Bachelor thesis

Usability and experience of cross-border digital services

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14-06-2019

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USABILITY AND EXPERIENCE OF CROSS-BORDER DIGITAL SERVICES

Abstract

Not all European countries currently meet the standards for a user-friendly eGovernment system that can be used by foreign citizens. Still, the EU commission has strived to have a single digital market for all EU countries (Digital single market, 2018-b). An important point they focus on is to implement connection between countries and cross-border mobility such that public services can be delivered across borders. Research on eGovernment services is needed because there is a lack of information on what and where the difficulties are that obstruct foreign citizens from using eGovernment services successfully. The aim of this exploratory research was to investigate and get better understanding of the difficulties that people face when moving from one-country to another while using eGovernment services. By performing a user journey analysis, interview and scenario test, different difficulties are identified. This in order to explore the unknown difficulties and needs of citizens. Major findings in this study included steps that need to be performed when moving abroad, availability of touchpoints, problems encountered while moving abroad and recommendations on how to improve eGovernment services. Problems encountered included insufficient skills of user, language barriers, lack of availability, usability problems and cultural differences. By mapping people's difficulties, insights are obtained on what issues need to be addressed in order to improve eGovernment services on a digital level and ultimately facilitate cross-border interaction in the EU.

Key words: Cross-border, Digital services, eGovernment, Usability.

1. Introduction

Many people move to another country for different purposes, like economical, ecological, political and social purposes (Eurostat, 2018). When they do, they need to take steps to successfully move from one country to another. By doing this, migrants often face bureaucratic and time-consuming procedures (Gouscos, Mentzas, & Georgiadis, 2001). Citizens often rely on online content provided by the government to get access to the needed information on for example; taxes, housing etc.

eGovernment, the abbreviation for electronic government, can offer the needed information and help to make procedures less complicated. eGovernment is defined as the use of technological communication means as e.g. websites and mobile apps by the government to provide services and information to citizens (Ntulo & Otike, 2013). It is an ICT service of the government that is used to make services and information available to all citizens and has been designed to make government policy as efficient as possible (Fod economie, 2019). Key functions of eGovenment include providing efficient services, simplifying regulations, improving citizens participation and trust and saving costs for government and businesses (Ntulo & Otike, 2013). Activities include for example extensive information provision on policy by use of technology and more specific by use of web-based internet applications (Ntulo & Otike, 2013). A well-functioning eGovernment system is important because many people use this service and see it as the primary source to successfully move to another country (Ntulo & Otike, 2013).

At this moment, every country in the EU has a different implementation of eGovernment. Some are more advanced than others. Still, the EU commission has strived to have a single digital market for all EU countries (Digital single market, 2018-b). An important point they focus on is to implement connection between countries. Also, cross-border mobility which can be defined as the extent to which people can use services outside their country (Digital single market, 2017-e) should be implemented such that public services can be delivered across borders. In the next part, eGovernment in its current situation and the accompanied challenges will be outlined. Subsequently, needs and difficulties of citizens will be presented and lastly the aim of this research will be explained.

1.1 Tallinn declaration

To achieve the accessibility of the digital services and improve above mentioned issues regarding cross-border usability of eGovernment services, the European union approved the Tallinn declaration on eGovernment on the 6th of October 2017 (EU2017.EE, 2017). This declaration continues the vision of the Malmo declaration of 2009 to modernize public administration and deliver cross-border services (Digital single market, 2017-e). The declaration states that between 2018 and 2022 the goal is to tackle the objectives and reach the vision and principles of the EU eGovernment action plan. The overall vision of this declaration is; 'strive to be open, efficient and inclusive and providing borderless, interoperable, personalized, user-friendly, end-to end digital public services to all citizens and businesses' (EU2017.EE, 2017).

1.2 Current situation

Still the goals of the Tallinn declaration are far from being achieved. There is a wide variety on how well EU countries are able to implement digital eGovernment successfully in the population (Digital single market, 2017-d). Top performers in achieving a digital single market are; Estonia, Malta, Denmark, Sweden and Norway. Performance is measured by different aspects as; cross-border mobility, which is an important goal. EU countries score less on this benchmark. This according to the fact that there are still linguistic and communication barriers that are encountered when a foreign citizen is using the digital services (Digital single market, 2017-d).

One problem stated by the European commission is that national services are more advanced than cross-border services when it comes to availability and usability of eGovernment services (Digital single market, 2018-c). For national services in the European Union, online availability to citizens reached 83% and for citizens abroad only 64%. Also for usability, defined as "the extent to which a product can be used by specified users to achieve specific goals with effectiveness, efficiency and satisfaction in a specified context of use" (Jokela, Iivari, Matero, & Karukka, 2003) national services are more advanced. For usability national services reached 88% while cross-border services only reached 68% on usability of content. For example, the national services contained more opportunities for feedback (like an online chat service) and opportunities for online support compared to the cross-border services.

1.3 Needs and difficulties for migrants when moving to other country

Unsatisfied needs have been recognized by the government among foreign citizens with regard to the use of eGovernment services. These include the opportunity for digital communication with the government and proactive services (Rijksoverheid, 2017). Additionally, other needs include no unnecessary repetition of data provision by citizens, reduction of administrative burden and open access to data (Rijksoverheid, 2017). To improve this, it is proposed to identify unnecessary burdens for cross-border services and to optimize data provision for these citizens.

According to the European commission, to commit to the needs of citizens regarding the use of eGovernment services, principles of user-centricity should be taken into account when people try to complete steps that need to be taken while moving abroad (Digital single market, 2018-c). These include digital interaction, no administrative burden, digital delivery of public services, engagement of citizens, and a mechanism for redressal of complaints.

To enable accessibility to these digital content to all European citizens, different aspects should be taken into account, by not only including different language interfaces, but also take into account social cultural and experiential backgrounds of the migrants to enable borderless interaction and share information world-wide (Bridge-it, 2012). Nevertheless, the cross-border services of many

countries are still in need of development and further research is needed to improve the above- mentioned aspects.

