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ECSCW CONTRIBUTION

The March of Chatbots into Recruitment: Recruiters' Experiences, Expectations, and Design Opportunities

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Abstract. Organizations' hiring processes are increasingly shaped by various digital tools and e-recruitment systems. However, there is little understanding of the recruiters' needs for and expectations towards new systems. This paper investigates recruitment chatbots as an emergent form of e-recruitment, offering a low-threshold channel for recruiter-applicant interaction. The rapid spread of chatbots and the casual nature of their user interfaces raise questions about the perceived benefits, risks, and suitable roles in this sensitive application area. To this end, we conducted 13 semi-structured interviews, including 11 interviews with people who are utilizing recruitment chatbots and two people from companies that are developing recruitment chatbots. The findings provide a qualitative account of their expectations and motivations, early experiences, and perceived opportunities regarding the current and future use of chatbots in recruitment. While chatbots answer the need for attracting new candidates, they have also introduced new challenges and work tasks for the recruiters. The paper offers considerations that can help to redesign recruitment bots from the recruiter's viewpoint.

Keywords: Recruitment bot, Chatbot, Talent acquisition, Recruitment, E-recruitment, Human resource management, Expert interviews, User experience

1 Introduction

The trends on the global job market set new requirements for organizations' recruitment of workforce and human resource management practices. For example, the global competition of workforce (Ashton and Morton 2005; Stahl *et al*. 2012), passive job seeking (Trusty *et al*. 2019), and decline in employee tenure (Hollister 2011) add to the dynamics and degree of difficulty in hiring. The mismatch of demand and supply of skills on the job market (Cappelli 2015) can cause large numbers of job applications, yet few relevant candidates. The so-called "war for talent" between organizations (Michaels *et al*. 2001) and the

job seekers' demand of good candidate experience may reverse the traditional recruiter-job seeker power relationship (Claus 2019). Such trends have led to the introduction of various digital services in recruitment (Holm 2012; Wirtky *et al*. 2016; Thite 2019). *E-recruitment* refers to the use of corporate web sites, social media, and various other information systems (Chapman and Gödöllei 2017; Holm and Haahr 2019) in workforce hiring. Despite the growing general interest towards e-recruitment activities (Holm 2012; Koivunen *et al*. 2019), there is relatively little empirical research on how e-recruitment is utilized in practice and how the various systems are experienced by recruiters who represent the employing organization.

A key goal of e-recruitment is to attract and encourage potential applicants to send job applications (Eveleth *et al*. 2015). To this end, this paper focuses on a specific emergent e-recruitment technology: recruitment chatbots (henceforth, *recruitment bots*). Following the conceptualization of chatbots by Grudin and Jacques (2019), recruitment bots refer to web-based, publicly available, and task-focused chatbots that communicate with potential applicants to gather information about them and to help the recruiter handle queries.

While various task-focused chatbots are already vast in number, scholars call for more HCI research regarding the purposefulness of chatbots, since user needs and motivations are often poorly understood (Følstad and Brandtzaeg 2017; Brandtzaeg and Følstad 2018). Furthermore, user research around e-recruitment is scarce and lagging behind industry adoption (Chapman and Gödöllei 2017; Johnson *et al*. 2017). The applicant perspective has been studied to some extent (McCarthy *et al*. 2017), for example, in relation to website usability effects on potential applicants' intentions (Eveleth *et al*. 2015). At the same time, considering the perspective of a recruiter, there is little academic research on the utilization of chatbots for this particular organizational need. We identify a need to study if and how recruitment bots address real needs in recruitment and the benefits they are expected to provide.

This research aims to support the development of next-generation chatbot-based e-recruitment systems by providing user- and activity-centric understanding of chatbots in recruitment from the viewpoint of the recruiter. Recruiters, are here defined as HRM professionals whose job tasks include coordinating recruitment processes and serving as the applicants' interface to the organization, hence representing a central user group for e-recruitment systems (Connerley 2014). Given the early phase of technology diffusion in this area, we ask: "What are recruiters' initial experiences of and the expectations towards recruitment bots?" To this end, we conducted qualitative interviews with 11 recruiters whose organizations have either recently deployed a recruitment bot or are intending to do so in the near future. To enrich the data, we also ran two interviews with software experts who are involved in developing recruitment bots and have extensive domain

knowledge in recruitment. They represent a relevant stakeholder group that can give insight how recruitment bots have been across organizations and what kind of new features can realistically be envisioned from the next-generation recruitment bots. Regarding recruiters, to narrow down the broad spectrum of possible user experiences and subjective opinions, the study focuses on the chatbots' practical role in the organizations' recruitment process, how they relate to other e-recruitment systems, and users' expectations towards this technology. Studying domain experts' expectations help to understand how an emerging technology could be further developed to serve in the recruitment process and in what kind of recruitment tasks it could be particularly helpful. In other words, we focus on discussing and unpacking the *experiential and systemic aspects* of this emergent social technology, rather than, for example, usability evaluation of specific recruitment bot user interfaces. The systemic aspects include interviewees' considerations on chatbots' impact in recruitment processes.

The findings highlight several important themes to consider by both the technology developers and the organizations adopting recruitment bots in the hiring processes. While lowering the threshold to applying for certain positions was generally considered beneficial, a significant flip side was a larger pool of applicants to examine in detail. The recruiters felt burdened by unexpected tasks that they had little experience in, such as planning predefined scripts for the chatbots. In this sample, the recruitment bots were used rather separately from other recruitment channels and information systems, which added to the need for configurations by the recruiters.

To the best of our knowledge, this is one of the first qualitative studies on the user experiences and expectations considering recruitment bots from the perspective of recruiters. The job seekers' perspective has attracted more research interest, which has recently resulted in a call for research on the recruiters' perspective (Wheeler and Dillahunt 2018; Lu and Dillahunt 2021). We contribute to this emerging thread of research and provide valuable insights into the possible roles and uses of chatbots in recruitment. We offer considerations for the uses of, interactions with, and design of next-generation recruitment bots and explore opportunities for the future use of recruitment bots.

2 Theoretical framework and related work

The following first outlines e-recruitment as a context of applying chatbots, followed by an overview of chatbots and related taxonomies, along with a classification of currently typical categories of recruitment bots. The last subsection defines user expectations and trust in technology as a theoretical and conceptual lens for the empirical study.

