitted during the previous ten years. For the technical positions, like software developer, the majority of past applicants were male, therefore, the system "learned" that male applicants were better, and it dismissed all the resumes that presented the word "women's" as in "women's book club president" (Dastin 2019, 296). The tool was then reprogrammed to make it unbiased toward those

specific terms, but it was dismantled as it was believed that the system could have found other ways to discriminate; however, according to anonymous amazon representatives, the tool was never actually used to hire (ibid).

3.6 Is AI the one at fault?

After the Amazon case, algorithms used for hiring, and Artificial Intelligence in general, were strongly criticized and deemed unreliable for their biased decisions. Algorithms are often used as "scapegoats", while they should be leveraged to locate biases in the organization (Logg 2019, 2). The immense amount of data that the algorithm can access, allows it to unveil toxic patterns that humans have issues identifying, therefore when this kind of technology finds bias, the company should take the opportunity and learn how to get rid of it, and most importantly how to prevent it from existing in the first place. Moreover, claiming that algorithms are biased makes them "human", ad shifts the blame from the people to the machine; in fact, humans are accountable as first of all, algorithms are a human product, hence created by employees of the company; and second, they are usually programmed on historical data. If such data is biased is surely not the algorithm's fault; for example, in the amazon case, it was human recruiters who hired more men than women for years, creating discrimination that was then perpetuated by the machine (Logg 2019, 3).

The usual decision, following a "biased algorithm", is to eliminate it and go back to the flawed human judgement (as Amazon did); however, people can be inconsistent, and their decision process is rarely rational. In fact, a manager will tell you that one of the most crucial characteristics in a new hire is being a "team player", which is not an objective characteristic, and it is also not easily measurable. Therefore, algorithms should be used as magnifying glasses of an organization (Logg 2019, 4): once the bias is found the company can attempt to get rid of it in several ways: changing the input data by transforming the way hiring is done; keeping the historical data but reprogramming the algorithm so that it does not discriminate; or analyzing how input data introduce bias in the first place (ibid).

The main question in this issue is whether the alternative is better. Artificial Intelligence is a tool, and algorithms can be programmed by a multitude of humans. If tested, not only they can discover bias, but they can also eradicate it. Recruiters usually make their decisions by themselves, and according to the case studies analyzed in the first chapter, their decisions are not always fair. This happens because as humans, recruiters are subject to mood swings, tiredness, and unconscious prejudice. Hence, perhaps we should not be so quick to dismiss the power of technology; moreover, as I already pointed out in this dissertation, leaving part of the recruiting process to the algorithm does not exclude the human from the procedure, on the contrary, the collaboration between the two might yield an even more accurate result.

In the next chapter, I will proceed with an experimental case-study with the collaboration of the multinational Unilever, and the head-hunting firm Reverse. By interviewing six recruiters, I will attempt to better understand the relationship between AI and humans and to discover whether these new methodologies of recruitment can really contribute to the limitation of the socio-cognitive bias.

Fourth Chapter

A qualitative comparative case study: Reverse and Unilever

4.1 Overview

Throughout this dissertation, my aim was first and foremost to investigate the concept of socio-cognitive bias and to give relevance to an issue that is not yet internalized enough in the corporate world. As we learned from the first chapter, recruiters should try as much as possible to be free from any kind of bias, as these cause a "crooked" decision-making process where only certain categories of people are allowed into the workplace. As we discovered from Rivera's 2012 research "Hiring as Cultural Matching", cultural similarities between employers and candidates often have a role in the deliberation process to choose who to employ. This can happen following the extremely controversial aspect of "cultural fit", for which new hires end up being similar to the employees already present in the company, in order to maintain the same customs and habits; the decision can even be made on more personal aspects, as shared experiences or common interests, and through an imaginary "merit scale" the recruiter chooses those more similar to them. What this implies is that the selection is not done through objective criteria, but by trusting a gut feeling, that in my opinion, should have a marginal role in the evaluation process. In fact, as recruiters, it is acceptable to trust the instincts on certain occasions, as this is a job that has to do with humanity; but excluding candidates on null premises should always be avoided. For example, the "cultural fit" alibi, gives the recruiter the power to exclude perfectly good candidates, based on abstract requirements.

The reason why this issue should have much more resonance is that it can even cause ethnic discrimination. As we pointed out in the first chapter, in the Oreopoulos study (2009), thousands of different resumes were sent to different job postings in Toronto. All of these resumes were constructed, and some of them represented recent immigrants from China, Pakistan and India. Having an Indian name would make the callback rate drop from 15.8% to 12%, while a Chinese or Pakistani one meant an additional 1% decrease in callbacks. It is crucial to point out that these resumes all had Canadian education and experience, the only difference was in the name (English-sounding vs foreign-sounding). As a matter of fact, when the resumes presented foreign education and experience, the callback rate dropped even more (an additional 6.2%); but while this aspect can be somewhat explained by the unwillingness of employers to invest in training costs for people who did not work in Canada, the name aspect reveals that this characteristic matters more than the extracurriculars, the education, and the experience. This is only one of the case studies analyzed in the first chapter that deals with ethnic penalties, and even in the Rivera's (2012) which does not necessarily focus on this issue, we can assume that racial discrimination is still in place: evaluators favoured cultural

similarities and akin behaviours, but first of all, they were white, which automatically excludes certain cultural habits, and second of all, the "favoured" extracurricular activities were easily associated with a white upper-middle class, like travel, sports and arts; as a matter of fact, this type of leisure interests require time and resources, not available to everyone. Hence, this bias is dangerous in the workplace, it can cause discrimination and exclusion, and even more importantly, a dull homogeneous workplace, where everyone is the same person.

Now, it is certain that not all recruiters in the world follow this decision-making process, and hopefully the majority, really try to be objective and detached; nevertheless, the problem with the socio-cognitive bias is that it is unconscious, namely, we cannot know for certain when and if we are exercising it. As humans, it is almost impossible to not be biased, and that is why recruiters have such a huge responsibility on their hands. So, is there a way to get rid of bias completely? Perhaps there is not. But maybe certain tools can help us: we live in a digitalized era, where Artificial Intelligence is growing every day, assisting humans in their daily tasks. AI is already expanding in the corporate world, where it is used in customer support, sales, operations, marketing, and accounting, but also in the most human-centric sector: Human Resources Management. From this starting point, my research question stemmed: can Artificial Intelligence assist in limiting the unconscious socio-cognitive bias of human evaluators? This question starts from the widespread belief that Artificial Intelligence is free from some of the most common human flaws, like tiredness, distraction, mood swings and why not, even the famous gut feelings. Perhaps, conducting the selection with an AI tool can make the process more impartial and fairer. That again is not necessarily true; we learned in the third chapter that AI systems do have limitations and at times they can be the first perpetrators of bias (i.e. the Amazon case). Hence, this is not a clear science, and that is why I want to investigate this issue with the help of professionals in the sector. The two companies that I chose are quite different ones, in terms of dimensions, industry, and scope, but they shared peculiar ways of doing selection: In Unilever's case, the candidates go through a video-interview process that is administered through one of the Automated Hiring Systems mentioned in the third chapter, although I am not at liberty to say which one; while in Reverse, the selection process is supported by an external figure, a scout, that has the role of checking merely the technical competences of the candidate, prioritizing them against the less crucial characteristics. Moreover, in Reverse an Artificial Intelligence tool is used to simplify the work and allow the recruiters to focus completely on the selection process. Neither of these two companies uses AI as much as I would have hoped for at the beginning of my research, and I could not find another company that would adopt AI techniques in the recruiting process; this goes to say, that we are still far from seeing AI take over the selection process, or having more than a marginal role in it. Nevertheless, the expertise of the interviewees helped me better understand whether a more

consistent use of these new technologies would ultimately make a difference in the diminishing of bias.

4.2 Methods

For the scope of my research, I wanted to investigate with HR officials their views on socio-cognitive bias and how (if at all) Artificial Intelligence can be of assistance in their job, specifically to avoid such bias. The two companies that I collaborated with are: Reverse, a headhunting company, extremely scientifically driven. On their online site we can read "We transform the headhunting process in an exact science" or even "Digital, to be more human", they declare to have found a way of using their technology to free the human capabilities from all those repetitive actions that take away time and energies. Moreover, they talk about "collaborative recruitment", in which at a certain stage of the selection process the candidate is interfaced with a more specialized figure that works in the same sector, and is truly able to evaluate their hard skills. The thing that mostly struck me about this company, and that ultimately made me realize that I needed their participation, is their knowledge and awareness of the socio-cognitive bias: on their online site there is a whole section dedicated to explaining what the bias is and how one can attempt to limit it. What I found extremely honest and realistic, was their way of describing it as something natural, that happens to all human beings, and that is inevitable. They also mentioned the use of AI as a possible solution, for example for "blind recruitment" in which the AI does the resume screening by looking only at the competencies and not at the personal information like name, nationality or gender; they also point out some limitations of the AI, as the possibility of internalizing human biases in the automated process (Reverse 2023). Overall, this company is extremely aware of the risks of being a recruiter and I found this aspect crucial.

The second company I chose is Unilever. I decided to go with this multinational because I saw it annumerated among the company partners of the Automated Hiring System before mentioned. Since the other companies were all American-based, I thought it would have been easier to make contact with them. Unilever is a huge reality whose 400 brands reach 190 countries. Their main purpose has to do with sustainability, but on their online site they also deal with equity, diversity and inclusion: their ambition, according to their online presence is to reach the "belonging", namely an inclusive reality where everyone receives fair treatment, access and opportunities. They also mention "removing barriers and bias from all policies and practices that impact the employees' experience" (Unilever 2023). Getting in touch with these two companies was a quite different process: in the Reverse case, I had a direct connection, which allowed me to speak immediately to one of the main managers of the company, who in turn connected me to the three interviewees. Thanks to their AI

system I was able to schedule the interviews on my own, based on their availabilities, and in a week, I had done all three interviews. With Unilever, being a multination company, it was a bit more complex to organize the interviews. The reason behind this is that each thesis project that the team receives needs to be evaluated to make sure that is in line with their policies. Once the project was approved, we set three different interviews with HR team members that work closely with AI.

Since the number of interviewees was not enough to reach conceptual saturation I included another company, that was Reverse. Nevertheless, even if I included Reverse almost three weeks after my first contact with Unilever, the speed of the process made it possible to do all the interviews in time (actually I even finished the Reverse ones before starting the Unilever ones). These differences in bureaucratic processes, availabilities and degrees of formality are interesting to notice, as it already goes to outline the distinctions between a smaller and a larger firm, an aspect that will come back later.

As I already anticipated, the method that I chose to conduct this research was through interviews, specifically semi-structured ones. Hence, I had a topic guide, that I used to orient myself during the interviews, but I was also free to add or remove questions where needed or ask for clarifications. This gave me the chance to gather more in-depth information when necessary. Open-ended questions were also useful to gather qualitative data. The topic guide was slightly different for the two companies, to adapt it to the distinct sectors and jobs, but the sensitizing concepts were the same. These are the main topics that I wanted to investigate as I believed had relevance to the research. They were:

- Influence of the professional and educational path: To understand how and if the fields where one studied had an impact on their knowledge of the bias and the approach they have towards it. Moreover, I also wanted to understand what motivates the interviewees to work in their respective companies, and if it had to do with innovation or new technologies, in order to outline their relationship with AI.
- Personal knowledge of the concept of bias: I wanted to investigate how much the interviewees are aware of this issue since they are in a delicate position as recruiters. Moreover, I wanted to explore their own experiences with bias as both victims and perpetrators.
- Impressions regarding the use of Artificial Intelligence: Although we said that these companies do not use AI to an extensive degree, they still had their opinions on adopting it in the recruiting process, and this section went to investigate the relationship between humans and AI.
- Can Artificial Intelligence diminish bias?: This sensitizing concept put together the two main topics of the research, namely the bias and the AI, and it went to ask more direct questions on the correlation between the use of AI and the dampening of the bias.

- Future of Artificial Intelligence: In conclusion, I wanted to summarize the opinions and impressions of my interviewees by asking how they feel about a possible increase of these measures.

Thanks to this topic guide I was able to cover most of the topics of my interest and I did feel satisfied with the answers obtained. However, the research saw some limitations, due to the sometimes-poor knowledge of the interviewees on the Artificial Intelligence part of the discussion. Especially for the interviewees of Reverse, that do not use AI at the recruiting level, it was sometimes hard to answer the more specific questions, so I had to explain more specifically how the processes work and they were ultimately able to give their informed opinion. Overall the main issue was not realizing in advance how modest of a role AI still has in these companies, but again I did not have much choice as, at least in the Italian territory, I could not find other organizations that put AI at the centre of their recruiting process. Perhaps, I will continue this research in the future when these methodologies will be more developed.

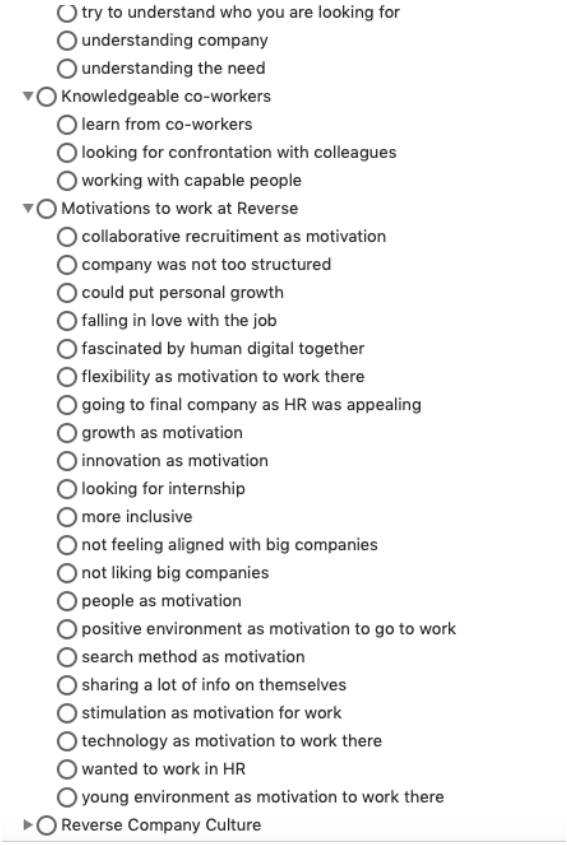
4.3 Data collection

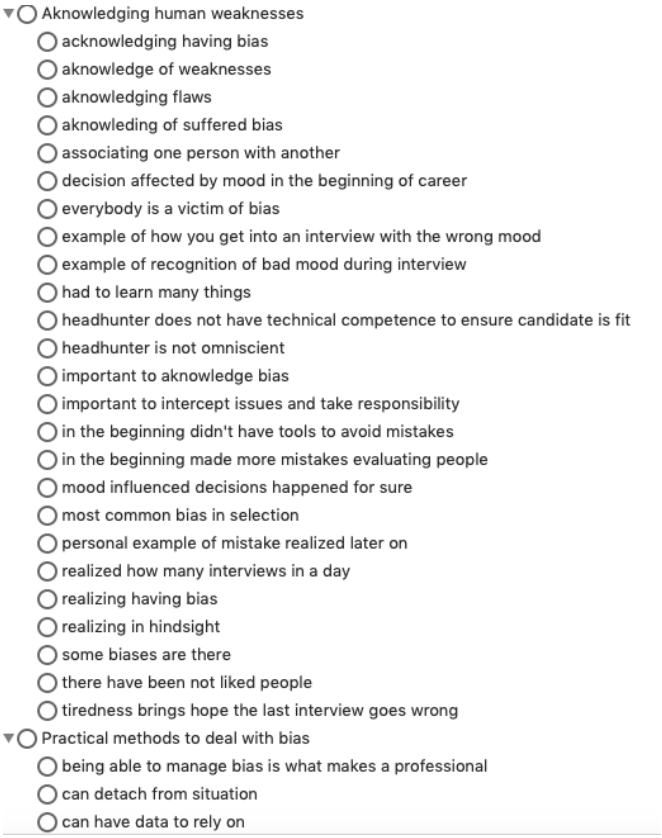
For what regards the collection of data, namely, the interviews, I did not have any particular issue. I did realize after the first interview that the questions were too many to be covered in half an hour so I got rid of the ones that in my opinion were less relevant (i.e. did you see a difference in the quality of the new recruits since this method was implemented, did you undergo this process when you entered the organization, do you know how this transformative desire came to be for the business). Unfortunately, I had to prioritize more crucial issues. After this first interview, I started every following interview by telling the respondent to try to be concise for each answer as I would have asked for more in-depth information if I thought was necessary. As a matter of fact, after this "false-start" (that was still a very useful interview) all the other interviews were concluded on time with all the questions answered. Overall, I would say that the respondents seemed all quite honest and sincere. The Reverse ones in particular were able to give specific examples of times when they had a bias or felt they could have a bias, namely, they were extremely aware of their weaknesses and did not hold back from sharing them. In the Unilever case, 2 out of 3 respondents claimed to have almost complete control on their bias, and indeed they did not recall of times when they inflicted a bias on someone else. Of course, it is perfectly believable that they did not give specific examples of times when they thought they were biased because indeed they never were. Nevertheless, I will go more in-depth in the findings sections.

The last small limitation that I encountered was the fact that Unilever preferred that I would not record the interviews, hence I had to transcribe every word they said in real-time. Overall, I am satisfied with the transcripts that I obtained but I might have missed some nuances.

4.4 Data analysis

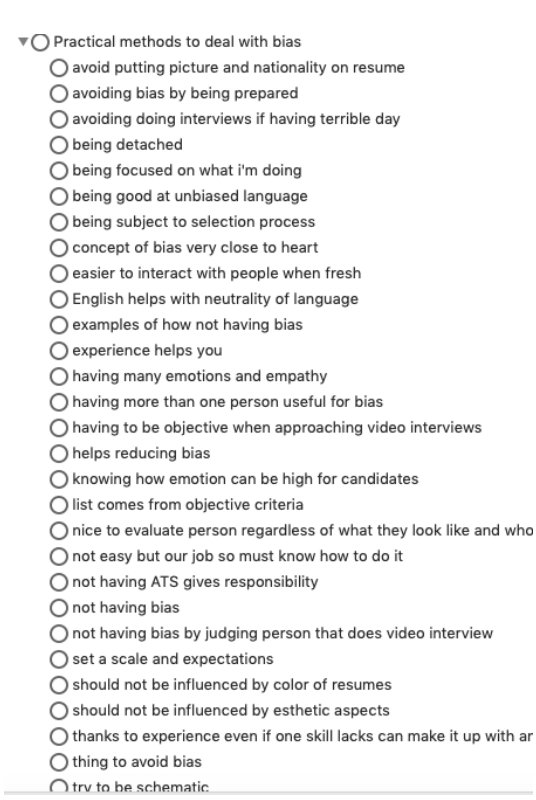
For the data analysis, I started by transcribing the Reverse interviews in their entirety and editing the transcription that I had done manually during the Unilever interviews. In the end, I had 6 transcripts, 3 of them (the Reverse ones) were longer for two reasons: as already anticipated, the Reverse interviewees left nothing to case and were extremely detailed in their answers; moreover, the Unilever transcripts were not done from a recording which made them drier and free of all the connectors, false starts etc. Once I had translated the transcripts from Italian to English I started with the coding process. Such process was done separately for the two companies, as they work in different sectors. The coding was done using the NVivo system. I started with the Reverse coding, I imported the three transcripts and initiated the open coding phase. I was extremely detailed trying to code almost every sentence, unless completely irrelevant. I ended up with 384 open codes. The clustering part to get the axial codes was not complicated as the interviews were all quite coherent with one another, hence I immediately recognized some common topics. The first round of axial coding presented 15 codes. These axial codes dealt with three main spheres: what it means to be working at Reverse, namely, the motivations, the job of a headhunter, the decision-making process, and the company culture; the opinions regarding the use of AI in recruiting, hence, the differences between human and AI, the positive and negatives and the general knowledge; and how one can attempt to limit the bias, therefore, acknowledging the human weaknesses, having practical methodologies, referring to personal experience, and using external help as the scout and the AI tool. I was then able to further cluster these codes into 9 bigger spheres. For example, the positives of AI, limitations of technology and general knowledge were all clustered together as “Pros and cons of using AI in recruiting”. Finally, finding the selective codes was quite easy, since, as I already mentioned, three main topics were noticeable since the start of the analysis. So my final three selective codes are Company’s values and purpose; Feelings on the use of AI in recruiting; Ways to avoid bias. A graph with these results will be available in the findings section.