1.4 Aspects affecting cross-border interaction

Culture and background of an immigrant influence the usability of cross-border interaction and digital services. For example, values attitudes and traditions who can differ in particular cultures, can shape the understanding of people on website content (Denman-Maier, & Parycek, 2003).

A way in how culture influences usability is through the six cultural dimensions of Hofstede (2005). These dimensions map cues of different cultures and enable to compare cultures. The six dimensions include; power distance, individualism, masculinity, uncertainty avoidance, long-term orientation and indulgence. Multiple studies have been conducted regarding these dimensions with respect to usability and showed that implementing cultural dimensions into websites increases usability (Downey, Wentling, Wentling, & Wadsworth, 2005; Díaz, Rusu, Pow-Sang, & Roncagliolo, 2013) .

Thus, we see that dimensions are important to consider while inspecting the usability of the eGovernment services. They also show the importance of understanding the journey that the user makes to identify where improvements can be made. Cultural differences should be incorporated in the design of eGovernment services to enable foreign citizens to use it successfully. Still, the aim is to make interfaces of eGovernment insensitive for cultural differences and make it as usable as possible for all people.

1.5 Research

Research on eGovernment services is needed because there is a lack of information on what and where the difficulties are that obstruct foreign citizens from using eGovernment services successfully. As mentioned above, major improvements can be made in use of eGovernment such as in availability and usability of services. By identifying the difficulties, problems can be tackled, and the government can provide citizens with accessible information and services online. The aim of this exploratory study is to investigate and get a better understanding of the difficulties that people face when moving from one-country to another while using e-government services. This in interest of facilitation of cross-border interaction and free movement of people in European countries. By mapping people's difficulties, insights could be obtained on what issues need to be addressed in order to improve eGovernment services and ultimately facilitate cross-border interaction in the EU.

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Since little is known in existing literature about the difficulties people face while moving abroad, this research will identify them by performing a user journey analysis, interview and scenario test. This in order to explore the unknown difficulties and needs of citizens. The formulated research question is; What are the difficulties that people face when moving from one-country to another, for work related reasons, while using e-government service?

2.informed user journey

The aim of this journey analysis was to explore if steps could be carried out through different touchpoints by looking at various websites of European governments. The composed user journey map is presented in Table 1. In this map, the goal of the user was to successfully move to a European country. In the horizontal line of the table, the steps are represented. In the vertical line of the table, the touchpoints are represented. Further explanation about how the user journey is composed is explained in the following part.

2.1Touchpoints and identified steps

At first, steps that need to be performed by citizens to move abroad were identified by looking at the study of the EU commission (Tinholt, Carrara, Tol, Foley, Graux, & Erdogan, 2013) and various governmental websites. A study of the EU commission (Tinholt, Carrara, Tol, Foley, Graux, & Erdogan, 2013) identified general steps that foreign citizens need to perform to successfully move abroad. These steps included; Registering at the municipality and get a citizen's service number, arranging identification, arranging taxes, arranging health care insurance, Getting a residence/work permit or visa. Then, Governmental websites of different European countries like Rijksoverheid.nl (Rijksoverheid, 2017), government.fr (Republic France, n.d.) and nyidanmark.dk (New to Denmark, 2019) were consulted to see if these steps could be supplemented. The attached steps included; arranging a home address, arranging a bank account and legalising diplomas. These steps generally need to be performed to move abroad for work.

Also, the study of the EU commission (Tinholt, Carrara, Tol, Foley, Graux, & Erdogan, 2013) identified different touchpoint that are available when using eGovernment services of European countries. These touchpoints include any interaction with the user and in this case the government service (experience investigators, n.d.). 'Online' touchpoints include channels where actions can be fully completed by online services (for example an online application form). 'Offline' touchpoints include channels where actions could be fully completed by offline services (for example a service desk). 'Both' represents a combination of both offline and online touchpoints. Services can be subdivided into these categories of touchpoints. These categories of touchpoints are generalizable for services in different countries. Steps that need to be performed were tried to be completed on different government websites to explore the availability of different touchpoints.

The website of the European commission was used to find the government websites of various nations (Digital single market, 2019-a). These websites were then used to identify which touchpoints were available to complete the steps. For each step, another government website was used to get a broader view and explore available channels in government services of different nations. This was done to set ground for the interview scheme and scenario development.

2.2 Design of user journey

In this section, an explanation will be given on how the user journey was created.

2.2.1 Getting a residence/work permit or visa

Sometimes, requesting a visa is required to stay in a country for a certain time. Especially for people who live outside Europe (Auswaertiges-amt ,2019). For this step the website of the German government (Auswaertiges-amt ,2019) was consulted to see which touchpoints are available for performing step 1: getting a residence/work permit or visa. On the website, special attention was paid to keywords on residence. Then, a link was found on *entry and residence*. Information was found on visa regulations and how to apply for a visa. After consulting the webpage, it was found that this step could be completed by filling out an online application form, which includes an online touchpoint. Also, the step could be completed by downloading and filling out the visa application form on the Auswaertiges- amt (2019) website and send it to the relevant municipality. This includes a combination of both online and offline touchpoints because this action is not completed by only using web-based applications.

2.2.2 Arranging a home address

The second identified step was arranging a home address. Arranging this can be done by approaching realters through newspaper advertisements, websites etc. For completing this step, no government services have to be used. Therefore, the focus will be on the other steps.

2.2.3 Register at the municipality and get a citizen service number

The website of the municipality of Amsterdam (Gemeente Amsterdam, 2019) was consulted to see which touchpoints are available for performing step 3: register at the municipality and get a citizen service number. This step needs to be performed because a citizen's services number is needed for civilian affairs. On the website of Amsterdam (Gemeente Amsterdam, 2019) special attention was paid to keywords on immigration. By consulting the webpage on *immigration*, information was obtained on available touchpoints. It was found that you can register at the municipality of Amsterdam via the call service of the registration agency or at the city hall and receive a Citizen service number. This includes an offline touchpoint as no web-based applications are used to finish this step.

