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AI-enabled recruiting: What is it and how should a manager use it?

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Abstract AI-enabled recruiting systems have evolved from nice to talk about to necessary to utilize. In this article, we outline the reasons underlying this development. First, as competitive advantages have shifted from tangible to intangible assets, human capital has transitioned from supporting cast to a starring role. Second, as digitalization has redesigned both the business and social landscapes, digital recruiting of human capital has moved from the periphery to center stage. Third, recent and near-future advances in AI-enabled recruiting have improved recruiting efficiency to the point that managers ignore them or procrastinate their utilization at their own peril. In addition to explaining the forces that have pushed AI-enabled recruiting systems from nice to necessary, we outline the key strategic steps managers need to take in order to capture its main benefits.

1. Human capital: From supporting cast to a starring role

"People are our most important asset." This is not just a nice-sounding platitude, it is a competitive imperative born of a seismic shift in where firm value and competitive advantage are found. From the turn of the 20th century until the early 1980s, 70%—90% of firm value was tied to tangible assets such as plant, property, and equipment (Lev, 2000). By 2000, this had flipped. With intangible assets accounting for roughly 65% of the average firm's value (Black, 2019), people went from cogs in the wheel of tangible assets to the engines driving value. For the majority of intangible assets, people either make up their sum and substance, or they are the direct drivers. What would happen if you separated people from intangible assets like customer service, customer insight, or innovation—what would you have left? The answer is not much (Paschen, Pitt, & Kietzmann, 2020).

As a consequence of this shift in the source of value and competitive advantage, recruitment has evolved from an important HR activity to a top strategic concern for CEOs. Over the last several years, CEOs listed attraction, selection, and

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retention of human capital as their top strategic concern (Conference Board, 2018).

2. Digital recruiting: From periphery to center stage

Against the backdrop of the ascending role of human capital, the technological context of how companies recruit people has also changed. Today, companies are at the beginning of what we term Digital Recruiting 3.0. At the heart of this transformation is the use of artificial intelligence (AI) in recruiting activities. Computers can now perform tasks and make decisions that normally require human intelligence. Some key potential advantages include the ability to more effectively identify, attract, screen, assess, interview, and coordinate with job candidates. These advantages come from AI's ability to process information and make decisions at volumes and speeds that far exceed human capacity and the availability of AI-enabled recruiting tools and systems that overcome common cognitive biases that hurt the reliability and validity of human judgment in recruiting activities. In subsections 2.1—2.4., we examine three key stages that brought us to the early days of Digital Recruiting 3.0.

2.1. Analog recruiting

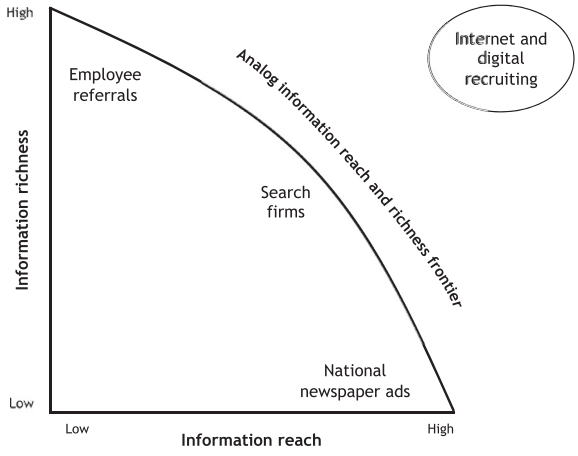
Until the mid-to-late 1990s, recruiting was an analog process in which people were the primary mechanism for recruiting new employees. Often, job candidates had to physically go to job boards in search of opportunities, or read about them in newspapers and other print media. Once they found a job they were interested in, they typically had to physically go to the company offering the job, get a paper job application, and manually fill it out and turn it in. The analog nature of the process made it tiresome. Firms wanted to reach as many qualified candidates as possible to provide them with both the rich details the job and the context of the opportunity, but maximizing both was prohibitively expensive. As a consequence, firms had to make trade-offs, which created what we refer to as the analog reach and richness frontier (see Figure 1).

For example, if a company wanted to optimize reach, it could advertise its jobs in a national newspaper or some other widely distributed print media, but it had to settle for a few lines of text about the job because it was too expensive to also add information richness. Conversely, a company could achieve high richness via its employees, who could describe the company and open positions in great detail to their friends and family. However, reach was limited to the people in the employees' circle. A company could achieve reasonable richness and reach through search firms, but the cost of doing so was high enough that firms could only afford it for a limited number of position openings. The same general trade-off between information reach and richness was true for prospective employees as well. Simultaneously knowing all the potential jobs out there and knowing a lot about those jobs was prohibitively expensive for prospective employees.