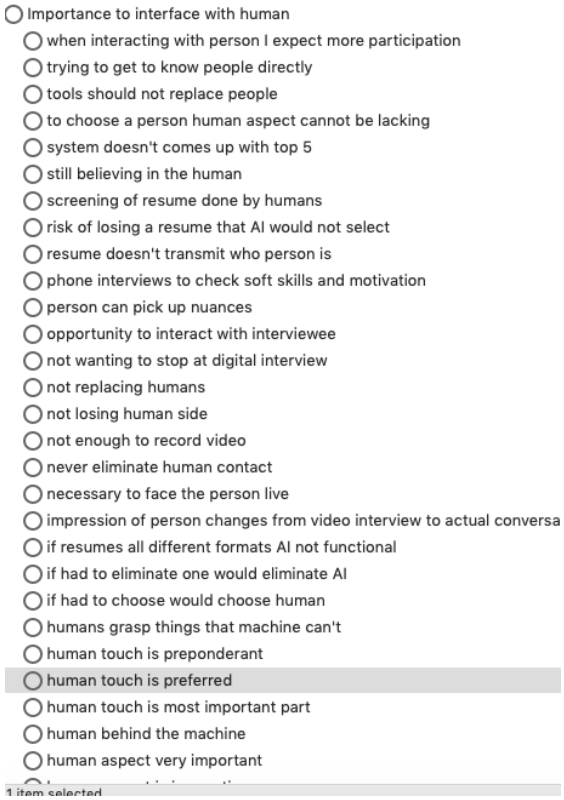




Figures 1 and 2: examples of open and axial coding for Reverse

For what regards Unilever, the process was the same. The open coding phase resulted in 286 open codes, hence 100 less than the Reverse ones, which is in line with the fact that the Unilever's transcripts were all about two pages shorter. Even in this case, the topics that emerged were quite similar to the ones of the other company, namely, discussions on bias and AI; but this time, the opinions were slightly different, and there was one specific topic that was highly present in all the interviews: the importance of the human touch. Of course, this was accompanied by the opposite as well which regarded the weaknesses of technology. Even in this case, there was much talk on how to limit bias, although, as I already mentioned, in Unilever's case the suggestions did not all come from an admission of their weaknesses but rather from a description of the ways they manage to not be biased. After the first round of axial coding, I clustered the 286 open codes into 14 axial codes, and then I managed to cluster them again reaching 7 axial codes. For example, the importance of hard skills, the importance of soft skills, the job of a recruiter, and Unilever's vision were all clustered under the axial code "decision-making process". Said axial codes were in turn clustered into 2 selective codes: Cruciality of human touch and ways to get rid of bias. A graph with these results will be available in the findings section.





Figures 3 and 4: example of open and axial coding for Unilever

4.5 Ethical considerations

To consider all the ethical aspects that result from taking part in a study of this kind was extremely important to me. Therefore, I made sure from the very beginning that all the participants were extensively informed on the scope and topic of the study, and I remained available for any type of clarification. In fact, since the first contact with the interviewees, I explained the objective of my research and their role in it. This was also formalized by a consent form that I sent to the two organizations to be signed by each participant. This informed consent declared that participants should be aware of the fact that participation in the project is completely voluntary, and they will not be receiving any kind of direct benefit from it. It was also stated that they could withdraw within a certain amount of time and always refuse to answer any question. It was also made clear that the data obtained would be in my possession for a limited time, for research purposes. In the case of Reverse, the consent form also included that the conversation would be audio recorded and treated confidentially, while for Unilever this part was changed to specify that the interview would instead not be recorded. To ensure impartiality on my part, as a researcher, I tried to formulate questions as neutrally as possible to not push the respondent toward one or another answer. Moreover, a priority for me was to safeguard the anonymity of the participants. In fact, this research went to deal with delicate topics, where a recruiter needs to truly admit their own weaknesses in order to transform them into strengths, and I realized that this is not something easy to do. Therefore I tried to eliminate

any kind of information that could identify the participants because in this way they felt more confident in answering freely. Plus, I did not pressure the participants into answering any question, although ultimately all the participants had no issues answering every proposition. I did stress the importance of honesty, and I reiterated this aspect as well as the anonymity one, throughout the interviews.

4.6 Findings

4.6.1 Company's Vision and Purpose

Before we get into the technicalities of the results, let us remember that the research question was "Can AI have a substantial role in the limitation of the socio-cognitive bias?". The ways in which this issue was faced by the interviewees were several: one thing they all had in common was a strong connection to the vision and purpose of their respective companies. In the Reverse case, the interviewees stressed the importance for them of having a combination of human and digital, a model of collaborative recruitment and a young and positive environment. An aspect that came through when introducing the bias section of the interview, was the collaboration among co-workers, namely, having knowledgeable colleagues to learn from. Also, in the Unilever case, the purpose factor had a strong influence on the participants, especially the inclusion and the internationality. The importance of the vision is particularly kept in mind during the selection process, in fact, one of the most important aspects to rely on according to one of the Unilever interviewees is *"the connection the person has to the values of the company "*, it is imperative *"to understand if they are in line with the standards, but even more with the purpose of the company"*. Therefore, for Unilever, this is an extremely crucial element. However, their decision is not final, in fact, they usually involve the hiring manager at a later selection stage and even the line manager of the sector the candidate should be hired in. Hence, this is not a decision taken lightly but rather it needs the contribution of many people and several reasonings. The situation at Reverse is quite similar, as being a headhunting company that works for other establishments, the recruiters never make the decision on their own, but they deliberate together with the client. The latter provides Reverse with very clear requirements of the person they are looking for, therefore the recruiters have a quite clear idea of which candidate could be a good fit.

4.6.2 Decision-making process, soft or hard skills?

An interesting part of the selection process is when the so-called "soft skills" come into the picture. During all six interviews this dualism between hard and soft skills was mentioned, although, there is not much consensus on which should have the priority: let's look at Reverse first. It seems that the

technical competencies are the main concern, in fact, the interviewees declared *"the first skim is very technical"*, *"if the candidate does not have a crucial characteristic that the client wants, it's eliminated"*, *" maybe we are more interested in a person who is very technically performing rather than one who is particularly brilliant in soft skills";* and then more specifically: *"if we're looking for a developer who has to write code in front of the computer from morning to night, I'm going to be much less interested in his or her communication skills there"*. Hence, from these claims, it would look like the most important thing, the starting point when choosing someone, is their technical competencies, but we also have additional information regarding the less concrete capabilities: the third interviewee, when explaining how communication aspects are taken into consideration, said: *"maybe they smiled less, were less talkative, or gave fewer examples, those are the communication aspects",* another respondent argued that *"maybe you have the potential to develop it in a quick time with some training"* referring to a hard skill when the soft ones are all ideal. Moreover, for specific figures certain characteristics are essential: *"managerial sales figure, it's clear that it can't be someone who is super introverted, who is not able to put one word after another"*. Then a whole other issue opened up: the fit with the company. Namely, understanding whether the person could integrate with the team, and that is surely a soft-skill issue: the Reverse respondents made me understand that the more they know the "company culture", the more they understand whether the candidate can ultimately fit.

This same battle between soft and hard skills emerged during the interviews with Unilever, in this case even more strongly, in fact, during the first round of axial coding I created two codes, one that defined the importance of soft skills and the other of the hard ones. In this case, I noticed more discrepancies among the interviewees regarding how they prioritize the characteristics of a candidate. The second respondent was a strong supporter of hard skills, they said: *"I always start from the hard skills that we define", "if they are a nice person but they don't have the competence, I do not send them forward", "starting from the hard skills, and after ensuring that they actually have the requirements that we are looking for, we send them on the platform"* and also *"we mainly rely on hard skills"*. On the other hand, the first interviewee believed that technical competencies are not necessarily the most important thing. One crucial aspect is having the "Standards of Leadership" which are soft skills that, according to Unilever, the leaders of the future should have. The respondent said *"Clearly the more we find these characteristics in the candidate the better, because it means that there is fertile ground to have a leader who meets our standards"* and also *"Maybe you lack more technical skills but I know that you can express a passion, a purpose"*; and finally they declared *"Consider that for us many times a person's attitudes are more important than their skills"*. So, in a nutshell, we can confidently say that the decision-making process is not an exact science and

that where some put in the first place the attitudes and behaviours of the candidates, some prioritize the technical competencies. Perhaps these two factors go hand in hand more often than we would expect; however, I do not think that recruiters would give the job to an incompetent but communicative person, therefore I assume that soft skills are taken into consideration once the hard ones are at least partly accounted for. This part of the research was extremely important, as to understand whether recruiters have a bias, we need to analyze how they make their decisions.

4.6.3 AI in the recruiting process: is it really necessary?

At this point let us proceed to the first topic of interest of this research: Artificial Intelligence, and its adoption in the recruiting process. As I already mentioned, neither of the two companies does extensive use of these types of technology, but I was still able to gather quite a lot of opinions on this subject. In the Reverse case, the amount of information was so broad that in the end one of the selective codes was indeed "Feelings on the use of AI in Recruiting". Overall, the positive factors of using AI in recruiting surpassed the limitations and were much more than those found by Unilever, which instead stressed repeatedly the supremacy of the human touch. The opinions of the Reverse's respondents regarding the use of AI can be summarized in the following way: AI can be a helpful hand when you need profiles that are of the same kind (i.e. graduate in economics with 5+ years experience), in this occurrence, the screening works and saves a lot of time. Moreover, if you need to screen a big amount of resumes it can be faster and more useful to have it done by AI. Finally, it can help avoid bias, as it does not get tired or distracted, and it can spare the human wasteful and repetitive actions. Nevertheless, if your requirements are not set in stone, and you are more flexible, as they are in Reverse, AI can make you lose opportunities. Hence, sometimes a recruiter would bring forward a resume that AI would not because it has the capacity of seeing the potential side: i.e. maybe the candidate does not have a specific competence, therefore the AI would eliminate it, but the recruiter would notice a specific type of experience that would compensate for the lack of competence. Therefore, the most agreed upon solution among the Reverse interviewees is to make the human and the AI collaborate, as on one hand, the AI needs supervision, and on the other, the human can be slow and inaccurate; so these three respondents followed the vision of their company of unifying the human and the digital.

As I anticipated for the Unilever's respondents, the human touch is imperative. The artificial intelligence that they use is an Automated Hiring System that is employed to do video interviews, which are then watched and evaluated by the recruiters. So, the AI does not suggest any kind of information, it simply gives the candidate the option of recording the interview whenever they prefer, saving the recruiter the struggle of having to schedule it. The evaluator then chooses a time to watch

all the various interviews free of any kind of pressure. Naturally, this is only the first of different steps that the candidate will go through if they are selected.
The use that Unilever does of this kind of technology was defined by one of the respondents as *"the prime example of how actually there is the human behind the machine"*, and this is a good way of summarizing this part of the research. In fact, the light motive that was shared by all three interviewees is that technology is a good thing, as long as it works as a support for the human. Leaving AI the power of making decisions on its own could indeed result in a technological bias, moreover, the interface with the human is too important: people can pick up nuances, and the impression you have of a person from the video interview can change when you have an actual conversation, knowing the candidate can make a difference and also, to choose a person, the human aspect cannot be lacking. Overall, technology can help only partially, it cannot remove completely the bias and it can be more accurate only when dealing with a numerical analysis. Even in this case, the agreed-upon solution is a combination of both parts, machine and human, to combine tradition and innovation.

4.6.4 How to deal with bias?

At this point, we are reaching not only the most important section of the research, but also the one that was the most similar between the two companies, so much that not only the selective code "Ways to avoid bias" is the same for both, but also the respective axial codes are extremely similar. For this reason, I will analyze these results by axial code, in a parallel way for the two companies:

- Acknowledging human weaknesses: in order to get rid of bias, the first thing to do is learn to recognize it, which is an immensely difficult task. As we learned throughout this dissertation, bias is often unconscious, and we do not even realize when it is present. These interviewees were all more or less aware of what the bias is and how impacted their careers, both as victims and perpetrators. As I already anticipated, Reverse's respondents were able to dig deeper into their past and describe times when their decisions were affected by mood; these events happened for the most part at the beginning of their career when they were unable to understand how tiredness and pushing too much can affect your mental clarity. One of them said *"In the beginning, I made more mistakes in terms of evaluating people, and I didn't even have all the tools to be able to understand how to obviate these aspects"* and also *"Gradually I also realized how many interviews to do in a day, and how high I can perform in interviews, and so I found another way"*. In the same way, another interviewee gave me an example of how a bad review can impact your mood right before having to meet someone: *"If you go to an interview after your boss has yelled at you, and told you that if you keep this up, he's not going to renew you, you definitely do not enter the interview in a very purposeful way".* Another extremely

interesting example was one regarding the most common bias in selection: *"most common one in selection is to associate one person with another: so I saw a person that didn't fit, who we hired; then another person has the same patterns, so I already think they might not fit; in my opinion, that is maybe the most impactful bias"*. In Unilever's case, there were two thought waves: one, that included 2 out of 3 respondents that admitted the possibility of having bias every now and then, as a perfectly natural human response; and another, that claimed to have a strong control over its bias that makes it hard to make prejudiced decisions. The opinions of this third respondent were extremely useful for the next part, which deals with the practical ways in which bias can be avoided. Going back to acknowledging weaknesses, one of the Unilever respondents said: *"Obviously we're human so it would be impossible for that not to happen so yes but then it's the experience that helps you"*. The second interviewee was not able to find a specific example but hypothesized *"Yes definitely it must have happened, maybe while I was doing screening one day that I missed something, I would say yes"* and also *"So it's true that you can't see all the candidates in the same way, someone gets lost among hundreds of resumes"*; when asked whether there was a way to get rid of bias completely they answered, *"I think it's not impossible but very difficult because there are really a lot of them [biases] that we don't even realize"*. Overall, 5 out of 6 interviewees recognized being biased, not always, not even sometimes, but rarely and mostly at the beginning of the career. This awareness is a crucial point to then try and get rid of biases.

- Practical methods to deal with bias: Having acknowledged the presence of bias, even in a hypothetical way, the next step consisted of understanding which practical ways can be used to deal with this issue and hopefully get rid of it, to the greater extent possible. In this phase of the interview, due to the nature of the section, all interviewees were able to provide more specific examples. In the Reverse case, I was surprised to learn that the company organizes training programs that have the objective of recognizing biases to then avoid them. In the more day-to-day activities the recruiters learned, after the faulty judgement at the beginning of their career, that a way of avoiding this was to share more often the profiles with the manager, to have a second opinion; but also to understand their own limits, as, for example doing only a certain number of interviews per day. For the headhunters it can be easier, as they work for another company with specific requirements, therefore their preferences do not really matter, they take off their lenses and put on the company's ones. Another practical method that is common to both companies is linked to the possibility of having been a victim of someone else's bias: an interviewee of Unilever that was not born in Italy shared *"Just because of my name, very often I was not called back even though I had the degree, I did several internships, and I also had some experience; so this definitely was a factor that I suffered from in all*

honesty". Also, others made more general examples but not all of them underwent the bias of someone else. Nevertheless, for those who did, the responsibility of not making feel the candidate in the same way they felt is very significant, and that is a crucial factor to avoid being biased. Finally, more practical methods were to not be influenced by the format of the resume, physical aspect of the candidate, trying to be aware and objective, and avoid doing interviews after a terrible day; one interviewee also said that as a candidate they would not put picture or nationality on the resume, as it would be preferable to just evaluate who the person is rather than without knowing what they look like or where they are from.

- Use of AI tools (and scout for Reverse) to avoid bias: We dealt with AI, and we dealt with the bias and how to avoid it. Now let us put the two concepts together: can these tools help with the diminishing of bias, or is the human perfectly able to resolve the issue on its own? Allow me to quickly recap the use that these two companies do of AI: Reverse has a system called "Hound", that helps with scheduling appointments, keeping track of everything that happens on Linkedin, and overall just removes all those repetitive and "superfluous" tasks that can be easily managed by a system like this, letting the recruiter the time and space to dedicate themselves to the conversation and evaluation with the candidates; Unilever as we know, uses an Automated Hiring System for video-interviews, only in this case, this software is not directly used to hire. The candidates that go through the resumes screening are sent to the platform where they have to answer established questions; these interviews are then evaluated by the recruiters, not by the AI, hence the function of this software is similar to the one in Reverse, where AI is merely a support to the human, that allows the workers to stay focused on the most crucial tasks. Moreover, Unilever has a gender bias detector tool that is used for their job postings, to check whether the language used could be more inclusive. According to all three Unilever respondents, their AI tool (the video interview) helps diminish bias. One said *"It helps to decrease it because a resume doesn't transmit to you who the person is, I'm not saying that then the video gets you the essence of the person in front of you because that's impossible, but at least it gives the candidate a chance to present themselves without that anxiety […] it helps the candidate to be comfortable, to present themselves in a more relaxed way, and it also helps us to evaluate them at a time when we are also more relaxed"*; another pointed out how these resources help with the inclusivity and accessibility: *"Today you can do them [the interviews] from anywhere in the world with such a platform, you can do it at the time you decide, and so in terms of accessibility and inclusion, I would say definitely yes"*. They also added: *"You are not influenced by the characteristics that jump out at you more in other contexts"*. In the Reverse case, the AI tool has an indirect effect on the bias, according to the interviewees, as it allows them to have efficient

communication with candidates (i.e. automated feedback), and organized scheduling, which results in them being fresher and more concentrated for the actual selection. However, what truly seems to help Reverse have a fair and objective recruiting process is the Scout. The scout is an external figure that has the responsibility of evaluating only the technical capabilities of the candidate (hence we go back to the hard vs soft skills dilemma). The scout is a professional with many years of experience that works in the same field as the one of the candidate; according to the respondents, this figure is a guarantee, for the client and for the candidate as well, who knows they are being evaluated by an impartial figure. Moreover, the scout is also an agreed-upon solution to deal with bias: in fact, the objectivity of the scout forces you to think twice before selecting someone based on a good first impression. Perhaps, initially, you have a good feeling toward someone, but you do not have the specific knowledge to check whether the competencies listed on the resume are factual; it is at that moment that the Scout comes into the picture and does a more direct evaluation. In the same way, if you have doubts about a candidate because at first, they did not convince you, the scout can help ensure their technical capabilities. It is then a matter of choice between soft and hard skills.