2.2.4 Legalise diplomas

The website of the Dutch IDW (2019) was consulted to see which touchpoints are available for performing step 4: legalizing diplomas. This step needs to be performed to validate obtained degrees that are needed in particular jobs. On the website, special attention was paid for keywords on legalizing documents. By consulting the webpage on *diploma credential evaluation*, available touchpoints were found which included going to the IDW (2019) website and download the request form and sent both the certificate and request form to the institution via e- mail. This includes an online touchpoint because the action can be completed by web-based applications.

2.2.5 Arrange health care insurance

For this part the website of the Ehic (n.d.) was consulted to see which touchpoints are available for performing step 5: arrange health care insurance. This step needs to be performed to ensure that healthcare insurance is arranged. On the website, special attention was paid for keywords on residence. Then, a link was found on *entry and residence* were information was found on touchpoints. To arrange health care insurance, it is needed to apply for an European health insurance cart at the Ehic website and fill out the online application form. This includes a online touchpoint because the step can be completed by a web-based application.

2.2.6 Arrange Identification

For this part, the website of New in Denmark (2019) was consulted to see which touchpoints are available for performing step 6: arranging identification. This step needs to be performed if you possess a residence permit and want to apply for a passport. On this webpage, special attention was paid to keywords on applying for identification. On the webpage named *How to Apply* was found that it is needed to fill out the online application form and appear at the Immigration Service's Citizen to have biometric features recorded and apply for a passport. This includes a combination of both online and offline touchpoints because the step could not be finished by only using a web-based application.

2.2.7 Arrange a bank account

The seventh step includes arranging a bank account. To arrange a bank account, you need to consult a France bank office (Expatica,2019.) Because completing this step also does not involve eGoverment services there is focussed on the other steps.

2.2.8 Arrange taxes

For this part the website of the Federale overheidsdienst Financien (2019) in Belgium was consulted to see which touchpoints are available for performing step 8: arranging taxes. This step is performed to request tax return for foreign citizens who work in Belgium. This webpage immediately gives the opportunity to fill out the online request form for tax return which includes an online touchpoint because the step is completed by using a web-based application.

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Table 1

User Journey Map of General steps that need to be performed when moving abroad with examples

Stages	*1.Getting a residence/work permit or visa (Germany)*	*2.Arranging a home address*	*3.Register at the municipality and get a citizen service number (Netherlands)*	*4.Legalise diplomas (Netherlands)*
Touchpoints				
Offline			e.g. Register at the municipality of Amsterdam (Gemeente Amsterdam, 2019) via the call service of the registration agency or at the city hall and receive a Citizen service number.	
Online	e.g. Complete an online visa application at the diplo.de (Auswaertiges amt, 2019) website			e.g. Go to the IDW (2019) website and download the request form and sent both the certificate and request form to the institution via e-mail.
Both	e.g. Download and fill out the visa application form on the auswaertiges-amt.de (2019) website and send it to the relevant municipality.	Approaching realters through newspaper advertisements, websites etc.		

	5.Arrange health care insurance	*6.Arrange Identification (Denmark)*	*7. Arrange a bank account (France)*	*8. Arrange taxes (Belgium)*
Offline			E.g. Visit a branch and bring identity, address and residence status and ask to open a bank account. (Expatica, 2019)	
Online	E.g. Apply for a European health insurance cart at the Ehic website and fill out the online application form (Ehic, n.d.).		E.g. Choose one of the France's banks and fill out an online secure form and upload documents and signings online via the website of the relevant bank (Expatica, 2019).	E.g. Go to the website of the Federale overheidsdienst Financien (2019) and fill out the online request form for tax return.
Both		E.g. Go to the website New to Denmark (2019) and fill out the online application form and appear at the Immigration Service's Citizen to have biometric features recorded and apply for a passport.		

Note: Table 1 includes examples on how general steps for moving abroad can be completed in different nations and outlines which general touchpoints are available to complete the step.

3.Methods
Interviews

3.1Design

This part of the study was exploratory qualitative research. It included an interview survey design to explore the difficulties people face while using eGovernment services and get better insight into the needs of people while moving abroad. Primary outcome measures included difficulties found in moving abroad while using eGovernment services.

3.2Participants

The respondents in the interviews included two people who had experience with moving to another country for work related purposes. Respondent one, was male and aged 56. The respondent's country of origin was Albania and has moved to the Netherlands. Respondent two, was male and aged 55. The respondent's country of origin was the Netherlands and has moved to France. The sampling method used for the interviews was convenience sampling.

3.3Materials

The materials used during the interview included a standardized interview scheme (Appendix A) based on steps and needs in the use of eGovernment services found in the informed user journey analysis. At first, the identified steps in the informed user journey were added into the interview scheme. These included steps on how to move abroad. The identified steps were extracted from the results of the informed user journey and added to the scheme to refresh the respondent's mind on what they did to move abroad. After that, the following question was composed to identify difficulties participants experienced while completing the steps; 'Did you experience any difficulties while completing these steps?'.

The second part of the interview scheme included questions on touchpoints. These questions were created based on the results of the informed user journey were different touchpoints have been identified. Identified touchpoints included offline, online and both touchpoints. Questions on touchpoints were asked to see if there was a preference for offline or online touchpoints. This could suggest that eGovernment services are not available or insufficient.

The third part of the scheme included questions on overall satisfaction level. This to identify if important difficulties experienced by the respondent were missed during the interview. Demographic questions were developed to clarify age, the participants' country of origin and to which European country they moved to. Additionally, a recorder was used to capture the interviews.

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3.4 Procedure

At first, the respondents were approached for the in-depth interview. Questions were sent beforehand to enable the participant to have some time to think about how they completed the steps and give the needed information. In the beginning of the interview, respondents were informed about the study and asked to sign the informed consent. After approval, the respondents were asked some demographic questions on age. In the first part of interview, the steps on moving that have been found in the informed user journey were presented to the participant and asked if they experienced any difficulties while completing these steps. Then, a definition of touchpoints was given to the participant and questions on touchpoints in government services were asked. After that, general questions were asked about their overall experience in the use of government services. The participant was thanked for participating in the study and asked if they agreed with using their data for this research. The interviews lasted approximately thirty minutes and were recorded. The second interview was done via video-call.

