

Barriers to Mobile Government Adoption: An Exploratory Case Study of an Information Platform for Refugees in Germany

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Abstract: Mobile government (m-government) is considered one of the most important trends in e-government research. Citizens increasingly use their smartphones to organize their affairs and governments strive to leverage that trend with mobile applications. Especially in the context of the refugee crisis in Germany, m-government is expected to add value to the integration process. It is widely anticipated that m-government provides benefits for refugees compared to traditional e-government because of the prevalence of smartphones among refugees. Despite the high expectations of politics and public administration, the adoption of m-government services remains low and the expected benefits are often not being realized. To identify barriers and to develop measures to increase adoption, we conducted an exploratory case study on an m-government project for refugees in Germany. First, we reviewed literature, highlighting the necessity of differing between barriers of m- and e-government adoption. Second, we evaluated the adoption behavior of refugees of a particular mobile information platform. After introducing the application to randomly selected participants, we conducted interviews about their usage behavior one month later. We confirmed some of the barriers from our literature review and, in addition, identified new barriers. The study contributes to research on e-government non-adoption by highlighting differences and similarities between e-government and m-government non-adoption as well as identifying new barriers.

Keywords: digital government, information technology, user study, non-adoption, migrants

1. Introduction

1.5 million refugees have arrived in Germany since 2015 (Federal Office for Migration and Refugees, 2018) and the influx of refugees continues due to unresolved conflicts in their countries of origin. By the end of 2017 over 71 million people worldwide were displaced according to the UNHCR (2018). The integration into a new society is not only a huge challenge for these people but also for the hosting municipalities. One particular challenge is the information processing (Kutscher and Kress, 2015, Schreieck et al., 2017a) for a large and increasing number of people with only limited human resources. Neither paper-based documents nor governmental websites could solve this problem in the past. Shortcomings of these solutions were language barriers and the problem that not all relevant information was bundled in one channel but provided by different stakeholders (Schreieck et al., 2017a).

More and more municipalities want to solve this challenge by providing information through mobile applications. However, especially smaller municipalities in Germany often lack IT knowledge and budget to realize such projects (Jakob and Krcmar, 2018). Furthermore, regardless of the alleged advantages of m-government, in practice, it becomes apparent that many services are not used by the citizens to the expected extent (Krcmar et al., 2016). The assumed demand and the actual use seem to contradict each other, which means that the benefits of m-government have hardly been realized so far. Literature already contains various publications on barriers to e-government adoption in general (Distel and Ogonek, 2016), special concepts such as e-participation (Zepic et al., 2017a; Zepic et al., 2017b), and also with a focus on services in Germany (Krcmar et al., 2017). Yet, the characteristics of m-government and specific cases among which the adoption barriers may differ remain largely unconsidered. Based on this issue, our paper will investigate the research question of which barriers can prevent the adoption of m-government in general and in the specific case of an information platform for refugees.

In order to answer the research question, we followed a qualitative approach consisting of a literature review and a case study. In section 2, we will present the concept of m-government, including definitions and expected benefits in the context of the current refugee situation in Germany. Section 3 describes our methodology. After a summary of the e-government adoption barriers derived from literature in section 4, section 5 and 6 present the findings of this paper. In section 7 we compare our findings from literature with those of our case study. The paper ends with the conclusion, limitations and a research agenda in section 8.

2. Expected Benefits of M-Government

According to Akkaya (2016, p.29), a commonly used definition of e-government is the so-called Speyer definition (Lucke and Reineremann, 2000). It defines e-government as “the business activity of public administrative agencies in correlation with the governance and administration reliant upon information and communication techniques under participation of citizens and internal administrative communication partners”. While this definition does not define the channels through which e-government services are accessed, Kushchu and Kuscu (2003, p. 254) consider in particular the provision of services “through wired networks with interactive and relatively intelligent web applications”. Carroll (2005) also defines e-government as the electronic provision of information at stationary locations.