Within the confines of this recruiting frontier, humans were tasked with attracting candidates, filing applications, screening applicants, and determining who should move on to and who should be dropped from subsequent steps in the process. But human recruiters could only read so fast and process so much information. On top of this, they needed periodic rest in order to keep fatigue from degrading their results. In addition, humans are beset with cognitive biases that limited the reliability and validity of their judgments in the screening process (Judge, Cable, & Higgins, 2000), including:

- *Anchoring bias*, in which the information a recruiter sees or hears first unduly shapes or influences how he or she interprets subsequent

Figure 1. Analog information reach and richness frontier



information (Levashina, Hartwell, Morgeson, & Campion, 2014);

- *Confirmatory bias*, in which recruiters seek out and note information that confirms initial judgments—positive or negative—about job candidates (Windschitl, Scherer, Smith, & Rose, 2013); and

- *Similarity bias*, in which recruiters unconsciously favor candidates who are similar to them independent of whether those similarities are good predictors of the candidates' subsequent performance (Sacco, Scheu, Ryan, & Schmitt, 2003).

As a consequence of these and other cognitive biases, multiple studies have shown that an unstructured interview—the most widely used traditional analog selection mechanism—is only about 14% accurate in identifying candidates who subsequently stay with the firm and perform well (Hunter & Schmidt, 1998). Even when these interviews are structured, their validity is only about 30% (Huffcutt, Culbertson, & Weyhrauch, 2013).

2.2. Digital Recruiting 1.0

The digitalization of both job and candidate information via the internet in the mid-to-late 1990s broke through the original reach and richness frontier. Early digital job boards such as Monster.com (established in 1994) could take rich descriptions of jobs and convey them to thousands of prospective employees at minimal cost because it did not need to print or ship newspapers and incur all the attendant costs. Likewise, candidates did not have to scour print ads or spend time hand delivering and mailing hundreds of résumés and job applications. Prospective employees could simply go to a digital job board site and in minutes freely search and filter through thousands of jobs to identify the ones that were the best fit. The internet also enabled companies to reach thousands of prospective employees via corporate websites. They could include as much static information (e.g., words on a page) and dynamic information (e.g., videos) as they desired and felt would be effective.

The network effects were exponential and self-reinforcing. The more jobs that Monster.com could list, the more job seekers it could attract. The more job seekers it could attract, the more jobs it could persuade companies to list. As a consequence, employers began opting out of the analog practice of sending recruiters to select colleges and universities. With digital recruiting, they were able to reach a diverse set of prospective candidates across thousands of campuses.

The leap in value that Digital Recruiting 1.0 brought to both employers and prospective employees was such that for the next decade, new companies and job boards proliferated, providers consolidated, and the overall digital recruiting market soared. Monster.com's revenue increased from $162.6 million in 1996 to $1.1 billion in 2006.

2.3. Digital Recruiting 2.0

Digital Recruiting 2.0 emerged 10 years after the start of Digital Recruiting 1.0, and it was driven largely by two key developments. The first was the ability to aggregate jobs across multiple individual job boards, which led to the emergence of firms such as Indeed. This meant candidates could essentially access all the unique jobs that existed across multiple job boards without having to visit and search within each of them, and companies could reach unique job candidates across all the job platforms without having to list their jobs on each one individually.

The second major development was the advent of digital professional and social network platforms. One of the earliest and most successful professional network platforms is LinkedIn. Launched in 2003, LinkedIn allows people to form professional networks and communities of interest, exchange information, and endorse the people in their networks as well as receive endorsements from people in their networks. One of the earliest and most successful digital social platforms is Facebook, which launched in 2004. Facebook allows individuals to build their social network by 'friending' others and keeping friends updated by posting activities, videos, pictures, etc., and commenting on friends' posts. While on the surface, these digital networks and exchange platforms might not seem to have much bearing on digital recruiting, nothing could be further from the truth (Bizzi, 2018). They provide consolidated digital space where firms can digitally post their job opportunities efficiently. In addition, the platforms provide information that helped companies better target job ads and opportunities to prospective job candidates. As was true for Digital Recruiting 1.0, the network effects were exponential and reinforcing. As a consequence, in just 5 short years, Facebook went from a few thousand users to 608 million by the end of 2010; similarly, over the same period, LinkedIn went from approximately 5 million to nearly 100 million users.