3.5 Data analysis

Both the interviews were transcribed. After that, important citation and quotes were marked in the transcription. The interviews were both coded. Important sentences were highlighted and used to support the interpretations. A deductive approach was used to analyse the interviews. During the process special attention was paid to the needs and problems encountered by the respondent. Quotes of the interview were used because of the repetition of these themes in the interview and importance for the results of the study.

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4.Results

Interviews

The results of the interview are presented in Table 2. On the left side of the table, the codes and sub codes that were found are presented. Codes include barriers, cultural differences, process and recommendations. Sub codes include Language, use of touchpoints, knowledge, information lack, bureaucracy, organisation/ online linkages, use of touchpoints information sources, digitalisation, roles, touchpoints, information supply and digital services. Codes are ordered so that the most frequently encountered codes were placed above. Also, the thereby, associated example quotes of the interview are given in Table 2. In Appendix C an outline of all the relevant quotes can be found.

Table 2

Codes of Interviews with Example Quotes

Codes	Sub codes	Frequencies	citation
Cultural differences	Bureaucracy	4	'If you move to another province, you need to register everything again like registration at the chamber of commerce and tax authorities.'
	Organisation/ online linkages	4	'There is no population register. They cannot trace you if you live in France.'
	Use of Touchpoints	3	'A one-on-one conversation is important to us as we need to trust someone. Internet, we see as something unpersonal.'
	Information Sources	2	'If we want to know something, we do not search on the internet. We first ask our family.'
	Digitalization	2	'They have more than 90 provinces that are not linked to each other.'
Barriers	Language	7	'Sometimes, I feel ashamed about how texts are translated.

			Interpreters often come from different parts of the country where they have different dialects. People often do not understand what is written down.'
			'In France, they are chauvinistic. You need to speak French or bring you own interpreter.'
	Use of touchpoints	4	'You always encounter problems because online platforms are not available.'
	Knowledge	2	'The only thing they can do is read and write. They have no knowledge on how to use the internet.'
	Information Lack	1	'If an Albanese arrives at the municipality, they hear that information is not available.'
Process	Touchpoints	8	'An interpreter at the location, who explains everything to the immigrant will cost thousands of euros. It is a shame that this information is not available online.'
			'I often made use of offline touchpoints.'
Recommendations	Information Supply	5	'The government should start a conversation with several municipalities to discover what kind of questions are asked by people. What do they want to know? and how can we offer it?'
	Digital services	3	'It just takes a long time to arrange everything now. With digital services it could be done much faster.'

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4.1 Cultural differences

The first theme that was discussed was cultural differences. This theme included the differences between countries that influence the use of digital services and was mentioned sixteen times during both interviews. In the first interview it was encountered four times and in the second interview it was encountered ten times. The code was important as it was mentioned frequently. The first interviewee mentioned cultural differences that effected the use of digital services. These were dived into differences in information sources and use of touchpoints and roles. When looking at information sources, aspects could be mentioned like family as a source and absence of an embassy. An example quote here was; '*There is no embassy to ask questions as in Holland*'. In use of touchpoints subjects as preference for one-on-one conversations and use of internet (which they basically dislike) can be found in the interview. An example sentence was; '*If you recommend them to search for information on the internet, they will not do it*'. On roles, the male/female role distribution was discussed. Woman often do not get the opportunity to obtain knowledge about arrangements.

The second interviewee mentioned the bureaucracy and the endless repeated registration procedures while moving and the absence of a collective citizen database. An example included; '*If you move to another province, you need a new bank account. Everything needs to be arranged again*'. While discussing the digitalization, topics on underdevelopment of digitalization in France were discussed. At last, the absence of linkages between states and absence of a population register and overarching data system for performing tasks were mentioned.

4.2 Barriers

In the interviews, barriers where discussed. This code includes the problems that people encountered while moving abroad. This code was encountered fourteen times in both interviews. In the first interview it was encountered six times and in the second interview is was encountered eight times. The code was used because of its importance in the focus of the study and because it was mentioned frequently. The first interviewee pointed out different barriers that people face while moving abroad. At first, language barriers where mentioned during the interview. Thereby, factors on educational attainment, availability of information in native language and translation errors are referred to. An example quote of the interview was; '*People are not highly skilled. They do not speak the language well. Also, not the English language. That's why they do not search online*'. Also, knowledge barriers were mentioned, which included educational knowledge and knowledge on the use of internet that impede the use of digital services. An example quote that shows this was; '*People who are not high skilled, do not like to read so the barrier gets bigger*'.

In the second interview, the use of touchpoints was discussed. Topics that came up included the absence of online touchpoints and the long time it takes to arrange everything. An example from the interview was; '*Most villages in France do not have online platforms. Only big cities like Paris have it*'. While discussing language barriers, topics like availability of information in other languages, the problems you encounter when you do not speak the foreign language and the chauvinistic approach in France came up.

4.3 Process

While discussing the process, the main topic mentioned were the touchpoints. This included aspects that people encountered while moving abroad. The topic was mentioned eight times during both interviews. In the first interview it was encountered two times and in the second interview it was encountered six times. The code was important because it was frequently encountered. In the first interview, various touchpoints were mentioned that could come across while moving abroad. In this case the costs of offline touchpoints in form of a personal conversation and the start of the process were discussed. An example quote here was; '*An interpreter at the location, who explains everything to the immigrant will cost thousands of euros. It is a shame that this information is not available online*'.

In the second interview, touchpoints were also discussed. The topics that were mentioned included the absence of online services and complicated procedures online. An example quotes here was; '*Many villages have an online webpage with information about the city itself. But that is it. They often give information on how to get to an offline touchpoint*'.

4.4 Recommendations

Lastly, several recommendations were given by the interviewee. This included advice that was pointed to the government. The code was encountered eight times in both interviews. The code was used because of the important associated quotes. In the first interview it was encountered five times and in the second interview it was encountered three times. Recommendations focussed on information supply and included a conversation with the municipality to discover what kind of information is needed and how it should be distributed. Also, recommendations were made for use of video recordings on websites, organising information-meetings and conversations in which the use of internet is discussed with the immigrant. An example quote was; '*Start with an offline touchpoint and point out what is offered on the internet, so they do not get flooded with information*'.