M-government, on the other hand, is seen as subset (Kumar and Sinha, 2007), complementary (Kushchu and Kuscu, 2003), extension (Shareef et al., 2012), value added (Trimi and Sheng, 2008) or further technological evolutionary step (Zepic et al., 2016) of e-government. Frequently quoted (Abu-Shanab and Abu-Tair, 2014, Isagah and Wimmer, 2017, Palka et al., 2013) is the following definition of Kushchu and Kuscu (2003, p.254): “[M-government is the] strategy and its implementation involving the utilization of all kinds of wireless and mobile technology, services, applications and devices for improving benefits to the parties involved in e-government including citizens, businesses and all government units.”

First mentioned in the early 2000s, the understanding of m-government has significantly changed with the technological development. Before the time of mobile Internet, m-government applications were mainly SMS-services (Ghyasi and Kushchu, 2004) and GSM-based data transmission (Franz, 2005). In earlier articles, personal digital assistants (PDAs) are often reported as mobile devices for m-government applications (Carroll, 2005, Kushchu and Kuscu, 2003, Trimi and Sheng, 2008). Today, m-government is mainly associated with Internet-based applications via smartphones or tablets (Albeshar and Stone, 2016, Zepic et al., 2016).

Zepic et al. (2016) argue with regard to Germany that the concept of m-government has several benefits compared to conventional e-government. This includes, for example, simplifying, improving or facilitating administrative processes. Moreover, smartphones allow continuous availability and interaction of the respective services (Albeshar and Stone, 2016). Thus, both articles assume a high demand of m-government among the population. Smartphones play also an important role for most of the refugees, both before and after their arrival in Germany, regardless of their country of origin, level of education or financial background (Brücker et al., 2016) - a finding that has been confirmed in numerous studies on the media use of refugees (Emmer et al., 2016, Kutscher and Kress, 2015, Mason and Buchmann, 2016). Around 90% of the refugees in Germany have access to a smartphone (Emmer et al., 2016) but only very few to a computer (Kutscher and Kress, 2015). It is therefore assumed that the smartphone is the preferred communication channel compared to governmental websites or printed materials. M-government has thus a lot of potential in this context; however, identifying and overcoming adoption barriers still can improve it.

3. Methodology

In order to answer our research question, we first conducted a literature review based on vom Brocke et al. (2009), and second, embarked on a case study on an m-government project for refugees in Germany.

For the literature review, we built on the study by Distel and Ogonek (2016), which examines barriers to the use of e-government. We combined their search terms with different spellings of m-government and used the following keywords in a search string: Mobile government, mGovernment, mobile-government, mGov, mobile e-government, non(-)usage, non(-)adoption, (technology) refusal, failure, barrier(s), obstacle(s), non-use, non(-)acceptance, inhibitor(s) (to), (technology) rejection, usage intention(s). We then applied these keywords to the databases Scopus, Springer Link, IEEE Xplore and Google Scholar. By reviewing title and abstract, we identified 91 relevant articles and another 21 through backward and forward search. Results that have been discussed by Distel and Ogonek (2016) have not been considered since the mentioned barriers are already summarized and presented in the following chapter. After a complete review, 13 articles proved to be relevant to answer our research question. Since we could not find any exploratory case study regarding barriers to m-government adoption as a methodological model, we chose the following approach.

For our case study, we selected the “Integreat-App”, a mobile platform to provide local information for refugees. The application was created by an NGO, launched in 2015 and is currently used in 44 German municipalities (August 2018). The platform is managed centrally, whereas the content itself is provided by local authorities (Schreieck et al., 2017a).

To evaluate the usage of the application we conducted interviews, observation and content analysis. We initially assumed that lack of awareness would be a main barrier, so we first explained the concept of the application to 31 participants from three different German cities and four countries of origin (Afghanistan, Eritrea, Somalia, and Syria). They were randomly selected and contacted with the help of local volunteers. The respondents had a short time to familiarize with the application. We then used a questionnaire to obtain general information about the participants including a first impression about the Integreat-App. After the survey, we recorded observations and experiences in form of field notes.

One month later, we re-contacted the participants and conducted 10 evaluable interviews about their usage or non-usage behavior of the application. The interviews were transcribed and evaluated according to the content analysis process model and the method of inductive category building of Mayring (2015) which means the derivation of categories directly from the material and not in advance by certain theories. We conducted the surveys in the first round and the telephone interviews one month later in German, which occurred in language difficulties in some cases. We solved this issue with the help of other participants with the same native language but a better German level in the first round and the help of text messages during the interview sessions.