4.6.5 Graphical Representation of Findings

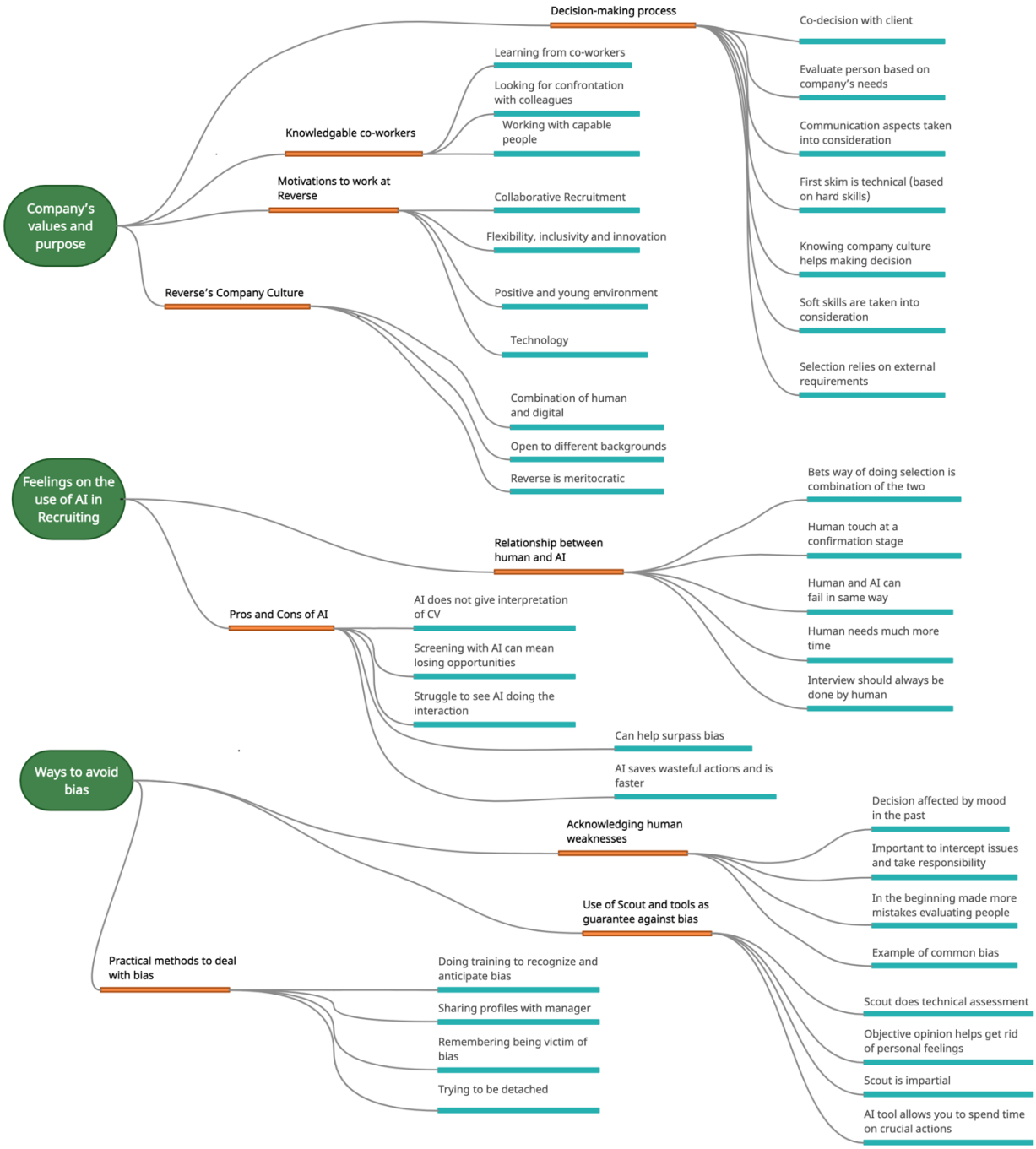


Figure 5: Reverse results map created with the Creately program

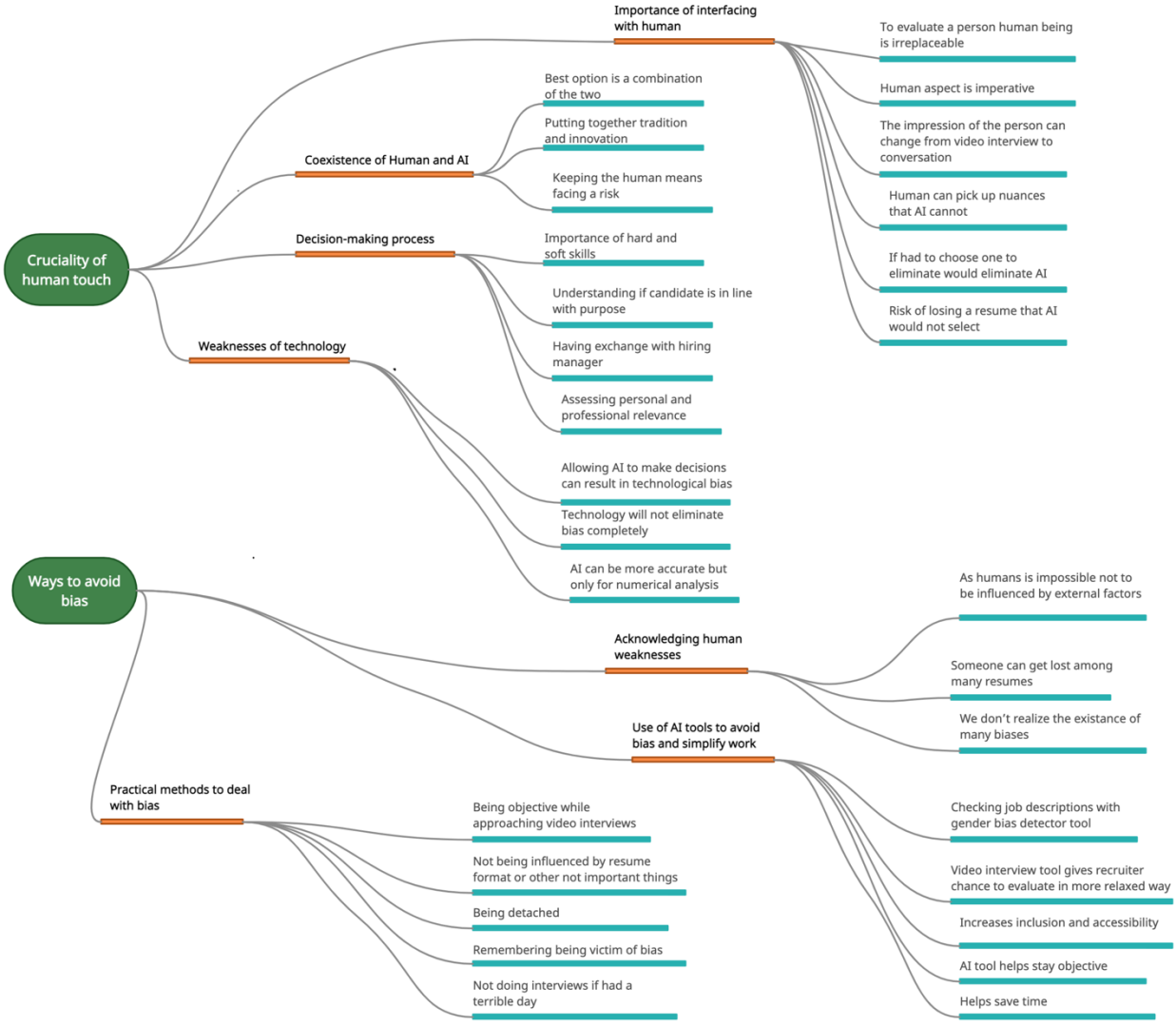


Figure 6: Unilever results map created with the Creately program

4.7 Discussion

This research had the aim of confronting professionals of the HR sector to investigate if and how socio-cognitive bias impacts their everyday work-related actions. In particular, what I wanted to examine was how these recruiters deal with having an unconscious bias, what methods they use to stay as objective as possible and finally, whether the assistance of external tools, i.e. Artificial Intelligence, can make a difference in the prevention of these behaviours. What emerged from these results are three main things:

- How recruiters decide who to hire and who to pass on, is not an exact science. This job is a hard one exactly because there are several aspects to consider simultaneously and oftentimes, they all have the same importance. Therefore, one can decide to trust their gut and prioritize the communicative skills,

while another can rely on the objectiveness of the competencies, in other cases the most important factor is the connection of the candidate to the company's purpose or even how the person "fits" inside the team. All these different reasonings depend on a myriad of independent variables that outline the needs of the company at that moment in time. A safe choice, in my opinion, is to give more relevance to those characteristics that are concrete, such as the hard skills and the technical requisites; nevertheless, I realize that the attitudes of an individual, and their social capabilities, are crucial conditions to work in specific roles. Therefore, if soft skills need to be taken into consideration, given their 'abstract' nature, I would attempt to create a clear-cut and detailed description of their characteristics, and what is expected from a candidate who should present them. Giving the recruiter too much freedom in defining requirements can ultimately lead to arbitrary decisions, even biased ones. Nevertheless, in this research, the respondents all had a quite clear idea of how to proceed with selecting someone, even if it entailed looking at their soft skills.

- AI tools can help, but not that much. The role that Artificial Intelligence should have in recruiting, according to all the participants of this study, is a marginal one. AI should absolutely not reach the level of undertaking the whole selection process; it can be used to simplify the work of the human, but always in a supervised way. For what regards the bias, AI can help indirectly by freeing the worker from standardized, repetitive, and tiresome actions. The human will have the possibility of dedicating to more crucial aspects of the job and hopefully, they will be less subject to distractions, exhaustion and therefore bias.
- The human is always preferable. In a world that is progressing and evolving every day, technology is still not the answer to all of our problems, as one of the respondents said: "the human touch is imperative". Because humans give second chances: where an AI would discard a resume due to lack of competence, or even for a formatting mistake, a person looks beyond that, as it would see another person. Therefore, according to our interviewees, the development of these new forms of technology is a good thing to welcome with open arms, but without replacing the human touch. People can indeed make mistakes, and due to their nature, they are prone to have preferences, but at the same time, the AI can be biased as well, and its flaw can damage a whole system. The human can deal with bias, following the respondents' suggestions, first of all through experience, then by trying to be as detached as possible, by maintaining an objective mindset, and, even with the help of technology, by approaching the evaluation process in a neutral and stable mood.

This research shed light on numerous open questions, and although not all of them found a specific answer, they were addressed. It is also interesting to point out a dualism that came to be between a larger and a smaller business, although this difference was not particularly marked due to the type of research. The Reverse interviewees in more than one occasion expressed that hypothetically they

would enjoy the help of an AI for the screening phase, if the number of resumes were particularly large, as the one at Unilever's. However, the multinational's respondents were not in agreement with this assertion, as they believe that regardless of the number of resumes, the human should always be in first line. This goes to say that the size of the company does not matter as much as one would think, because when there is a clear vision, it can be applied to any context.

4.8 Conclusion

Is it possible to get completely rid of bias? Probably not, and that is not necessarily a bad thing. The bias is what might save our life when we come back home late at night and take the long route to avoid a sketchy alley; or that feeling we have when something does not look okay, and we sense that we should probably leave. We are humans, and as such, we are bound to be directed by our feelings every now and then. At the same time, recruiters have a huge responsibility on their shoulders. Working is an identifying part of everyone's life, more than a simple mean to survive. Having a job means being an active part of society and getting access to decent living conditions. Hence, deciding whom to hire can seem like a triviality, but most likely, an individual's life will dramatically change thanks to that opportunity: maybe it will switch direction, as they will move to a different country, where they might find their life partner and start a family; perhaps someone in economic distress will be able to start enjoying life, rather than just trying to get to the end of the month; or a young graduate will have a chance to be trained in a specific company, where their mentor will ultimately affect the course of their whole career.

Therefore, the starting point is to realize the kind of responsibility that a recruiter has, and why every decision that affects the life of another, needs to be made with extreme mental clarity. Awareness is the answer: if I know and recognize what are the conditions that could potentially make me biased, I will be much more luckily to avoid them and to prevent them.

I want to thank from the bottom of my heart the participants of this research, namely, the interviewees from Reverse and Unilever. You put yourselves in an extremely vulnerable position for the sake of science. Ultimately this study was about admitting your weaknesses and transform them into strengths, and I am infinitely grateful that you found the confidence to do that. I hope that if I will ever be able to become an actual recruiter, I will have the same courage to face my own fragilities.

Perhaps to make the world a better and fairer place we do not need much Artificial Intelligence, but rather the willpower to confront our flaws and the constant dedication to improve ourselves.

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APPENDIX

Transcripts of interviews

Interview Code 001R
Date of interview: 12/04/23
Interviewer: Anita Marconi

I: Good morning! Thank you so much for allowing me this interview!
P: You're welcome, I'm glad
I: Well let's get started right away! What is your role in Reverse?
P: So I am a people and culture specialist so in people and culture we do the internal selections for reverse as if we were the internal HR. But people and culture is another job title because we see it more like "people and culture", so for us, it's more inclusive and it represents us more on what we actually do, so we listen to people obviously from the moment they come in, through the whole cycle: so the training the onboarding and I have been working here since January 2021
I: Okay perfect! What did you study?
P: I got a bachelor's in philosophy and a master's in precisely human resources training and development, so I just knew I wanted to work in the human resources world and I did a master's in [name of city].
I: What motivates you to work at Reverse?
P: So um, the growth; it's a reality that struck me right away, so I fell in love as soon as I saw the job title and I was looking for an internship, I was finishing my studies so I started looking and I'm from [name of town] a little town near [name of town], and so I was looking for something on [name of city] anyway I had heard about big companies, however as I was interviewing I didn't really like them in terms of their approach, I didn't feel aligned with them. Instead, when I interviewed with Reverse with my manager, I realized that they had something different, like the growth aspect, they shared a lot of information about themselves; so it was a company that was already a little bit structured but not too much, so where I could put my personal growth. Then, the idea of collaborative recruitment: combining the human aspect with the digital aspect. This was something that fascinated me, but I didn't understand it that well because I was young, a neophyte in the industry anyway, so I didn't understand it that much. However, I could see that the service they were offering had a lot of potential so I wanted to understand more. And then going forward, the reason I stayed is the people; they are very knowledgeable, so I know I can learn from them. So in the beginning, it was definitely the

growing aspect, the people, and the search service, selection service; so, the company's goal to innovate the world of selection research. So these are the three reasons.

I: Alright! Very interesting.

I: I saw on the reverse website that there is a whole section on the bias; so, I think it is a topic that you are familiar with and take into consideration. Do you more or less know what this socio-cognitive bias is?

P: So yes I have studied them a little bit so I more or less know how it works. it's about our brain, the way we work, we think, also to preserve some information

I: Exactly, the most important thing is that bias differs from prejudice because it is unconscious i.e. it is not something that you go and do on purpose, it is something that necessarily happens because we are human and it is absolutely natural and we all have it. It is just hard for someone not to have a bias somehow.

P: We function like that.

I: And in your opinion when you sent resumes could it have happened sometimes that you were a victim of this bias?

P: Absolutely yes, yes yes absolutely yes. Maybe when I interview someone, maybe since I am a young woman, this sometimes maybe made me a victim of a cognitive bias. Maybe somebody thought I did not look like a competent person, and so yes sometimes yes. Or sometimes I was the interviewee, but we're talking about two and a half years ago, and maybe people with a different approach were asking questions that I thought didn't make a lot of sense, and so yes yes definitely. But I think everybody in one way or another is a victim, or anyway we have the biases and it's more than normal. The important thing in my opinion is to know that they are there, that you have them so that you also understand how to avoid them in some way.

I: Absolutely. You are a head-hunter, so you go and find talent rather than selecting from those who come to you right? Can you explain more about how your job works?

P: Yes so, I do what others do basically, however, they do it for clients whereas I do it for us; so, I do search and selection like others with the same tools, some of which I don't use 100% because they are for clients, however, we also use them internally.

In Reverse, for the selection, you have a figure that you are looking for; so, you are looking for a sales consultant; you try to understand who you are looking for, so you make kind of a sketch of the figure of what you are looking for: maybe it's a person who has to have approximately 3-5 years of experience, they must have these ideal characteristics and they must come from this sector, so, they can sell services already or they can sell a product, they can sell to companies, they can sell to individuals.

So there are a few characteristics that you go and figure out, and then you classify who you're looking for. And then you have to know the company that you're doing it for, so I have to know Reverse, because if they have questions I have to answer them, and my colleagues have to know it for the client. After that, you basically go and write a job description and then you post it to have something in hand to show that there is a research that actually is in place. Then you start with an active search i.e. you go on Linkedin and you put the company that you are interested in and you go and search and contact someone. Because you need information, you need to start a dialogue with some people inside the company. What I do is maybe I go to [name of business] profile and I write 'commercial' and I start contacting like you did, with messages, e-mails of people and I try to see if they are interested in talking to me. The goal is to set up an interview and from the interview you start talking and understanding, you ask some questions, you try to figure out if the profile you found matches the person you are talking to. So you have different questions all the time, you have areas given to probe, you study the person and then gradually you go and ask more specific questions to see if there is a match between what you need and the skills the person has.

For the other part of the interview, you have to answer the person's questions because the person also maybe needs to figure out if it's something they're interested in; so, you sweep over these two aspects. After the interview is over, a profile-sharing part begins to see if the person might fit or not. Maybe it's a figure who may be in line but is not ready to change jobs, or it may be a person who is aligned but has out-of-budget compensation, or it's a person who lives in [name of city] and has to go to [name of city] twice a week so anyway not everyone is perfect, you have to figure out if the aspects that are a little bit more difficult, can be realigned. So from then on you make alignment calls, because I always clearly present the candidates to my manager and my team and I have to figure out if they are a good fit or not, then arrange the various interviews until the contract is signed.

I: I get it. This process differs a little bit from the idea of the recruiter who receives hundreds of resumes because you're actually the one who goes out and finds people.

P: Absolutely yes, the head-hunter is proactive.

I: Okay, so that certainly could help you in what comes next; because precisely the next question is, are these decisions of yours ever influenced by your mood? So I'm asking if you ever found yourself making decisions in a less accurate, rushed way which then maybe made you regret it?

P: So in the beginning in my opinion yes, like in my first year yes, because I had to learn so many things and I felt so much responsibility on me: I had to get used to the rhythms, because I also do 8-9 interviews in a day. In the beginning, clearly, I had very challenging goals also to achieve; so, clearly in the beginning you work a lot and I mean I had to learn; so, in my opinion in the beginning I made more mistakes in terms of evaluating people, and I didn't even have all the tools to be able to

understand how to obviate these aspects. Gradually however I learned to do one more sharing than one less with my manager. But anyway, we don't talk about people I see and I want to discard because the goal is to find somebody, so before I discard I think about it many times. So especially in the beginning, I shared profiles, and I sent to the second-step people that I had some doubts about and that was then confirmed at the second meeting that is done with two other reverse managers. Selection is not a perfect science because when we talk about people it is never perfect, however, how can we break down this gap as much as possible? At the beginning in my opinion yes I made some mistakes, however maybe I would take a lot of notes I would write down a lot of things during the interview so that I would remember a person and I would also think back on it the next day so, in the beginning, I would share as many profiles with my manager who had more experience; so, I would tell about the people I met and I would take a lot of notes so to overcome this aspect I did that. Gradually I also realized how many interviews to do in a day, and how high I can perform in interviews and so I found another way. So now I feel like I can say that I am less susceptible to a perceived level of bias. Then of course I am a person and if I had a very heavy weekend or a very heavy week I also come to the interview maybe more tired, but I can also detach myself a little bit from the situation and evaluate the person based on what it is the company needs so I feel like if it happens, it happens really very rarely now.

I: In any case, in your opinion, can you get rid of the bias completely 100%?

P: In my opinion no because I will always have some. I'll give you examples: there have been people that I didn't like, but, that I nonetheless shared with my manager and maybe they even went into Reverse because I had to respond to a need that wasn't mine. So I try a little bit to detach myself from what I like as a person, obviously, some people can still fit in even if they don't like them, however, some biases are there anyway; the most common one in selection is to associate one person with another: so I saw a person that didn't fit, who we hired; then another person has the same patterns, so I already think they might not fit; in my opinion, that is maybe the most impactful bias.

I: This is very interesting. Some companies, to get around this bias problem, are trying artificial intelligence which can still be biased but maybe less than a human being, what do you think?

P: It's a double-edged sword in my opinion. In Reverse we combine two aspects for selection as you understood. I contact a lot of candidates, even fewer than my colleagues who have 10 to 15 selections at the same time, I have three. But being that we are in a growth phase of reverse and the way our company culture is, we don't just want a certain type of person at the resume level, we also want to vary and we are always open to talking to the person because we are looking for people not necessarily technical, they don't have to know specific things, they have to be in a certain way, have a passion, interest. For example, a salesperson who sells a product can still do well if they sell it well they don't

necessarily have to sell the application. So in Reverse, we are more open to evaluating different types of backgrounds. The active search is backed up by a tool that basically is like a sort of a bloodhound, so when you contact people it keeps track of everything that happens with everybody, so as people respond to you on [site name] you have this sort of pop-up, this sort of extension next to you that says "you had this kind of exchange, do you want to set up a follow-up call?" So it does a recap of the main touch points. But I was the one who chose to reach out to you because I did a certain kind of assessment; hence, active research. And we do it because we are open to assessing backgrounds that are of different kinds. And anyway, this tool helps us decrease all those actions that maybe take away time; so, my focus is to see the most people talk to the most people, and avoid having to keep track of everything; so, for all that repetitive part I have the tools that support me. The part where I have to assess is done by me. So, in my opinion, it always depends on the company: if the company already knows that they want that kind of person, so they do the screening with artificial intelligence and it is good especially if they get a lot of applications. We, right now, think that for the historical moment, we are in, technology can support us in another way which is to allow us time to be consultants, to be head-hunters.