2.4. Digital Recruiting 3.0

As Digital Recruiting 2.0 matured from 2010 to 2015, Digital Recruiting 3.0 transitioned out of conversations at conferences into commercial applications. The principal new element of Digital Recruiting 3.0 was the introduction of AI (Kaplan & Haenlein, 2018). However, before examining in detail the potential advantages and applications of AI to recruiting, as well as various challenges, it is important to highlight two outcomes generated by Digital Recruiting 1.0 and 2.0 that became critical background elements for this new phase.

The first contextual element was the avalanche in applications per position that Digital Recruiting 1.0 and 2.0 generated. They did this primarily through the reduction and near elimination of friction in the process of jobs finding people and people finding jobs (Maurer & Liu, 2007). Although we know of no definitive study of the increase, one estimate found that toward the end of Digital Recruiting 2.0, each online job was generating 250 applications (Sullivan, 2013). Various company cases illustrate this growth, including:

- In 2013, Walmart, the largest private employer on the planet, received on average 23,000 applications for 600 positions when it opened a new store (Lutz, 2013);
- In 2017, Johnson & Johnson generated over 1 million applications for 28,000 positions (McIlvaine, 2018); and
- In 2017, Google generated an estimated 2 million applications for just 14,500 jobs (Torres, 2017), meaning that it was nearly 10 times more difficult to get a job at Google than to get into Harvard University.

Ironically, as digitalization lowered friction costs and the number of candidates per position increased, it also drove the number of unqualified candidates higher. Estimates vary, but toward the end of Digital Recruitment 2.0, between 75%—88% of all job applicants were unqualified for the position for which they applied (Ideal, 2018). The reason for this is straightforward. If it costs a candidate next to nothing in terms of time and money to apply for a job, then why would candidates not apply for more rather than fewer positions and even apply for positions in which they were interested but not truly qualified? With job application costs plunging and the number of applicants per job soaring, firms were forced either to take longer to review all the new applicants or to hire armies of screeners to sift through the avalanche of digital applications.

The second contextual element underlying Digital Recruiting 3.0 was the widespread acceptance of the criticality of human capital by top executives, including CEOs. Although the shift in the source of firm value and competitive advantage had largely occurred by 2000, it took CEOs a decade or more before they generally acknowledged the shift and recognized the role of human capital in driving intangible assets and firm value (Conference Board, 2018). When people were just cogs in the wheel, selecting the best cogs made a marginal difference, but once people became the engines, effective recruiting became mission-critical. Research also began to demonstrate the difference that quality talent could make when intangible assets were the primary source of firm value (Paschen, Wilson, & Ferreira, in press). A study of 600,000 researchers, entertainers, politicians, and athletes found that the very best of them were more than 400% more productive than the average among them (Herman & O'Boyle, 2012). In another study, McKinsey found that for complex jobs, the impact on performance was an astonishing 800% higher for top performers compared to the average performer (Keller & Meaney, 2017). This performance gap proved that finding the right needles in an avalanche of hay was critical, and CEOs—not just HR executives—wanted to identify, develop, and deploy every possible technical and technological advantage in the recruiting race for talent (Desouza, Dawson, & Chenok, 2020).

3. AI-enabled recruiting: From nice to necessary

This background and context turned AI-enabled recruiting from nice-to-have to necessary-to-employ. AI-enabled recruiting tools have primarily been employed across four general sets of activities: outreach, screening, assessment, and coordination. In the outreach stage, firms try to identify candidates and get job opportunities in front of them in ways that will prompt them to apply. Applying for a position might involve filling in a digital application or electronically transmitting a résumé. Once candidates submit these applications, the employer has the daunting task of screening them. As mentioned, many companies now receive between 20—200 applications for every opening, and screening them efficiently is no small task. For those candidates who pass the initial screening, employers need to assess and evaluate candidates to determine which are most appropriate for the job. This

stage may involve more than one round or means of assessment, but the ultimate objective is to identify the best candidates who will then receive job offers. AI can be used to coordinate with candidates all along the process. Based on a recent survey (Deloitte, 2018), only about 38% of firms use AI-enabled recruiting tools across these core recruiting activities.