The second interviewee mentioned the digitalization in France and recommended an improvement of data transferal between states to reduce bureaucracy by using digital means and overarching digital system for performing tasks like the (Digid) system in Holland. An example quote here was; '*The linkages between provinces can be improved. When this is done by implementing digital services, things can be transferred easily*'.

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5.Methods
Scenario tests

5.1Design

An observational design with a scenario test was executed including scenarios based on the interviews and informed user journey. Primary outcome measures included difficulties found in moving abroad while using eGovernment services.

5.2Participants

The scenario test included N=10 participants (30% male, 70% female) between ages 18 and 59, who voluntarily participated in the study. The sample included people from Dutch nationality. The sampling method used in scenario test was convenience sampling.

5.3Materials

During the scenario test, a laptop was used to let the participant go through the scenarios. They could use the web-browser to get the information on how to complete the task. Scenarios were developed based on the results of the informed user journey and interview. The scenarios included the identified steps of the informed user journey (legalising diplomas and checking visa requirements) and steps that were performed by the interviewee and were experienced as difficult (import car). Scenarios were developed by processing the steps in a hypothetical story with an assignment at the end which the participant had to execute on the internet. Possible scenarios were developed to get an idea of where difficulties would be experienced during the process. Scenarios can be found in Appendix B. Additionally, recording software was used to capture the screen of the laptop and the voice of the participants during the test while they were thinking out loud.

5.4Procedure

A scenario test was developed to test cross-border usability and analyse the main issues in getting access to information in eGovernment services when moving to another nation. Participants in the scenario test were first informed about the study and were asked to sign the informed consent. After they agreed to participate, they had to use the web browser to run through the scenarios. Participants were allowed to use search terms and click through websites to obtain the needed information. While completing the test, the screen of the laptop and voice were recorded. After the scenario test was completed, some demographic questions were asked, and respondents were thanked for their participation.

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5.5Data analysis

        The scenarios were analysed through the video and audio recording obtained during the test. More specifically, the steps that were taken by the participants were identified and comments participants made during the think aloud test were noted down. This was done to get structured overview of the main steps people performed and identify important barriers people encountered while finishing the test.

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6.Results
Scenario tests

During the scenario test, difficulties in completing steps for moving abroad, were identified. In the Table 3 the steps that people took to reach their goal were discovered and the accompanying comments that stood out or have been repeated were noted down. In addition, the observations during the test and the thinking-out-loud recordings are included in the Table 3. Table 3 has an overview of the steps, quotes and observations of the participants in the scenario test. Observations include noteworthy and representative observations during the tests. Each step presented is further described in the next section. An overview of the scenarios and test scheme that were used in the scenario test can be found in Appendix B.

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Table 3

Steps, Comments & Observations during Scenario test

Scenario	Steps	1. Insert Search term	2. Evaluation Results	3. Webpage Assessment	4. Further Research	5. Information Given
1 Check visa requirement for Germany	example Comments	'I will search for; 'visa Germany'.' 'Visa request Germany.'	'This looks like a useful website.' 'I will just choose the first one.' 'The first hit seems to have sufficient info.'	'It looks a bit unprofessional.' 'I would have liked to encounter information from the Dutch government.' 'I would have preferred to find a tool to register digitally.'	'This looks more government related.' 'I want to know things for sure.'	'If you live in the EU, you don't need a visa.' 'This looks like enough information.'
	Observations	No real problems encountered	It takes a long time to get to an official government website	Often encounter unofficial websites from not governmental institutions	People associate websites published by government agency as trustworthy, but have difficulty finding them	Often encounter the same results

2 Find information on how to legalize diplomas for France.	example Comments	'I will look for; 'legalize diploma for abroad'.'	'This looks like a government related website' 'Rijksoverheid.nl, that sound like it will give trustworthy information.'	'It looks like I can't arrange this online…' 'This will be a challenging course.' 'Government websites give me more confidence.' 'This should not be difficult.'	'This is disasters.' 'I got stuck.' 'It is a maze.' 'I have been here before…'	'I only can arrange this by going to the office counter or by certified mail.' 'I think it is not necessary to do it.' 'I think it is important to complete this.' 'I need information on university diplomas but can only find info on others.'
	Observation	Search terms give broad information	People try to complete task trough local/ national institutions People try to recognize official trustworthy websites	Encounter unofficial websites	People get stuck on ambiguous and difficult procedures and checking requirements (e.g. checking apostille country list, request a comprehensive or standard declaration etc.) People get lost in all the weblinks that are given to check on the needed information that is not provided on the original webpage.	No opportunity for online touchpoint found People encounter French websites and language barriers. People give incomplete and different answers

3 import car into France	example Comments	'Car import France.'	'I want a government website.' 'There is no clear government website available. I need to inquire this personally.'	'Google translate gives incorrect translation.' 'Why do national services not give me the information I need…'	'What is a *quites fiscal?*' 'This is unclear. I should take a guess here.'	'Is the information also available in Dutch.' 'You need to deliver many documents.' 'French… uh'
	Observation	No problems encountered	Government websites are not directly available to people. Therefore, they need to depend on unofficial resources (not evaluated to be trustworthy).	people consult translation websites. They often give crooked translations. National institutions often refer to French institution to collect the required documents. Here they encounter a language and cultural barrier.	Often referred to French websites they cannot understand Encounter ambiguous terms	No translation button available on website Incomplete and wrong information found Online touchpoint is not found Encounter language barrier at website embassy

6.1 Insert search terms

The first step people took while reaching the goals stated in the left side of Table 3 was to insert a search term. In this step, participant tried to come up with search terms that would bring them to the results they wanted. Overall, not many problems were observed in tests during this step. Participants were able to get to the result they wanted. Sometimes, in between steps, participants refined their search terms to get more specific results. For example, people changed their search term form *'legalise diplomas abroad'* to '*legalise diplomas France'*. All participant performed this step.

