

Mobile Recruiting Beyond Job Search: A User-Centered Approach for Smartphone-Based Job Applications

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Abstract—This paper presents a user-centered approach to identify user requirements for smartphone-based job applications. Initial user requirements were derived from a questionnaire within a smartphone-affine user group. The survey findings were then used to generate low- and high-fidelity prototypes of a mobile app supporting job applications. The prototypes were tested to collect user feedback and to improve their functionality and usability. As a result, some key recommendations for the implementation of smartphone-supported job application processes can be presented at the end of this paper.

Keywords—*Mobile recruiting; mobile job applications; user-centered design; mobile application; mobile usage behavior.*

I. INTRODUCTION

According to the GSM Association, worldwide mobile Internet penetration reached 44 percent at the end of 2015 and is predicted to grow to 60 percent of the world population by the end of the decade in 2020. In the same time period, mobile Internet penetration is expected to increase from 66 percent to 77 percent in the developed countries [1]. The growth of mobile Internet changes user behavior and shifts information retrieval activities from desktop to mobile devices. In mid-2015, Google searches on mobile devices already exceeded those on computers in ten countries including the US and Japan [2]. Drivers of the development are a greater availability and affordability of smartphones as well as broadband mobile network infrastructures. Smartphone adoption rate in the developed world was already 65 percent of the connection base at the end of 2015 [1].

Smartphones connected to the mobile Internet can be used to access a wide variety of information for very different purposes. One field of application is the search for job-related information by job seekers. Access to this kind of information via smartphone depends on how the content and its presentation is adapted to the special requirements and limitations of mobile devices. Despite the considerable technical improvements achieved, mobile devices are still characterized by smaller displays, limited keyboards, as well as less processing power and memory compared to desktop computers. For this reason, the web-based offerings of job-related information like career websites and job portals need to be optimized for access by mobile devices to provide an adequate user or “candidate” experience. Another reason why this is business critical for employers is that search en-

gines like Google have started to consider mobile-friendliness of websites as a ranking factor [3]. Mobile-friendly web pages will appear higher on search results which corresponds with a higher chance to be recognized and clicked by mobile job seekers.

Responsive web design is one popular technical approach to provide an improved user experience of websites across multiple devices [4]. Besides this, the structure and the content needs to be adapted to the requirements of a mobile usage context (e.g., text adapted to shorter attention span). Another approach to provide a mobile-optimized candidate experience is to provide job-related information via mobile applications. Besides the device limitations mentioned above, the use of mobile technology can enable organizations to find new ways to attract or hire potential candidates. Examples are the use of QR codes in job advertisements to provide additional job-related information or to filter job offers by the jobseekers’ current location. The use of innovative mobile technologies for recruiting purposes is often referred to as “mobile recruiting”. More precisely, mobile recruiting can be defined as “... any organizational information provided for or delivered to a mobile device in order to attract and hire potential applicants and employees” [5]. It can be interpreted as a field of e-recruiting that deals with the challenges and opportunities of deploying mobile technologies along the whole “recruiting funnel”. This recruiting process begins with the use of mobile media to increase awareness of the employer brand and it ends with the support of the candidate’s application via mobile devices [6].

In contrast to the mobile recruiting activities for job search, the job application is a more interactive process. For example, candidates might need to submit comprehensive application documents to the prospective employer or want to include a cover letter to highlight particular qualifications for a job. Smartphone user interfaces are not designed for extensive text input or document management efficiently. This is why a mobile-optimization of the job application cannot be confined to the adaptation of the job-related content and its presentation. Rather, the complete application process has to be redefined and aligned for smartphone-based job applications.

Against this background, the aim of this study is to identify user requirements of such a mobile-optimized job application process. Following this introduction, the research background and objectives with regards to mobile job appli-

cations are discussed in Section II. The study's user-centered design approach is the subject of Section III before the key findings are presented in Section IV. The paper concludes with best-practice recommendations for the implementation of the mobile application process in Section V and the study's limitations and an outlook on further research in Section VI.