4. Barriers to E-Government Adoption

In order to highlight the differences between the barriers of e-government compared to m-government and to better classify our own findings, we chose to first present the results of the literature research of Distel and Ogonek (2016) on adoption barriers regarding e-government. They divided their findings into six categories.

The first category consists of technological barriers. Here, security concerns and risks in data privacy were identified. The second category refers to socio-economic barriers, often related to the digital divide, and described as access gap through poverty and geographically isolated areas (Hellström, 2011). This gap arises through different factors including age, education, employment status, and income. Moreover, variables such as ethnicity, gender, computer experience, IT resources and place of residence are mentioned. There are two different forms of this gap: first, differences in accessibility and second, differences in the ability to use e-government services. Distel and Ogonek (2016) also classify the financial barrier that can arise from the costs of using e-government in this category. The third category are communication barriers, which mainly include a lack of awareness, their advantages, and a lack of knowledge in the handling of the services. The fourth category are cultural barriers. These include differences in the acceptance behavior due to cultural factors and peculiarities (Schreieck et al., 2017b). Confidence in e-government services as well as in the political system, traditions, lack of interest and fears of Internet use were cited as reasons for non-use. Individual barriers are a very broad category according to Distel and Ogonek (2016) including preferred personal contact with the administration, lack of time and interest, habits and no individual benefit from the use. The last category mentioned are service-related barriers. The complexity of some processes involves problems and the need to interact with a person employed in public administration.

5. Barriers to M-Government Adoption according to the Literature

We divided the identified barriers into technical and non-technical barriers based on Al-Hadidi and Rezgui (2010) and then classified them into sub-categories. We found all of the previously presented barriers on e-government in our own review but decided to create more detailed sub-categories as presented in table 1.

Table 1: Barriers of M-Government according to the Literature (own representation)

Category	Sub-Category	Source
Technical Barriers		
Infrastructure	Lack of infrastructure development	(Al-Hadidi and Rezgui, 2010, Abu-Shanab and Abu-Tair, 2014, Albeshar and Stone, 2016)
Compatibility	Lack of compatibility between existing (e-government) systems and mobile devices	(Al-Hadidi and Rezgui, 2010, Hellström, 2011, Hung et al., 2013, Abu-Shanab and Abu-Tair, 2014, Albeshar and Stone, 2016)
Limitation of Mobile Phones	e.g. screen size, memory space, processor capacity	(Hellström, 2011, Alrowili et al., 2015)
Non-Technical Barriers		

Privacy, Security Concerns	Protection of privacy, fear of identity theft	(Al-Hadidi and Rezgui, 2010, Abu-Shanab and Abu-Tair, 2014, Ohme, 2014, Alrowili et al., 2015, Albeshher and Stone, 2016)
Trust	Lack of trust in security or contents of m-government, fear of surveillance	(Al-Hadidi and Rezgui, 2010, Hellström, 2011, Alrowili et al., 2015, Albeshher and Stone, 2016)
Laws and Regulations	Lack of privacy policy	(Al-Hadidi and Rezgui, 2010, Hellström, 2011, Shareef et al., 2012, Hung et al., 2013, Abu-Shanab and Abu-Tair, 2014, Alrowili et al., 2015)
Digital Divide	e.g. language, age, gender, income, level of education, place of residence, disability	(Al-Hadidi and Rezgui, 2010, Hellström, 2011, Shareef et al., 2012, Hung et al., 2013, Abu-Shanab and Abu-Tair, 2014, Albeshher and Stone, 2016)
Costs	Costs for (mobile) Internet/WIFI, fees for the use of m-government services	(Al-Hadidi and Rezgui, 2010, Hellström, 2011, Hung et al., 2013, Abu-Shanab and Abu-Tair, 2014, Bakar et al., 2016, Isagah and Wimmer, 2017)
IT-Skills	Lack of required IT-skills	(Al-Hadidi and Rezgui, 2010, Albeshher and Stone, 2016)
Cultural Differences	Different acceptance factors of m-government due to cultural influences	(Shareef et al., 2016, Shareef et al., 2014)
Awareness	Lack of awareness regarding benefits	(Hellström, 2011, Abu-Shanab and Abu-Tair, 2014, Bakar et al., 2016, Isagah and Wimmer, 2017)
Time	Perceived loss of time	(Ohme, 2014)
Willingness	Lack of willingness to try services, "resistance to change"	(Al-Hadidi and Rezgui, 2010)
Information Quality	Information and content are not adapted to the location and requirements of the target group	(Bakar et al., 2016)
Competition	Competing against commercial applications	(Sahu and Singh, 2017)