2.1 **The research context of e-recruitment**

Organizational success is argued to depend on the social composition of employees (Breaugh 2013). In the broader context of Human Resource Management, the target of recruitment is to find the right person for the right job at the right time (Ashton and Morton 2005). Acquisition of new human resources typically takes place through external recruitment (Keller 2018). It refers to organizational activities like bringing a job opening to the attention of potential applicants, influencing them to stay in the applicant pool, and affecting the decision of accepting a job offer (Breaugh 2008; Lievens and Slaughter 2016). The recruitment process, if done with deliberation, tends to follow a linear decision-making process with multiple stages (Keller 2018; Holm and Haahr 2019; Koivunen *et al*. 2019), which include establishing requirements, identifying and attracting alternatives, comparing alternatives and selecting the most suitable match (Holm and Haahr 2019; Koivunen *et al*. 2019). Common challenges in this process are settling the requirements and deciding the recruitment channels (Holm and Haahr 2019; Koivunen *et al*. 2019). Further, according to market research surveys, organizations' top priorities in recruitment include acquiring candidates, engaging them during the recruitment process, and developing the employment brand (Bullhorn 2022).

The first electronic forms of recruitment included company websites, social networking sites, and job boards (Chapman and Gödöllei 2017). More recently, specific e-recruitment software (e.g., applicant tracking systems) have emerged for finding, attracting, and communicating with the applicants (Chapman and Gödöllei 2017; Holm and Haahr 2019). The benefits of e-recruitment include managing talent pool, potentially reaching new applicants, and branding (Chapman and Gödöllei 2017). However, empirical research on the effectiveness and appropriateness of various e-recruitment tools is scarce (Chapman and Gödöllei 2017) and the existing tools have been strongly criticized (Cappelli 2019). According to a critical view by Cappelli (Cappelli 2019), companies are generally obsessed to decrease the enormous costs of hiring and the market is full of vendors that offer new technology. At the same time, it remains unclear whether the various e-recruitment tools result in better hires or not (McCarthy *et al*. 2017; Woods *et al*. 2020).

Organizations' websites and web-based job boards are commonly used to attract potential applicants to apply (Eveleth *et al*. 2015; Chapman and Gödöllei 2017; Holm and Haahr 2019). Here, often the first touchpoints for applicants are standardized online forms (online applications) which provide personal and job-specific information (Woods *et al*. 2020). To this end, the much-studied website qualities like usability, visual design, and content of the website have been found to influence potential applicants' intention to submit an application (Braddy *et al*. 2006; De Goede *et al*. 2011; Eveleth *et al*. 2015). Especially the importance of website's aesthetic features, navigability, and interactivity in terms of two-way communication are emphasized (Chapman and Gödöllei 2017; Holm and Haahr

2019). Further considering conventional web applications' usability, while job seekers use mobile devices to search for jobs, it seems that many organizations do not often have mobile-optimized or even mobile-compatible websites (Chapman and Gödöllei 2017). Overall, the introduction and exploration of new technologies has been rapid despite the unsolved issues in the previous generations of e-recruitment technology.

While e-recruitment tools facilitate contacting and communication between job seekers and recruiters, this kind of sociotechnical systems remain relatively little studied in CSCW and HCI. Two key threads of research can be identified in this emerging area of literature. The first thread has focused on designing, implementing, and evaluating new tools (e.g., to support low-resource job seekers (Dillahunt *et al*. 2018; Dillahunt and Lu 2019). The second has focused on methods for gathering information about job seekers and employers (Wheeler and Dillahunt 2018; Lu and Dillahunt 2021). For example, Lu and Dillahunt (2021) conducted interviews with employers of low-wage workers in the U. S, providing insight into employers' use of social media in low-wage labor market. While their research context differs from ours, the research marked an important first step to study recruiters' perspective that had been called for in prior research (Wheeler and Dillahunt 2018).

Recently, management research has explored the opportunities and pitfalls in utilizing information systems in HRM, particularly looking at artificial intelligence (AI) solutions (Albert 2019; Allal-Chérif *et al*. 2021; Vrontis *et al*. 2021). Such studies imply that while AI tools can increase efficiency and fairness (Charlwood and Guenole 2022), HR's context-specific challenges for adopting AI include small data sets, accountability related to fairness, possible adverse employee reactions, and other ethical and legal constraints (Tambe *et al*. 2019). The research has specifically criticized whether e-recruitment tools clearly help organizations to attract large and diverse pool of applicants (Stone *et al*. 2015). To this end, recruitment bots address the issue of e-recruitment tools' traditionally static communication processes that merely provide information without the possibility to ask questions (Stone *et al*. 2015).

Furthermore, Charlwood and Guenole (2022) show that while there are over 100 published papers on technical aspects of applying AI in HR, there is little empirical research on the use and consequences of such systems in practice. It appears that much of the research investigates responses to hypothetical scenarios (Langer and Landers 2021; Charlwood and Guenole 2022), probably due to limited deployment of such systems in organizations (Benbya *et al*. 2020).

2.2 **Positioning recruitment bots in the family tree of chatbots**

In general, chatbots have entered a broad spectrum of application areas. Most often they are used in various forms of customer service (Zamora 2017; Følstad and Skjuve 2019) but also in specific areas like therapy services (Fitzpatrick *et al*.

2017), news (Jain *et al*. 2018), gaming (Jain *et al*. 2018), and education (Smutny and Schreiberova 2020). Also, conversational bots have been studied in the context of stimulating discussion on social media platforms (Nichols *et al*. 2013; Savage *et al*. 2016). In the workplace context, chatbots have been introduced, e.g., to support an individual's detachment and reattachment process (Williams *et al*. 2018).

The deployment of chatbots is often justified by improved efficiency and performance, delay-free and always-available service, and by making the end-user's life easier by supporting simple practical tasks (Zamora 2017; Brandtzaeg and Følstad 2018; Følstad and Skjuve 2019). Internet-based customer service has shifted from personal and dialogue-based interaction towards automated interaction and self-service, and chatbots represent a potential means for automating customer service (Følstad *et al*. 2018). Considering interaction design, chatbot's human-like behavior may have a positive effect on relationship building between the organization and individuals (Araujo 2018). In addition, the interactivity can facilitate a feeling of interacting with other people (i.e., social presence) (Liao *et al*. 2018; Go and Sundar 2019), which may induce greater involvement with the content provided by the website and even lead to more positive attitudes, especially when it minimizes the navigational load (Sundar *et al*. 2003; Sundar and Kim 2005). In turn, work by Zabel and Otto (2021) examined the existence of algorithmic biases when designing chatbot dialogues. They found similarity-attraction of gender, meaning that there was a more positive affect when a person reading, and the designer of dialogue had the same gender. Similarly, Feine *et al*. (2019) showed that gender-spesific cues are commonly used in the design of chatbots.

Prior literature offers classifications of the various manifestations of chatbots, which helps to position recruitment bots in a broader technological landscape. Smutny and Schreiberova (2020) propose a classification based on the input and messaging channel of the chatbot, covering button-based, keyword recognition-based, contextual, and voice-based inputs. Messaging channels may manifest as a standalone application (mobile or desktop), a web-based service, or are integrated into other services (instant messaging apps or collaboration platforms). The taxonomy by Grudin and Jacques (2019) is based on the conversation focus. In task-focused chatbots the focus is narrow, and a typical session has 3-7 exchanges, whereas intelligent assistants (e.g., Apple's Siri, Amazon's Alexa) have a broader focus and typically 1-2 exchanges, and virtual companions (e.g., Eliza and Tay) have the broadest focus and up to 100 exchanges per session.