6.2 Evaluation Results

The second step was evaluating the results. People completed this step by rating the results that they obtained from inserting the search terms in the search engine. In the first test, people had trouble finding trustful information. People preferred to get information from official government websites although they sometime experienced trouble finding them. For example, they moved back and forth to get trustful information from the websites. Also, people first tried to find information on local or national platforms. An example quote here is; '*This looks like a government related website*'. In all the tests, this step was encountered.

6.3 Webpage assessment

The next step that was identified was the webpage assessment. After assessing the result, people choose for a website to find the needed information. While doing this in the first two tests, people encounter unofficial websites. They move back and forth to get the website of their preference. People do not directly trust websites but rely on them when no other sources are available or if these sources are difficult to use. Also, while completing the third scenario test, people encounter French websites they could not understand. Therefore, they consulted translation websites that not always give correct translations. This made them confused. An example quote was; '*Google translate gives incorrect translation*'. This remark was given while a participant was trying to clarify the information by translating it into the native language without getting the wanted results. This step was encountered in all the tests.

6.4 Further Research

The fourth step was the further research. During this step, people tried to refine their search, look for more reliable websites or sources that give more information. They did this by inserting new search terms in the search engine or move back to the results evaluation step. Also, during the third scenario test, people tried to clarify unclear terms or language they encountered while searching for information. A problem they faced while completing this step is that they got lost in weblinks that are not clear or not offered in their native language. For example, a participant clicked on a weblink and encountered a French website. At this point the participant got stuck because of the language barrier. The websites of government institutions often refer to weblinks or touchpoints of other institutions (e.g. the embassy) to get the needed information instead of offering it themselves. Checking these procedures is often experienced as difficult and people do not know how they find all the information needed. They feel like they are trapped in a maze.

They cannot find a platform were all the information is offered that is needed. Subsequently they come back to the starting point. Therefore, many participants choose to inform an offline touchpoint. An example of this is given in Figure 1. In this roadmap, there is referred to a different web links. Not all participant completed this step. Some of them trusted the first information they encountered.

1. Log in op Mijn DUO om te zien of uw diplomagegevens bij DUO bekend zijn. Ga naar 'Mijn studies en diploma's' en kies 'Diplomaregister'. Staan uw gegevens in het Diplomaregister dan kunt u het proces vervolgen met stap 2. Staan uw gegevens niet in het Diplomaregister dan kunt u het proces vervolgen met stap 3.

2. **Document in het Diplomaregister**
Ga naar de balie in Groningen voor legalisatie van uw document. Neem het originele document mee. Het is niet nodig het uittreksel uit het Diplomaregister mee te nemen. Adres: Kempkensberg 12. Openingstijden: maandag tot en met vrijdag van 10.00 tot 16.00 uur. U hoeft voor legalisatie geen afspraak te maken. De balie is gesloten op 22 april, 31 mei, 10 juni en 25 en 26 december 2019.

3. **Document niet in het Diplomaregister**
Staat uw document niet in het Diplomaregister? Mail dan een kopie naar ks.dw@duo.nl. Misschien kunnen we uw document toch legaliseren. U kunt ook eerst even bellen, op werkdagen tussen 9.00 en 12.00 uur: 050 599 80 36.

4. Staat uw land van bestemming op de lijst van apostillelanden? Dan kunt u naar de rechtbank in Groningen (Guyotplein 1) of een andere rechtbank in Nederland gaan voor een apostille om de legalisatie definitief te maken. Als uw land van bestemming niet op de lijst van apostillelanden staat, hoeft u niet naar de rechtbank. U moet de legalisatie dan afronden bij het ministerie van Buitenlandse Zaken.

Figure 1. Example of weblink confusion.
Taken from*: Dienst* uitvoering onderwijs (n.d).

6.5 Information Given

The last step includes the given information. At this step, people reached the point where they obtain the information that they think is needed. In the first task they often encountered the same outcome. In the second task, outcomes of participants did not correspond. Answers were often incomplete or incorrect as seen in Table 3. Also, people experienced problems with language and did not find online touchpoints to complete the goal. An example is given in Figure 2. People transferred to this website of the French embassy and could not find the information in their native language. Also, they encountered ambiguous terms that are not known in their own culture. An example is the '*quites fiscal*' in France. People did not understand what was meant here and could not continue.
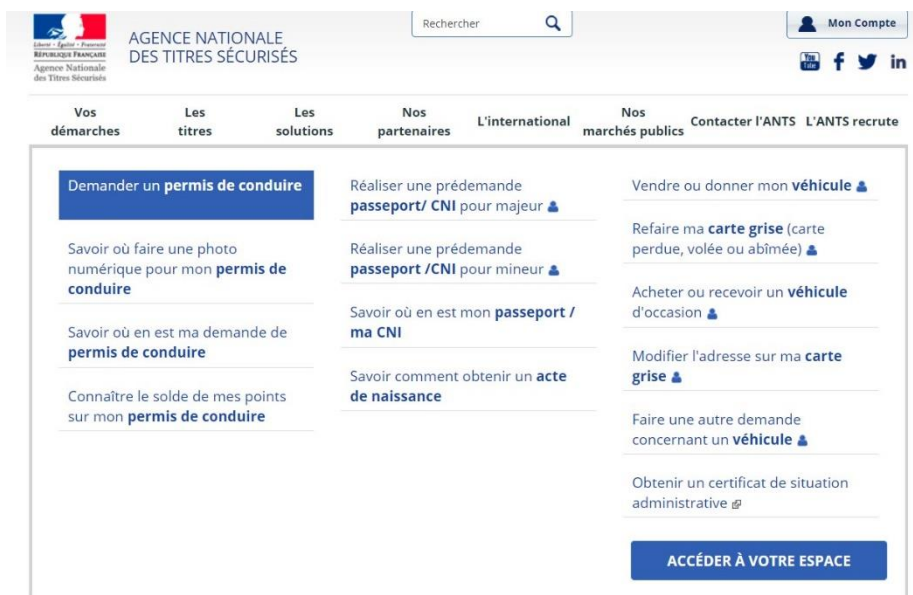

Figure 2: Example of Language Barrier Online. Taken from: Republic France (n.d.)

