E-government and the Digital Agenda for Europe

A Study of the User Involvement in the Digitalisation of Citizen Services in Denmark

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Abstract. Several initiatives in regards to digitalisation citizens' services have been launched, both in the European Union and in Denmark. Several problems have been reported in related work in regards to lack of accessability and usability of e-government self-service solutions. The objective of this paper was "How are software providers developing e-government self-service solutions that should be usable for all citizens?" we conducted 11 phone interviews with self-service providers in Denmark. We found that no citizens are involved in the development process and only few of the self-service solutions are usability evaluated before being released.

Keywords: E-Government, Digitalisation, Usability, Self-service systems, E-Government providers, Digital agenda for Europe.

1 Introduction

Digitalisation happens at all levels in these years, both The European union, the Danish state and municipalities are digitalising their contact with the citizens in these years. The European Commission has an initiative called "Digital Agenda for Europe" which describes a set of actions for digitalisation of the European Union. Action 64 is named "Ensure the accessibility of public sector websites" the aim of this action is that the public sector websites for citizens should be fully accessible and usable for self-services by 2015. [13]

In 2012 Denmark took the first step towards full digitalization of citizens services. By 2015 the goal is that the citizens services websites should not only be accessible, but 80% of all all forms filled out by citizens should be done digitally [11].

In Denmark citizen services are developed by a number of private companies and the municipalities are free to buy the systems they feel are the most suitable [15]. Other literature has suggested that people prefer self-service over face-to-face service, primarily because it is possible to save time and effort [6]. But the related work also describe there are some challenges in regards to the digitalisation of citizens' services, which will be elaborated in the related work section.

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The research question of this study is "How are software providers developing e-government self-service solutions that should be usable for all citizens?". In our study we have conducted interviews with 11 software providers of digitalized self-services.

The study has been conducted by covering the second of four phases in the digitalisation strategy that is deployed between 2012 and 2015. In this second phase 12 software providers are in play developing software solutions covering 13 areas of citizen sell-services, like application for assistive technologies for handicapped or elderly, application for reporting rats, notification of marriage and ordering a new passport or drivers license.

The following section presents a more detailed description of the work related to this study. It describes the consequences if citizens self-services are not created to be intuitive and usable for all citizens. Section 3 presents the method used for data collection, which consisted of semi-structured qualitative phone interviews. Coding were used for analysing the transcriptions of the interviews. Section 4 presents the results from the interviews. Section 5 provides a discussion of the results in a broader context. Finally, section 6 provides the conclusion.

2 Related Work

This section will provide an overview of the related work, with a clear focus towards which obstacles to overcome if e-governement and self-service solutions should be a success, we also look at the results of other studies conducted about evaluations of e-governement websites. As no literature was found with a clear objective at the software providers of e-government solutions and how they secure creating solutions that are usable, we identified the largest obstacles and challenges in relation to creating successful e-governement websites.

E-government or electronic government can be referred to as "*The utilization of Information Technology (IT), Information and Communication Technologies (ICTs), and other web-based telecommunication technologies to improve and/or enhance on the efficiency and effectiveness of service delivery in the public sector.*" [16].

If e-government self-services should be a success and save money for the municipalities the systems need to be created so the citizens trust the e-government sites and feel satisfied using the self-services [3] [6]. Problems have been reported in regards to self-service technologies and the ability to reduce cost operations. Business Wire reported in 2010 that actually the majority of organizations investing in self-service technologies fail to reduce operating costs and experience decreasing costumer satisfaction which means that there are obstacles yet to overcome if e-governement websites and self-service solutions should be successful [3].

Trust in a government is directly related to e-government web-sites, but not to trust in the technology. Trust towards e-government web-sites are also closely related to the quality of the website, this includes quality of the information, the system and the service. The quality of the e-government website is less important if it is more convenient for the citizens to use the website than other options or if the user can e.g. save time by using the website. [9]

User satisfaction can have a great impact on whether a self-service system is used by the citizens or not [6] [17]. To keep the users satisfied the system must get the user out of a troubled situation as soon as it appears [6] [21]. The user needs to get an advantage from using the self-service system, e.g. saving time, ease of use or accessibility. The self-service system needs to do what the user intended the system to do. [6]

To prevent the user from being dissatisfied a self-service system needs to be reliable [6]. Failing technology makes users dissatisfied, if the self-service is not reliable that could make citizens decide that they do not trust the system and do not want to use the sell-service system [6]. Process failures will increase user dissatisfaction, especially if the failure happens at a time that the citizen believe the process has been a success, when this does get known by the citizen the dissatisfaction will increase and the trust in the self-service system will decrease [6]. Poor design can also lead to users being dissatisfied with the system, designing a system like a self-service system only works if the user has been kept in mind during the design process [4] [6].