3.1. Outreach

Given the importance of finding the right people, companies need to be as broad as possible but also as targeted as possible in their outreach efforts. Clearly, firms want to reach all of the right *active candidates* as possible (i.e., people who are deliberately taking actions to find a job). However, the majority of people are not actively looking for a job and are therefore *passive candidates*. Eighty percent of people not actively looking for a different job would nonetheless consider an appropriate job opportunity if it were presented to them (Smith & Kidder, 2010); the number of passive candidates is roughly three times larger than active candidates.

Intelligently identifying both active and passive job candidates is critical for companies to create the best possible candidate pool (Guinan, Parise, & Rollag, 2014). Companies such as Pandologic, Talenya, and HireScore use AI to scrape data from LinkedIn, Facebook, Instagram, Pinterest, Twitter, XING, Ryze, Beyond, and MeetUp and then match candidates to the job (Campbell, Sands, Ferraro, Tsao, & Mavrommatis, 2020). Over time, the AI tools learn what methods work best with each type of candidate. More precisely, the AI connects the right presentation methods (e.g., banner ads, email, text) with the best candidates. The system learns and places job opportunities via banners, popups, email, texts, etc. for the optimal uptake and response by candidate profile.

This learning can be applied not just to the delivery form of the job opportunity but also the exact wording and description of the job. For example, Textio can use AI to adjust the wording in ads and track the effect of those changes on the number of applicants and various demographic dimensions of applicants, helping clients to improve outreach impact. Johnson & Johnson used Textio to adjust its job description opportunity language and increased female qualified hires by 13% (McIlvaine, 2018). L'Oréal was able to use AI to remove previous gender bias wording with a resulting even split between male and female candidates, which the organization had never achieved before (Sharma, 2018).

The ideal candidate pool for companies consists of both active job and passive job candidates. However, today it is not just the breadth or size of the pool that has expanded, but the depth of information about candidates in the pool has deepened to almost unfathomable levels. In 2018, LinkedIn had nearly 600 million users, and each one had literally hundreds of unique data points in their profiles. Thee discrete data points for each profile yields volumes of data that are nearly incomprehensible. Sifting through that many profiles and that much data intelligently and efficiently without AI would be impossible, even if a firm hired an army of humans to do the work.

AI can not only help firms increase the total number of applicants, but it can also target more appropriate candidates. For example, Unilever partnered with AI hiring provider Pymetric to target candidates for its 200 key internships (Feloni, 2017). This effort more than doubled applications from 15,000 to 30,000, or 150 applicants per position, and also dramatically increased the diversity of the candidate pool. Specifically, Unilever noted that it was able to broaden the base of applicants from 840 universities to 2,600 universities. Even more dramatic, in 2017 L'Oréal used AI to not only present its opportunities to active candidates but to identify passive candidates as well. As a consequence, it received 2 million résumés for only 5,000 positions, a stunning 400 applicants per job (Sharma, 2018).

These examples illustrate how AI helped push back the reach-richness frontier even further than Digital 1.0 and Digital 2.0 achieved. Using AI, the reach portion of the frontier has been pushed back because firms can now reach not only thousands of active candidates for a given position, but it can also identify more passive candidates who are likely even better matches for an opening. AI also has the potential to push the richness frontier back just as far, but this opportunity has not yet been fully explored or developed. Specifically, just as AI has been used to determine which aspects of a candidate make them more or less of a fit for the position, AI has the potential to determine which aspects of the company—its culture, results, leadership, technology, etc.—should be presented to candidates in order to generate the most positive responses.

As important as it is for companies to generate these pools of candidates, most already have pools of past candidates that typically lie dormant and unleveraged: past rejected candidates (Kakatkar, Bilgram, & Füller, 2020). While it may not be obvious that these rejected candidates should be examined for current positions, the fact that past

candidates were not a match for a previous jobs does not mean that they are not a match for a current opening. However, because these applicants and applications often sit in different formats and in different places (i.e., in on-premises servers, in third-party digital storage, in the cloud), it is too costly to manually examine this pool. AI tools have the ability to screen these candidates regardless of the format of the application. As a consequence, companies such as Engage Talent use AI-enabled tools to examine past applicants and match them to current open positions.