II. RESEARCH BACKGROUND AND OBJECTIVES

According to the results of a global IBM Work Trends Study from 2015, more than half of all job seekers (53 percent) used their mobile devices to search for a job. The most typical mobile job seekers' activities are the search for job postings (74 percent) or job-related information (55 percent) and to get job alerts (54 percent). Less common within the group of mobile job seekers is the use of mobile devices to express job interest (35 percent) or taking job-related assessments (18 percent) [7]. Use of mobile devices for job search also changed job seeker behavior. Job search with mobile devices is a less focused and planned activity than something that occurs incidentally and often done to fill waiting or idle time during the day. According to Jobvite [8], most of the job seekers (32 percent) spend between six and ten minutes on mobile devices for job searches. Common situations for mobile job search mentioned in this study are in bed (47 percent), during commute (38 percent), in a restaurant (36 percent), on the job (30 percent), during a meeting (21 percent) and even in the restroom (18 percent).

While job search via mobile devices is becoming more and more common, applying for a job using a smartphone is still less popular. With regard to the IBM study mentioned before, only 25 percent of the global employees who have used mobile in their job search also completed entire job applications on this device [7]. The user acceptance to apply mobile varies between countries. A recent study carried out by the job portal provider Careerbuilder reports that 9 percent applied for a job on a mobile device in the US but 14 percent in Germany. The main reasons to not apply mobile in both countries (US; Germany) are the lack of a full keyboard (53; 58 percent), too small screens (47; 44 percent), problems regarding the availability of a resume on the device (30; 21 percent), the creation of personalized cover letters (18; 25 percent) or the perception that this way of applying is too hard in general (19; 16 percent) [9][10]. This industry research shows that there is a gap between mobile job searching and application behavior and that there are some usage barriers which need to be overcome.

However, more detailed findings on user expectations and requirements as well as more concrete recommendations on how to design a mobile-optimized job application process are not revealed within these studies. Similarly, empirical knowledge and findings from scientific research on mobile job applications are still rare. Only few authors have identified mobile recruiting as an object for research or considered it to be a trend within e-recruiting during the last five years. The majority of these publications discuss the status quo [5], challenges and opportunities for HR and personnel recruitment [11][12][13][14] as well as factors influencing user acceptance of this new recruiting channel [15][16][17]. Some

more industry-oriented publications have analyzed mobile job seeker behavior [6] as well as mobile-optimization [18] or video-enhancement of job advertisements [19]. The authors of this paper are not aware of any article that has analyzed the user requirements for mobile job applications.

Summarizing the discussion above, it can be stated that there is a research deficit and a demand in practice to gain knowledge on the user-oriented design of mobile job application processes. In this regard, this study has the following three objectives:

- *Describe the status quo* of job applications via mobile devices from the employer and the candidate perspective: The focus is on early adopters and the group of young talents in Germany.
- *Identify basic user requirements* with regard to the mobile job application process and deduce some fundamental best-practice recommendations for a user-centric design of such a process.
- *Generate a prototype* for an app-based mobile job application support as a basis for initial user testing and feedback-based improvements.

As this work was conducted in cooperation with a job portal provider, the focus of this study was application-oriented research with the aim to generate scientific knowledge that can be applied in the further development of job portal systems.

III. RESEARCH METHODOLOGY

The previous section revealed that the support of job applications by smartphones is a relatively new topic and can be assumed to a certain extent to be unknown within the target groups of recruiters. In this situation, the identification of user requirements cannot be based solely on user surveys. For this reason, this study is built around a user-centered design approach. User-centered Design (UCD) can be seen as a "... methodology used by developers and designers to ensure they're creating products that meet users' needs" [20]. The basic idea is to involve users at a very early stage of the development to acquire information on users' expectations, behavior, and perceptions in order to continuously evolve and improve the product design in an iterative and interactive process [21]. A key element of UCD are prototypes. Prototypes demonstrate and visualize a design idea prior to implementation, enable user experiments with design variations, as well as clarification of user requirements. They are a communication tool between the different stakeholders in the product design and development process [22]. A UCD process can be structured in five phases: initial assessment, up-front user research, design and development, implementation, and market introduction [21][23]. The focus of this study is on the first three phases and thus the early stages within the UCD process.