7. Discussion

This study tried to identify and explore the difficulties and needs that people have when moving abroad while using eGovenment services. To capture this, an informed user journey was created and interviews and scenario tests were carried out. Major findings in this study included identified steps that need to be performed, touchpoints used in eGovernment, problems encountered while moving abroad and recommendations from interviewees for improving eGovernment services which will be explained in detail below.

7.1 Informed user journey

In the informed user journey it was found that people have the opportunity to complete steps for moving abroad via different touchpoints. These can be broken down into online, offline, or both touchpoints. Still, these touchpoints are not always available for each step. Also, sometimes it is needed to use a combination of both touchpoints because procedures could not be completed by web-based applications alone. Steps included getting a residence/work permit or visa, arranging a home address, register at the municipality and get a citizen service number, legalise diplomas, arrange health care insurance, arrange identification, arrange a bank account and arrange taxes.

7.2 Interviews

The results of the interview showed that several barriers can be encountered during the process. Firstly, language barriers were found. Websites are not always available in people's native language and translation are not always of sufficient quality. Secondly, skills of the user can be a barrier in use of the online services. People are not always able to use webservices properly. Thirdly, lack of availability can be a barrier. Steps cannot always be completed by digital services. Fourthly, cultural barriers are encountered while using eGovernment services. Thereby, the results show that the chauvinistic approach of a country obstructs the publication of information in different languages and people do not always see online information as a primary source. Also, bureaucratic approaches obstruct the easy transferal of people to another country. At last, the usability of eGovernment services can be a barrier. Sometimes, it is difficult to use online services properly due to difficult procedures. To conclude, different categories in barriers are found during the interviews which include cultural differences, lack of availability, problems in usability, language barriers, and insufficient skills of the user.

Considering the barriers, lack of availability was found as a difficulty in the use of cross-border eGovernment services. This in accordance with the findings of the European commission. These findings included that online availability for cross-border services is still insufficient (Digital single market, 2018-c). Also, language and skills were important barriers in the use of eGovernment services. It was recommended by the interviewee to use instruction videos to overcome this barrier. Lowe (2004) found that interactive animations in video provide the opportunity for learners to deal with available information selectively and avoid excessive processing demand. Therefore, this could be recommended to help people overcome skills and language barriers.

Also, other recommendations came from the interview. These included the information meetings on how to use webservices, data collection on questions asked by citizens and distribution of this information. The government could consult different municipalities to gather information on needs of people while using eGovernment services. This bottom up approach has proofed its success by the Swedish municipality (Lönn & Uppström,2013). In Sweden, the bottom up approach was used to improve the services offered to citizens. Identifying challenges encountered by municipalities helped to improve the administrative processes and effectiveness in offering services to citizens. Also, the implementation of an overarching digital service system was recommended. This could reduce administrative burden by reducing unnecessary data provision by citizens. These recommendations could be incorporated in the improvement of eGovernment services to reduce the difficulties encountered.

7.3 Scenario tests

In the scenario test also, different difficulties were identified. Firstly, people had trouble finding trustful government websites. Other websites might give incomplete, wrong, or outdated information which could mislead them and obstruct them to reach their goal. They are not evaluated to be trustworthy. The results imply that better availability of government websites could improve this issue. Secondly, websites are sometimes not translated in people's native language or translated badly. Also, they encounter ambiguous terms that are not understandable for foreigners. The results imply that translations and explanation of these terms helps to prevent confusion. At last, people got lost in weblinks to search for all the needed information. The results imply that this can be prevented by creating a platform were all the information needed is provided.

7.4Limitations

This study was exploratory. Hence, it only focused on a few cultures and countries. Focusing on more of these cultures could give more insights into difficulties people face while moving abroad. This gives a broader perspective on what the needs are of people in different countries. Therefore, more interviews should be carried out with people from other regions or cultures to obtain a broader perspective. Another limitation was that the scenario test only focussed on a few steps that need to be taken while moving abroad to explore the difficulties experienced by participants. Researching other steps as well would give more insights in limitations in the use of eGovernment services. This could be done by carrying out more tests including the other steps and use other methods to get new insights into the user's experience.

7.5Implications, strengths and Suggestion future Research

The results from the interview and scenario test can be a first step in helping to improve the usage of eGovernment services by tackling the problems encountered. This will make it easier for people to move to an EU country. Despite the fact that further research is needed to identify all the difficulties, these results can be used in future studies. The finding also implied that identifying difficulties and improving them, helps to save costs for the government through sufficient implementation of online services. Therefore, there is no need to make costs for e.g. office staff, interpreters or call service if information is available online or steps can be carried out online. The results that were obtained are a first step in identifying the difficulties of people while moving abroad. Still, further research is needed to reach these objectives.

A strength of this study was the connection of the different methods used. The Nielson Norman group (2017) states that the most effective method for usability improvement is to execute a think aloud usability test. Also, they mention that it is helpful to use a mix of different methods to get more insight into the user's experience. By incorporating a think aloud usability test and using a mix of three different methods, much insight has been obtained in the use of eGovernment services.

Suggestions for future research include further exploration on how to improve eGovernment services. A mix of other methods should be used to get more insights as suggested by the Nielson norman group (2017). Also, this can incorporate interviews with more people from different cultures to recognize needs that can be captured in the services offered by the government. Also, it is suggested to focus on improvement of webservices one by one by caring out usability tests on eGovernment services for EU countries separately.

In this study, relevant information was found on the difficulties encountered and needs that people have while moving abroad. Further exploration on this topic is desirable to get more insight into the limitations of eGovernment at this moment.

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Appendix A

Interview scheme

1. **The goal of the study is explained to the participant and he/she is asked to read and sign the informed consent.**

2. **Demographic questions are asked:**

What is your age? ……

What is your country of origin? ………………

To which country did you move for work related purposes? ……………..