3.2. Screening

It does little good to reach more active candidates, identify and attract more passive candidates, and reactivate past candidates if firms cannot effectively screen them. The evidence that AI-enabled screening tools save time is somewhat anecdotal but worth noting. For example, Ideal provides AI-enabled screening tools and claims that across its clients, time-to-hire has dropped from an average of 24 to 9 days—a 62.5% decline. While more research and study are needed to establish the impact of AI on time-to-hire, specific company case studies suggest that AI can help achieve significant reductions in lead time. Hilton Hotels & Resorts implemented an AI-enabled screening tool and saw its time-to-hire drop from 42 days to just 5—an 88% decline (McLaren, 2018). L'Oréal used AI-enabled screening tools and the time to review a résumé dropped from 40 minutes to 4 minutes—a reduction of 90% (Sharma, 2018).

The strategic human capital implications of reductions in time-to-hire are potentially game-changing for some firms. Take the case of Hilton referenced above. According to the U.S. Bureau of Labor Statistics, the annual turnover rate for hotels is over 70% (Bureau of Labor Statistics, n.d.). Thus, hotel companies such as Hilton are constantly trying to find and hire staff. If Hilton can make an offer to a housekeeping job candidate in 5 days and its competitor takes 42 days, will Hilton or its competitor likely win the battle for that housekeeping candidate? What are the odds that candidate would wait 37 days after receiving an offer from Hilton to see if he/she will also receive an offer from the competitor? Clearly, the odds are near zero. Thus, AI's ability to reduce time-to-hire represents not just an efficiency gain but also potentially a strategic advantage in the battle for human capital, especially in industries in which there is high turnover.

In addition to the recruiting speed and efficiency gains that are possible with AI, there are also potentially impressive effectiveness gains as well. For example, recent research found that AI-enabled tools were at least 25% superior to humans in screening applicants even when humans took a reasonable amount of time to evaluate an application or résumé (Kuncel, Klieger, & Ones, 2014). Today, AI-enabled screening has moved beyond just looking for keywords in applications and résumés to inferring capabilities not stated in specific words. For example, persistence might be a characteristic required in a particular job. Today, instead of just scanning for that term or common synonyms, AI-enabled screening tools can infer persistence from natural language sentences that describe not quitting when facing an obstacle or overcoming resistance when implementing a new process.

3.3. Assessing

Once companies have screened candidates and have eliminated 50%—80% of them, AI-enabled assessments can help narrow the field even further. These assessments can come in a variety of forms. Some involve the gamification of tests that provide insight into skills, capability, and even personality. For example, Unilever used Pymetric to create 12 neuroscience-based games that candidates complete in just 20 minutes (Feloni, 2017). One of the games measured risk-taking. Candidates had 3 minutes to collect as much money as they could by clicking 'pump' to inflate a digital balloon with air and money. Each click added 5 cents. At any point, the candidate could choose to collect money to add the amount to his or her total and start with a new balloon. However, if the candidate waited too long and the balloon popped, the candidate collected no money from that balloon. Candidates could collect money about as fast by clicking early and frequently or waiting—as long as they didn't wait too long. The point of the game was not really about the amount of money collected but identifying the individual's risk propensity.

Obviously, before implementing this assessment game in the recruiting process, Unilever needed to understand the relationship between risk propensity and job success for certain positions (e.g., product managers). In fact, Unilever found an inverted-U relationship between risk propensity and job performance. Specifically, moderate to moderately high levels of risk propensity were positively related to job performance, while low

and very high levels had negative relationships with job performance.

The top 33% of candidates who completed the 12 game assessments were subsequently asked to also participate in a video-recorded interview with AI-enabled technology and analytics provided by HireVue. During the interview, the AI system asked candidates various questions and candidates submitted their recorded responses. The questions were based on an analysis of successful and average employees in those internship positions in the past. Based on this research, Unilever determined what capabilities and characteristics were most likely to lead to success and which questions HireVue's AI system would ask. The system analyzed not only the content of candidates' responses but their word choice, tone of voice, and microfacial movements and correlated them to those of Unilever's successful employees. Candidates were able to participate in the virtual interview on any day or at any time convenient to them within a several-day window. This not only saved countless hours in scheduling but also gave candidates more control over the experience. Unilever wanted this increased sense of control because it understood what research has consistently shown—people have more positive attitudes toward experiences in which they feel they have more control over the process (Hamilton & Davison, 2018). These AI-enabled interviews and evaluations narrowed the original pool of over 45,000 candidates for internships in the United States to 300 finalists. Unilever made offers to 240 finalists. This was approximately a 25% higher offer rate than in the past. Of these, 82% accepted the offers—a yield rate that was significantly higher than the previous rate of 65% (Feloni, 2017).