- *Initial assessment:* In a first step, the general objectives and requirements need to be defined. The objective is to present a user-centered concept for an app that enables users to apply for jobs by smartphone. As there are already existing solutions to en-

able mobile job application, we started this study with an in-depth competitive user experience analysis [23]. For this purpose, the recruiting apps and websites of the 30 highest-turnover companies (2014) in Germany as well as 14 websites of job portals and 21 related mobile apps were analyzed. The objective of this initial assessment was to (1) outline the status quo on the implementation status in Germany, (2) identify components and process steps from the employer perspective as well as (3) best-practices and what to avoid with regard to the current implementation status.

- *Up-front user-research:* The results of the initial phase were then structured by using a morphological box approach [24]. The parameters of this box were defined by the identified components and process steps of a generic mobile job application process. Therefore, the employer-driven perspective from the initial assessment was extended and completed by a user journey for a mobile application process derived from expert discussion. As a result, a two-dimensional morphological box was created with process steps and components as a first dimension and a varying number of corresponding implementation variants as a second dimension. Each combination of implementation variants along the process steps and components represents a possible implementation of a mobile application process. The result was then used to identify areas where the knowledge of user preferences could help to reduce the number of implementation variants that need to be considered for prototyping and user testing. For this purpose, a questionnaire was developed and used to collect feedback on user preferences of young talents within the German job-applicant market. The questionnaire was distributed online and offline among media-affine students in Germany by using a convenient sampling method. The survey contained 29 questions on the participants' general job application behavior as well as experiences and expectations towards mobile job applications. The survey was actively distributed from December 7th to 30th, 2015 and resulted in a data sample of 382 participants.
- *Design and development:* The prototypes for user testing were generated in the last step of this study. Scribbles of screen designs were developed for each of the process steps and the user interface components along the generic user journey mentioned above. This was necessary to identify elements within the screen flow that can be separated from each other or need to be combined. The resulting library of user interface patterns was then used to deploy the empirical findings from the questionnaire to define user-oriented job-application process variants as a subject of further user testing. The process variants identified were then discussed with experts for job portals and transferred into first interactive high-fidelity prototypes using the mobile prototyping tool

proto.io [25]. Based on two prototype variants, demo videos were produced. This was in order to be able to present a standardized stimulus and to reduce complexity as it was not possible to generate an interactive prototype in this phase that supports all the features required for a realistic screen flow (e.g., cloud upload, text recognition). Each demo video was then presented to test users (18 and 17 participants) between January 20th and 22nd, 2015. Feedback was collected based on a questionnaire at the end of the sessions and used to develop improved prototypes summarizing the study's findings.

To sum up, on the basis of the above, the procedure presented can be categorized as a (sequential) multi-method or mixed-method approach combining qualitative and quantitative approaches. The study is focused on the early stages within a UCD process to generate knowledge about user requirements with regard to a smartphone-supported job-application process. Intended outcomes are a prototype visualizing the mobile-optimized and user-oriented mobile job-application process as well as best-practices or recommendations on how to fulfill user requirements.

IV. STUDY RESULTS

Following the presented approach and for the sake of brevity the presentation of the study's results, in this section, will focus on selected findings: (1) market analysis, (2) user survey and (3) key characteristics of the prototype.

A. Market Analysis

Only five of the analyzed career websites of the 30 highest-turnover companies in Germany support a mobile job application. In most cases (4), the applicants have to enter their profile data manually. Some of the employers (2) offer an option to import this data from (business-oriented) social networking services. Application documents can be uploaded from the smartphone (4). One company supports mobile applications and abstains entirely from additional documents. An option to upload from a cloud service was not offered by any website. Only three of the 30 companies offer a mobile app with an option to apply for jobs. Two of these apps support the creation of a candidate profile by text entry or import from social network providers. The findings demonstrate that mobile job applications are not yet of any great importance for German top employers. However, some innovators have started to test the applicability and possibilities of this new recruiting channel and integrated features beyond the traditional online application. Among those features identified in the analysis are video-based applications, options to give feedback on the application process, or include text recognition capabilities that reduce the necessity of extensive text entry.

The situation is slightly different for the job portals. Five of the 14 popular job portal websites investigated provide an option to apply via a mobile device. One without and four with the requirement of user registration. Application documents can be uploaded from the smartphone (4) or –again rarely supported– by cloud services (1). However, support of smartphone-based job applications appears to be a domain of

mobile apps from job portals and related service providers. Fifteen of the 21 apps analyzed offered such an option. Candidates can apply in different ways: directly without registration (5), after they have registered at a job portal (10), or by using an existing login from a social network (8). The picture is more mixed regarding the collection of candidate information. Most of the apps (9) required manual text entry for the profile data. Five apps offered an option to apply without resumes and cover letters. The support to submit additional candidate information of the other apps varied in terms of the type of documents between uploads, social network import or manual text entries.