3. **Questions on moving. (begin recording)**

The following questions will be based on the steps that must be taken to move to the European country

1.Getting a residence/work permit or visa

2.Arranging a home address

3.Register at the municipality and get a citizen service number

4.Legalise diplomas

5.Arranging health care insurance

6.Arranging Identification

7. Arranging a bank account

8. Arranging taxes.

a) Are there any points that I have forgotten to mention that you have implemented?

b) Did you experience any difficulties while completing these steps?

Definition of touchpoints is given to the participant.

A touchpoint is any interaction with the user and in this case the government service. These touchpoints can include online touchpoints (e.g. filling out an online application form) and offline touchpoints (e.g. calling a service desk). I will ask you a few questions on these touchpoints.

c)Did you mostly rely on online or offline touchpoints while completing the steps? Or did you use both?

d) Did you experience any problems while using particular touchpoints?

e) Did you have a preference for certain touchpoints?

f) To your opinion, what should be arranged better regarding the use of government services?

g) Overall, where you satisfied on how able you were to implement these steps?

4. **Respondent thanked for his/her participation and end of the interview.**

USABILITY AND EXPERIENCE OF CROSS-BORDER DIGITAL SERVICES

Appendix B

Usability test scheme

1. **The goal of the study is explained to the participant and he/she is asked to read and sign the informed consent.**

2. **Demographic questions are asked:**

   What is your age? ……

   What is your country of origin? ………………

3. Scenario is given to the participant

I will give you a hypothetical story; 'The scenario' in which you have to empathize. At the end I will ask you to work your way through the problem stated in the scenario while using the laptop.

a) The production company you are currently working for is located in the Netherlands. They have you a few months to work at their new location in Germany. You have been sent feathers and you decide to stay in Germany for a while. To stay in this country, it is sometimes a requirement to have a visa. At this stage you will be happy to receive information about how you can apply for a visa and whether you need a visa. How would you do this?

b) You prepare for your departure from the Netherlands to France to work and reside there. You work as a doctor and you have a university degree. Then you will hear from a friend from France that it is necessary to have your diplomas legalized to get to work. You would like to receive information about how to legalize a diploma for France. How would you do this?

c) You would like to take your car with you when you leave for France. You have heard that it is necessary to registrate the import of your car in this country. Now you want to know how to do this and what information you need. How would you do this?

4. Explain think aloud protocol to the participant and Start Usability test (start recording)

During the test we will use the thinking aloud method. Hereby, I will ask you to say out loud whatever comes to your mind when performing the task. This includes what you are thinking doing and feeling.

USABILITY AND EXPERIENCE OF CROSS-BORDER DIGITAL SERVICES

Table 4   **Appendix C**

Codes with Citations from Interview

Codes	Sub codes	citation
Barriers	Language	'People are not highly skilled. They do not speak the language well. Also, not the English language. That's why they do not search online.'
		'There is not much to find in Albanese online.'
		'Sometimes, I feel ashamed about how texts are translated. Interpreters often come from different parts of the country where they have different dialects. People often do not understand what is written down.'
		'To arrange everything, you need to go there personally. Then you encounter the language barrier.'
		'If you are lucky, you can sometimes get a leaflet in English.'
		'The language is very complicated.'
		'In France, they are chauvinistic. You need to speak French or bring you own interpreter.'
	Knowledge	'The only thing they can do is read and write. They have no knowledge on how to use the internet.'
		'People who are not high skilled, do not like to read so the barrier gets bigger.'
	Information Lack	'If an Albanese arrives at the municipality, they hear that information is not available.'
	Use of touchpoints	'Internet websites are barely available.'
		'Most villages in France do not have online platforms. Only big cities like Paris have it.'
		'you need to drive a very far to get everything arranged.'
		'You always encounter problems because online platforms are not

available.'

Cultural differences	Information Sources	'There is no embassy to ask questions as in Holland.'
		'If we want to know something, we do not search on the internet. We first ask our family.'
	Use of Touchpoints	'If you recommend them to search for information on the internet, they will not do it.'
		'A one-on-one conversation is important to us as we need to trust someone. Internet, we see as something unpersonal.'
	Roles	'Woman stay at home in our culture. They do not get to know how everything is arranged in Holland.'
	Bureaucracy	'In France, the bureaucracy is very large, and digitalization is not.' 'If you move to another province, you need to register everything again, like registration at the chamber of commerce and tax authorities.'
		'If you move to another province, you need a new bank account. Everything needs to be arranged again.'
		'I had to import a vehicle. This took a while as nobody wanted to take responsibility. People are always afraid for a claim.'
	Digitalization	'They have more than 90 provinces that are not linked to each other.'
		'Digitalization is very bad in France, per province it is better, but they are not linked.'
	Organisation/ online linkages	'There is no population register. They cannot trace you if you live in France.'
		'If you register at your municipality, the adjacent municipality even does not know you exist.'
		'You do not get a Citizen service number.'
		'They also have no system as Digid, as we know it.'
Process	Touchpoints	'The first help that is offered when you arrive is at the municipality. It often starts with a personal conversation.'
		'An interpreter at the location, who explains everything to the immigrant will cost thousands of euros. It is a shame that this information is not available online.'
		'I often made use of offline touchpoints.'

		'Many villages have an online webpage with information about the city itself. But that is it. They often give information on how to get to an offline touchpoint'
		'If you are talking about online touchpoints, France can improve itself'
		'In Holland everything can be arranged online'
		'It improves as you can overwrite a licence plate online now, but it was so complicated that nobody used it'
		'I am curious if they eventually are able to implement the digital services'
Recommendations	Information Supply	'The government should start a conversation with several municipalities to discover what kind of questions are asked by people. What do they want to know? and how can we offer it?'
		'As we prefer a one-on-one conversation with someone, video-recording could help to give information, so people do not have to read.'
		'Information meetings. Organise a meeting where people can join and can share experiences. They will be helpful and people in our culture are often inclined to help.'
		'Start with an offline touchpoint and point out what is offered on the internet, so they do not get flooded with information.'
	Digital services	'Things need to be linked. As in Holland, we have Digid. It would be good to implement it in France.'
		'The linkages between provinces can be improved. When this is done by implementing digital services, things can be transferred easily'
		'It just takes a long time to arrange everything now. With digital services it could be done much faster.'