The related work shows that e-government websites have been evaluated in scientific research for many years. There is a tendency to citizens services in other countries being designed without attention to quality, accessibility or usability. [1] [2] [5] [11]

The contribution from our study is that we studied what the software development companies do to ensure usability and accessibility in the e-governement self-service solutions in Denmark and how they did it. In the following section we describe the method we used for the data collection and how the data was analysed.

3 Method

This study was conducted as a single case study. We approached all software development organizations which were identified as self-service providers for this phase in spring 2013 as involved in developing the software solutions for the second phase. We contacted 12 organizations and 11 organizations accepted to participate in this study and one organization declined. The companies we interviewed varied in size from 12 employees in a small company only located in Denmark, up to global companies with up to 170.000 employees all over the world.

A total of 11 semi-structured qualitative interviews were conducted as phone interviews. The interviews lasted from 21 to 82 minutes and were conducted between May 30th and July 4th 2013. The length of the interviews depended of the extent of the solutions developed by each organisation. Some organisations only developed one of the 13 solutions while others developed up to seven of the solutions. The length of the interviews also depended on the personality of the interviewee and how much in-depth information and knowledge they had about our main focus areas.

The interviews were recorded and later transcribed. The data was analysed using Dedoose (https://app.dedoose.com/App/?Version=4.5.98). All interviews were analysed using coding with four coding categories; Development Method, User Involvement, User Evaluation and User Criterias.

4 Results

This section presents the findings based on the analysis of the interviews. The findings are divided into four sub-sections that should ensure that we understand all aspects of what the self-service providers do to make sure the solutions are usable to all citizens. We have divided the results into the following sub-sections;

Development method, user involvement, ensuring usability and Supporting the process of the self-service providers.

4.1 Development Method

Eight companies described working agile when creating software solutions. One interviewee described their development process as the following;

"*We follow the Scrum method completely, hosting Scrum meetings every day and working in small sprints*".

Three companies described that they some times worked agile but other times they used a more traditional development method.

"It varies which development method we use, sometimes we use a method like the waterfall method, other times we use an agile development method like scrum. It depends on various things like if the costumer wishes to be involved as an on-site costumer or not."

We found the development method interesting as agile development methods encourages user involvement. In the following sub-section we will describe how and which users were involved in the development process'.

4.2 User Involvement

The user group contains of two very different types of user groups. On one hand is the citizens who fills out the forms in the self-service solutions. On the other hand is the case workers at the municipalities who receives the forms and process' it. First we describe how the case workers are represented and then we describe how the citizens are represented in the development process.

In Denmark there is 98 municipalities, which means that for each self-service solution there is 98 potential buyers in Denmark. This means that the self-service providers does what the can to keep the costumers they have but also tries to get more costumers. This is done by using the self-service solutions to optimize the processes for the case workers to save money for the municipalities.

"*Our primary focus is to simplify the work flows for the case workers, other wise this would not be worth the effort*".

Six of the self-service providers describe that they host workshops with current costumers. These workshops are used to understand the work flows for the case workers and what could be optimized by creating a new self-service solution.

One interviewee described it as follows;

"*On the first workshop we do not present anything, typically we say, teach us – We know nothing...The workshops are typically used to figure out how we digitally can support the digital work flow*".

The interviewees describe different variations of the workshops but the principal is basically the same, which is to understand and optimize existing work flows, at least for the first workshop. Some interviewees describe hosting workshops each year to continuously getting new inputs and feedback that can be optimized when the make new releases. Several also describe having a smaller group op users from 1-5 municipalities who are kept on as on-site costumers. They are the ones who are contacted if the software providers have any doubts in regards to the work flows.

"*Every time we have a question we ask the small group of municipalities working as our on-site costumer, to tell us if it is the right thing we are doing...This is also typically the municipalities who get the solutions implemented first to test if everything works as it is intended.*

It is described that this is a win-win situation as the municipalities get influence on the solutions and the work flows of the self-service solutions. The software providers get access to a lot of insights of the work flows that needs to be supported by the developed solutions.