L'Oréal used a similar AI-enabled interview tool from Mya Systems to assess candidates who passed initial screening and verification (less than 10%). Maya, an AI chatbot, interactively asked candidates three questions (Sharma, 2018):

1. Tell us about a project that you worked on which failed. What did you learn from that project?

2. Tell us about a project where you were working with the multi-cultural teams and what experience did you have?

3. Tell us about a situation where you were convinced about your idea, but your seniors were not. How did you convince them?

The AI system subsequently analyzed and compared the content of candidates' answers with the answers given by high-performing L'Oréal employees. It also analyzed the sentence structure and vocabulary used in the answers and, in combination with the content analysis, created an overall score for each candidate. Only then did the team of 145 global recruiters interview candidates and make final selection decisions.

3.4. Facilitating across stages

Given the high volume of applications that AI-enabled outreach can generate, most companies are in the rejecting business rather than the hiring business. Nonetheless, it is in their own self-interest to ensure that the experience is a positive one for all candidates, especially those rejected, for at least three reasons. First, rejected candidates today may be good-fit candidates tomorrow. Candidates who were once rejected by a company are more likely to be open to a subsequent opportunity if they had a positive experience when they were rejected (Swider, Zimmerman, & Barrick, 2015). Second, the positive or negative experience of rejected candidates informs the positive or negative word-of-mouth comments to friends and family. This makes an important difference when rejected candidates can constitute as much as 99% of the total candidates. In today's connected, social-media infused world, positive or negative comments can ripple through family, friends, and followers with a breadth and speed not seen or perhaps even imagined in the past, and those positive and negative ripples can, in turn, drive up or down the sentiments of individuals who might be the company's future job candidates (Van Esch & Mente, 2018). Therefore, structuring a positive experience so that rejected candidates still provide positive word-of-mouth is simply smart business. Third, at the end of the day, companies not only want to select the best candidates, they also want and need those selected candidates to say yes to an offer. After all, companies can only employ those who say yes to an offer. Therefore, companies need the candidates they want to want them. The more positive the candidate's recruiting experience, the higher the likelihood the candidate will say yes to the offer at the end (Jarrahi, 2018).

Before diving into the ways in which AI can enhance an applicant's recruiting experience—even for those who get rejected—it is helpful to paint a

picture of the less-than-ideal current state of affairs for candidates. First, according to one study (Talent Board, 2017), 41.3% of companies do not survey or gather data from job candidates about their experiences. This is unfortunate because 77% of candidates who had a positive experience and 61% who had a negative experience share their experiences with friends and family. Obviously, if a company does not know how good or bad its candidates' experiences are, it cannot deliberately leverage the positive or change the negative. This matters because the same Talent Board (2017) survey found that 81% of rejected candidates who had a strongly positive experience were still willing to recommend or refer people they knew to the company. More responses from the survey (Talent Board, 2017) include:

- Of those who had a very negative experience, 84% would definitely not or likely not recommend the company to others;
- Of those who had a positive experience, 51% posted comments about their positive experience on one or more of their social or professional media accounts;
- Of those who had a negative experience, 31% put comments about their negative experience on one or more of their social or professional media accounts; and
- One of the strongest causes of a negative experience was simply receiving little information during the process—52% of candidates fell into this camp.

The positive or negative ripple effects from rejected candidates via their social media accounts can reverberate with impact unseen in the analog days of the past (Van Esch, Overton, & Van Esch, 2014).

Fortunately, AI-enabled systems can make the job application experience a smooth and positive one, even for the vast majority of candidates who are rejected by companies. As evidence, 92% of the nearly 2 million candidates L'Oréal rejected indicated that they were satisfied to very satisfied with the process (Sharma, 2018). Part of the key for L'Oréal's success was thinking of candidates as customers and trying to make the digital experience as seamless and positive for candidates as it had done for its online customers. Creating a positive experience can start when candidates apply for the job. In Digital Recruiting 2.0, applicant tracking systems (ATS) required candidates to put their résumés in a format that the structured systems predefined in order to facilitate storage, search, and retrieval. Digital Recruiting 3.0 AI systems do not require this step. In fact, AI systems now do not even require candidates to fill out an application or submit a résumé. For example, Unilever only asked applicants to submit their LinkedIn profile and the AI system intelligently combed through the candidates' profiles and filled in the application for them.