2.3 **Preliminary taxonomy and prior research of recruitment bots**

Building on the aforementioned classifications, we interpret current recruitment bots as task-focused chatbots that utilize button-based or textual inputs. In practice, they are typically integrated into a web-based service such as company

website or Facebook Messenger. To complement the existing taxonomies, Table 1 presents different types of chatbots used to support recruitment activities, based on the authors' review and analysis of their functionalities.

The categorization was produced through extensive search of examples and recruitment bots' offering, as well as analyzing them with respect to purpose of use (from the recruiter's viewpoint) and forms of applicant interaction. Before the interviews, we found several examples of attraction bots and customer service bots in use at websites of several Finnish companies. While we did not find functioning examples of interview bots, they had already been presented and discussed in several research papers. During our search, we identified a few vendors that were developing attraction and customer service bots for Finnish companies. Notably, vendors also typically produce various chatbot solutions for purposes that are also beyond recruitment. The chatbots' purposes and forms of interaction were further clarified during the study interviews (Figure 1).

First, attraction bots are meant to be an easily approachable way to send one's contact information and a few basic details to a potential employer in a matter of minutes. They serve as an additional channel for an applicant to indicate their interest: the bots provide an opportunistic and a low-threshold way to send contact information compared to conventional application channels, such as a phone call, an email, or web forms. Basic questions that the chatbot could ask include the amount of work experience and level of education, for example. Commercial solutions include, e.g., Mya,[1] XOR.AI,[2] and Leadoo.[3] Second, customer service bots can help the potential applicant to find relevant information concerning a specific position, the recruitment process, and the hiring organization. Such chatbots aim to automatize the repetitive work that a recruiter would traditionally carry out via emails and phone calls and offer a low-threshold way for the applicants to ask questions. The main motivation to automate customer service is to reduce costs (Følstad and Skjuve 2019). In practice, they can provide information and instructions on, for example, how to log in to a recruitment system, what the current open positions are, what the key qualifications for a specific position are, or what the salary level is. Alternatively, in large corporations with plenty of HR staff, a customer service bot may be implemented as an internal tool to provide easily accessible recruitment information for the staff. The third category, interview bots, refers to technologically more sophisticated chatbots that can conduct a virtual interview and, thus, help to screen applicants. While these currently seem to be little used, a few research prototypes and product visions have been created (e.g., (Xiao *et al*. 2019, 2020)). For example, Juji chatbots are promoted

[1] https://www.mya.com/
[2] https://www.xor.ai/
[3] https://leadoo.com/

Table 1 Identified categories of recruitment bots.

Type of chatbot	Main purpose	Interaction with user
Attraction bot	To collect basic information about the applicants. Offers an interactive alternative to online application forms.	Asks pre-scripted questions. User input is often based on clicking predefined answer options.
Customer service bot	To answer questions about recruitment and the organization. Helps candidate to find the right information and can reduce the recruiters' workload.	Analysis of user's textual answers and the intents therein based on natural language processing.
Interview bot	To elicit rich information and make interpretations of the candidate's personality and competences through a virtual job interview.	Understands natural language, is context-aware, and can react to the user's input by asking questions.

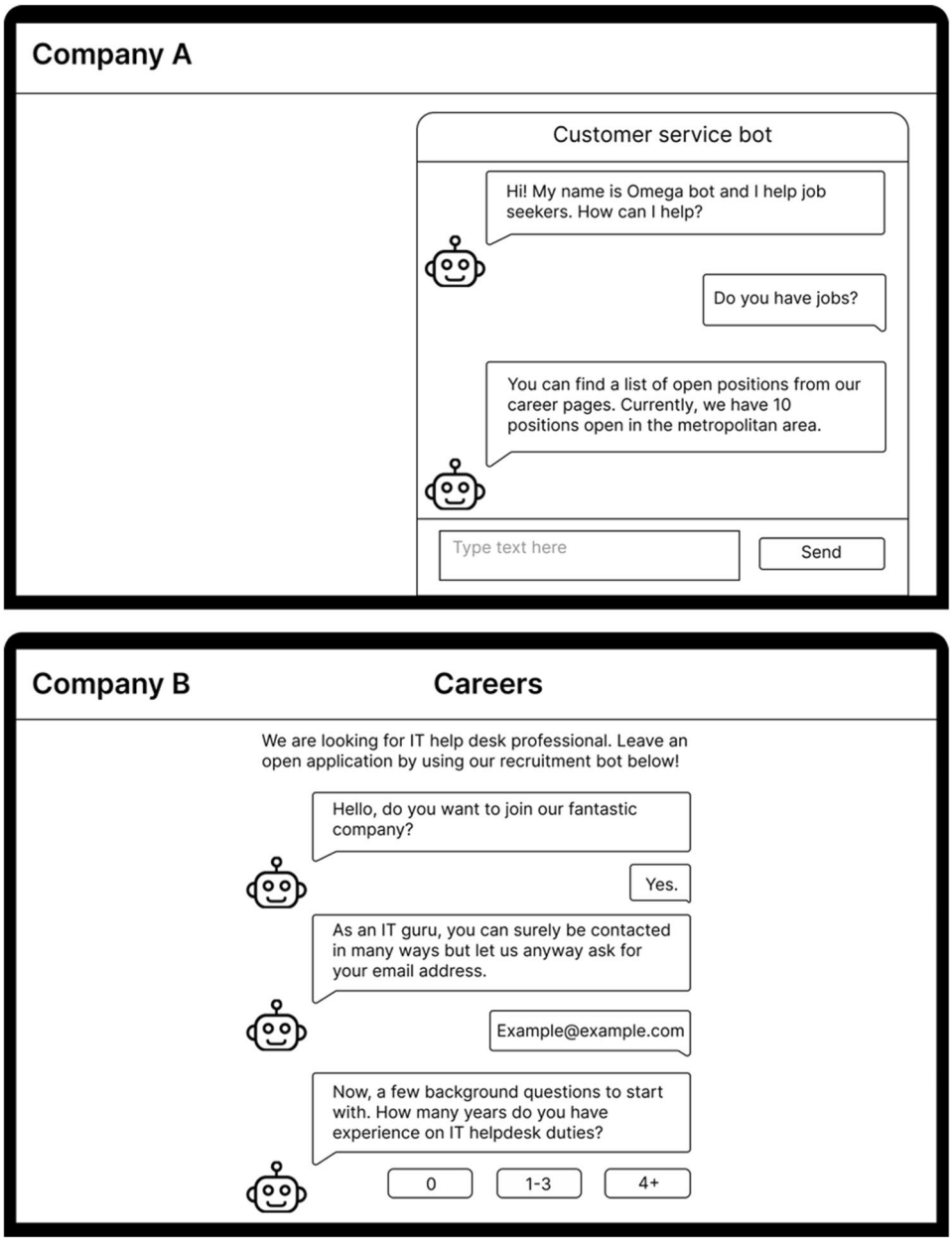

Figure 1 Illustration of two types of recruitment bots. Above (Company **A**) is a customer service bot that is typically realized as a pop-up window that opens from the bottom right corner when visiting the organization's web site. A candidate can ask a recruitment-related question by writing it to the text box and pressing the send-button. Below (Company **B**) is an attraction bot that, in addition to a pop-up window, can be more integrated to a specific web page. A candidate can type simple answers or choose from predefined answer options.

as a scalable, standardized, and potentially information-rich solution to infer applicant's characteristics, such as personality traits (Zhou *et al*. 2019).