I: Can you explain more about what the scout is?

P: So the scout is a great way to get around some of the biases definitely because the scout is impartial. So the head-hunter starts doing the active search so you do the interviews. On day 10 we present the profiles and then we go and present everything that happened numerically; so, "we contacted 100 people today I present three and I interviewed 10 the others I don't present because..." So we go to cluster all the data, so with [name of AI software] that creates some kind of slides with all the numerics and we go to present the profiles and together with the client, we figure out which ones they like and which ones they don't. The ones that they like and the ones on which you want to verify their technical competence you go and arrange a 30-minute technical interview with a talent scout. Reverse these years has created a kind of network of professionals who are more than 500 experts and based on the research we are doing we then go and call the support of the most competent scout. So we tend to call professionals with 15 to 20 years of experience in the exact same field as the search we are doing; so, for a commercialist with three years, we go and activate one who has 15 years of experience. you set up the technical interview and it is only technical so the scout asks technical questions.

I: Do you think this helps to decrease the bias?

P: Yes because the candidate may be very good at pitching themselves but maybe they don't know things: i.e. we as head hunters have the experience to be able to assess whether the person is competent or not however if you need a person who knows how to write in a code or a language we can ask what tools you have used, what you know how to do, but we don't have the in-depth

knowledge, so we need to have it done by someone who has that in-depth knowledge. So yes the scout absolutely supports us; not only us actually, but also the customer. And by having a third person who (said also a little bit concretely) gets paid anyway, whether the person is hired or not the scout still gets paid and does the job anyway; so clearly it's a kind of guarantee for both sides both for us and for the client, but also for the candidate because the candidate feels evaluated by the person who masters his language.

I: I understand. Going back to AI. What are your impressions about the differences between a computer and a human during the selection process? Do you think one is more accurate than the other?

P: So for the screening of cv, you have to set it in a certain way so you know you're going to have all the profiles of a certain type, so you've already clustered in that way and if you know you want to have those, you only have those and so you can help yourself; however it may not be the best solution here. If the person does it you invest a lot of time sometimes with the applications because they come randomly, they don't even think...and so I waste time. So sometimes I would like it, sometimes I would like to have a screening done already [laughs] however sometimes you can miss opportunities. It always depends on what the initial setting is, and what the goal is.

In the selection stage then in my opinion the interview has to be done by the person always. Because maybe you get a person who shines in a certain way at the level of the soft skills, and the hard ones you can learn. In my opinion, you would also have to say whether the screening is going to be done by a person or by a robot or by an artificial intelligence because you go and set it up differently so in my opinion the candidate should know that. There are pros and cons, either way, it always depends on what the goal is.

I: Very well, concluding question: is it better to have the recruiting process handled by only a human, only by artificial intelligence, or a combination of the two?

P: A combination of the two, in my opinion. The way we do it in Reverse is optimal because as I was saying the screening aspect is handled partly by us and partly then you remove the most repetitive part which is the most expensive part anyway of our work, which is done by the tools; you could also enhance it a little bit in some aspects: for example, my colleagues received sometimes so many applications, so maybe, in that case, having the opportunity to do some automatic screening could be appropriate, but not always. I think based also on the numbers, on the data that you have, you can vary it. Yes, ideally you would be able to modulate it based on what you need. I also read your question "Would you prefer to receive the screening from a human or an AI", eh very difficult [long pause] I don't know with that question I don't know absolutely [laughs]. It's a little difficult actually; I mean maybe sometimes by a machine; however I would always have an interface with the person I

have also done interviews in which the questions would appear on the desktop, and I was videotaped. I don't like it personally, I don't like it, I'd rather do a question where you do two-thirds of the interview rather than 20 minutes because I think on the other side, they will never watch 20 minutes anyway, it would make more sense to do it with the person

I: Very well, considering that artificial intelligence is now catching on, is that good or bad in your opinion?

P: In my opinion, it is good, yes yes it is good. In the way we do it, in my opinion...because I see it working: the client when you have certain data comes back down to earth and says 'Yes we have to pay more for this profile' because they have the data. But we also internally had very complex selections where we understood that we wanted a [name of town] on [name of the same town] person and no one fit. We figured out through the data what was important to us and what we could compromise, but we couldn't do that until we had the data. So, in my opinion, it's really good and we are trying to share this way of operating in the market with our clients because it's not true that with people you can't have data of the concrete things to rely on. For the selection you have to like the person, but the person has to have skills that you have to evaluate and based on what you need then you can combine some aspects. So, in my opinion, it's good however it doesn't have to be done in toto by that because otherwise then the selection aspect is missed and well great issues open up [laughs].

I: Unfortunately, we don't have time for them [laugh]! However, I thank you very much for your helpfulness!

P: I hope I have answered all your questions! But if you need anything else don't hesitate to write to me.

I: Thank you, you are very kind I will let you know.

P: Thank you and have a great day!

I: Likewise!

Interview code 002R
Date of interview: 12/04/23
Interviewer: Anita Marconi

I: Good morning! Thank you so much for allowing me this interview!
P: You're welcome, I'm glad
I: Well let's get started right away! Tell me a little bit about what you do at Reverse, what is your role?
P: So at Reverse I am a delivery manager, so a delivery manager is to be a head-hunter first and foremost; so you have goals of closing revenue projects brought in, and at the same time you have the management of a team. Reverse is a head-hunting company, so basically we deal with the search and selection of professional profiles in the market, and Reverse is specialized in the recruitment of, let's say middle and top management positions. So we deal with the search and selection of highly specialized profiles so not for example blue collar figures that might not have a particular specialization. So a client comes to us and says "We need to hire...maybe a manager with certain characteristics, certain background"; then we look for them with respect to the requirements the client gave us, on the market. Then our goal clearly is for the client to hire that person and we work on a fee that the client gives us upon hiring the person. That's what reverse basically does, that's what I do and in the role of the manager, you are also expected to manage a team.
I: I understand, and what did you study?
P: I studied political science with an international relations angle, and so actually not something related, however more or less halfway through my master's degree, I had the opportunity to do an internship in this field, not in reverse actually, in another company that does the same thing and so even before I finished my master's degree I was working; then anyway I finished the next year and started working and it was an area that I liked. So then I continued that regardless of whether there was a relevance to my major or not.
I: What do you like about Reverse? What are three things you like working there for?
P: So definitely something that struck me right away is the fact that it was a much more technological, advanced, modern, smart in a one-word context than the one I was working in previously. That is, the context in which I was working previously was a context that tended to be Word document based and without any kind of technological tools. Instead, it struck me right away in reverse that there were a lot of tools that could support the work; so certainly this is something that right up until the beginning I liked. Also, the fact that there's a very young environment and so I'm surrounded by basically people my age with whom there are certainly common interests, primarily because we do the same work but

also because there's an affinity, anyway, even on a personal level, and so a very very positive environment that actually entices you to go to the office every morning here. So that's certainly another thing that I like very much; and a third thing I would say to you is the flexibility that the company allows: that is the possibility of smart-working, and in short what you have to guarantee clearly is a status of a certain kind, a presence of a certain kind, and an Internet connection that's fine. So if you need to work from home that day or that week you can do it there. So certainly this is a kind of flexibility that I like; then if I'm in [name of city] I work in the office every day because I prefer to work in the office; but the idea of being able to work elsewhere the moment I need to do it, is priceless in my opinion. So those are the three reasons.

I: Perfect thank you very much. I saw that on your site you talk about this concept of bias that I am very much working on: the socio-cognitive bias. Do you have any idea what I am talking about more or less or do you want me to refresh it for you?

P: So I have an idea but I don't know how accurate it is, if you want I'll tell you a little bit about what idea I have and then we'll figure out if I'm on the right track [laughs] or not: it's certain preconceptions, I would call them, that we all have preset, preconstructed let's say, in our minds; and they lead us maybe to certain conclusions about certain situations and that are not totally free of precise bias

I: Yes that is very right. Let me just add that the main characteristic of bias is that it is unconscious. So we all have it as humans and often we don't even realize we have it. Could you give me an example of how you go to find a person? What is the decision-making process?

P: So the first basic thing to say is that we rely on a whole set of requirements and information that the client passes on to us; therefore, the first thing we do is collect these from the client. So I tend to, the moment I look for a person, do it with a filter that is the client's, not my own personal filter; so, that is the first thing in the process. Then I tend to have different kinds of filters i.e., they can be about the background: I want this person to have a particular background; or prior experience: I want this person to have 5 years of experience in certain contexts; or even geographic origin; I need this person to be in the office every day, it has to be based nearby. So necessarily we give ourselves these kinds of filters that are also very objective.

At the moment I have maybe two profiles that can be similar on these parameters, so they tend to fit in these parameters at that point it is clear that even I as a head hunter decide which to present to the client because maybe I already have a shortlist of four in my hand I don't want to present them with an infinite amount, so I decide which are the four best ones I want to present to them. So it is clear that you make a whole series of reasoning to prefer one instead of another, but these reasonings you always make them trying to put yourself in the client's shoes.

I: Do you also do interviews?

P: Yes, we always do an initial step with candidates, an initial interview to see if that person can be aligned, with respect to the requirements that the client has given us, and to see if they can be a motivated person, what communication skills they have. For example, if we're looking for a managerial sales figure, it's clear that it can't be someone who is super introverted, who is not able to put one word after another; on the other hand, if we're looking for a developer who has to write code in front of the computer from morning to night, I'm going to be much less interested in his or her communication skills there. There are all these kinds of assessments, but again, they are assessments that we make mostly based on what are the policies that the client has given us

I: How many years have you been working in this role?

P: 5 years

I: Taking into consideration what we have said so far: have you ever found yourself making decisions in a way that was not always accurate that you later rethought and regretted your choice? Maybe you were at a time in your life a bit and your decisions were influenced by your mood?

P: It certainly did happen. If you ask me to give you a concrete example of when it may have happened maybe I'm having a bit of a hard time reconstructing and thinking back to a specific case, there's no particular specific case that comes to mind right now. But it undoubtedly does happen, but I'm telling you maybe these are things that you realize in hindsight: that is, maybe a candidate that you're betting on that you initially thought was super motivated, then maybe in betting on this candidate you leave behind another candidate that you were a little less convinced about, and maybe then it's that candidate who at the end of the day instead proves to be not motivated at all. So at that point, you ask yourself "Maybe it was the wrong choice to bet on him"; so yes absolutely. But also with respect to the question of making a decision: one thing that I realize happens, and I find myself quite often even confronting colleagues about this: maybe you spend the whole work day interviewing interview after interview, maybe on the tenth interview of the day, you are tired, you still have to interview, so maybe you realize that you almost hope that it goes wrong [laughs] because then it ends sooner. So I mean every now and then I've wondered myself "what if I had placed this person earlier in the day, would I have liked them more or less".

I: I understand. Do you think you as a person who applied to jobs were you ever a victim of someone else's bias?

P: So I haven't done that many interviews in my life, I've done very few and the ones I have done actually went well. I have, however, often had to send out resumes to which I never got a response.

I: Even in cases where maybe you were pretty sure that you had the right skills for that particular job?

P: So actually since I've been in Reverse I haven't sent any more applications, and that is, this thing I'm telling you about [referring to the non-response to applications] happened mostly at the time when

I was trying to get out of the previous company, and then I went to Reverse. But that was a phase when I sent a few applications, and actually at that time even the idea of going to a final company as HR appealed to me. So they are applications that I sent to final companies for an HR role. I'll tell you I'm not at all surprised that they never responded to me, because I came from a tiny consulting company, absolutely unknown; so I mean it's already difficult to transition from consulting to head-hunter to HR, even more so if you come from a tiny, unknown company. So I was actually never taken aback by that. The moment I applied at a company like Reverse, which instead was akin to what I was already doing before, everything went smoothly.

I: Considering that indeed maybe we are unable to completely get rid of the bias; there are some companies that are experimenting with an alternative through artificial intelligence. What do you think of these forms of technology used especially in recruiting?

P: So, I've never had a chance to use them, to see them, to touch them let's say. I've always heard about them absolutely. In the world of head-hunting, I don't think they make any particular sense, in the sense that precisely our work is based on active searching, so you actively search for people; so it tends to be that if I'm looking for candidates, it's clear that if you send me the cv I'm going to evaluate it anyway, anyway I'm interested in it, even if you've written it badly, even if I don't know, there's some bias behind it; I overcome that bias easily because I'm interested in interviewing you. But I do realize, though, that this kind of software, this kind of tool, can certainly be very useful instead for larger contexts, where for one position you have to screen thousands of CVs; so certainly it's a big helping hand for the recruiter and certainly, I think it can help you get beyond biases that may be there, sure. But I think without a doubt then the recruiter's touch, so the human touch, has to be there subsequently.

Should I happen to use these kinds of tools, I would like to understand very well first how they work.

I: Sure. Reverse on the other hand while not using AI, has a fairly innovative recruiting method: Can you explain to me more about who and what the scout does?

P: So he is a human being [laughs] and he is a professional in the market, who has usually been working for many years; and therefore with very high expertise in the same field in which the candidate works. I'll give you an example: if I am recruiting a developer for a company as a recruiter I cannot know the technical dynamics of code development, because I do a totally different job, and so I rely on a figure, the scout, who instead maybe has been working in code development for twenty years. I ask this scout to make a technical assessment of the candidate, because to me the candidate can say yes I develop in [name of program], I have 5 years of experience, I have done these projects; however, for me it is a sterile thing, that is, I take note but I don't then have the technical competence

to make sure that the level of competence of that person is sufficient, so that is what the scout does: he makes a technical assessment by actually speaking the same language as the candidate.
I: And in your opinion does this presence of a second human being, a scout who is perhaps a more objective one, help in some way to limit and dampen the unconscious bias of the selector?
P: So the scout is also very useful for that, I mean definitely he does a technical examination, but there is also another step to take: if I have doubts about that person, I can decide to show a person to the scout, maybe in agreement with the client, and at that point, we can do a little bit of compromise reasoning: that is maybe it is not the brightest and most energetic, sunniest person there is however, they are brilliant so we can understand what we need. That is, maybe we are more interested in a person who is very technically performing rather than a person who is particularly brilliant in soft skills, so having a technical opinion from the scout can help you make some kind of reasoning, whereas if you didn't have an actual objective and concrete parameter on what the person's technical skills are maybe you would be saying "ah alright but this one can't speak Italian what's the point of me introducing him" however maybe that's not the client's priority, so there's no point in you putting a filter on when the filter is less important than a technical skill.
I: In your opinion is an AI or a human more accurate in the recruitment process?
P: Well I would definitely tell you a human offhand. It's clear though that a human needs a lot more time than an AI: what a human does in two hours an AI can do 200 times more, so you have to understand what the need is.
I: If you had to choose between having your resume analyzed by a human or an AI?
P: I would choose the human
I: Okay! We've talked about this socio-cognitive bias thing, and you've already told me that with the scout we manage to decrease it quite a bit; instead, now let's talk about the differences in the process of screening resumes and interviewing between a human and an AI
P: So my knowledge of Artificial Intelligence in this field tends to be null, however, the idea that I have, the main difference is on the very different level of depth: namely, artificial intelligence by definition is based on keywords, filters, and so it doesn't give an interpretation of what is on the CV; this keyword is either there or not there. It's clear that not giving an interpretation is also what then allows for no bias, on that, we totally agree. But in my opinion, the moment we have a CV in hand, it is also important to interpret it with what this may entail: so yes with the risk of bias we were saying, absolutely, but in short it may happen that on a CV there is not a certain keyword, and then reading the experience it can be deduced that that competence anyway is there. In short, these are all evaluations that I make, and I realize that I may bring forward CVs that AI would not bring forward;

but again I can afford to do that in my job, and indeed I need to do that, and that is exactly what an HR who instead has thousands of CVs to trash, does not need but they are different jobs.
I: What about the interview instead?
P: The interview on the other hand allows you to I don't know... I can't find this keyword on the CV, so I ask you a series of questions that allow me to investigate that competency, even if you haven't put it on my CV and it doesn't emerge as a keyword, maybe you've done a whole series of projects, of related activities, that make me understand that even if you don't have that competency maybe you have the potential to develop it in a quick time with some training. There are classes of variables i.e. you also go a little bit more on the potential in the interview phase, which artificial intelligence definitely can't do.
I: So human touch is always to be preferred?
P: The human touch either before or after or always has to be there. But that is to say again it is clear that the goal is to make the process as streamlined as possible as effective as possible, so if to do that, adding the process stage helps, I am not against that at all. However, I repeat maybe mine is also scepticism given by not knowing the software, the object, in short, however, I believe that the human touch should be there, even maybe at a later confirmation stage. I have a hard time thinking about doing selection only exclusively based on AI. But also because in my opinion in some cases, bias can also be something positive: that is, I am making a selection with people who then join a team, so as much as it is something that is related to bias, I also have to make sure that that person integrates well in that team; so I know that team, I know those people and this personal knowledge of the team of mine helps me to understand whether that person can integrate well in that team or not. Then, in short, yes definitely there are biases behind it, however in this case they can bring the best result for example.
I: OK! Thank you for that answer. These methodologies will increase, maybe along with human touch, maybe not. What are your impressions? Do you think it's good or bad?
P: I'm just very curious, I don't think I can make a judgment at the moment really, I've never dealt with it either as a candidate or as someone who works with it; and I would be super curious to see how such an interview works, to see what kind of output then the AI gives, what it checks, what it looks at. I mean super curious absolutely and I really struggle to make a judgment right now as a total ignorant say of the subject. To this date, I can tell you I think the human touch has to be there: that is, it's perfectly fine the work the machine does, however with some kind of supervision, that's it, let's put it that way.
I: I understand, our interview would be over, but if you would give me another minute I would like to ask you a question that I skipped earlier.

P: Sure!

I: Thank you very much: I wanted to ask you about [name of software] : I mean you guys anyway use artificial intelligence in a part of your process, how does it help you?

P: So I don't know if it makes sense to call [name of software] artificial intelligence, the way I understand artificial intelligence. But maybe in a broader sense, we can also put in there i.e. I'll tell you quickly what [name of software] is: it's basically a management system developed by reverse, tailored to what reverse's needs are; so, it's a system that connects to a whole series of other external systems, primarily [name of site], and allows us to optimize the timing of a whole series of activities such as contacting candidates and following up on various conversations with candidates. It doesn't suggest to you what to do, but it optimizes your time and makes sure that what you're doing is optimized and automatic as much as possible. Plus it also allows you to spend more time on more crucial actions; but all the tools we have beyond [name of software], there's another internal management tool called [name of software], which is basically a task manager. I mean the whole goal of this is to have as many things automated; I mean we also recently introduced another system of automating candidate feedback, and before we had to contact candidates even to tell them 'Look we're not moving forward for this for that,' but if you do 40 interviews a week, then that becomes 40 people to unhook, so double the work, and we have a whole series of automation of our work that obviously leave us much more time then to do the rest; whether it's really in terms of the client-candidate relationship. So yes absolutely, in terms of artificial intelligence making your life easier, yes we have that.

I: Perfect. The interview is over, thank you very much! Do you have any more questions?

P: No, but very interesting! Thank you very much.

I: Thank you! I'm glad you weren't bored [laughs].

P: You're welcome [laughs].