The citizens are not directly involved in the development of the self-service system, in most cases the case workers are used to represent the citizens;

"*We presume that what the municipalities say are correct, we are not in direct contact with citizens, we expect that the municipalities and their case workers know what the citizens need*".

Eight interviewees described that talking to the case workers was combined with the use of other tools like personas, scenarios, user stories and mock-ups, meaning that the combined the data collected from the case workers about the user groups with tools used in their own analysis of the user groups for each self-service solution.

The following sub-section will describe how the self-service providers ensure their solutions are usable for all citizens.

4.3 Ensuring Usability

Nine out of eleven self-service providers believe they are creating systems that are usable as they have hired people with experiences with or an education including usability evaluations, target group analysis' and interface design. In regards to ensuring the developed systems being usable for all citizens, one interviewee stated the following;

"W*e know if our system is usable by looking at how much the system is actually being used*".

Two other interviewees both described that their experience was that if the citizens wanted something from the municipalities they would get through all steps of a self-service solution if it was usable or not;

"We discovered that for 80% of our self-service solutions only 10% of the people who started filling out the form also finished and submitted their form. For the last 20% we found that 80% of the citizens who started filling out the form also submitted

it to the municipalities. We found that those 20% was all services were the citizens would get money from the municipalities."

The point was that the focus on usability might be a bit overrated as the citizens can fill out the forms if they really want to, usability or not.

Usability evaluations are conducted to some extent by three of the self-service providers. One also states that they always conduct a usability if they are developing a new system from scratch. One of the self-service providers described that the system would be user evaluated by one municipality, the test would be conducted at the library where citizens would simply be approached and asked to participate. The self-service providers who conducted usability evaluations mainly described finding test persons that was employees at the municipalities. One interviewee described that one municipality sent out an email out to all employees asking if they fit a defined profile they should reply. E.g. when they wanted to user evaluate the solution in regards to issuing a marriage certificate they emailed all employees asking if some of them were getting married in a near future.

To ensure usability and accessability some guidelines were created to support the self-service providers in their development process. These will be described in the following sub-section.

4.4 Supporting the Process of the Self-service Providers

The municipalities' joint IT organisation have developed some materials to support the self-service providers in creating usable systems. The purpose is to ensure that the citizens are kept in mind during the development process of the self-service solutions.

They have e.g. developed 24 Usability criterias [19] that all self-service solutions are encouraged to comply with though it is not mandatory. Among these criterias are e.g. keeping all text short clear and using simple language. Another criteria is about that the user should always see a status bar so the citizens will know how many steps they have left.

The responces we got from the self-service providers was very mixed. Some thought it was overkill e.g. "*Too many pages was spent to describe something that is actually a pretty elementary flow"*.

Three interviewees indicated that the thought it was wishfull thinking to think that usability could be ensured by creating 24 usability criterias. Corresponding with that another interviewee stated;

"Just because the self-service solutions live up to these 24 usability criterias does not mean the solutions will actually be usable, there could be other problems with the self-service solution getting in the way of that".

The same interviewee also stated that it was very important that the self-service solutions were created focusing on usability, but they does not rely on this kind of material to ensure usability as there might be a new and better way to do that than what is stated in these criterias. Others liked the criterias because they could use the criterias as a check list. The criterias were described as being a collection of common sense, but now they have a good reason to ensure these things are implemented.

The idea behind the user story was to make sure that the self-service providers understood the citizens and their needs in each of the solutions and to make sure the self-service providers kept the citizens in mind through the development process. The user stories were created as a pamphlet with drawings and text describing a citizen and the process of filling out a form on the self-service system. The user story described a scenario in regards to the use situation but was not bound to what is posssible right now, it described a vision of what the future could be like. Eight of the self-service providers described it as being confusing either to them or to the municipalities. One interviewee stated;

"*As a lot of actors are quite new both self-service providers, the solutions and digitalisations consultents at the municipalities. People might view the user stories as the answer, which causes confusion...I feel that in some situations the municipalities got the impression that we as self-service providers could not implement the visions that the municipalities joint IT organisation have.*

Nine of the self-service providers expressed satisfaction with the idea behind the user stories, and felt it was the right way to go.