5.1 Technical Barriers

The first barrier preventing the use of m-government is infrastructure. According to Al-Hadidi and Rezgui (2010), infrastructure in the context of m-government means access to services with mobile devices via a wireless connection. Too low bandwidth and slow download speeds are also mentioned (Abu-Shanab and Abu-Tair, 2014). Albeshher and Stone (2016) emphasize that weaknesses in infrastructure development are nowadays largely overcome in Western countries but still represent an obstacle in developing countries.

The second barrier is the lack of compatibility between existing e-government services and mobile devices (Al-Hadidi & Rezgui, 2010) and between different platforms (Hellström, 2011). Hung et al. (2013) mention display problems due to different screen sizes and shapes.

The last identified technical barriers are limitations of mobile devices. In literature, this barrier is characterized by screen size, complicated handling (especially with older devices), limited memory space and performance of mobile phones (Alrowili et al., 2015; Hellström, 2011).

5.2 Non-Technical Barriers

In this category, concerns about privacy protection and security (Abu-Shanab and Abu-Tair, 2014; Al-Hadidi and Rezgui, 2010; Ohme, 2014), as well as identity theft (Alrowili et al., 2015) can be found. Albeshher and Stone (2016) emphasize that m-government poses a higher risk than e-government, as devices can be stolen or get lost more easily. This barrier often goes hand in hand with the lack of trust in the respective service. This is expressed according to Ohme (2014) in a lack of confidence in the provider of a service, both in terms of security concerns and in the content itself. Hellström (2011) reports an example in Uganda where, during riots, the government

tried to reassure citizens via SMS but they did not trust the source of the information. Fear of surveillance also falls under the category of trust (Alrowili et al., 2015).

A further important barrier is the lack of data protection through laws and regulations (Al-Hadidi and Rezgui, 2010; Alrowili et al., 2015) or an information security policy (Hung et al., 2013). Many countries lack such laws (Abu-Shanab & Abu-Tair, 2014), which might spark security concerns among users (Shareef et al., 2012).

The digital divide, as presented in the previous chapter, seems to be reduced by m-government (Shareef et al., 2012), but still remains an adoption barrier that cannot be neglected (Albeshar and Stone, 2016). One important factor are costs for using m-government services such as costs for mobile Internet or WIFI (Abu-Shanab and Abu-Tair, 2014; Hung et al., 2013). Hellström (2011) and Isagah and Wimmer (2017) mention examples of m-government where the use of the service itself is fee-based. Another barrier is the lack of IT skills (Al-Hadidi and Rezgui, 2010; Albeshar and Stone, 2016). Lastly, the accessibility barrier for disabled people was mentioned by Hung et al. (2013).

6. The Case of a Mobile Information Platform in Germany

In the first survey phase, the application was personally introduced to the participants and installed together on the smartphone. 29 of 31 respondents had never heard of the Integreat-App and none of them had previously installed it on their smartphone. 28 people found the application helpful and 26 people planned to use it in the future. Two participants did not plan to use the Integreat-App further due to lack of time.

Directly after the survey, field notes about the observations were prepared in order to capture barriers, which could not be found via a questionnaire or an interview. Some participants had a smartphone with an operating system too old to download the application, insufficient memory or battery capacity for the installation process. It also happened that the existing Internet connection was too slow to download the service. Regarding non-technical barriers, the language barrier was the most prominent. Even if the content of the application was available in the native language of a refugee, a lack of German skills appeared as a barrier. This became apparent when the use or benefits of the application were not understood properly. One person turned out to be illiterate. The last barrier that we observed was a lack of knowledge about the technical use of the smartphone. Some participants did not manage to download the application without help.