There is some prior research on the use of customer service bots but, in contrast to our study, they have focused on the applicant's perspective. Notably, the abovementioned Juji that is able to conduct personality assessment interview has recently been used in several academic studies (Li *et al*. 2017; Xiao *et al*. 2019, 2020; Zhou *et al*. 2019). For instance, Li *et al*. (2017) used Juji as an virtual interviewer to screen candidates. They concluded that the chatbot can make the interview process more efficient as it was able to shortlist 12 candidates from 316 candidates that completed the interview. The job seekers were seen to act authentically in the virtual interview. Later, Xiao *et al*. (2020) found that it is technically and practically feasible to build an interview chatbot with a capability to actively listen, comprehend and respond properly to different kinds of open answers from job seekers. Zhou *et al*. (2019) highlighted that chatbot interviewer's personality influence job seekers' behavior and it seems that in a high-stakes situation like job interview, a more assertive agent is preferred. Overall, recruitment bots have emerged as a new e-recruitment tool and there are inspiring examples of the potential benefits from the applicants' perspective. However, we identify a need for qualitative research to better understand the experiences of utilizing chatbots in recruitment from the organizational perspective.

Overall, considering the level of automation, recruitment bots can be said to interact independently with the candidate but their role in recruitment seems to vary. For example, attraction bots support the recruiters' interests by attracting additional candidates but usually do not take a stance regarding the suitability of an applicant.

3 Methods

To understand recruiters' subjective experiences and expectations, we conducted 13 in-depth, semi-structured expert interviews with people from different types of organizations. We deliberately had a range of participants with different viewpoints in order to develop a rich qualitative understanding of this emergent sociotechnical topic. Eight interviews were conducted at the participant's workplace, three remotely using a teleconferencing software, one at university facilities, and one in a meeting room at a public library.

We initially created an interview outline for three different groups of participants that we identified as relevant interviewees: 1) people with first-hand experience of using different kinds of recruitment bots, 2) people who are about to pilot a recruitment bot in the near future, 3) people who develop recruitment bot technology, having certain value propositions and benefits in mind. However, practical challenges in participant recruitment led us to focus on the first group and enriching their experiences with the perspectives of the second and third

group. It is noteworthy that most of the actual user experiences in this sample of participants related to the use of attraction bots. However, in the interviews we deliberately asked about the expectations towards all the identified categories (see Table 1) as this was supposed to shed light on the perceived risks and opportunities in technologically supporting the recruitment process.

In the beginning of each interview, we asked the participant to describe their work, their job tasks and how recruitment bots are relevant considering their work. The participants described how the recruitment bot in question (either in use or about to be deployed) works, and what kind of concrete experiences the participant had with it. We explicitly encouraged participants to focus on the parts of interview they felt comfortable to discuss based on their expertise. According to that, we selected one of the interview structures to follow and refined its questions. The interview was further structured according to three key stages: before deployment, present use, and future use. The first stage covered questions such as why recruitment bots were deployed, what the expected benefits, risks and other implications were, and what the internal and external attitudes before deployment were. The second part inquired about, e.g., the role of recruitment bots in recruitment, the information on applicants that is collected or cannot be collected, perceived concerns (e.g., equality and privacy), perceptions of trust, effects on recruiters' work tasks, and how various expectations have been met. The third part covered themes like which direction the development of bots should be aimed to and the perceived future risks and opportunities. With the second participant group, we naturally focused on the expectations. With the developers, we also inquired about the expected benefits from the perspectives of their businesses as well as their clients' expectations.

3.1 **Participants and their recruitment**

We identified relevant organizations that have used recruitment bots through online searches, which led us, for instance, to relevant news articles or blog posts. Typically, we used "chatbot" and a recruitment related word, such as "recruitment" as search terms (in Finnish). In addition, we created a LinkedIn advertisement that targeted people with experience or interest in using recruitment bots. However, the advertisement resulted in only one interview, which convinced us to rather rely on online searches. Furthermore, after each interview, we inquired whether the participant knew other relevant interviewees (i.e., snowball sampling).

Overall, nine of the 13 participants had experience in using a recruitment bot, two were planning to deploy one in the near future (P12 and P13), and two were working at a company that develops recruitment bots (P6 and P10). All the participants represented different organizations from Finland. The participants' professional roles and other background information are presented in Table 2. It is noteworthy, that most of them had a considerable amount of experience in

Table 2 Participant information (experience refers to years in the current role).

ID	Professional role	Experience with chatbots	Experience in years
P1	Recruitment manager in construction sector.	Tested a live recruitment chat in the previous company and is planning to deploy an attraction bot in the current company.	~4
P2	HR manager. In charge of recruitment in a company that provides billing and financial management services.	Actively using an attraction bot to reach customer service and knowledge work professionals.	3-4
P3	Head of HR department. Worked in a company that provides IT services.	Tested various chatbots to automate HR activities.	7-8
P4	Head of HR Digitalization and AI project in a multinational company of ~100,000 employees.	Deployed an internal customer service bot for HR.	5
P5	HR software development manager in an employment agency (~250 employees) that helps to recruit 6000-8000 people annually.	Deployed a customer service bot for job seekers.	3
P6	CEO in a company that develops chatbots.	The company develops attraction bots for several clients. Also uses a recruitment bot to hire new people to their company.	1.5
P7	HR manager in restaurant business. Oversees the recruitment process.	Has experimented an attraction bot.	~20
P8	Product manager and HR/recruitment specialist for a public sector job board.	Tested AI-powered chatbots to match job seekers and job openings.	7+
P9	Director of recruitment department in a company offering a job board.	Offers two different attraction bots to companies that are placing job ads.	3.5
P10	Chief marketing officer and co-owner in a company that develops recruitment software.	The company is developing a recruitment bot that matches information provided by candidates to job ads.	3.5
P11	Responsible for communication and recruitment marketing in an employment agency that specializes in construction workers.	Oversees the use of attraction bots by, e.g., creating chatbot scripts.	10+
P12	Project manager**.** Manages a network of people in a company that promotes a better working life for the youth.	The company has recently received offers from chatbot vendors but has not yet deployed a recruitment bot.	~2
P13	Head of a production unit in a confectionery**.** Decides what kind of talent is needed.	Interested in testing recruitment bots in the near future.	7-8

conducting or overseeing recruitment processes even before their current work role. In addition, while such experts tend to have multiple work roles, they are all in significant roles in their organizations' recruitment activities (or are developing recruitment tools).