"*If you just start with a specification of requirements, you might not end up with the product the users actually need, so I think this is the right way to go. The details just need to fit the reality.*

The self-service providers are very positive about the initiative but find that there is room for improvement. Also that the self-service providers should have been included in the process of the development of the user stories by e.g. interviews as that might have made it easier for them to use as part of their development process.

A large issue which was adressed by six interviewees was that the user story only described one of many paths through the system. For examle applying for a marriage certificate, the scenario in the user story is two Danish citizens – a man and a woman sitting together, but other scenarios include same sex marriage, one or both being foreigners, one being deployed, etc. One interviewee stated that the user story made him believe that the solution would be more simple than it turned out to be during the analysis phase which turned out to be a problem for them.

The following section will sum up our results and discuss these in relation to other literature.

5 Discussion

Next, the results will be discussed in relation to the issues described in the related work. Scrum is the primary development method used to develop the self-service solutions, with short iterations, sprints and an onsite costumer.

The onsite costumer is case workers from the municipalities, their responsibilities are both in regards to the underlying system the case workers will use, but they also have a responsibility to ensure usability and accessibility of the self-service solution that the citizens' will have to use, as they are working as ambassors for the citizens.

Several self-service providers stated that they believed the case workers knew the needs and requirements of the citizens very well. It does make sense that the case

workers are part of this process as they have the expertese to know what kind if information the citizens need to register for them to do their job most effectively, but it does raise a flag in regards to creating usable and accessible self-service solutions as they might be expert users and not being able to see problems related to less experienced users. Several of the self-service providers described having usability experts in house and that they also used tools like personas, scenarios, user-stories and mock-ups to get an understanding of the users and their needs before developing the self-service systems. Whether the self-service solution actually fits the citizens are not tested before the self-service solution has been finalized, if it is even tested at all. Youngblood and Mackiewicz [10] concluded that the most efficient and cheapest way to fix problems is during the desing phase and not after deployment. As the case worker is the ambassador for the citizens problems might not be found before the solution has been deployed and then the problems will be harder to fix and cost a lot of money. This could be avoided if the system was user evaluated as paper prototypes using citizens as test persons [22].

Several interviewees stated that if the citizens were to get something from the municipalities, e.g. free day care or a new passport, then they would be able to use a self-service system whether the system was usable and accessible or not which corresponds with Teo et al. [9] as they found that the quality of the e-governement website was less important if it was more convenient for the citizens to use the website than other options they might have.

The plan in Denmark is that at one point citizens will be obligated to use the self-service solutions if they need anything from the municipalities. The citizens will have to get through filling out the forms no matter what. The problem is if the citizen think they have filled out the form and sent it to the municipality, but an error occured. Another problem is that in Denmark alone 500.000 people have never used the internet, of these 400.000 people are more 65 years old [23]. This could cause a much greater problem as these people might not be able to use an online self-service system at all and there need to be found another strategy for these citizens.

The usability criterias are primarely described as stating the obvious by the interviewees but a fine check list to make sure all requirements have been met, even though a concern was raised, if the self-service solutions is more usable for the citizens because they are living up to these criterias. On the other hand the criterias could mean better accessability as several of the criterias evolve around accessability.

The fact that the criterias exist is supported by Abanumy et al. [2] as they believe guidelines for accessability should be developed for e-governement solutions.

The user stories are perceived as a good idea but also that it needs some more work before they will actually make a difference, also that the user stories was too narrow as they only described one of many scenarios.

The fact that usability and accessability are being adressed in the development of the self-service solutions is very positive but there are definately room for improvements in regards to the initiatives since the plan is to make it a requirement for all citizens to use self-service solutions in a foreseeable amount of time.

6 Conclusion

The purpose of this paper was to understand how software providers are developing e-government self-service solutions that should be usable for all citizens. To accomplish this we conducted 11 phone interviews with the self-service providers.

The study showed that no citizens are involved in the development process as the case workers are used as ambassadors for the citizens. Some systems are user evaluated after the system has been developed but the majority releases the system in a few municipalities and wait to see which problems are being reported back to them.

Our findings show what happens during the development process, where the related work evolves around the final product. We conducted a close to complete study as 11 of 12 self-service providers have participated in this study.

The limitations of this study is that we have not been focusing directy on the self-service solutions being developed as they where released six months after this study was conducted. This will be the focus of another study we will conduct spring 2014.

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