The findings from the market research were consolidated with feedback from job portal experts and summarized in a list of fundamental mobile application components and implementation variants as presented in Table 1.

TABLE I. FUNDAMENTAL MOBILE JOB APPLICATION COMPONENTS AND IMPLEMENTATION VARIANTS

Login/Registration	No registration, register account, register with existing social network account (e.g., LinkedIn, XING)
Candidate Profile	None, text entry, import from job portal, import from social network profile
Photo	Camera, gallery, cloud upload (e.g., Dropbox), import from social media profile
Cover Letter	None, free text, predefined text templates and blocks, customizable text, text entry structured by questions, upload (non-editable), upload and text recognition (import for editing), video-based self-presentation
Submission	None, text entry, form, local upload, cloud upload
Resume	None, free text, text entry structured by questions, upload (non-editable), upload and text recognition (import for editing)
Submission	None, text entry, form, local upload, cloud upload, import from job portal, import from social network profile
Certificates	None, grades only, free text, scanned documents
Submission	None, text entry, form, local upload, cloud upload
User Control	None, confirmations, save and submit later
Guidance	None, status bar, tooltips, popups

These results of the market analysis were then used to define a questionnaire to identify user requirements and preferences with regard to the implementation variants as discussed in Section III.

B. User Survey

The questionnaire on the user preferences and requirements was completed by 382 respondents. As mentioned in Section III, the survey was conducted as a convenience sample and thus reflects more or less the demographics of the Media Management students at RheinMain University. The average age of the respondents was 22 years and 64 percent of the participants were female. The majority of the students are studying for a bachelor degree (78 percent) and 54 percent will graduate by 2017.

Almost all the participants own a smartphone (99 percent) with Android being the most used mobile operating

system (50 percent). Facebook is the most popular social network and 81 percent use it often or regularly. Business-oriented social networks are only used regularly by a very small proportion of the young talents (LinkedIn: 1 percent; XING: 2 percent). In this regard, it can already be assumed that importing candidate profiles from this type of social network –as is already offered by German career websites and job portals– is not an adequate option for this specific target group. Dropbox is the most common cloud service, regularly or often used by 63 percent of the participants (Google drive: 14 percent; OneDrive: 5 percent).

The majority of the young talents have experience with job applications: 39 percent have applied for a job within the last six months and 14 percent were currently seeking a job. Most of the jobs in scope are internships (30 percent), part-time jobs (24 percent) or working student positions (18 percent). About 70 percent send between one and five applications when seeking a job. Seventy-one percent manage to complete the preparation of a job application within one hour. The perceived importance of candidate information varies by type of document (important or rather important): resume (94 percent), cover letter (83 percent), certificates (77 percent), and photo (46 percent). The most popular platform to search for a job is still the desktop computer. More than half (54 percent) of the respondents stated that they always use a computer. Mobile devices are still less popular for job searches. A smartphone is always (often) used for job search by only 6 percent (22 percent) of the respondents.

The study participants had little or no experience with job applications via mobile devices. Less than one fifth (17 percent) had ever seen such an option and only 7 percent have already applied for a job from a mobile device. However, the low level of experience seems to be more a result of a lack of opportunities than a lack of interest. Half of the respondents are open-minded towards this new way to apply for a job. The majority of those who can imagine applying mobile stated that such an option is a contemporary requirement (79 percent), should be offered more often (61 percent), and can be expected from innovative employers (56 percent). The main reasons to use such an option are non-availability of computer access (79 percent), applying while being on-the-go (68 percent), to make an initial contact (67 percent), or if such an option is less complicated and more convenient to use (66 percent). Only 9 percent would apply via mobile if they could do so by submitting a video-based application.

