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Title: The Relation between User experience, Privacy and Information Overload in e-boks.dk

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Abstract: The project investigates the value proposition of e-boks from users' point of view. It focused on examining users experience and analysing the gathered information in order to better understand the digital post service.

Furthermore, different reasons about how and why people comprehend the system have been discovered. For example, the lack of goal-directed design, and the keeping the balance between security and usability have been pointed out as reasons for the service performance.

Therefore, this have been achieved by collecting qualitative interviews and e-boks performance testing order to find out the user's perspective.

In result this project aims to identify and suggest possible improvements for better access to digital post documents and moreover better serve the users. Consequently, a list of suggestions for future development of the usability of e-boks will naturally end this master thesis project.

By signing this document each group member confirms that all have participated equally in the project work and that they collectively are responsible for the content of the project report. Furthermore each group member is liable for that there is no plagiarism in the report.

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1. INTRODUCTION

This thesis project focuses on Denmark e-government system that has already been implemented for the citizens. The implemented service is called e-boks and aims to replace the old way of physical post service delivery. In fact, most of the public authorities in Denmark have already been using e-boks as a representative of the e-government digital post service.

Moreover, e-boks is part of the web services and e-government implemented in Denmark to take care of the citizen's needs. This is due to the fact the governmental institutions are representing usually people demands which is pointed out by Palvia [1]:

"E-government involves using information technology, and especially the Internet, to improve the delivery of government services to citizens, businesses, and other government agencies." [1]

However, e-boks has become mandatory as a subscription for every person over 15 living in Denmark since 01.11.2014. [2] In addition, the service is supposed to work perfectly and without any drawbacks since everyone in Denmark uses it. Like this e-boks is situated in a critical line to work smoothly and effortlessly. [3]

This project examines the offered product by e-boks.dk service provider on the one side and users' requirements on the other. In plain English how users' understand and evaluate the value proposition of e-boks.dk. Holding a similar research, Oracle had analysed people's interests and needs of governmental digital services. Back in 2012 they resulted in qualities as for instance the services to be *"fast, accurate and less complicated"*. [3] On the other hand, those specific characteristics of a service could be also related and further developed to user experience and usability of a digital service. Considering a statement from Seto's paper [4] *"...studies have shown mobile users preferring usability over security"*. It could be argued that for users the aspect of usability and high user experience is evaluated higher than personal privacy.

In this project people have tested the e-boks' value proposition with their experience. Furthermore, the project examines how people adapt to the service and how they evaluate the offered features. Trying to achieve better understanding of e-boks, different aspects of the service have been researched. For example, not only how people qualified the purpose of e-boks but also what are the reasons of people to perceive the system in this particular way.

If we compare vendor's perspective - e-boks has aimed to achieve high performance of the service and strong security since they are responsible for operating with users'

personal data. [5] E-boks.dk's main purpose is to provide round-the-clock working service that has implemented high level of security and proper experience to the users. [5]

All of techniques and method for implementing user-friendly service together with keeping the level of high security are the challenges of this project. In other words, how to achieve the value proposition of e-boks but in a more user-centric way. So far, the service has provided very simple interface and small list of integrated features. On the other hand, the empirical data collected by this project has introduced e-boks as a digital folder used for archiving. Moreover, in this folder people receive emails from public authorities and private companies. However, the raw data presented the fact that people feel usually discouraged to communicate back with the service. Furthermore, this turns the users to passive and only receiving information without any interest for further communication. This however, provokes questions about people's willingness to operate with the service and how e-boks.dk encourage citizens to use the service. On top of that adding the mandatory NemID code (explained later in chapter 3) could make users hesitant about their readiness to engage with further actions in e-boks.dk.

In this paper I am also trying to find out if there is any connection between privacy and user experience in e-boks and how they may interfere in the digital post service offered to the Danish citizens. Moreover, this project was further narrowed down in aiming to explore what are the needs of the users and are they indulged and achieved by the e-boks.dk service provider.

In order to obtain that 10 qualitative interviews have been conducted together with testing of the system. As part of the development of this project user requirements have been collected, comparison with the currently offered services has been made and proposals for improving usability have been suggested to enhance the e-boks service.

The main approach of this project is to present the user's experience of people operating with e-boks.dk digital service and by this to enrich and empower the final product which in the case is the e-boks itself. The project aspires on analysing the people's understanding of the service and the ease and convenience they find while performing the system. However, this user perspective only enlarge the development of the technology and helps to achieve greater technology services.