In the end, we had a few participants from both food and technology industries and several from organizations that provide personnel services. Organizations were mostly medium- or large-sized companies. Notably, the two people who were working with recruitment bot solutions (P6 and P10) were from small-sized companies. Most of the organizations were from the private sector.

All the participants were Finnish, and the interviews were held in Finnish. Considering generalizability of findings in this cultural context, we regard the Finnish job market to represent a typical Nordic system with relatively extensive regulation by the government, and labor unions having central roles in defining wages and contracts. While workforce mobility and general dynamics on the job market have been steadily increasing, they can be said to be lower than in North America, for example. According to the Finnish ministry of economic affairs and employment of Finland, other general characteristics of Finnish work culture include high level of participation, appreciation of equality, generally high skill levels and low hierarchy.[4]

3.2 **Data analysis**

All the interviews were audio recorded and then transcribed using a professional service or by one of the authors. The average length of an interview was 59 min (min. 39 min and max. 85 min). The total word count of the transcribed data was 95,447. We conducted a bottom-up data analysis with the help of Atlas.ti. We employed constructivist Grounded Theory oriented analysis as described by Charmaz and Bryant (Bryant 2017; Bryant and Charmaz 2019). The constructivists approach notably highlights multiplicity of perspectives, and that outcomes are provisional social constructs. It contrasts with traditional objectivist approach to Grounded Theory where investigation and observation are independent of a specific researcher and context-free generalizations are aimed for (Bryant 2017). The coding process started with descriptive initial coding by reading the data line-by-line (Bryant and Charmaz 2019). This was done separately by two of the authors. We then categorized codes that had the seemed to have the most analytic power using two seemingly potential lenses, the recruitment process and the expectations. Within the categories, we identified most promising themes and used focused coding to further identify the most interesting codes by relating them to other codes and themes. Finally, we arrived to set of codes and themes that captured a number of initial codes. We then organized them to form

[4] https://tem.fi/en/working-life

a narrative for the Results. The analysis was collaborative, multidisciplinary and iterative by nature. The coding process was conducted by the first two authors and was periodically challenged and enriched by the research team. In practice, we organized several meetings where we made clarifications on our categories and discussed the most promising themes and codes.

Finally, we express our findings through an analytical narrative that attempts to be abstract enough to show the theorization process, yet a contextually-rich description of recruitment bots (Bryant and Charmaz 2019). During the analysis, the storyline on early experiences and expectations started to seem evident and coherent across participants, and we are confident that the findings we raise stay true to all accounts and more broadly in our cultural context. We use quotes to illustrate the abstract concepts and to ground the storyline. Additionally, we deliberately avoid quantifying the findings as a concept has relevance because of what it brings to the theory qualitatively, regardless of how frequently it may have appeared quantitatively (Bryant and Charmaz 2019).

4 Results

We first focus on the motivations behind the development or utilization of recruitment bots, then follows an analysis of their practical effects on the activities and experiences of the recruiting experts' work. Finally, we analyze the experts' optimistic expectations towards the long-term future use of recruitment bots. In general, while there likely is variation across specific professions or industries in terms of the presented themes, the findings aim to raise general considerations that are relevant in most professional domains.

4.1 Practical motivations to deploy recruitment bots

The recruiters stressed that the key motivation to try recruitment bots is the general interest to increase both the quantity and quality of the applicants. To this end, attraction bots and customer service bots were expected to provide a new channel but with a distinct approach. In addition, the easy-to-approach UI was expected to provide benefits regarding accessibility. Here, we discuss how these three factors practically motivated deploying recruitment bots.

4.1.1 Attraction bots reach candidates that other e-recruitment channels fail to reach

Attraction bots were expected to reach candidates that other e-recruitment channels and marketing cannot reach. As a light-weight way for potential applicants to be in contact with an organization, such chatbots were seen especially suitable for attracting initial applications from passive job seekers. For instance, P2's organization had recruited an employee from a competitor with

the help of an attraction bot on their career web page. Similarly, P7 consolidated that the recruitment bots can indeed attract candidates that do not realize that a certain organization could be their potential employer.

> *"This way we can reach a larger talent network. […] They (passive job seekers) might not exactly know what this (chatbot) is but when they try, it can lead to successes."* (P7, HR manager, representing knowledge work organization in commerce sector)

Many participants felt that the trends in the job market motivate them to try new application channels, such as attraction bots. First, P9 stressed that, in knowledge industries, the competition for talented personnel has led to headhunting, i.e., proactive searching and attraction of workforce, which partly explains why the potential candidates might not actively send their applications. Second, a CEO whose company develops attraction bots (P6) confirmed that one major motivation of their clients is their dissatisfaction with the results in conventional recruitment. Third, referring to the trend of skills mismatch in labor market (i.e., a discrepancy between the skills that are sought by organizations and the skills that are possessed by individuals), P1 told how their company receives large numbers of applications but not from people who meet the criteria.

> *"Getting more qualified applicants was the primary (expected benefit). Second, we received a lot of applications, but they were not the right kind of applicants at that time."* (P1, referring to a situation in a construction sector company)

4.1.2 Customer service bots could attract high-quality applicants by proactively helping candidates

Another expected benefit was increased general interest towards the company. For this type of brand image building and communication of company values or mission, a few participants had either deployed or tested a customer service bot that advices a web site visitor. For instance, P4 believed that the proactive chatbot offers a chance to opportunistically approach web site visitors and offer customer service that might, indirectly, result in high-quality open applications. This consolidates our classification in Table 1 that a customer service bot serves not only HR activities but also marketing and other external communication. Some participants highlighted that chat interface can be a great way to approach young job seekers. This was reasoned both by companies' target groups and the younger generations' assumed familiarity with chatbots.