Once candidates submit their applications, AI-enabled chatbots can take over to smooth and improve the process in three ways. First, chatbots can proactively let applicants know where they are in the system and elucidate the next steps. At any point in the process, AI chatbots can answer candidates' questions about the process, such as: "Should I wear a suit for the HireVue video interview?" Second, AI chatbots can ask candidates questions in order to fill in any missing or unclear bits of information, including the candidate's potential start date. Third, chatbots can answer candidates' questions about the company or the job that candidates might have, such as salary range or education reimbursement benefits, on a 24/7/365 basis. Thus, AI has the ability to enhance the efficiency of the coordination of candidates across the core recruiting activities.

4. Recommendations for managers

The early academic research, practitioner surveys, and company experiences have all indicated that Digital Recruiting 3.0 via AI-enabled systems is providing significant improvements in recruiting efficiency. However, we would argue that given the volume of applications triggered by Digital Recruiting 1.0 and 2.0 and the fact that that genie cannot be put back in the bottle, the continued growth of Digital Recruiting 3.0 is inevitable, but not without challenges or potential concerns (Kietzmann & Pitt, 2020).

One of the challenges of AI-enabled recruiting is simply the cost of creating the tools and systems. The complexity involved in creating AI-enabled outreach, screening, assessment, and coordination tools is significant. Unless a company has a large number of hires each year and can amortize the cost of developing and deploying those tools, it may make economic sense to buy tools from external providers. In addition, even if a company could justify the development of the AI recruiting tools, the limited supply of talent who could undertake this challenge and the exploding demand for these people may make internal development simply impractical.

Another challenge is privacy. If laws are passed or if people in general start to significantly restrict data in their social media or professional network profiles, this could significantly hinder the effectiveness of AI-enabled outreach tools. As another example, if laws are passed that do not allow firms to keep information on past candidates, AI tools specifically built to mine this particular pool of candidates would have limited value (Canhoto & Clear, 2020).

The possibility that HR employees will see AI-enabled recruiting tools as a threat to their jobs is another challenge and, as a consequence, will stymy or even sabotage the implementation of such tools. Whether recruiters in HR see AI as a threat or opportunity will likely depend on which tasks AI is applied to first and whether it is applied as a complement or substitute. For example, if AI is applied as a substitute for on-campus recruiting, there is likely a good number of HR recruiters who would view AI as a threat. However, if AI is used to generate candidates as a complement to those reached by on-campus recruiters, recruiters may not view AI as a threat at all. If AI is used heavily in tasks that recruiters find routine and often fatiguing—such as screening 8,000 resumes per day in the case of IBM—AI could be viewed by HR staff as a welcome relief from lesser-valued tasks and as a means of opening up time to engage in higher-value tasks, such as workforce planning or candidate interviews.

Despite these challenges and concerns, the need for AI and the potential of AI in recruiting are significant enough that practicing managers are looking for guidance on how to best work with and deploy AI-enabled recruiting tools. To this end, we present five strategic-level recommendations.

4.1. Identify the critical positions

For the majority of companies today, AI-enabled recruiting systems are new and unfamiliar. Trying to implement them from the very start across all categories and levels of employees may be taking on too much too quickly. Consequently, companies should exercise some caution given the vast research that has found that 60%—80% of large organizational change initiatives, in general, and digital transformations, in particular, fail (Black, 2014). Therefore, companies might do well to identify important categories of talent, as Unilever did relative to interns, and apply AI-enabled tools to those limited groups of job candidates. The good news is that, even though they are not free, AI-tools are much more efficient on a per-candidate basis than humans. Companies can cost-effectively apply AI recruiting tools to candidate pools that will result in 200 or 5,000 hires.

4.2. Take care to corral

By its nature, an AI system does not automatically know what a bias is or is not, and cannot determine if it is learning one. This is important, especially when companies design AI tools to look at existing high performers in order to determine key capabilities and characteristics of future employees (Neubert & Montañez, 2020). If there has been gender, age, race, education, or other biases in the past and if those emerge in the current high performers in the company who serve as benchmarks, the algorithms will simply learn those patterns and perpetuate the biases (Lee & Shin, 2020). Amazon learned this the hard way (Dastin, 2018) when it hired 77,000 net new people in 2014 (meaning that the total number of hires was much higher due to turnover) and they projected hiring of an additional 110,000 net new employees in 2015. As a consequence, Amazon had a high incentive to develop an AI tool that would help this task be more efficient and effective. The tool looked back over the previous 10 years to determine the capabilities and characteristics of individuals who were high performers at Amazon. The majority of these benchmark individuals were men. Thus, soon the tool learned to penalize résumés that had female designations such as 'women's basketball team captain' and to discount applicants who came from two different women's colleges. By 2015, key executives were frustrated enough with these results that they scrapped the project. However, Amazon may have thrown the baby out with the bathwater because it is possible to code algorithms to be neutral on dimensions such as gender, ethnicity, race, and religion. The key point is that if there are biases that may have unwittingly been at work in the past, it is necessary to deliberately neutralize them and to corral the AI system and not allow it freely learn. Moreover, companies need to place an emphasis not on old patterns but on new inputs to ensure AI tools are aligned with the organization's human capital strategy going forward (Weinstein, 2012).