Moreover, this project explores the possible new ideas and suggestions from the users' assessment during the interviews, in order to make e-boks more appealing to the Danish citizens. Additionally, e-boks' owners could also use part of the ideas to enrich their experience and their future projects with the service.

1.1 MOTIVATION

E-boks is a relatively new and vastly spread way of communication between public authorities and Danish citizens. The service itself was created around 2001 [6] and the main goal at the time was to replace the physical delivering of letters from authorities. However, as a mandatory for every Danish person it became since 1st of November 2014 according the Danish agency for digitalization (Digitaliseringsstyrelsen). [2] The first target of e-boks, back in 2001 was the service to cover 350 000 users. In 2003 e-boks reach their quarter of million users. The company kept the progress and in 2006 reached a million of users and has started offering features as digital signature and “all state payslips” send via e-boks. On the table 1 below it is presented more precisely the growth and expansion of e-boks.dk.

Year	Target/reached number of users	Added features
2001	350 000 (future target)	Email service
2003	Reached quarter of a million	Email service
2006	Reached one million	Digital signature, all state payslips
2008	Reached 1,5 million users	Approximately 500 public and private companies use e-boks to send emails
2009	Reached 2 million users	
2010	Reached 2.7 million users	
2011	Reached 3 million users	Offer menu in English
2013	Reached 4 million users	
2014	Reached 5 million users	Became mandatory for all Danish citizens above 15 years
2016	5 million users	Think into the box – cloud storage

Table 1 – Evolution of e-boks.dk according their background information [5]

Furthermore, as a completely new service launched in 2016 is the free 1 GB storage space offered to every user. [7] This progress show that e-boks service providers are willing to constantly improve and upgrade their product.

Moreover, table 1 shows the e-boks's evolvement from a simple email client service, to secured place by implementing digital signature and being responsible authority for payment information. Finally, by increasing the number of public and private companies - e-boks has been able to cover greater number and variety of services.

Similarly, by reason of the same development, the user requirements also have grown over the time as well as the number of offered services. According to Oracle research [3] users usually require fast, smooth and easy access to their information.

E-boks.dk is part of the e-government in Denmark. As part of the e-government e-boks.dk has to fulfil specific requirements. For example, to ensure covering private companies' and public authorities' interests. On the other hand, according to their profile, mission, and value section [5] the service should provide:

"e-Boks offers companies, public authorities and private individuals an effective, secure and user-friendly platform for digital dialogue, and the distribution and storage of important documents."

Presented like that, this information offers the stakeholders of the service and what are their main goals to be achieved. The above mentioned could also be considered as requirements for the service that should be accomplished. Covering all the sides, e-boks must be able to provide suitable service that is appropriate for each one of their stakeholders.

On the surface e-boks seems to offer client service email that helps to replace the paper post. However, with the mission set like:

"E-Boks contributes to increased streamlining of public and private companies, via secure and effective management of digital documents and associated value-creating functionality."