"They (recruitment bots) could be more for engaging, they could ask whether you are like this or that […] It would motivate (the visitor) to later create an application." (P4, Head of HR Digitalization)

4.1.3 Chatbot UI improves accessibility and lowers application threshold

The interviewees felt that attraction and customer service bots could be more accessible and approachable than other e-recruitment channels and, therefore, lower the threshold to send an application**.** Recruiters acknowledged that job seeking can be stressing, laborious, and unrewarding. For example, it is hard to estimate how much time it takes to prepare the various position-specific documents. The participants further acknowledged that the typical experience of sending an application often tends to appear complicated, and the presence of various information systems during the process might hamper the overall applicant experience. For instance, despite the popularity of mobile browsing, online application forms are rarely mobile-friendly, while chatbots were seen to fit well with responsive web design and, therefore, can be smoothly used in both desktop and mobile. However, the quotes from P1 and P6 reveal a contradiction: the desire and need for responsive UIs based on website traffic (P1) and the assumption that applicants' wish to craft their job applications with care (P6). It seems, however, that mobile-friendly UIs tend not to cater for creating detailed and fine-tuned applications. Other perceived potential benefits of mobile UI included faster task completion time and easy to use speech-to-text functionality. The interviewees felt that attraction and customer service bots are more accessible and approachable than other e-recruitment channels and, therefore, lower the threshold to send an application**.**

"People are terribly stressed about how their CV looks and nobody wants to be rejected […] Especially if they have put in a lot of effort." (P6, CEO, both develops and utilizes attraction bots)

"It is much easier to type the answer using a mobile device. I noticed that two thirds of the visitors on our career pages were on mobile but job applications are almost always sent on desktop." (P1, Recruitment manager)

4.2 Early experiences and implications to recruiters' practices

At the time of the study, the early adopter participants had used recruitment bots for several months or even years already. The early adopters' trials could be publicly witnessed on organizations' web sites, and the examples were recognized to have created positive expectations and encouraged piloting also in other organizations. At the same time, the adoption of chatbots was found to have introduced interesting new challenges and needs for compromising, which we will focus on in this subsection.

4.2.1 The new channel has brought new applications and new tasks

According to participants with experience of using attraction bots, the expectation of increased quantity and quality of applications has been surprisingly well met. The number of applications has concretely increased, and while it is hard to measure the quality of applications, for example, P11 believed that their attraction bots result in as good applications as the online job application forms they use. P11 is working in a company that searches construction workers for other companies and, as an organization, they are striving to make the application process for the job seekers as easy as possible. After experimenting with an attraction bot, they realized that they only need to inquire a few key details about the applicant. The recruiter can then make the decision whether to contact the applicant or not simply based on the chatbot conversation log.

> *"We get approx. 10 000 applications per year, 2500 of them come through lead bots, nowadays […] I think the share is surprisingly big […] Based on discussion with our recruiters, at least (the quality) does not significantly differ from what we get to our (recruitment) system.* (P11, Oversees the use of recruitment bots)

At the same time, a central change that chatbots have brought relates to the recruiters' new tasks in managing them. If a company has deployed an attraction bot, it is typically the recruiter's job to create the chatbot script and to supervise that it produces relevant answers. For example, in P2's organization, recruiters both tailor unique attraction bots for individual job openings and manage a more permanent attraction bot for open applications. In a typical case, the attraction bot first checks the contact information and the applicant's professional suitability for the targeted work task. Next, the recruiter contacts the candidate for further details and, if the candidate is interesting enough, the recruiter books an interview with a hiring manager.

> *"It takes maybe 15 to 60 minutes to create and test (an attraction bot)—depends on whether I can copy an old bot script or if I need to create a new one with new questions […] I usually take one day per week when I am anyway reading the open applications we receive through email. Then I also check the bot applications and possibly contact people."* (P2, HR manager)

While it is relatively fast to create a recruitment bot for an individual job opening, this brings the challenge for a recruiter to present the questions in a way that optimally attracts job seekers. P9 pointed out that recruiters and other HR professionals are used to creating traditional job descriptions, which, as a form of communication, is far from creating a sequential script for a chatbot.

"People are used to creating bullet points but not a recruitment bot." (P9, Director of recruitment department)

In contrast, it seemed that a customer service bot did not require as active role by the recruiters. As its purpose is to automatize answering frequently asked questions, it decreases repetitive work. P5 told that their customer service bot is updated based on the asked questions, and this information also helps to update the company website. Interestingly, in that particular case, the customer service bot was able to provide information that was not available from the website:

"It takes maybe 15 to 60 minutes to create and test (an attraction bot)—depends on whether I can copy an old bot script or if I need to create a new one with new questions […] I usually take one day per week when I am anyway reading the open applications we receive through email. Then I also check the bot applications and possibly contact people." (P2, HR manager)

For sure there can be found some unique information (by using the customer service bot). Also, we have a lot of information available on our web pages. The chatbot can help to find the correct (desired) information (from the web pages). (P5, HR software development manager in an employment agency)

4.2.2 **Recruitment bots as a potential fast lane for applicants**

A recurring theme in the interviews was that attraction bots are a complementary technology in relation to the conventional applicant tracking systems or other recruitment channels. Notably, at least in the current phase of emerging, recruitment bots are typically developed outside the company by a vendor. Therefore, they were not yet connected to the existing e-recruitment systems. P11 highlighted that in their organization the recruiters get an email notification when they receive a new application from an attraction bot. In contrast, applications from traditional recruitment channels end up to an applicant tracking system in which case the recruiters need to open the software to see the application. Also, in the applicant tracking system, the application presented just as another line among other applications. In other words, an attraction bot application can offer a fast lane for a job seeker to get the recruiter's attention. While this might put some applicants in unequal position, P11 justified this by the need for faster ways to react to the applications in order to succeed in the competition for talented workforce.

"(In the past) either people have called, or we have received (the applications) to our recruitment system […] Now, we receive fast email leads and we call back. It has made contacting faster […] We need to contact people as fast as possible […] Because otherwise they have already accepted another job offer." (P11, representing a field with fierce competition of workforce)

4.2.3 Chatbot can be an option to replace a human-operated chat

P1 did not have experiences about chatbots but they had worked in a construction company that, a few years before the interview, had tested a chat where a human customer service professional collects initial applications in a similar manner as an attraction bot. Interestingly, it seemed that the conversations in human chat do not remarkably differ from those with current recruitment bots. Typically, a human customer service person would start a conversation and ask questions about work experience or educational background. While human conversations would allow asking much more creative or personalized questions, in practice, the customer service professionals might have up to ten chat conversations simultaneously open, and, to boost their performance, they frequently resort to predefined questions. The participant speculated that in the future, a chatbot could accompany a human chat by automating most of the conversation and giving space for the human operator to come up with follow-up questions. Finally, P1 emphasized the drastic change in work tasks that resulted from deploying the chat:

> *"It (the deployment of a chat service) actually made me a salesperson overnight […] After I started to receive contacts from outstanding candidates every five minutes, all my time went into making follow-up phone calls […] 80 percent of my working time transformed. We needed to immediately hire more recruiting professionals who continued the conversations with the candidates."* (P1, Recruitment manager)

4.2.4 Balancing between acquiring details and easy application process

The participants reported that, in some cases, an attraction bot would be offered as one channel to apply even for positions in which the applicants would conventionally need to show creativity and unique skills to be selected. This necessitates open-ended textual answers rather than closed-ended questions; the combination of short conversations with simple answering options inevitably results in applications that are quite similar to each other. At the same time, it was often assumed that the chatbot conversation should be short in order to keep the potential applicants interested, especially the passive job seekers. P6, whose company develops attraction bots, argued that if open text fields were used instead of multiple-choice questions, their clients would receive even 80% less applications through the chatbot, which would be considered suboptimal:

> *We have already noticed from our chatbots that, if an open text field is used, you can say goodbye to 80 percent of your chatbot conversations (that have been started) […] Right after you start asking (in the attraction bot) that*

could you write down your life story by typing on your mobile, then the response is an immediate "bye bye". (P6, CEO in a company that develops chatbots)

Moreover, while applying through a chatbot might require less effort from the applicant, several recruiters (e.g., P7 in the quote below) told that a shorter application often means more work: the application might be missing key details that need to be inquired later via other communication channels. Consequently, when using attraction bots it is necessary to balance between brevity and high level of detail, and chatbots might not provide the applicants with the best ways to stand out.