I: Have a good evening

Interview code 003R
Date of interview: 12/04/23
Interviewer: Anita Marconi

I: Hi [name]! Thank you very much for your time! I will tell you right away that the interview is anonymous, so I encourage you to answer all the questions truthfully. Also, I ask you not to expand too much on the answers as time is short, if I need more information I will ask you!
P: I understand, that's fine indeed thank you for telling me!
I: So in the meantime tell me what you do in Reverse, what is your role?
P: I'm an Industry leader, so I'm on the delivery side, namely who takes over the research that sales sold, so I ensure all the relationships with the client, understanding the company, understanding of the design, presiding over the research activity; and then the active hunting, the interviews, the selection, presentation of the profiles to the client. So the management is threefold: the client, the candidate, and the team that I manage, which is also made up of people managing other people. So I accompany from the search and selection to the placement of the person.
I: What did you study?
P: Behavioral psychology in the bachelor and work and organizational psychology for the specialization.
I: Would you tell me 3 reasons why you enjoy working in Reverse?
P: It's a reality that gives a lot of stimulation, you never get bored. So if you're the kind of person who likes a bit of competitiveness, bringing good results and doing good work it's the place for you, because it still pays off in terms of consensus, and appreciation but also in terms of money banally. It's a very meritocratic place so if you have the cards to grow you grow, you breathe great energy. It is a very young context, there is a lot of training that is pitted over time.
I: You guys on your site mention socio-cognitive bias, do you know what I'm talking about?
P: Well anyone who has done a human subject knows that we are humans with a bias. I think being able to manage the bias is what recognizes a professional, so it takes a lot of attention from both the candidate and the client. We also do a lot of training, we are in the second cycle of a training on "nudging" the gentle push, and part of it is just related to the different biases that there can be, and how to recognize them, anticipate them or maybe even make them come in handy.
I: In your professional life do you think you have ever been a victim of it?
P: Look, it depends if you give bias a negative reading. Because when I came in years ago and a former colleague of mine was working here, we had worked together so many years and she knew very well how I worked, and I can imagine, at that time we were even younger, I'm talking about 5

years ago; I can imagine that an influence, in that case, positive with respect to who chose me at that time was there. Because she is a very high-performing person, our backgrounds were the same, so it's kind of like I had a sticker that said "trust she is a capable person."

I: How does your decision-making process work?

P: It's a co-decision-making, so the client tells me he needs a-b-c, we figured out what he needs from the soft skills point of view based on the team, the reality, the company culture, so a lot of aspects also soft, not related to hard skills. Because if they tell me that their team is very competitive and they need a certain type of person I have to take it into consideration; so we map out what is it that makes you say "This candidate I wouldn't take forward " or what makes you say "stop," because maybe that candidate is a 'crybaby' , complaining, or I don't see in them the ability to solve a problem creatively. So then when we go for the interview, we go and put on the company's lenses, so I take off mine and put on theirs here. The fact that I know the culture on the team, allows me to understand that if you say to me "I like to work alone in a closet," and I know that the client told me that they are participative, they go trekking together, they work together in an open space, I might think about it. Then obviously the first skim is very technical, so if you maybe, don't know how to do something that for the client is crucial, like you don't know a process...so it's very much about doing the first skim. Then going forward that becomes our plus, namely, you give a space even to the soft things: if you tell me you want to make a career, you want to be the boss of..and then you know you have a family business so it's going to be a mostly operational role. So it's up to us then there to figure it out well... make the dreams fit with the expectations.

I: Sure. Considering the work that you do, and the fact that precisely you are human [laughing], do you think there were times when the process was influenced by your mood, or when your decisions did not turn out to be accurate?

P: Definitely experience teaches you, but I would definitely say yes. If I'm interviewing and I have to tell you who sticks out to me more between a mope, someone who never smiled, who you have to pull the words out of their mouth, so if you ask me if I'm more able to push, to enthusiastically tell a profile that I liked versus one that I did not like less, then yes certainly I feel more effective as well... so yes the bias that can occur, you know motivation doesn't always funnel into smiles, one might even be motivated but not be able to show it, or not have struck the right chord. So maybe sometimes it can happen to push a candidate that makes you more aware that they're interested, versus one that you have to drag them and they give you less information. Because we are very present in the whole process, it's not like my job ends the moment I find a profile and I send it to the client. So that might be a bias; and a bias that I definitely have is that I try to figure out, if I have a candidate that I like, if they've already received other applications, other proposals, if they've accepted a counteroffer, to me

that's important; because if you've accepted a counteroffer, that means you've made it to the final, you've had the employer make an offer, and then you've been "bought off" by promises or money within your company. That to me is a bit of a stain, then maybe I don't tell the client, however, I take that into consideration.

I: Some companies recognize the fact that humans can be biased, and they are considering the use of Artificial Intelligence to overcome this bias, what do you think?

P: I think I don't like to demonize or go to extremes, I mean excesses have never appealed to me. So just as I believe in human fallibility I also believe in the fallibility of other tools. What makes a difference is how they are used, so also how much there is our involvement and supervision. Recently I was reading a post on GDP chat, I think then the difference is when there's a human mind combined with the power of the machine, and just in this interview they were using AI to generate very bizarre questions that you could use in the interview phase, but they were generative questions, of comparisons; so, maybe you wouldn't have come up with them or you would have had to spend a lot of time coming up with them anyway. And afterwards, however, there is always a human exchange. For example, I'll give you an example of soft skills, if you use AI you can definitely (through various programs) go and intercept on a CV a specific characteristic, and that to me is very powerful: if you need a profile with a mechanical engineering degree and you have a tool that processes 500 CVs and tells you "these 40 the person has the mechanical engineering degree and these others don't", perfect, you have saved me a very wasteful action because then I have to go and see: some people write it up, some people write it down, some people don't write it at all; so you take away time from me, a time I could use being virtuous in handling the communication with those people. So on the interaction, I struggle more because I am old [laughs], because the human part, the tone of voice, the speed of exposure, the eyes, a series of elements that is another thing. If I have to think of a client to whom I have to present a candidate who is maybe even extremely centred but who is one of those who says everything so monotonously [mimicking a monotone voice], the client will say to me, "but who did you send me? We eat this one for breakfast." And this is a nuance that only I who have been working for years maybe with a particular client can understand. it is good for the screening though.

I: I understand. Reverse however uses a rather unique recruiting method. Can you explain more about how the scout works?

P: Look the scout is something that necessarily helps, it's a guarantee. Even for the candidate himself, there is if I were a physicist-nuclear engineer and you had to evaluate me with respect to how I handled projects, I think you would struggle a little bit, because you can't be omniscient. So often you run the risk of overpraising a person's preparation or underpraising them, because precisely maybe they smiled less, were less talkative, or gave fewer examples, those are the communication aspects.

Whereas the scout, who in this example is also an engineer, so they speak the same language; hence they don't fool me if you want to fool me, maybe you can with the person who does the initial selection because they are not so specialized and maybe you threw 4-5 big words to me [laughs] there, but you can't with the scout. So it's a guarantee because it allows you to not over-select those who maybe you liked initially then you find out that there's no substance; and those who maybe, by predisposition are less talkative or anyway don't feel efficient talking to someone who doesn't have the same background as them... and so with the scout, you have a way to handle that more technical part.

I: I know you also have a tool called [name of software], which helps you eliminate those repetitive actions...

P: Yes exactly, it really streamlines the operation, the automation, it then allows you a high degree of customization, which then gives you that element of humanity.

I: So taking all that into consideration, and your personal opinions, who do you think is more accurate human or AI?

P: [pause] Well I would say a machine, as it doesn't perceive fatigue or distraction. I'll give you an example: if you go to an interview after your boss has yelled at you, and told you that if you keep this up, he's not going to renew you, you definitely do not enter the interview in a very purposeful way. I'm lucky enough to work with HR people who are very strong on this part, so maybe they tell you, "Look I interviewed with this person, and I wasn't that excited about it, however, I have to recognize that I'm coming from days when I'm extremely tired, right now I'm seeing everything a little bit blue, so I want to see her again because I don't know if it was me who wasn't predisposed, or actually she didn't convince me." This thing here, I find it harder to think about it on a machine, then maybe I am ignorant and by now they can recognize even the tone of voice, the silences the pauses.

I: In theory yes [laughs].

P: Eh okay see, so Artificial Intelligence [laughs].

I: OK! Now a somewhat provocative question, if you had to choose between having your resume analyzed (or screened) by a person or a computer?

P: Look, I would say a computer. I was reading recently that on average, it takes a head-hunter 6 seconds to discard a resume, so I would tell you I would have a machine screen it for me.

I: Because you're saying that 6 seconds are too little?

P: So it's clear that if you know the cv has to have this and this, there is if you need German and you don't have it I don't care so much about the experiences you've had. You are not a fit.

I: Maybe instead of choosing one of the two a combination of the two would be better?

P: That in my opinion, could be the best option. So for example on the fact of German, that you have to be very quick in skimming and also translating because precisely you get very technical CVs; so,

maybe you don't understand all the technicalities. Whereas instead the computer is set that way, and so afterwards you interview them with a more qualitative analysis.

I: These methodologies will definitely increase because AI is catching on, do you think that's good or bad?

P: No I think it's good if it's used in the right mix, it also has to be there..I give an example: you take a rottweiler, it's not a problem if you take the rottweiler if you've had training, you've done a dog educator course, so there's a security in that sense. So I think it then also goes hand in hand appropriate to train some resources to intercept some issues and take responsibility. So the example of the post I was telling you where he was asking 10 absolutely outlandish questions to ask a person, starting from the person's experience, so just the ability to go and personalize the questions. And that I think is the ultimate power, because then I meet with you for 20 minutes and I don't have to ask you life, death and miracles, I go and ask you 2-3 very powerful generative questions that are calibrated for you, that allow me in a very short time to bring you out and get to know you really well. That I think is apotheosis.

I: I got it, we are done! I thank you very much for your time.

P: You're welcome. It's great to do these things, and it makes you reflect a lot.

I: Thank you! Have a great evening

P: bye Anita! Thank you

Interview Code 001U

Date interview: 13/04/2023

Interviewer: Anita Marconi

This transcript was not produced from a recording, but rather from notes taken during the interview.

I: Hi [name] thank you very much for taking this time!

P: Hi Anita it's a pleasure, let me introduce myself, I am [name] and I coordinate the talent and employer branding team of Unilever in Italy and in my team work [name] who gives me support both on the recruitment part and on the employer branding part and [name] who works in our office at [name of foreign country] and she deals instead more specifically with the recruiting and interviews part, so probably among the three she will be the most useful for the topic you are addressing with your thesis. I have read your request to increase the pool of interviewees, our team however in Italy is composed of us. It makes it difficult for us to involve other colleagues from other countries because then everyone has slightly different practices also in terms of policy; so also to optimize time since I imagine you have deadlines...

I: Yes absolutely, but that's perfectly fine I appreciate your availability. However, I resolved this by interviewing people from another company besides yours.

P: Very well, remind me please of the scope of your research.

I: [summary]: The starting point is the concept of socio-cognitive bias that can sometimes influence recruiters' decision-making. To overcome this problem, a new solution is to integrate Artificial Intelligence into the recruiting process. In this research, my aim is to understand whether the use of these forms of technology actually has an effect on decreasing bias.

P: So we actually don't use artificial intelligence that much, in the sense that the human aspect is really important to us so we try as much as possible to get to know, through the means that are available to us, the people that will join the company directly; whether it may be an interview at the beginning by phone, a call on teams or even in-person clearly. Technology today helps us so much to manage volumes that are high so imagine when you have a high number of inputs to guarantee and need to carry on a machine that has to respond to the market in a short time. Considering that for every position we open, we get hundreds of applications, surely technology can help speed up our processes a lot. So if you want I'll tell you a little bit about how the selection process works and let you just understand how we actually use technology. In my opinion, the most interesting thing that I can share with you is that we have recently implemented but it's really very fitting with the topic you are dealing with: it's a tool that is a real gender bias detector that we use for our job descriptions. That

is, we enter the text of our job descriptions before publication within this tool, which goes to alert us if the language that we use has been affected by gender biases, so a real decoder that then alerts us on how we could improve a terminology to make it more inclusive. Fortunately, we are quite good at it, and also the English language helps in that, because most of our postings are in English, as we look for candidates and applicants who know it well; because Italian is important to us but as important as English is. Going back to the selection process, when we have to search for a resource we go to have a briefing with the hiring manager, at that point we agree on a job description with the business partner, the type of contract and the period of collaboration of the resource that we are looking for, and then at that point, we are ready to publish and we do the check with our tool; we publish it usually on our Unilever carriers site and then from there we give resonance on our social channels so Linkedin but also every now and then Facebook, Instagram, it depends clearly also on the need and the seniority of the profession. After that what happens we clearly receive applications from a lot of resumes, we have now several years ago introduced the "digital interview." Previously the first contact with the candidate was done by phone, and then we used to do phone interviews to understand what the soft skills of the person who applied were and what their motivation might be; to this day the screening of the resumes is all done by my team, so we read them one by one with no gender bias or nationality bias or this I absolutely guarantee, in fact I think [name of employee], she grew up in [name of city] but lived in [name of foreign country] and she is really the first promoter of excluding any kind of bias of this kind. Once we have identified the resumes that seem to us to be most in line with the opportunity, a link is sent to these candidates through which they can answer on video, by registering through a dedicated platform, pre-set questions that go to investigate their soft skills; and the soft skills for us in Unilever are what we call the SOLs, they are the Standards Of Leadership, that is a set of characteristics that for us the leaders of the future must have. Clearly the more we find these characteristics in the candidate the better because it means that there is fertile ground to have a leader who meets our values. So these questions pretty much go to replicate the ones we were initially asking by phone. You understand that in this case, we save a lot of time because I don't have to be calling, seeing, when the resource maybe at that moment can't answer me; instead, the resource autonomously decides when they want to record this video interview and sends it to the system autonomously. Clearly, everything doesn't end there because then we see them one by one, also for us there is optimization of time, because I then carve out a period to watch all the interviews slowly, mark the feedback, and then create my list.

I: And you already have feedback from the online interview system?

P: No we just directly watch these videos and then do an evaluation to select or not select people, and at that point, we identify a shortlist and bring it to the attention of the hiring manager. The platform,

if a candidate doesn't answer questions, it flags it to the hiring manager who goes together with HR to make the next step which is always a call on teams where there is much more direct contact; there is the possibility of confrontation as it is necessary because one thing is to record a video and one thing is to exchange ideas directly i.e. it's a whole different thing, so for us here is this step is fundamental. That is, we can never stop at the digital interview, I hope not even the other companies, in the sense that we try in some way with our questions to create empathy, putting the person at ease to understand if they are in line with the standards but even more with the purpose of the company. For example, for us it is very important the issue of sustainability and in general some issues related to sustainability, and it is precisely through the questions of the digital interview that we try to understand if the person has an attitude for certain issues that are the heart of the company. Because only those who have a purpose that is in line with that of the company, we think they can best express their potential.

I: I understand, and in your opinion does the use of this platform have any effect on decreasing bias or not necessarily?

P: In my opinion yes, more than decreasing bias these kinds of tools increase the possibilities of inclusion and accessibility: if you think maybe years ago interviews were only done in presence. Today you can do them from anywhere in the world with such a platform, you can do it at the time you decide, and so in terms of accessibility and inclusion, I would say definitely yes; even trivially you are not influenced by the characteristics that jump out at you more in other contexts. As far as it's true that is always an important exercise to do. It's not easy, however, it's our job so we have to know how to do it.

I: In fact just going back to the first part when I was talking to you about bias: the recruiter's job can sometimes be frustrating. I would like to ask you if at times, even maybe early in your career, in your opinion, you made a decision inaccurately maybe because it was influenced by your mood.

P: Obviously we're human so it would be impossible for that not to happen so absolutely yes and then it's the experience that helps you: on the one hand you rethink later on and then you realize what you can improve, so on the one hand experience; and on the other hand maybe tools indeed.

I: So these tools that you use a little bit help you?

P: In my opinion yes, in my opinion, yes absolutely

I: Okay I wanted to talk now about the differences between human and artificial intelligence in the recruiting process: in your opinion is there one of the two that can do a job better than the other from the point of view of accuracy, maybe in screening resumes or in interviews?

P: [long pause].

I: Or look I'll start with a somewhat provocative question: if you were to have your resume screened would you rather have it done by a machine or a person?
I: Interesting that's food for thought. For me, I told you, the human aspect is imperative. That is, if you go to choose a person, the human aspect cannot be lacking, technology can help bring improvement and optimization, but it cannot replace the human being, especially if I have to read the heart of the person in front of me. Then maybe on the one hand technology, I receive resumes that have the email misspelt and the cell-phone number misspelt and I can't contact these people and they lose the opportunity, so technology can give you a hand where there is human inattention; so, yes however for the evaluation of a person, in my opinion, the human being is irreplaceable. We also have a range of emotions and really empathy comes into play.
I: Does this also apply to resume screening? I ask you specifically because I imagine you have a huge amount of resumes per day and maybe an artificial intelligence tool that does a preliminary screening could help.
P: Yes it can definitely help however I repeat knowing the person makes a difference: consider that for us absurdly many times a person's attitudes are more important than their skills, so if you have a great passion or you firmly believe in the concept of self-esteem for girls and you actively turn this passion of yours, this belief of yours into a certain activity, maybe you lack more technical skills but I know that in you there is a fertile ground to express a passion, a purpose, so yes if the answer is always the same surely, on the one hand, it can help, but it cannot replace.
I: Can you clarify the process: you do these digital interviews then you do another interview afterwards with the people you select?
P: Yes first we identify a shortlist, so screening of resumes, the best ones that are most in line are sent do the digital interview; and then we send the shortlist to the hiring managers to whom we give an excerpt of what we feel is the potential of the person who applied. And then you go and explore with the manager that knowledge. Sometimes the impression you have of the person when you go and talk to them directly is different because it is clear that sometimes you can feel a little bit intimidated, or a little bit more rigid about registering, however, even that is a way to see how the person measures up with a tool like this; and precisely in order not to have bias we don't say "this person is intimidated by the camera" because we understand, it is a particular situation, however it is certainly a good test. So yes we then do the interview with the hiring manager and if all goes well the hiring manager already decides who to bring in; if not, we start the round again if we exclude all the candidates. We usually use this tool for early carriers so mostly internships, so theoretically the selection process ends there; sometimes you can plan to do an additional step with maybe the director if he wants to get to know the candidate, it also depends a little bit on the case that comes up.

I: I understand and the interview with the hiring manager is done by only him or you are also there?
P: Yes we are there; although the hiring managers are given all the tools, clearly they are also trained to interview. But yes we are also there because it is the opportunity to interact with the interviewee and also this probably anyway helps to dampen any bias because more than one person is always useful to have.
I: Is recruiting better handled by the human, the computer, or a combination of both?
P: I would tell you a combination of both
I: The way you do it is the best way in your opinion?
P: It works for now, but I am hopeful that we could implement more and more forms of technologies that could fit well with the needs of the human side: so without replacing them; we are open to introducing them to the extent that they precisely meet our needs.
I: We got right into the major issues and I didn't get a chance to ask you a couple of introductory questions. Do you mind?
P: No of course ask away!
I: Why did you choose a multinational corporation like Unilever instead of a small company and what motivates you to work here?
P: So why a multinational... I'm going to say a triviality but it's such a big reality; first of all we allow a lot of rotating among functions and we push career paths that we call "future feat" so once you identify your purpose and you've joined the company you go and develop, with your line manager, a development plan and in this development plan you put a series of short or long term activities that will help you reach and express more your potential and so in Unilever, this is possible. That is, if you want, you can work in marketing, in the supply chain, in human resources; namely, the ability to see everything is perhaps the aspect that I have always liked the most: if you have an idea that fits within the strategy, within your competence, the timeframe in which it can become a reality is very quick; so, this has always fascinated me. Most of all it makes me see that I can actually make a difference in the concrete maybe with an initiative, a project, namely, make a contribution to society in some way in my own small way. I had done an internship in a European institution in communication then I joined Unilever six years ago and I stayed. From communication, I took part in the employer branding team and then I developed the part of talent acquisition and recruiting. And the company gave me so much support: it is a company that invests so much in the training of its people with skilling and reskilling, they did it also for me and it is because they understood my purpose, where I could give my best, and it is not for everybody.
I: I wanted to ask you if you think in your life, you have ever been the victim of someone else's bias, maybe while you were interviewing.

P: So I've done very few interviews fortunately because I've been in Unilever for six years now. I would definitely tell you yes because it's not easy, not always, to find who really knows how to read a person a resume or maybe you can also be a little bit influenced by aesthetic aspects, so definitely yes it's normal. I think anyway not even any technology of the future will be able to completely eliminate this because if we want to keep the human component a minimum there's this risk; so, it's kind of a balancing of everything.