The main causes of concerns with regard to applying with a smartphone are uncomfortable and awkward text entry (82 percent) as well as small screens (81 percent) and unreliable Internet connections (71 percent). Beside these more technical problems, the respondents are concerned with regard to limited possibilities for self-presentation (46 percent) and the acceptance of mobile job applications by HR departments (45 percent). With regard to the application documents, most of the study participants consider it likely that they would prepare a cover letter on the computer (72 percent) or make only small modifications with the smartphone keyboard (59 percent). Even short text entry was more accepted (37 percent) than relying on standardized text modules (18 percent) or always reusing the same cover letter un-

changed (15 percent). The most preferred option for uploading information was a local upload from the smartphone. This might be due to privacy concerns when uploading the documents via the Internet. With this regard it was a surprise that the study participants would rather upload from a cloud service (e.g., Dropbox) than use a job portal provider as a repository for their application documents.

C. Prototype

Prototypes were designed to acquire more knowledge on the submission of candidate information like cover letter, resume, and certificates that revealed to be critical for user acceptance based on the results of the user survey. In addition to a base case scenario, a prototype variant supporting “one-click applications” was designed. The prototypes were subject to user testing and improved based on the user feedback in two successive stages. The most important result from the prototyping phase was the requirement to provide a high level of guidance (e.g., show current and required steps for completion) and control (e.g., details of required documents and submission status). Unexpectedly, and contrary to the survey results, the majority (71 percent) of the participants refused to accept “one-click applications” after being exposed to the corresponding prototype. This might be due to the fact that the effort on the user side was quite similar for both prototype variants. Moreover, the one-click application function required some additional input for the personalization of a re-usable candidate profile. This is why the advantages of the one-click application for the user become apparent only when the candidate reuses the pre-prepared information for multiple applications. It turned out that a demo video to demonstrate the prototype functionality might be insufficient to convey such a user experience.

V. CONCLUSION

The growing shift of Internet usage from desktop to mobile devices puts increasing pressure on employers to provide a continuous mobile-optimized candidate experience over the entire recruiting process. Likewise applying for a job directly from a smartphone will become more and more common and expected especially by upcoming job seeker generations. Meanwhile, smartphone support can be introduced selectively to benefit from a potential faster response or lower barriers to submitting a job application. This study revealed important user requirements that have to be considered for a successful implementation:

- *Links to profiles in business networks cannot substitute the submission of application documents.* This is because business networks (e.g., XING, LinkedIn) are not very popular in the group of young talents investigated in this study.
- *Upload and cloud functions need to be integrated for document upload.* Candidates prefer public cloud services like Dropbox to a document upload to job portal providers.
- *Extensive text entry needs to be avoided but options for application document individualization are absolutely essential.* Usability can be increased by offer-

ing text recognition capabilities (to make documents editable) and pre-structured formats and layouts (e.g., resume).

- *Employers need to actively dispel candidates' reservations to apply via mobile.* Employers should reduce the uncertainty about the employer's acceptance of mobile applications by more actively promoting this new hiring channel.
- *Simplicity is the key.* Employers have to reduce the amount of required candidate information to the minimum necessary or allow “one-click applications” with pre-prepared documents. Again, the acceptance of such “streamlined applications” need to be actively communicated to the candidates in the job advertisements.
- *An elaborated user guidance through the application process is essential for usability.* Candidates need to keep control and keep track of each step in the application process. Due to the specific nature of mobile usage situations, the users must be able to interrupt and continue the application at any time.

Additional requirements for the implementation of a mobile application process need to be considered depending on the respective platform. Job openings published on corporate websites with singular candidate contacts might require a different approach for implementation compared to job portals with cross-company job offerings and recurrent users. A “one-click-application” for example requires the candidate to initially upload standardized application documents to be able to quickly respond to new job alerts. Therefore, from a user perspective, a “one-click-application” is attractive only for job portals or large enterprises with a high number of open positions matching the candidate's qualification.

VI. LIMITATIONS

This study was based on a convenient sample and can therefore not be considered to be representative. The data was collected in the environment of media-affine students. Therefore, it can be assumed that the results represent an early adopter group rather than the larger majority of young talents. Another limitation results from this study's focus on the user requirements with regard to the frontend interface on the smartphone. This is a gross simplification of reality as most of today's job offers and online applications are interfaced with backend systems for candidate management. Further research is needed on an appropriate design of backend systems and processes to deduce the implications of the user requirements presented here.

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