"We have to balance between having an easy application process and gathering enough information for a recruiter (to make an informed decision). However, at least currently (our) recruiters think that there is enough information." (P11, Oversees the use of recruitment bots at an employment agency that recruit construction workers)

"It is more laborious than receiving a complete application that has tremendous amount of information and a CV attached. Here we get only the lead and a little bit information on what kind of job they are searching and if they have any work experience." (P7, HR manager)

4.2.5 Indirect recruiter–applicant interaction affects the candidate experience and sense of privacy

From the recruiter's perspective, all recruitment bots are autonomous agents that interact directly with the applicant. Especially customer service bots tend to reduce the conventional recruiter–applicant interaction. As a result, the interviewees pointed out that the candidate's communication with the recruiting organization might feel a bit distant. This was seen particularly worrisome for organizations that aim to create a pleasurable candidate experience or convey certain company culture through their communications. This highlights that, considering user experience design, a customer service bot might not influence the organization's recruitment process as much as it influences the candidate experience. Also, it underlines the importance of piloting the chatbots before extensive use, which was also much discussed in the interviews.

"We wanted to be certain, that it really works and that we are allowed to talk with other organizations who have also implemented it. We just wanted to be sure that it does not risk anything in current processes or impair the candidate process." (P3, Worked recently in a company where they oversaw HR technology and tested various chatbots to automate HR activities)

Several participants brought up challenges regarding potential privacy issues and data protection. Interestingly, such challenges arose because of the job seeker trusting the technology too much: even if private information is not asked, one

might be tempted to provide this information to ensure that they are seen as a genuine applicant.

> *"A chatbot user may write anything, for example, about personal data (that makes them identifiable) […] That information is stored in our system, which then forms a person register. That is a challenge."* (P5, Developer, in charge of developing HR software)

On the other hand, if the job seeker is concerned of privacy issues, they might also not like to use chatbot interface to share private information. For example, a passive job seeker might not want that information on their job seeking activities spreads beyond the target company's recruiter.

In addition, attraction bots that simplify the application process might not be attractive to all active job seekers. P9 speculated that the first-generation attraction bots with simple UI might not be considered as a serious application channel among active job seekers. The participant elaborated that a high-quality user interface of a recruitment bot probably affects the job seekers feeling of authenticity and encourages to start a conversation.

> *"If it looks like it is blinking and looks a bit shady in general, it will raise a suspicion, where does it (recruiting bot) come from, from this website or somewhere else?"* (P9, Director of recruitment department)

4.3 **Expectations towards future recruitment bots**

Some of the discussion in the interviews revolved around rather optimistic expectations towards the next generation of recruitment chatbots, which we will cover in what follows.

4.3.1 **New behavioral data and insights into the job market**

The participants were hopeful that, in the long run, chatbots could provide them with insightful new data that could support other human resource management needs. For instance, a few participants raised the idea about the so-called *talent pool* in which the applicant could be added to serve as ad-hoc workforce when the need arises. This could be a secondary option if the attraction bot or recruiter recognizes that the candidate does not match with current recruitment needs. P12 underlined the organizations' benefit: a large talent pool would help them to quickly search for a suitable candidate when a recruitment need arises. Another line of thought was to conduct a lightweight yet broad skill survey with the help of a chatbot, which was raised by P8 when considering the future of public sector job boards. This could give interesting statistical insight about the job market in general and help the public sector to inform the private sector about what kind of skills are available and to what extent. Similarly, data analytics based on

web-based customer service bots could offer valuable information to the organization on which seem to be most interesting open positions or what might be unclear in the recruitment process based on the most frequently asked questions. Especially if hiring volumes are high, like in the case of employment agencies or large enterprises, customer service bots or attraction bots could allow gathering valuable data about the intentions of the job seekers.

> *"(Trend information) could give statistically relevant information on what kind of competence needs there will be. For example, where should we target training and coaching."* (P8)

4.3.2 Needs for chatbots beyond candidate attraction and applying

While different types of recruitment bots serve different purposes, they are typically utilized to support the early stages of the recruitment process and to enable instantaneous interactions around a specific job opening. Hence, many interviewees speculated whether a chatbot could be useful also in later stages of recruitment, for example, by increasing two-way interaction between a job seeker and an organization. There seems to be a need for actively engaging in information exchange also during the recruitment process, particularly when the recruitment is a deliberate process with multiple, inevitably time-consuming stages. Additionally, P4 saw an opportunity to implement an internal customer service bot to support a newly hired employee when they is onboarded to the company and large amounts of practical information is presented in a short time. While offering such support would typically not be a recruiter's responsibility, for the applicant the first days at work form a continuation of the candidate experience and influence the employer image.

5 Discussion

The following summarizes the findings from the perspective of the recruiters' practical activities throughout the recruitment process and the systemic effects that chatbots could bring to recruitment activities. Hence, we contribute to the emerging research thread in HCI that focuses on the understudied recruiters' perspective (Lu and Dillahunt 2021). Furthermore, we raise design considerations that can help designers and organizations to identify more sensible uses of, interactions with, and designs of chatbots in recruitment.

5.1 Towards next-generation recruitment bots

5.1.1 Support for careful planning of the chatbot script

The ongoing march of chatbots into recruitment seems to have introduced interesting new tasks, risks, and dynamics, some of which can be regarded as

unexpected consequences from the recruiter's viewpoint. Important downsides include ending up with larger masses or seemingly unsuitable applicants as well as additional tasks for the recruiters. While the bots might seem autonomous in terms of interacting with the job seekers, recruiters actually need to pay much attention to predefining and coordinating their actions. This efficiency paradox seemed to have caught the recruiters by surprise and forced them to redesign their work practices. Amongst the participants who had deployed an attraction bot, a fundamentally new task was to create the chatbot scripts. The sequential and pre-scripted attraction bot conversations arguably present a challenge of optimizing what information is given and inquired in the conversation.