I: Perfect, our time is up. Thank you very much for your availability.

P: You're welcome. I remain available for any clarifications.

I: Thank you! Have a great evening.

P: You too.

Interview Code 002U

Date interview: 28/04/2023

Interviewer: Anita Marconi

This transcript was not produced from a recording, but rather from notes taken during the interview.

I: Hi [name] thank you very much for the availability!

P: Hi Anita you're welcome it's a pleasure.

I: I would like to remind you right away that the interview is anonymous so I ask you to be as honest as possible, and then I would like you not to dwell too much on each question, at most, I will ask you more information.

P: Perfect thank you for telling me.

I: Okay let's start: tell me what do you do at Unilever, what is your role?

P: Yes I work in talent and acquisition so I mainly deal with recruitment and then hiring; so the search for new people and then their placement

I: Okay and how long have you been working at Unilever?

P: I have been working there for a year and a month

I: What did you study?

P: I majored in languages and cultural mediation then I did a master's degree in human resources.

I: OK perfect and tell me why did you choose a multinational company like Unilever over maybe a smaller company?

P: I'll tell you what attracted me a lot about Unilever is the company culture, its purpose, so all the company values, particularly the inclusion which I particularly care about, but also the fact that Unilever wants to make the world a better place both for its employees inside but also with the products.

I: Okay and three reasons that motivate you to work at Unilever?

P: So I reiterate: corporate culture, but also the mindset of people within the company, and personal growth, professionally and personally.

I: Now let's move on to the first topic that I am going to address with my thesis, which is that of the socio-cognitive bias. Do you have any idea what I am talking about?

P: Refresh my memory because I know what they are in general, but tell me what this one was in particular, as I struggle to differentiate them.

I: So yes the socio-cognitive bias is something that all of us humans have and it's unconscious and it's what sometimes leads us to decisions that are not always accurate; in this case, it's approached to the work of recruiters. Do you think you have ever been a victim of someone else's bias?
P: So yes, this is an issue that is very close to my heart because I am [foreign nationality]. I was born in [foreign country] and I was raised in Italy. So, let's say once I graduated, just because of my name, very often I was not called back even though I had the degree, I did several internships, and I also had some experience; so this definitely was a factor that I suffered from in all honesty. It changed so much when I put the Italian citizenship in the resume and I noticed the difference right after, in the sense that I didn't put it in before, I didn't think it was important obviously, instead, it turned out to be a factor that then opened doors for me.
I: I get it, you are a recruiter, you make selection. What is your decision-making process, that is, how do you choose who gets in and who doesn't?
P: So it's quite a long process, let's say that we mainly rely on hard skills: in the sense that before we go looking for people we have a briefing, a call, with the line manager under whom the people are actually going to work, to understand what they are looking for in the person who is going to come in. So if, for example, the manager is looking for a finance assistant and tells me, "They absolutely must have Excel and they must have studied either economics or finance or in this area of economics," that's the first thing, I go and look at the resume. Regardless of everything else, I have to start from there because otherwise that clearly can't work; so, I mean it's not that if they are a nice person but they don't have the competence, I send them forward, so I always start from the hard skills that we define. You can't disregard those, so you always start from those and then after this point, if you have for example 10 people who have all the hard skills, they did the same studies and so on, then we go to evaluate the soft skills, so just the person themselves the attitudes in short, the personality, how the team relates with that person, how they present themselves.
I: Was this process ever influenced in any way by your mood? Can you think of a time when you made a choice that you regretted?
P: Yes, it probably has happened yes, now I don't have an example in mind in particular, however definitely yes; in fact one thing I always try to avoid, is doing interviews when I've had a terrible day, if I'm in a bad mood maybe I try to avoid it because it's obvious that it would influence, and also how I present myself that doesn't seem right to the people that I'm going to hear from, that I have to talk to. But yes definitely it must have happened, maybe while I was doing screening one day that I missed something, I would say yes.
I: So you think you ever had bias towards somebody else? Maybe unconsciously.

P: [pauses] Yes I think it has happened, maybe more in the early stages when the resumes come in actually, even due to the directions that we are given today unfortunately: maybe you know we prefer a person x who has this, who doesn't have this. I try to be as aware as possible; I have to be objective obviously, however, sometimes it happens. In fact, one thing that I always advise when the resume comes is to avoid putting the picture and the date of birth, and even the nationality. Because I am evaluating a person, I don't care where they were born, how old they are honestly... Everybody in Italy still does it, it's not a problem, but it would be nice to evaluate the person regardless of what they look like and who they are.

I: So do you think there is a way to get rid of bias one hundred percent?

P: I don't think so, I think it's not impossible but very difficult, because there are really a lot of them [biases] that we don't even realize, and that maybe trick us, because as long as they are clear and obvious...I'll give you an example: I didn't consider a candidate because he was born in 1988 and we want someone who is at least from the 95, so, in that case, I'll wait and think about that. But with other biases sometimes we don't realize because they are totally unconscious and it's hard to realize.

I: Some companies are turning to the use of artificial intelligence to try to limit or dampen human bias, what do you think about this?

P: I think it's very useful however I'm also of the opinion that they can never replace the assessment that people do, the human contact, because we grasp some things that a machine can never grasp. So useful for sure, it helps with timing, however with limitations.

I: Unilever uses a platform for digital interviews, can you tell me more about how it works, how it helps you and so on?

P: Sure so, first of all we start by screening the resumes that come to us from the people who apply; so starting from the hard skills, and after ensuring that they actually have the requirements that we are looking for, we send them on the platform. They get an email with a link, and then they proceed with the video interview, and they answer the questions that come out; then there are different ways, either they can always answer via video, or they can write, it depends a little bit on how we structure the interview. People complete the 7-8 questions they are asked, we get the completed, finished interviews and from there we evaluate them.

I: Do you think using this tool has any effect on bias?

P: So, in my opinion, yes, it helps to decrease it because a resume doesn't transmit to you who the person is, I'm not saying that then the video gets you the essence of the person in front of you because that's impossible, but at least it gives the candidate a chance to present themselves without that anxiety to have the recruiter in front of them, they know then they will be evaluated but it's them alone talking; so, in my opinion, this helps the candidate to be comfortable, to present themselves in a more relaxed

way, and it also helps us to evaluate them at a time when we are also more relaxed, because we know that we are going to evaluate people and it gives us an idea then of who this person is, so, in my opinion, yes it helps us a lot.

I: And what do you think are the biggest differences between a computer and a human during the selection process?

P: So we don't do the screening with AI and I don't even agree that much because there are skills, it's true that we still go and select some of them, however, it's hard for a computer to catch everything we want because maybe there are other things or there are certain points that we can know, but the computer can't get there in my opinion. What it helps with is the speed, I mean it accelerates all of that a lot, however as I said again it absolutely cannot take our place: because a candidate that in front of the computer may be the perfect candidate, then actually when they go for the interview with a human, at the personal level they may not be understood. So a computer gets to a certain point and then stops in the sense that it can only do so much.

I: You guys have a very large volume of resumes, don't you think AI could help make an initial selection?

P: Yes and no, it would accelerate, but there is that risk of missing that resume that maybe as a resume AI would not select, but thanks to our experience we can see that maybe one skill is missing but it makes up for it with another. So it's true that you can't see all the candidates in the same way, someone gets lost among hundreds of resumes, but with AI, in my opinion, you risk too much, I don't think it's the optimal method. I don't know, not having used it, maybe I use it and it changes my life, however, we prefer to go this way, since we became very fast.

I: How long does it take you to screen a resume

P: 2 minutes more or less, depending on how long it is, for internships even less.

I: For the interview instead? Do you need the human touch or can AI be more accurate?

P: I think they go hand in hand, in my opinion, AI helps but you still always need to have that conversation between people. Because you need to connect with someone, as an initial step is good, but then you have to continue with each other.

I: Have you worked in other places as a recruiter?

P: Just one.

I: Okay and how has your work changed since you switched to a Unilever and started using digital methods?

P: So, the platform has helped me to manage my time better because I know that when the interviews arrive, I dedicate those two hours and I do it. Before I had to do interviews via phone and it was a little frustrating because often people are not available, they don't respond, you have to put it off.

Instead, now you give people the option to do it when they want to and when I have the time I dedicate myself to evaluate them and do it. So that was the main breakthrough.

I: So in your opinion, the human touch is to be preferred for Recruiting

P: Yes absolutely

I: Whereas in some cases AI can be more accurate or not?

P: Not in assessing people, in other things yes for example data analysis, but in this specific case no, if I have to eliminate one of the two things I eliminate AI.

I: So if you had to choose between having your resume screened by a human or an AI?

P: A human definitely

I: What about a combination of the two instead?

P: That would be the best option, it is good to use the tools we are given especially if they help us work better and more efficiently.

I: In the coming years these methodologies will increase, is that good or bad?

P: It's good if used in the right way. And if we don't eliminate people, anything can increase, there are many interesting ideas that also help to bring people together, but they should never eliminate human contact.

I: Okay thank you very much! The interview ends here.

P: Thank you Anita!

I: We will keep in touch, have a good day!

P: Sure! To you

Interview Code 003U

Date interview: 28/04/2023

Interviewer: Anita Marconi

This transcript was not produced from a recording, but rather from notes taken during the interview.

I: Hi [name] thank you very much for the availability!

P: Hi Anita you're welcome it's a pleasure.

I: I would like to remind you right away that the interview is anonymous so I ask you to be as honest as possible, and then I would like you not to dwell too much on each question, at most, I will ask you more information.

P: Perfect thank you for telling me.

I: Okay let's start: tell me what do you do at Unilever, what is your role?

P: I work in HR, my role is talent advisor and employer branding analyst so I do recruiting, from job posting to the 'on-boarding' of the person, and employer branding activities that go from managing social media channels, creating content, and working to connect with universities for the organization of events and preparatory activities for students.

I: How long have you been working at Unilever?

P: A year and a month

I: What did you study?

P: So I have a single-cycle master's degree in primary education, I was meant to be an elementary school teacher, and after that, I did a master's degree at Luiss Business School in human resources management and business organization and that directed me to this kind of career.

I: OK perfect. Why did you choose a multinational company like Unilever over maybe a smaller company?

P: So it also depended on the opportunities and the cases in life that lead you to choose what is best for you; however I had always set it as a goal because I am a person who loves challenges and I love dynamic and demanding contexts, even just the concept of challenge is something that is part of my way of approaching things, and then I wanted to work in a context that had an international scope and clearly a company like this gives you that.

I: Okay, so three reasons that motivate you to work with Unilever?

P: First internationality, then also vision, because I agree with what the company does and says, and also the type of business because the world of fast-moving consumer goods is very interesting.

I: So now let's go to the first topic of interest for me and my thesis which is the concept of socio-cognitive bias, do you have any idea what I'm talking about do you want me to refresh your memory a little bit?

P: Let's say I'm pretty aware of what it is, partly because it's an everyday risk of my work, especially when you're brought in to evaluate people.

I: Do you as a candidate think you have ever been a victim of it?

P: I don't know... however I think once yes: I perceived a bias on the part of a person with respect to an answer of mine that was not a definite answer; they wanted, in a quite passive-aggressive way, in my opinion, to point out that what I was saying was wrong, however maybe it was my perception I don't know for sure.

I: Tell me what is your decision-making process: that is, how do you choose who to hire?

P: I always try to rely on two aspects: the first one, which is more important to me, is the connection the person has to the values of the company and what is the target (although it's not a word I like) audience that the people here have; to the extent that certainly if you are within a large and structured organization like this, you have to be subject to certain values, even certain rules, you have to have personal and professional imprinting of a certain depth, regardless of whether you are a junior resource or the CEO, so I try to capture that attitude, first of all; secondly, you also have to look at the substance, so I try to figure out if, once the human and soft skills make the person in line, they also have the professional or academic background that is consistent with what we are looking for at that moment for that intended position.

I: Okay sure, has this process at times, even maybe more early in your career, been influenced by your mood?

P: I don't think so no, because since I was in the first place subjected to selection processes I feel a lot of responsibility in the way I bring forward a resource or not, so there can also be a bad day but in that very moment I try to forget everything, I try to be focused on what I'm doing.

I: So you don't think you've ever had a bias towards anybody?

P: No I don’t think so. It might have happened unconsciously.

I: Okay and do you think there is a way, maybe even a specific way to get rid completely of this bias?

P: Be prepared for what you do: if you set a scale and you set expectations with respect to what you're looking for, the work will go hand in hand; for example, I see a resume and with respect to what I'm looking for it fits into my search plan, that's all I need. I try to be as objective as possible because otherwise I would get biased because maybe the resume is made better or not, or maybe the person's interests are the same as mine and so I try to be as schematic as possible. Then the challenge is always to go beyond that, to try for the screening phase to be a screening phase: there are companies that

maybe use very specific ATSs [Applicant Tracking Systems], but we don't do that and that gives me an additional responsibility.

I: Exactly now we go to the second topic which is artificial intelligence: some companies to overcome this problem of bias are starting to integrate artificial intelligence systems into the work of the human, what do you think about this?

P: I think it is always right to combine tradition and innovation, tools should help not replace people, so where artificial intelligence can simplify, and speed up the work of the person, so I think it is useful. Giving AI the power to make a decision instead of me in my opinion can create technology bias.

I: Instead explain to me more specifically how Unilever uses artificial intelligence.

P: Yes so in our case it is the prime example of how actually there is the human behind the machine because at the end of the day, the final delivery sees a person interacting with a computer that asks a series of questions and so you are responding to technological inputs. The goal is to simplify and speed up our work to be more respectful of our candidates, the reason we use this system is not that we wouldn't like to spend time doing every phone call and every step in a live way. However, we try to set it up as if it were really a chat that they would have with us, a series of questions that people then answer and even there, we try there to empathize with the person: because it's different having to talk to the person rather than talking to a computer, so in some people that can cause embarrassment, in others it can cause ease. So already a first bias to not have is saying "but why is this person talking like this" or "but where does this person think he or she is" That is, you have to understand anyway that he or she is not really talking to an individual; therefore, you have to be objective even in the criterion of approaching any video interview; and after that we try, even there with respect to the things I told you at the beginning, to assess personal or professional relevance, and we bring people forward. However, even though [name of system] is one of the preparatory steps for most of our selection processes, there is always a stage where we then interface with the person. So if you were to interview with us tomorrow through [name of system] I would call you to continue the chat or invite you to have another one either live or virtually.

I: So you still feel that the human touch is preferable to AI anyway?

P: I think it is right now the most important part still; I don't know if I would say preferred however in my opinion it carries more weight.

I: And instead do you think AI can be more accurate in some eventualities?

P: Probably yes, but only if there's a purely numerical analysis to be done like doing research, because then I'll give you an example: if 100 people had the same resume template, the same fields to be entered and they all filled it in the same way, so maybe the AI having all the same information for all

100 people, because that's how ATSs work, does an objective and democratic screening. By having people with different formats of resumes, and different information, in that case, it might not be functional. Then people try to cheat the ATS as well, however in my opinion if the baseline is the same for everybody so in my opinion yes.

I: And so if you had a choice between having your resume screened by a person or an AI what would you choose?

P: I would choose a person although people have limitations, so it has to be a person I trust.

I: I want to understand if in your opinion the method that you use, so with [name of video-interview system], or any way this helping hand that artificial intelligence gives you has any impact on decreasing any bias.

I: In my opinion yes. Because people are people so at times when you have a whole day of interviews, it is easier to interact with people when you are fresh, rather than when maybe you are more tired. As I was telling you I always try to put all the problems away, however, there is no question that it is a job that still challenges you, you have to be connected all the time. So I would say it helps us because of the way it is set up; because right now the human touch in this process is preponderant: we don't tell [name of system] to look at the video interviews and come up with the list of the top five out of ten that we sent in video interviews; we look at ten video interviews, we try to approach it the same way in all in all cases, we evaluate it, we have the opportunity to also comment on each question that is asked by giving it a score, so, in the end, the list of the top five out of 10 comes out of a calculation that you do based on objective criteria, so it helps us to speed up our decision-making process.

I: So what do you think are the main differences between a human and an AI in screening resumes and then interviewing, and who can do a more accurate job?

P: So computers have an analytical mind so definitely if the criteria are objectively defined, the margin of error of artificial intelligence is maybe less, probably a person can pick up the nuances that are still important. Because while it is true that I should not be influenced by the fact that Anita has a nicer resume colour than Elisa's, on the other hand, however, I still also try to see how Anita reported the information, and what she wanted to communicate to me. Always with the right detachment but noticing how much the person put into the same resume writing, because that is also a strategy. That a machine can do up to a certain point.

I: What about in the interview instead?

P: In the interview, in my opinion, it depends on the person instead, because if a person does their job well for example, I always put everybody at ease by trying to get a smile out of them and to really put the conversation on the most informal level possible. Because I know how heavy emotion can be at that time, so for some people, this mode can help. Then if a person acts like a machine within an

interview maybe a machine is better because I at least know that I'm talking to a computer and I have two minutes to answer the question, I try to focus my questions there. Whereas if I'm interacting with a person, from the candidate side, I would expect there to be a little bit more participation, so it depends on the person and what their approach to this kind of thing is.

I: So you then after [name of system] also do an interview of your own?

P: Of course [name of system] is never the last step if anything it is the first step: if you apply tomorrow for a position, I screen your resume, send you in [name of system], watch your video interview along with 8 other people, if you are in my top five we get in touch after that there is at least another step which is no longer [name of system] but it is an interview anyway interactive either with me or with your potential line manager. Then there might be other steps as well.

I: In your opinion, is it better to have the recruiting process handled only by the human, only by AI or a combination of both?

P: In my opinion the key is a good combination of the two, where the technology supports the human, speeds it up, and allows you to achieve results that are as democratic as possible, but also effective.

I: So the fact that these methodologies are increasing in your opinion is good or bad?

P: It depends on how they are used, and how much responsibility you give to these tools: because I think that evolution will lead maybe in 10 years to talking with holograms, or we will find a world where the whole selection process will be digitally set up but it will be effective because you will not lose the human side. I, to this day, still believe in the human.

I: Okay perfect that was the last question so we are done! Thank you very much for your availability

P: Of course not at all it was a pleasure.

I: Should you have any doubts or other questions please don't hesitate to write to me!

P: Yes the same goes for you!

I: Thank you very much, have a good evening

P: To you.

TOPIC GUIDE REVERSE

TOPIC GUIDE- How Artificial Intelligence can be used at the recruitment stage to decrease the unconscious socio-cognitive bias of recruiters. A study of the company "REVERSE".
Thank you for your participation! Before we begin, I would like to remind you that all responses will be kept confidential. Any information included in my final draft will not identify the real interviewees, and I assure you that your personal information and interview responses will be shared only with members of the graduate committee.

The interview will last approximately 30 minutes. I would like to mention that there are no right or wrong answers to the interview questions. During the interview, it is important to express your point of view and be completely honest. Any true experience you have will be greatly appreciated.
However, you have the right to refuse to answer any questions or stop the interview anytime for any reason.
With your permission, I would like to record the whole interview since any kind of remark you make is very helpful to the research. May I start the recording?

With your permission, I would like to record the whole interview since any kind of remark you make is very helpful to the research. May I start the recording?

Sensitizing concepts	Main questions	Side questions
INFLUENCE EDUCATIONAL AND PROFESSIONAL PATH	What is your role at Reverse? How long have you been working there?	How did you train/ what did you study to obtain this position?
	What motivates you to work here? 3 reasons	(if doesn't mention technological innovation or the like): Reverse is particularly technologically advanced, did this influence your choice in any way?
PERSONAL KNOWLEDGE OF THE CONCEPT OF BIAS	Do you know what socio-cognitive bias is?	(If yes, ask to explain; if no, explain us)
	Do you think you have ever been a victim in your professional life of such prejudice?	(If yes) In what way? (If no) Have you ever witnessed or heard of people who had been subjected to it?
	You work as a head-hunter, what is usually the process you employ to decide who to hire?	Has this process ever been influenced by its mood?