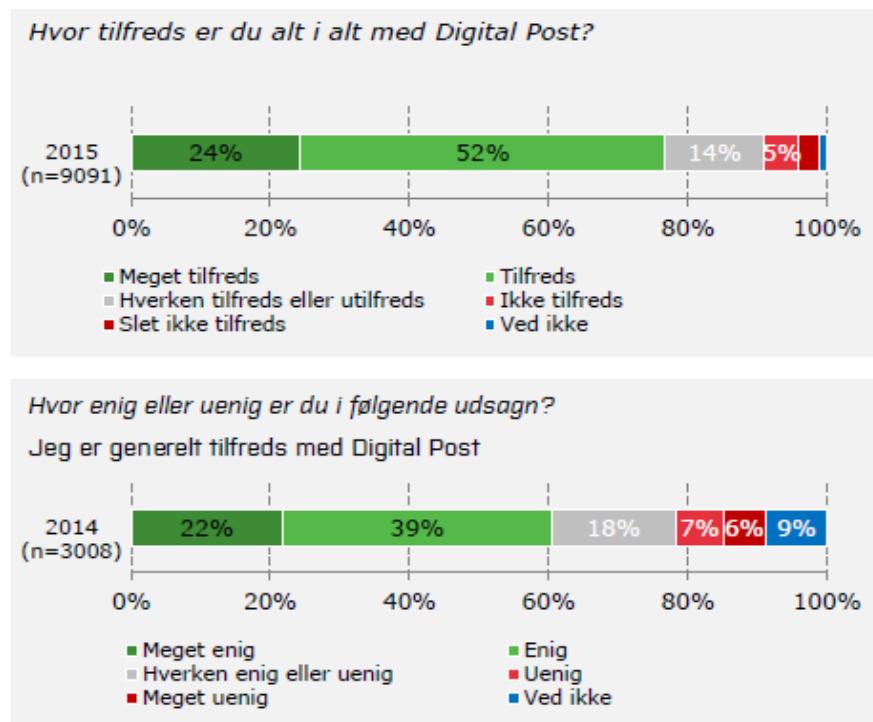


FIGURE [1] – USER SATISFACTION IN 2014 AND 2015 OF E-BOKS.DK [8]

IT is interesting to observe the statistics provided by e-boks.dk about user's satisfaction (figure 1) for 2014 and 2015 and then to compare it with the independent articles in newspapers and news. [9] [8] For instance, according to Plus (Danish online newspaper) [10] around at least 200 000 people have not opened their e-boks folder in the past 6 months which is due to different reasons. Another newspaper called Nationalt also present information about at least 260 000 Danish people who do not open their digital post.[11] Moreover, in a different article from the same newspaper the fact that young people in Denmark are not interested in using the service. [12] Those variations in the information were one of the triggers for this project. Furthermore, the same contradicting information have been a good starting point for a critical and comprehensive research.

Considering my personal motivation to start working on this project, at first this was my passion to the new technologies and my interest to e-boks.dk as a particular example of Danish e-government service. I was inspired of the fact how e-government in Denmark deals with their stakeholders. In the particular case, a trigger for the research was users and their perception of the service. Furthermore, e-boks.dk has promoted their service and put the user's expectations very high.

However, these expectations needed to be questioned continuously in order to cover the prolonged progress of the service and their continuous improvement. My personal view has tried to explore these results and check their coverage. Then, my interests was further encouraged by inspirational brainstorming sessions with other people. As a last incentive about those concerns of mine were used articles published in the Danish newspapers. There statistics were presented clearly and have shown that not all the time Danish people open their digital post folder which assumed they are not fully satisfied as customers. [10]

On top of these conversations, the desktop research in Danish newspapers and articles was another trigger for this project to be defined and started. Combining all and motivated to check what the user experience and user side of the situation with e-boks digital service, I have started working on this project. Furthermore, my personal interest was explicitly on the interaction between the online service and the users, their needs, expectations and their experience with the service.

Focusing on these facts the problem formulation was defined at first and then later in the progress of the project further developed.

1.2 PROBLEM FORMULATION

This project was formulated in the beginning in a wider scope. While working and developing the idea – assumptions were made from the first research. Those assumptions helped to narrow the scope down and limit the area of research. The assumptions are presented below:

- Majority of Danish citizens have unread emails in e-boks.dk
- E-boks.dk provides protected privacy (including the NemID code) to the users in the price of poor user experience and dissatisfaction of using the service
- Users are not attracted to the service because of the low user-friendliness of the interface of e-boks.dk
- Interface and provided functionalities of e-boks do not provide the required quality of services to the users
- Most of the time people are aware of the content of the received information and this does not encourage them to take actions to check it.

The assumptions try to explore the difference between user's perception of e-boks and what e-boks.dk service provider offers to their users. Moreover, possible misunderstandings and not realised potential between the both sides. Further, the project has decided to focus on user's perspective and analyse users' opinions. As a result of the listed assumptions and research a topic question has been formulated like:

This master thesis researches about: What is user's perception of the value proposition of e-boks.dk?

Defined like that the topic examines the value proposition of e-boks. Since, users are the major consumers of the service their opinion has taken into account within this project. Furthermore, additional questions has been defined to better shape the scope of the project. Those sub-questions are:

How would a user-centric service should look like?

What e-boks.dk offer to their users (usability of the service)?

These sub questions and sub-topic help to better shape the subject and scope of this project since the main questions could go in different directions and become too vast for

this research. Moreover, the sub questions narrow down more precisely the researched area and also benefit for formulating a cleared focus of the project.

1.3 PROJECT DELIMITATIONS

Due to limitations in the scope and also time constraints this project will not discuss the following areas. Even though they could be mentioned and are also interesting subject to discuss, they stay out of the scope of this master thesis.

This project aims to present user's perspective and contribute with new ideas for improvements referring to the user's needs. The current features are discussed and analysed. However, deliberations about the reasons of e-boks.dk why and what they did in the past are disclosed as out of scope for this project. Even though, e-boks.dk has been invited for collaboration and explaining their point of view, this project is not focused on their point of view or their reasons performing into the current status of the service.