However, there seems to be little guidance for recruiters on how to prepare high-quality scripts in practice. For example, the order of the questions, the answering options, the conversation flow, potential dead ends in the conversation, and the tone of voice can make a significant difference in terms of effectiveness. The underlying challenge is to turn relatively abstract and diverse recruitment criteria into short and engaging questions. Because task-focused attraction bot conversations typically do not offer many exchanges, the recruiter is forced to think what the essential aspects are that should, at a minimum, be covered.

This opens an interesting design space for chatbot interaction design (or *conversation design*) for the HCI community. For example, digital assistance in defining the questions could help with the general flow of questions: e.g., easy ones first (for ease and flexibility) and more specific questions later (for detailed applicant information). In addition, a chatbot script could include weighted answer options and the most potential combinations of answers could be automatically detected. The chatbot conversation should also be encouraging and polite in case the candidate does not have a realistic chance. In the long run, rather than following a tight script of inquiry, the chatbot interaction design could follow a mental model of guiding the applicant through the application process (Sands *et al*. 2020). To this end, Sands *et al*. (2020) interestingly encouraged the development of service-oriented chatbots to draw on learnings from the theatrical domain. Particularly, they encouraged to develop a dramatic script for service managers including considerations on how to relate with customer's experience, their physical environment, and the narrative context of the experience.

5.1.2 Chatbots support low-threshold interaction but are also part of external communications

The lack of communication between a recruiter and an applicant is a general challenge in recruitment (Koivunen *et al*. 2019). To keep the connection between a recruiter and an applicant alive, there exists commercial chatbot solutions, such as Mya, that can be used to interact with applicants during a recruitment process via a mobile application. Such messaging channel combined with a conversational UI seems like a promising way to communicate with the applicants but

would of course require the job seekers to find and download the application. In this sense, web-based chatbot interfaces have a natural advantage.

At the same time, especially when deployed on a public website, recruitment bots represent the recruiting organization and form a connection to the organization's brand. The significant role in organizations' external communication could explain why the perceived risks of recruitment bots relate to possible negative candidate experiences. This necessitates careful planning of how the chatbot represents the organization. For example, the chatbot's tone of voice was found to have been modified to better represent the organization but this is hardly the only way to tailor the communication style. More broadly, instead of seeing recruitment bots as information systems for human resource management, they could be regarded (and marketed) as marketing tools.

Another practical opportunity identified in the study is that customer service bots could help applicants to easily follow the situation in the recruitment process on general level (i.e., as a tracking system), without needing to bother the recruiters. However, web-based chatbots are not an optimal way to exchange personal information as a personalized service would require identification; if such a feature was implemented, the general approachability of the chatbot could decrease as the benefits of anonymous interaction and a low-threshold service would be lost.

5.1.3 Attraction bots can benefit most when targeted at specific job seeker profiles

The key opportunity and expected benefit in the use of recruitment bots seems to be reaching new candidates. The findings imply that the target audiences should be thoroughly considered when defining requirements for a particular job opening. It seems that recruitment bots are used rather opportunistically, and while some participants had a specific target audience in mind, they had not developed established practices to match the benefits of recruitment chatbot technology and job seeker profiles. For example, attraction bots could be a way to attract candidates who (i) primarily use mobile devices, (ii) are not likely to have their up-to-date CV or other traditional documents at hand, (iii) are opportunistically browsing for jobs while being employed (i.e., passive job seekers), or (iv) are highly accustomed to interacting through chatbots or an asynchronous chat interface in general. On the other hand, it was questioned whether the chat UI would attract serious job seekers. Therefore, it seems unlikely that an attraction bot would be used as the only way to apply for job openings in job sectors where it is vital to provide an extensive application. With these opportunities, we call for more targeted use of recruitment bots to complement the way of using them as general recruiter–candidate interaction channels for all. This opens an interesting design space for more contextualized instances of this generic technology, necessitating

new designs with respect to the interaction scripts as well as administrative interfaces for the recruiter.

5.2 **Limitations**

We acknowledge that the methodological choice to run an interview study in a specific cultural context has inherent limitations on generalizability. In addition, given the relatively early stage of diffusion of this technology in the target context, the study was challenged by practical issues like availability of eligible participants. First, while not weakening the contribution, the participant sample represented experiences from one country and from a limited number of organizations, rendering the data possibly specific to culture and/or certain professional domains. At the same time, it was clear from the beginning that there were not many people who could attend as a participant with experience in using recruitment bots. Hence, our participants had different levels of knowledge and perspective to the topic, which is both a limitation considering generalizability and an advantage considering diversity of the qualitative dataset. That said, we are confident that the qualitative findings help to understand the ongoing march of chatbots into recruitment and their systemic effects, as well as to identify relevant design challenges for follow-up HCI research to address. Second, it is inevitable that voluntary-based participation is likely to attract interviewees with an optimistic viewpoint to the topic. Should recruitment bots become more popular, it would be beneficial to run more quantitatively oriented follow-up studies.

We notice that in our findings, experiences and practical implications mainly focus on attraction bots, whereas the expectations and motivations also include other recruitment bot types. While expectations are arguably more speculative compared to actual experiences, we felt that adding the perspective gave a valuable opportunity to look at this topic more [broadly] covering different needs and functions in recruitment.

5.3 **Future work**

Our approach was explorative and as such it provides several directions for future research. We encourage other scholars to continue exploring this area from different viewpoints, for example by focusing on a certain type of recruitment bot or by more systematically analyzing the possibilities and limits of recruitment bots in the context of specific professional domains or cultural contexts. This has already been done to some extent with Juji interview bots (Xiao *et al*. 2019; Zhou *et al*. 2019) but customer service bots and attraction bots remain understudied to this end. Importantly, as recruitment bots are becoming more prevalent, job seekers' perceptions would warrant more extensive research, preferably by focusing on a specific type of recruitment bot.

6 Conclusions

Various types of chatbots used in recruitment represent an emerging form of e-recruitment systems that can help recruiters to attract potential applicants, partly automate the communication with them, and gather basic applicant information. The activity context, i.e., the inherently delicate, dynamic, and high-stakes recruitment process, contrasts with the use of chatbots in many other application areas and questions the effectiveness and appropriateness of conventional chatbots in this area. Prior HCI research has highlighted the need to study chatbot solutions in different contexts, especially focusing on the unheeded perspective of the recruiter. In order to understand the related motivations, needs, expectations, and early experiences, we conducted 13 expert interviews with people who are already using, developing, or planning to deploy recruitment bots in the near future. The initial experiences revealed interesting new dynamics and tasks related to the design of recruitment chatbots and the scripted conversations. Especially attraction bots that collect application information should be considered in relation to other e-recruitment channels in order to reach the most suitable target audience and, hence, yield most value considering the general interests of recruitment. As one the first qualitative studies on the utilization of recruitment bots, the study offers timely insights for both the designers of chatbots and the organizations intending to deploy such in e-recruitment activities.

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