	The recruiter's job can be extremely routinized and exhausting-have you ever found yourself making careless and rushed decisions?	
	Do you think that somehow you have also been a perpetrator of unconscious bias?	(If Yes) In what way?
	Do you think there is a way to get 100% rid of this bias?	(If yes) how? (If no) what can be other solutions?

IMPRESSIONS REGARDING THE USE OF AI	Many companies are turning to the use of Artificial Intelligence in recruiting but also in other functions. What are your thoughts on this?	Do your professional experiences influence this vision of yours? In what ways?
	Reverse is currently experimenting with alternative recruiting. Can you explain more about how it works?	Follow-up if needed
	You do not use AI in the recruiting process. Do you think the human touch is still preferred for recruiting?	Why yes/why not
	Do you think AI can be more accurate in some instances?	Why yes/why not
	If you had the choice of having your resume analyzed by a computer or by a person, which would you choose?	Why?
CAN AI DECREASE THE BIAS?	At the beginning we introduced the concept of socio-cognitive bias, and how inevitable it is for human beings. Do you think your system can help diminish it?	(If yes) how, (if no) what other solutions could be found?
	What do you think are the biggest differences between a computer and a human during the selection process?	Who do you think can do a more thorough job?

	Do you think Artificial Intelligence has the ability to act unbiased at all times?	Ask to elaborate on the answer (if necessary report what I know about the topic)
	In conclusion, do you think the solution to having a fair and accurate recruiting process is in having it handled by AI only, human only, or maybe a combination of the two?	
FUTURE OF AI	Do you think that over the years, these methodologies will increase? Do you think this is good or bad?	 Ask to elaborate on the answer

Concluding remarks (in the final part of the interview):

The interview ends here; thank you very much for your availability and the time you chose to devote to me.
I would also like to remind you that all the information you shared will be kept confidential and will only be shared with members of the graduation committee.
Do you have any other questions regarding the interview or the project in general? Thank you again and have a good day :)

TOPIC GUIDE UNILEVER

TOPIC GUIDE- How Artificial Intelligence can be used at the recruitment stage to decrease the unconscious socio-cognitive bias of recruiters. A study of the company "UNILEVER".
Thank you for your participation! Before we begin, I would like to remind you that all responses will be kept confidential. Any information included in my final draft will not identify the real interviewees, and I assure you that your personal information and interview responses will be shared only with members of the graduate committee.

The interview will last approximately 30 minutes. I would like to mention that there are no right or wrong answers to the interview questions. During the interview, it is important to express your point of view and be completely honest. Any true experience you have will be greatly appreciated.
However, you have the right to refuse to answer any questions or stop the interview anytime for any reason.

Sensitizing concepts	Main questions	Main questions
INFLUENCE EDUCATIONAL AND PROFESSIONAL PATH	What is your role at Unilever? How long have you been working there?	How did you train/ what did you study to obtain this position?
	Why did you choose a multinational company like Unilever?	If you have previously worked in smaller companies, what are the main differences you have noticed?
	What motivates you to work here? 3 reasons	(if doesn't mention technological innovation or the like): Reverse is particularly technologically advanced, did this influence your choice in any way?
PERSONAL KNOWLEDGE OF THE CONCEPT OF BIAS	Do you know what socio-cognitive bias is?	(If yes, ask to explain; if no, explain us)
	Do you think you have ever been a victim in your professional life of such prejudice?	(If yes) In what way? (If no) Have you ever witnessed or heard of people who had been subjected to it?
	You work in human resources, what is usually the process you employ to decide who to hire?	Has this process ever been influenced by its mood?

	The recruiter's job can be extremely routinized and exhausting-have you ever found yourself making careless and rushed decisions?	
	Do you think that somehow you have also been a perpetrator of unconscious bias?	(If Yes) In what way?
	Do you think there is a way to get 100% rid of this bias?	(If yes) how? (If no) what can be other solutions?

IMPRESSIONI RIGUARDO L'USO DELL'IA	Many companies are turning to the use of Artificial Intelligence in recruiting but also in other functions. What are your thoughts on this?	Do your professional experiences influence this vision of yours? In what ways?
	Unilever is also using a method of recruiting that employs AI. Can you explain more about how this works?	Is it preselection, interview, or both?
	Do you think the human touch is still preferred for recruiting?	Why yes/why not
	Do you think AI can be more accurate in some instances?	Why yes/why not
	If you had the choice of having your resume analyzed by a computer or by a person, which would you choose?	Why?
PUO' L'IA DIMINUIRE IL BIAS?	At the beginning we introduced the concept of socio-cognitive bias, and how inevitable it is for human beings. Do you think your system can help diminish it?	(If yes) how, (if no) what other solutions could be found?
	What do you think are the biggest differences between a computer and a human during the selection process?	Who do you think can do a more thorough job?

	Do you think Artificial Intelligence has the ability to act unbiased at all times?	Ask to elaborate on the answer (if necessary report what I know about the topic)
	In conclusion, do you think the solution to having a fair and accurate recruiting process is in having it handled by AI only, human only, or maybe a combination of the two?	
FUTURO DELL'IA	Do you think that over the years, these methodologies will increase? Do you think this is good or bad?	 Ask to elaborate on the answer

Concluding remarks (in the final part of the interview):

The interview ends here; thank you very much for your availabilitỳ and the time you chose to devote to me.
I would also like to remind you that all the information you shared will be kept confidential and will only be shared with members of the graduation committee.
Do you have any other questions regarding the interview or the project in general? Thank you again and have a good day :)

CONSENT FORM UNILEVER

Consent Form

You are being invited to take part in my research which aims to understand whether the use of Artificial Intelligence has an impact on the diminishing of the socio-cognitive bias.

Please, note that by signing this consent form you are agreeing to the following:

- I understand that participation in this study is completely voluntary, and I will not benefitfrom the study directly
- I understand that even if I agree to participate in the study now, I can withdraw data within the next 15 days or refuse to answer any question without any consequence of any kind.
- I understand that data obtained from the interview will be kept by the interviewees for 2 months for research purposes.
- I understand that all information I will provide during the interview will not be recorded and treated confidentially throughout the entire study.

Signature of participant

Signature of researchers

CONSENT FORM REVERSE

Consent Form

You are being invited to take part in my research which aims to understand whether the use of Artificial Intelligence has an impact on the diminishing of the socio-cognitive bias.

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- I understand that all information I will provide during the interview will be audio recorded and treated confidentially throughout the entire study

Signature of participant

Signature of researchers

Summary

Chapter 1- "Inequality in access to jobs"

The labour market is an arena in which workers with specific characteristics are matched to positions requiring their specializations; in particular, the labour market deals with giving value to an individual's economic services and then deciding whether to use such services or not. Hiring decisions and differences in the access to jobs can depend on a multitude of factors, for example by the workers' human capital (their skills, competencies, experience), or perhaps on their perceived "trainability", hence how much the organization would spend to train them. Nevertheless, regardless of how employers decide to fill their vacant positions, this matching process is not always fair for all the categories involved. In this first chapter, I will primarily deal with inequality in access to professional or "knowledge" jobs: *professional services* are defined as those that require extensive training, like medicine, law, engineering, high-tech and others. These occupations comprise a significant portion of the labour force, especially in developed countries. The first case study analyzed was the Oreopoulos one (2009) which was conducted by creating and sending thousands of resumes in response to different job postings in Toronto. What emerged from this study was that the call-back rate for type 0 resumes (English-sounding name and Canadian education and experience) was 15.8%, changing only the name to an Indian one would decrease the rate to 12%, doing the same with a Chinese or Pakistani-sounding name, made the call-backs drop to 10.8 and 11% respectively. The call-back rate for resumes with almost all experience gotten in India, China or Pakistan dropped an additional 2.6% (from 11.4 to 8.8). In contrast, in the case of all foreign experience, the rate decreased by 6.2%. We can draw two main conclusions from this study: for positions that require 3 to 7 years of experience, the latter plays a significant role, and it appears that Canadian employers prefer candidates with Canadian experience. While this aspect can be to a certain extent understandable, as employers might want to save on training costs, that might be higher for someone who does not know how the Canadian workplace works, the second aspect is less excusable: this study reveals how the applicant's name matters significantly more than his education, language knowledge and extracurriculars; in fact for type 1 resumes (foreign-sounding name with Canadian experience and education) the call back rate still decreased.

The second study was conducted by Koji Chavez (2017) who studied the hiring process at a Silicon Valley high technology firm (InGen), by interviewing about 50 employees involved in the hiring process, observing 67 hiring deliberations over eleven months, and collecting data from all the in-person interviews from June 2011 to February 2014. The selection process at this firm is done through both technical interviews and "cultural fit" checks. While the technical process is objective, during the evaluation of the individual's behaviours and attitudes a bias can occur. The results showed that

foreign-educated Chinese, Asian-Indian and "other" Asian immigrants received lower cultural evaluations. This also resulted in fewer job offers. The recruiters said that they respond more positively to candidates who show signs of American cultural membership: for example, engaging in conversation without being too submissive, but rather expressing their opinions; and being individualistic, namely, defending their ideas and being creative. These characteristics are distinctive of the American culture, while very far from the Asian one. This is called by Chavez "perceived cultural divide".

Another contribution came from Lauren Rivera (2012) who researched hiring in elite professional service firms to determine how cultural similarities make a distinctive difference in the employers' hiring decisions. By studying 120 interviews and observing the deliberations of the hiring committee, the researcher found that the selection happens not only based on the candidate's skills and competencies but rather through a process of "cultural matching" between applicants, employers, and organizations. Specifically, similarity is one of the most potent drivers of evaluation in job interviews (Huffcutt 2011, 68). This is so because having things in common can work as a bonding factor that creates trust and comfort. In sociology, this is called "homophily", which is the tendency of individuals to get closer and more appreciative of other individuals that are similar to them in values and general beliefs. According to Rivera there are three main ways in which cultural similarities affect the hiring process: organizational, cognitive and affective processes: in the first case, the recruiter will look first and foremost for similarities between the candidate and the firm's already existing employee base, because fit is an essential aspect due to the long hours spent in the office and on the road constantly near other colleagues (Rivera 2012, 1012); In the second case recruiters will look for shared and common interests and eventually will guide their decision toward those candidates that most fit their own extraprofessional background (Rivera 2012, 1013); in the third case, similarities produce a sense of excitement and complicity. A lack of shared interests would discourage recruiters from interviewing a candidate, even if their achievements were valid. According to many evaluators, these feelings of excitement were a prerequisite of the cultural fit and, overall, a crucial aspect of building chemistry with the applicant (Rivera 2012, 1015).

These studies proved that workers are excluded from the workforce based on their name, culture and even the ways they spend their leisure time or present themselves. Moreover, evaluators favoured leisure activities are associated with the white upper-middle class (sports, arts, travel), which necessitate a consistent investment of time and resources that are not available to everyone (Shulman and Bowen 2001). Hence, less affluent students which often also overlapped with immigrants or foreign students and had no chance at the game.

The bias originates naturally from stereotypes and social norms (Guynn 2015, 2), and can be "activated" by a multitude of external factors such as ethnicity, gender, level of education, marital status, use of leisure time and much more. The reason why bias is such a natural part of our essence, is that it is rooted in the brain: scientific research has in fact determined that the bias is found in the amygdala, which is the part of the brain that deals with threat and fear. The issue is when these biases creep into the workplace: at Queensland University, a research found that blonde women's wages were 7% higher than brunettes', while at Duke University another study discovered that people with a "mature face" were more likely to climb the career ladder than those with a "baby face" (McCormick 2015, 3). There are a multitude of biases in the world, the most common are: affinity bias, halo effect, perception bias, confirmation bias and group think. These biases, have the power to affect the way in which managers and leaders make their decisions, not only at the hiring level but also during the everyday deliberations. To remove bias firms should work on limiting subjectivity from the hiring process; for example, by setting objective criteria, standardizing the interview process for all the candidates, eliminate informal chats or other inappropriate social interactions like "coffee break banter" and avoid gut feelings in the assessment. Moreover, companies should provide awareness training, categorize the bias and creating structures to deal with bias.

Chapter 2- What is Artificial Intelligence?

Perhaps Artificial Intelligence could help in limiting the bias: by taking over repetitive and time-consuming tasks as scheduling, the quality of the hiring process might improve as it will also eliminate human biases (Hmoud and Laszlo 2019, 24). On the other hand, algorithms can make mistakes, especially if they are based on historical data that is biased or reliant on irrelevant criteria. AI is the science of making intelligent machines, in particular computer programs, that are able to perform tasks that would normally require human intelligence (McCarty 2007, 2). Artificial Intelligence is undoubtedly becoming a part of our everyday life, in fact, the question is not even about the role that AI might have but rather, about the role that it already has and how it will develop in the future. Moreover, the crucial point is to understand the new relationship that is forming between AI and human beings, and in this realm, it is important to understand which decision should be "delegated" to our artificial assistants. The four main kinds of AI are Reactive Machines AI, Limited Memory AI, Theory of Mind AI, and Self-Aware AI (McCarty 2007, 13), and there are also four main techniques in which AI is implemented: Machine Learning, Deep Learning, Natural Language Processing and Fuzzy Logic. The rapid development of these technologies bring some concerns regarding the political administration of AI. AI governance has not yet developed much, and it is still in a quite unorganized state. This is mostly due to differences in stakeholders' wills: in fact, if on one

hand, the private sector wishes to be left on its own, without the imposition of legal measures that could hinder its profit, on the other the public one, wants precautions to protect the citizens by the possible dangerous consequences brought by AI (Butcher and Beridze 2019, 89). The European Commission shared a report regarding the approach that the EU should have toward Artificial Intelligence, and it is based on three pillars, two of which encourage the readiness for socioeconomic transformations and the implementation of a legal and ethical framework (EU Commission 2018). There are also non-governmental organizations that are active in the research for AI development, such as the Institute for Electrical and Electronics Engineers (IEEE) that in 2016 created a Global initiative regarding the Ethics of Autonomous and Intelligent Systems, to put ethical concerns paramount (Butcher and Beridze 2019, 91). Even the UN's secretary general claimed during a General Assembly, that AI and other technologies could make a substantial difference to reach the Sustainable Development Goals. Moreover, he established in 2018, the High-Level Panel on Digital Cooperation to maximize the potential of digital technologies while taking care of all the possible negative consequences (UN 2018).

We established that AI will have an always more prominent role in our lives, and perhaps, with the right regulations, humans and AI will be able to coexist in harmony. In fact AI could be a way of solving the bias problem, but as we know, algorithms can be biased as well. Hence, the solution could lie in the collaboration between humans and AI, a sort of teamwork. There are two main decision-making approaches: analytical and intuitive. With the analytical one, information is gathered and analyzed, using rationality and logic; AI and its problem-solving capability are quite useful for this kind of approach as it can manage huge amounts of data and conduct precise calculations. Nevertheless, most of the processes used in decision-making, are not necessarily a consequence of gathering and processing information but are rather guided by intuition (Dane et al. 2012, 190). Intuition is the capability of deciding without the need to use rationality and logic, but rather by trusting one's gut instinct (Sadler-Smith and Shefy 2004, 77). This approach involves the use of sensitivity, imagination, creativity, and intuitive intelligence. AI cannot be extremely helpful with this kind of decision-making, because as we know, these technologies are still not much capable of understanding common-sense and unpredictable situations (Guszcza 2017, 12). Humans can display more capability in this field as they rely on their experience and judgement.

What does the future of Artificial Intelligence look like? It is important to foresee what we are going towards, to understand whether issues that we have nowadays will be resolved in the future. Apart from an always closer collaboration between humans and AI, there will probably be an advancement in NPL (Natural Language Processing), a shift from specific AI to general AI, an improvement in predictive maintenance and the final development of AI-powered Healthcare.

Chapter 3- Artificial Intelligence in the corporate world

Many businesses found a way to incorporate AI in many functions: for example, customer support, sales, operations, marketing, accounting, and Human Resources. There are three main reasons why AI is adopted in the corporate world: workers are spared from routinized and boring actions that can be delegated to AI; AI can analyze data in an unmatched way, which gives the company precious information for future paths; and finally, and as we already mentioned, the Natural Language Processing system makes AI more evolved and communicative.

Oftentimes, the perception that the public has of these new technologies is that of innovations that will sooner or later steal "our jobs". We need to keep in mind that the corporate world is extremely competitive, and businesses need to stay afloat; the use of AI increases the accuracy and quality of output while reducing times and costs. This however does not mean that there is going to be a wave of unemployment, on the contrary, new jobs are being created: workers will need to teach AI programs how to function: for example, chatbots used for customer service need to be trained to understand the nuances of human speech; employees will need to explain the mechanisms to non-experts; and finally a new category of workers will have to make sure every AI system is behaving correctly, and that unwanted consequences are taken care of (Wilson et al. 2017, 15).

Artificial Intelligence is starting to be adopted even in the most human-centric sector: Human Resources Management. In particular, algorithms can be used in the recruiting process: as we know at this point, humans tend to make gut decisions often based on looks, attire and way of speaking of the candidate, which is not always crucial characteristics that guarantee a favourable outcome for the candidate and the firm. In fact, in recent years the use of AI in the recruiting process has developed greatly and it is still expanding due to the complications that occur with the conventional "human" methods: HR is the foundation of a functioning firm, it is the sector that holds the competitive advantage and the growth potential of a business (Hmoud and Laszlo 2019, 23). The main objective of HR is to supply the firm with enough human resources at a limited expense while fulfilling all the requirements. This of course is not an easy task and hiring the wrong person could result in long-term and costly consequences. Therefore, AI can assist humans in dealing with this responsibility. AI can be used in a variety of functions: keeping the conversation going with the applicants through chatbots; doing the screening of resumes; finding a person whose values are compatible with the ones of the firm, through the analysis of social media profiles; conducting interviews; and onboarding the new hires by taking them through all the bureaucratic steps. The advantages of this methodologies are that they save time, find talents, save costs, address most of the employees and candidates questions rapidly, and thanks to the great amount of data, they *should* make quality hires. Some Automated Hiring Systems (Pymetrics, Hirevue, Applied) also claim to be able of conducting an unbiased

selection. These three systems pose three objectives to achieve fairness in job distribution: the first is "anti-classification", which is the removal of group characteristics that risk putting the candidates in different boxes, this is also called debiasing; in the second place, there is "classification parity", namely the passing rates should be quite equal for different categories; and third, "calibration", for which results should not depend on group variables (Sanchez-Monedero et al. 2020, 463).

The main issue that these systems pose, has to do with the data used as reference. As a matter of fact, data is generally drawn from past employees, usually the ones with the best performances, and this can yield bias. Overall, deciding to select people who are very similar to those already hired can result in perpetuating bias and excluding minorities (Sidanius and Crane 1989, 178). For example at Amazon Inc. a model was trained to select by taking into consideration the resumes submitted during the previous ten years. For the technical positions, like software developer, the majority of past applicants were male, therefore, the system "learned" that male applicants were better, and it dismissed all the resumes that presented the word "women's" as in "women's book club president" (Dastin 2019, 296). After the Amazon case, algorithms used for hiring, and Artificial Intelligence in general, were strongly criticized and deemed unreliable for their biased decisions. Algorithms are often used as "scapegoats", while they should be leveraged to locate biases in the organization (Logg 2019, 2). The immense amount of data that the algorithm can access, allows it to unveil toxic patterns that humans have issues identifying, therefore when this kind of technology finds bias, the company should take the opportunity and learn how to get rid of it, and most importantly how to prevent it from existing in the first place. The usual decision, following a "biased algorithm", is to eliminate it and go back to the flawed human judgement (as Amazon did); however, people can be inconsistent, and their decision process is rarely rational. In fact, a manager will tell you that one of the most crucial characteristics in a new hire is being a "team player", which is not an objective characteristic, and it is also not easily measurable. Therefore, algorithms should be used as magnifying glasses of an organization (Logg 2019, 4).