The findings of the interviews one month later can be roughly divided into four sub-categories. The first area is the lack of understanding of the application and the language barrier. Both respondents whose statements fall into this category have uninstalled the Integreat-App; as far as can be seen from the interviews, the application was not used before. Further statements of those who understood the idea of the application have been summarized on the barrier of missing individual benefits. The interviewees are familiarized with the application but do not see personal benefits. This is closely related to the barrier lack of time when respondents claimed that they had no time to use the application. All three people who made this statement had not deleted the application from their smartphone, and one respondent turned out to be an occasional user. The last subcategory summarizes statements why the application was uninstalled. Reasons such as switching to a new smartphone, rebooting the operating system or accidentally deleting the application were mentioned. Finally, one interviewee misunderstood that the Integreat-App is associated with personal on-site support and asked for an office. In this case, we assume that personal contact is preferred to app-use.

7. Comparison Findings of Literature and Case Study

We identified most of the barriers of our literature review in the case study but also found additional barriers. In the following, we compare some key findings that emerged during our case study with the barriers from our literature review and present a complete overview in table 2.

The barrier of lack of awareness of m-government is mentioned in the reviewed articles but did not emerge as significant as in our case study. Except for two participants, nobody had heard of the Integreat-App before the evaluation. This result was expected in one of the three municipalities, as the application was not available and advertised there before the time of the survey. In the other two municipalities, the Integreat-App had been online for six months at the time of the survey and was actively promoted through print material in a shared accommodation where one of the surveys was conducted. Without the recommendation of the application through personal contact this barrier remains a main obstacle.

The digital divide, which is suspected even higher among refugees (Alam and Imran, 2015), was also observed in the case study, in particular, the language barrier. Although the Integreat-App is available in different languages, an effect of the knowledge of German on the use of the service was recognized. Those people with profound German language skills understood the advantages of the application better than other participants and were willing to use it more often. Thus, the participants had different access to m-government offers. One aspect of the infrastructure barrier is the lack of Internet-access. Despite mobile Internet and offline functionality of the application, this represents an obstacle as the willingness to download the application on the smartphone is reduced.

Some frequently mentioned barriers in literature research have not been confirmed in the evaluation of the present work which can be explained by the nature of the application itself. This applies in particular to the categories of privacy and security concerns, legal regulations, and costs. Nonetheless, other factors, such as costs for mobile Internet or hardware, could not be identified as possible usage barriers. This may be explained by the fact that smartphones are already frequently used for other services like social media by the evaluated group.

The format of the smartphone application itself represents a barrier that was observed during our case study. Mason and Buchmann (2016) recommend therefore working with platforms that are already known.

Table 2: Comparison of Findings (own representation)

Barrier	Literature	Case Study
Technical Barriers		
Infrastructure	x	x
Compatibility	x	
Limitations of Mobile Phones	x	x
Non-Technical Barriers		
Privacy, Security Concerns	x	
Trust	x	x
Laws and Regulations	x	
Digital Divide	x	x
Costs	x	
IT-Skills	x	x
Cultural Differences	x	x
Awareness	x	x
Time	x	x
Willingness	x	x
Information Quality	x	
Competition	x	
Language Skills		x
Format Smartphone Application		x
Lack of Individual Benefits		x

8. Conclusion

In order to exploit the benefits of e- and m-government it is important to know the barriers that can prevent users from using such services. In our paper, we showed that m-government could both reduce barriers known from e-government and add additional barriers, especially in the context of refugees in Germany, where higher usage barriers appear, mainly due to the language barrier. By specifically removing the barriers identified in our paper, m-government use might be increased and so develop its full potential. For municipalities the platform-based approach of Integreat has several advantages compared to an own m-government solution (Schrieck et al., 2017a). Although we noticed that a digital platform cannot replace personal contact, its use could be increased by including it during asylum counselling sessions.

Some statements and results from literature research and evaluation, however, must be critically assessed with regard to their significance. It should be mentioned that some articles have examined very different applications in different cultures. The results thus represent barriers to m-government use in general, but do not necessarily represent barriers to m-government use regarding a specific region or service.

In a next step, it appears to be interesting to conduct more case studies, in relation to other applications, and also to other target groups and regions. We perceived differences within the characteristics of individual barriers, such as the motivation to use the application or the German language level by refugees from different cultural backgrounds. It may be of interest to find out to what extent the motivation and barriers of m-government use depend on cultural factors or whether there is a connection to the chances of permanent residence in Germany due to the country of origin.

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