4.3. Build an integrated system

Because AI-enabled recruiting is new enough and challenging enough, firms providing services have to some extent focused on particular activities within the overall recruiting process, such as HireVue's focus on interviews. However, the risk is that

companies will look for the shiniest AI objects out there and assemble an array of tools in which the whole is less than the sum of the parts, especially from the perspective and experience of candidates. It may be some time before there are end-to-end solutions that are not just efficient and effective but are seamless and enjoyable for candidates. Even though most companies by volume of activity are in the rejection rather than the hiring business, the consequences of the candidate's experience are wide-ranging and potentially long-lasting. The more companies take a candidate-as-customer perspective and build convenient and integrated experience, the more candidates are willing to both use and promote AI recruiting technology (Baum, 2017; Brahmana & Brahmana, 2013).

4.4. Be transparent and upfront

Our research suggests that AI-enabled recruiting systems are less biased and more objective than humans (Van Esch, Black, & Ferolie, 2019). In addition, the majority of candidates are motivated to engage with AI-enabled systems because they perceive them as novel, empowering, and convenient. Using and acknowledging the use of AI in recruiting results in candidates perceiving a company's brand as being cutting-edge (McIlvaine, 2018; Miles & McCamey, 2018). All of these factors lead not only to more positive perceptions of AI-enabled recruiting systems, but also to a higher likelihood that candidates complete the application process (Van Esch et al., 2019). This same principle of transparency applies to chatbots. The majority of applicants feel comfortable with chatbots. In a recent survey by Montage (2018), 82% of respondents indicated that it was important for the hiring organization to inform candidates that they were interacting with a chatbot and not a real person even though the language fluency of chatbots is reaching such a level that candidates might not detect the difference.

4.5. Be human

At the end of the day, even individuals hired to work on AI technology will spend most of their time working with other humans and not with AI chatbots. As a consequence, despite all the recruiting tasks that AI can facilitate, it cannot be the be-all and end-all of recruiting. Whatever the contribution of AI in reaching, screening, scheduling, interviewing, and evaluating candidates might be, what matters most when candidates decide to take the job or not is what they think of the environment and culture of the company that will employ them and the people they will work with (Kristof, 1996). As a consequence, companies have to keep in mind that as much as they are selecting employees, employees are selecting them. Companies can implement all the best procedures and use AI to enhance recruiting, but it will only matter if the candidates to whom the company ultimately makes offers to say yes. Thus, final interviews are not now and should never be handed over to AI-enabled tools—not because AI systems could not make effective final evaluations, but because candidates could not effectively evaluate the company without interacting with the humans in the company. This is why humans need to conduct final interviews with candidates. Candidates do not need an opportunity to determine if they like and want to spend more time with chatbots, but if they like to chat and work with real people in the organization. They want and need a chance to determine if they like the company culture in which they will be working and the people with whom they will be working.

5. Casting a wider net

The new primary source of competitive advantage and firm value—human capital—and the greater volume in candidates per job seem here to stay. As a consequence, Digital Recruiting 3.0 and the role of AI in recruiting are likely to only grow. Firms and executives that do not quickly embrace AI-enabled recruiting may find that the 60%—80% of their employees whom they considered engaged based on internal surveys are nonetheless vulnerable to targeted, proactive, and customized outreach efforts by their rivals. They may find that if they do not quickly fully embrace and create solid and integrated AI-enabled systems, they will see either the quality of their pool of candidates suffer or their yields decline, or both, as their competitors outdo them in the continuing Digital Recruiting 3.0 battles for talent. Conversely, if firms and their executives embrace AI-enabled recruiting systems, they have the potential to attract ever broader, more diverse, and higher quality pools of talents. They can take the time and money saved to ensure that the company and its culture are ever more attractive so that the people who executives want also want them.

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