Chapter 4- A qualitative comparative case study: Reverse and Unilever

As humans, it is almost impossible to not be biased, and that is why recruiters have such a huge responsibility on their hands, maybe certain tools can help us: we live in a digitalized era, where Artificial Intelligence is growing every day, assisting humans in their daily tasks. Can Artificial Intelligence assist in limiting the unconscious socio-cognitive bias of human evaluators? This question stems from the widespread belief that Artificial Intelligence is free from some of the most common human flaws, like tiredness, distraction, mood swings and why not, even the famous gut feelings. Perhaps, conducting the selection with an AI tool can make the process more impartial and

fairer. That again is not necessarily true; we learned that AI systems do have limitations and at times they can be the first perpetrators of bias (i.e. the Amazon case). The two companies that I chose (Unilever and Reverse) to answer this research question are quite different ones, in terms of dimensions, industry, and scope, but they shared peculiar ways of doing selection: In Unilever's case, the candidates go through a video-interview process that is administered through one of the Automated Hiring Systems mentioned in the third chapter, although I am not at liberty to say which one; while in Reverse, the selection process is supported by an external figure, a scout, that has the role of checking merely the technical competences of the candidate, prioritizing them against the less crucial characteristics. Moreover, in Reverse an Artificial Intelligence tool is used to simplify the work and allow the recruiters to focus completely on the selection process.

The method that I chose to conduct this research was through interviews, specifically semi-structured ones. Hence, I had a topic guide, that I used to orient myself during the interviews, but I was also free to add or remove questions where needed or ask for clarifications. This gave me the chance to gather more in-depth information when necessary. Open-ended questions were also useful to gather qualitative data. The topic guide was slightly different for the two companies, to adapt it to the distinct sectors and jobs, but the sensitizing concepts were the same. They were: Influence of the professional and educational path; Personal knowledge of the concept of bias; Impressions regarding the use of Artificial Intelligence; Can Artificial Intelligence diminish bias?; Future of Artificial Intelligence.

The main limitation of the research was not realizing in advance how modest of a role AI still has in these companies, but again I did not have much choice as, at least in the Italian territory, I could not find other organizations that put AI at the centre of their recruiting process. Perhaps, I will continue this research in the future when these methodologies will be more developed.

For what regards the data collection I would say that the respondents seemed all quite honest and sincere. The Reverse ones in particular were able to give specific examples of times when they had a bias or felt they could have a bias, namely, they were extremely aware of their weaknesses and did not hold back from sharing them. In the Unilever case, 2 out of 3 respondents claimed to not be biased at all, and one of them declared that it is possible to get completely rid of the bias. Of course, it is perfectly believable that they did not give specific examples of times when they thought they were biased because indeed they never were. The last small limitation that I encountered was the fact that Unilever preferred that I did not record the interviews, hence I had to transcribe every word they said in real-time. Overall, I am satisfied with the transcripts that I obtained but I might have missed some nuances.

For the data analysis I transcribed all the interviews and proceeded to the coding process. The coding was done using the NVivo system. For Reverse, I was extremely detailed trying to code almost every

sentence, unless completely irrelevant. I ended up with 384 open codes. The clustering part to get the axial codes was not complicated as the interviews were all quite coherent with one another, hence I immediately recognized some common topics. The first round of axial coding presented 15 codes. These axial codes dealt with three main spheres: what it means to be working at Reverse, the opinions regarding the use of AI in recruiting, and how one can attempt to limit the bias. I was then able to further cluster these codes into 9 bigger spheres. Finally, finding the selective codes was quite easy, since, as I already mentioned, three main topics were noticeable since the start of the analysis. So my final three selective codes are Company's values and purpose; Feelings on the use of AI in recruiting; Ways to avoid bias. A graph with these results will be available in the findings section.
For what regards Unilever, the process was the same. The open coding phase resulted in 286 open Even in this case, the topics that emerged were quite similar to the ones of the other company, namely, discussions on bias and AI; but this time, the opinions were slightly different, and there was one specific topic that was highly present in all the interviews: the importance of the human touch. Even in this case, there was much talk on how to limit bias, although, as I already mentioned, in Unilever's case the suggestions did not all come from an admission of their weaknesses but rather from a description of the ways they manage to not be biased. After the first round of axial coding, I clustered the 286 open codes into 14 axial codes, and then I managed to cluster them again reaching 7 axial codes. Said axial codes were in turn clustered into 2 selective codes: Cruciality of human touch and ways to get rid of bias.
To consider all the ethical aspects that result from taking part in a study of this kind was extremely important to me. Therefore, I made sure from the very beginning that all the participants were extensively informed on the scope and topic of the study. This was also formalized by a consent form that I sent to the two organizations to be signed by each participant. This informed consent declared that participants should be aware of the fact that participation in the project is completely voluntary, and they will not be receiving any kind of direct benefit from it. It was also stated that they could withdraw within a certain amount of time and always refuse to answer any question. It was also made clear that the data obtained would be in my possession for a limited time, for research purposes. To ensure impartiality on my part, as a researcher, I tried to formulate questions as neutrally as possible to not push the respondent toward one or another answer. Moreover, a priority for me was to safeguard the anonymity of the participants. Therefore I tried to eliminate any kind of information that could identify the participants because in this way they felt more confident in answering freely.

One thing all respondents had in common was a strong connection to the vision and purpose of their respective companies. In the Reverse case, the interviewees stressed the importance for them of

having a combination of human and digital, a model of collaborative recruitment and a young and positive environment. In the Unilever case, the purpose factor had a strong influence on the participants, especially the inclusion and the internationality. The importance of the vision is particularly kept in mind during the selection process, in fact, one of the most important aspects to rely on according to one of the Unilever interviewees is *"the connection the person has to the values of the company ".* An interesting part of the selection process is when the so-called "soft skills" come into the picture. During all six interviews this dualism between hard and soft skills was mentioned, although, there is not much consensus on which should have the priority: at Reverse, it seems that the technical competencies are the main concern, the starting point when choosing someone; however for specific positions that require certain attitudes, soft skills cannot be ignored. The Unilever respondents were less congruent one with the other: the second respondent was a strong supporter of hard skills, they said: *"I always start from the hard skills that we define";* On the other hand, the first interviewee believed that technical competencies are not necessarily the most important thing. One crucial aspect is having the "Standards of Leadership" which are soft skills that, according to Unilever, the leaders of the future should have. So, in a nutshell, we can confidently say that the decision-making process is not an exact science and that where some put in the first place the attitudes and behaviours of the candidates, some prioritize the technical competencies. Perhaps these two factors go hand in hand more often than we would expect.

At this point let us proceed to the first topic of interest of this research: Artificial Intelligence, and its adoption in the recruiting process. Neither of the two companies does extensive use of these types of technology, but I was still able to gather quite a lot of opinions on this subject. In the Reverse case, the positive factors of using AI in recruiting surpassed the limitations and were much more than those found by Unilever, which instead stressed repeatedly the supremacy of the human touch. The opinions of the Reverse's respondents regarding the use of AI can be summarized in the following way: AI can be a helpful hand when you need profiles that are of the same kind (i.e. graduate in economics with 5+ years experience), in this occurrence, the screening works and saves a lot of time. Moreover, if you need to screen a big amount of resumes it can be faster and more useful to have it done by AI. Finally, it can help avoid bias, as it does not get tired or distracted, and it can spare the human wasteful and repetitive actions. Nevertheless, if your requirements are not set in stone, and you are more flexible, as they are in Reverse, AI can make you lose opportunities. For the Unilever's respondents, the human touch is imperative. The artificial intelligence that they use is an Automated Hiring System that is employed to do video interviews, which are then watched and evaluated by the recruiters. So, the AI does not suggest any kind of information, it simply gives the candidate the option of recording the interview whenever they prefer, saving the recruiter the struggle of having to schedule it. The use

that Unilever does of this kind of technology was defined by one of the respondents as *"the prime example of how actually there is the human behind the machine"*, and this is a good way of summarizing this part of the research. In fact, the light motive that was shared by all three interviewees is that technology is a good thing, as long as it works as a support for the human. Leaving AI the power of making decisions on its own could indeed result in a technological bias, moreover, the interface with the human is too important. A light motive of all the interviews with both companies was "ways avoid bias", which was a selective code found after both coding processes. The three axial codes that composed this selective code, were also shared by the two companies. The first one is "acknowledging human weaknesses": these interviewees were all more or less aware of what the bias is and how impacted their careers, both as victims and perpetrators. Reverse's respondents were able to dig deeper into their past and describe times when their decisions were affected by mood; these events happened for the most part at the beginning of their career when they were unable to understand how tiredness and pushing too much can affect your mental clarity. In Unilever's case, there were two thought waves: one, that included 2 out of 3 respondents that admitted the possibility of having bias every now and then, as a perfectly natural human response; and another, that claimed to never be biased. Overall, 5 out of 6 interviewees recognized being biased, not always, not even sometimes, but rarely and mostly at the beginning of the career. This awareness is a crucial point to then try and get rid of biases. The second axial code was "Practical methods to deal with bias": In the Reverse case, I was surprised to learn that the company organizes training programs that have the objective of recognizing biases to then avoid them. In the more day-to-day activities the recruiters learned, after the faulty judgement at the beginning of their career, that a way of avoiding this was to share more often the profiles with the manager, to have a second opinion; but also to understand their own limits, as, for example doing only a certain number of interviews per day. Another practical method that is common to both companies is linked to the possibility of having been a victim of someone else's bias: an interviewee of Unilever that was not born in Italy shared *"Just because of my name, very often I was not called back even though I had the degree, I did several internships, and I also had some experience; so this definitely was a factor that I suffered from in all honesty".* Finally, more practical methods were to not be influenced by the format of the resume, physical aspect of the candidate, trying to be aware and objective, and avoid doing interviews after a terrible day. The third axial code was "Use of AI tools" which also comprised the scout in case of Reverse, even though it is not an AI, but it is indeed a "tool". Reverse has a system called "Hound", that helps with scheduling appointments, keeping track of everything that happens on Linkedin, and overall just removes all those repetitive and "superfluous" tasks that can be easily managed by a system like this, letting the recruiter the time and space to dedicate themselves to the conversation and evaluation with

the candidates. Unilever as we know, uses an Automated Hiring System for video-interviews, only in this case, this software is not directly used to hire. These interviews are then evaluated by the recruiters, not by the AI, hence the function of this software is similar to the one in Reverse, where AI is merely a support to the human, that allows the workers to stay focused on the most crucial tasks. Moreover, Unilever has a gender bias detector tool that is used for their job postings, to check whether the language used could be more inclusive. According to all three Unilever respondents, their AI tool (the video interview) helps diminish bias, one also pointed out how these resources help with the inclusivity and accessibility. In the Reverse case, the AI tool has an indirect effect on the bias, according to the interviewees, as it allows them to have efficient communication with candidates (i.e. automated feedback), and organized scheduling, which results in them being fresher and more concentrated for the actual selection. However, what truly seems to help Reverse have a fair and objective recruiting process is the Scout. The scout is an external figure that has the responsibility of evaluating only the technical capabilities of the candidate. The scout is an agreed-upon solution to deal with bias: in fact, the objectivity of the scout forces you to think twice before selecting someone based on a good or bad first impression.

Conclusion

This research had the aim of confronting professionals of the HR sector to investigate if and how socio-cognitive bias impacts their everyday work-related actions. In particular, what I wanted to examine was how these recruiters deal with having an unconscious bias, what methods they use to stay as objective as possible and finally, whether the assistance of external tools, i.e. Artificial Intelligence, can make a difference in the prevention of these behaviours. Three main things emerged from this study: how recruiters decide who to hire and who to pass on, is not an exact science. This job is a hard one exactly because there are several aspects to consider simultaneously and oftentimes, they all have the same importance. Therefore, one can decide to trust their gut and prioritize the communicative skills, while another can rely on the objectiveness of the competencies; AI tools can help, but not that much. The role that Artificial Intelligence should have in recruiting, according to all the participants of this study, is a marginal one. AI should absolutely not reach the level of undertaking the whole selection process; it can be used to simplify the work of the human, but always in a supervised way; the human is always preferable. In a world that is progressing and evolving every day, technology is still not the answer to all of our problems, as one of the respondents said: “the human touch is imperative”. Because humans give second chances: where an AI would discard a resume due to lack of competence, or even for a formatting mistake, a person looks beyond that, as it would see another person. Therefore, according to our interviewees, the development of these new

forms of technology is a good thing to welcome with open arms, but without replacing the human touch.

Finally, it is impossible to get completely rid of the bias, but the starting point is to realize the kind of responsibility that a recruiter has, and why every decision that affects the life of another, needs to be made with extreme mental clarity. Awareness is the answer. If I know and recognize what are the conditions that could potentially make me biased, I will be much more luckily to avoid them and to prevent them. Perhaps to make the world a better and fairer place we do not need much Artificial Intelligence, but rather the willpower to confront our flaws and the constant dedication to improve ourselves.

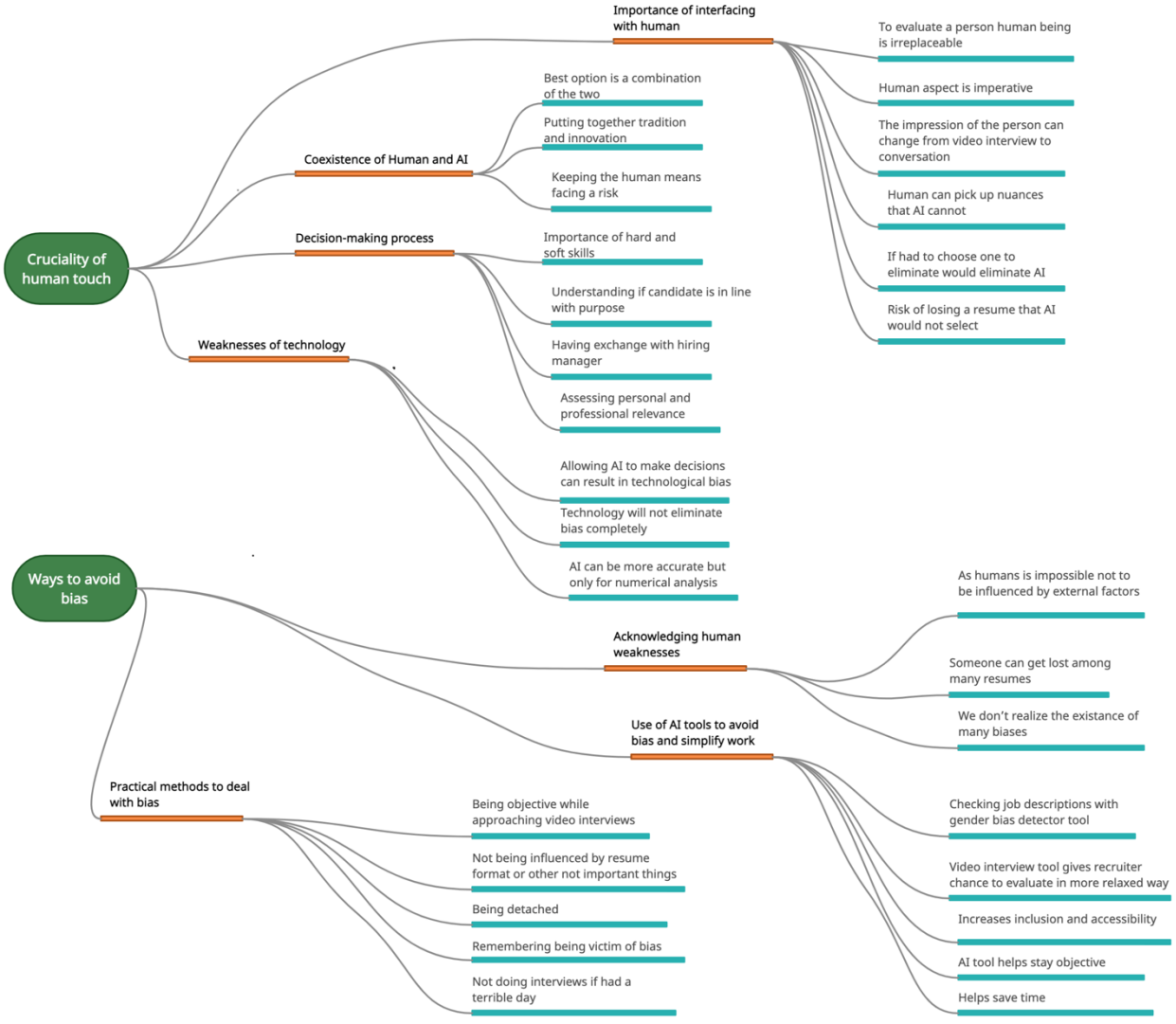

Figure 5: Reverse results map created with the Creately program

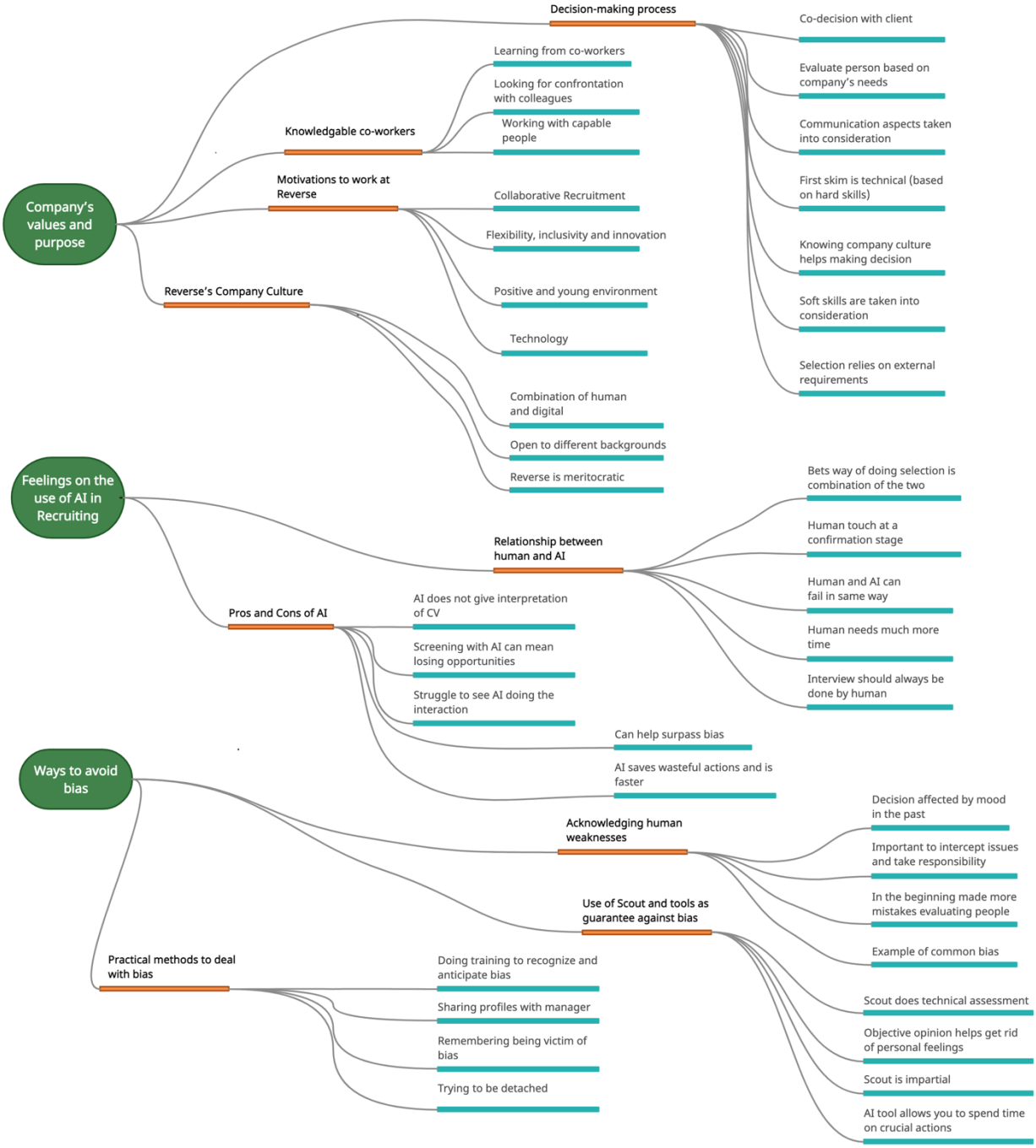

Figure 6: Unilever results map created with the Creately program