This project focuses on exploring the flows in the interaction between users and service provider in e-boks.dk. Furthermore, this project examines the connections and potential cases that have been offered to users. However, this project has contributed with researching and evaluating on the users' perception of e-boks.dk. Then, as an outcome has been suggested proposals for improvement of the service. Out of the scope for this project is the actual implementation of the suggested ideas.

Also, even though discussed the need of implemented security in e-boks, the project does not question the legal need or legal aspect of existence of NemID product. Furthermore, the project has investigated the security measurements (NemID) only as part of the experience of e-boks' service. General attitude or reasons for particular behaviour of people towards the product NemID are not part of the project.

1.4 STRUCTURE OF THE REPORT

The project has three main steps that need to be pursued.

The first one is considered as data gathering. At this stage opinions and suggestions has been collected while qualitative interviews were conducted. This primary data is vital for this particular project, since the project itself is mainly focused on the interaction between the users and the service.

As next step, those findings were summarised and organized in different areas. By this grouping the flow become natural for the project. In this stage analysis was performed. In the analysis the collected empirical data has been further supported by theoretical examples and testing of the system. Theory came in help to explain the cases and issues that has been revealed by the interviews and further held research. Theory also framed the project and gave it completeness.

The final step could be defined as conclusion. There suggestions and recommendations for improvement are proposed after analysis on the interviews. For this project empirical data is much more valuable since the project focuses on the user's experience. Supplementary, to the final stage are also presented user requirements and future development sections as the outcome of this project.

This structure present the ideal case of work while building up this project. After all, the actual methodology and original flow of the conducted work during the project is presented in the next chapter.

2. METHODOLOGY

The applied methodology to the project, as well as the methods and decisions that have been taken are explained in this chapter. Moreover, the reasons behind these decisions are described in greater details. The chapter starts with illustrating the research techniques. Later, details about the process of gathering empirical data and its specifics are introduced. Sources for the raw data are presented and discussed one by one. At the end of the chapter the used methods and flow are revealed.

2.1 SECONDARY RESEARCH

At the beginning of the project a secondary research was made. Based on assumptions further literature review was needed to clearly define the topic. It also helped to compose the research area and research topic easier. However, after collecting empirical data this topic was pinned down once more.

The literature review itself combined scientific papers and articles as well as empirical data from different organizations that were relevant to the project. For example, as e-boks.dk own web page and the Danish agency for digitalization (Digitaliseringsstyrelsen). All non-scientific articles will be very critically discussed together with their results. On the other hand, the research from the advertising companies is also sometimes relevant since they explore up-to-date information in a greater extent. Moreover, these companies can afford to conduct bigger surveys than the scientific ones and to research deeply the results. Furthermore, researches held by e-boks and also statistics presented (by Digitaliseringsstyrelsen.dk) about people's usage and satisfaction have been found relevant to this project. For example, all the statistics that are published publicly and can be retrieved by everyone. [13] Part of their outcomes have been taken into consideration of the later stages of this project. However, companies' conclusions and also other industrial conducted researches used in the project will be critically questioned for enough authenticity.

2.2 PRIMARY RESEARCH

Primary research contains all the qualitative and quantitative data collected during this project. It consists information about all the processes and techniques used for conducting the interviews, questionnaires and contacting the vendor of e-boks.

2.2.1 INTERVIEWS

User interviews have been conducted in order to explore the people's perception of e-boks.dk and how they exploit it as users.

As part of the project ten qualitative interviews [14] have been held to help identify the conceivable relation between privacy and user experience in e-boks.dk the Denmark digital post service. Interviews were approximately between half an hour and forty five minutes long. The users were encouraged to speak freely and explain their experience with the service related to the topic. At certain point users were also asked to come with new ideas for upgrading the interaction with the service.

2.2.1.1 RECRUITMENT PROCESS

As first requirement for the selected people for interviews was they to come from different places and all walks of life. This provided diversity but also solid IT understanding in the answers, since most of the interviewees had in one way or another IT background. Moreover, the interviewees were precisely chosen to be aware of the new technologies and use them frequently. Besides, their expected higher user experience can offer more impressions of the usability of the digital post service in Denmark. In this way their results have been more diverse and applicable to the purpose of this project.

Another factor was their age. People for the interviews were selected between the age of twenty-four and forty-five. As the majority was between 24- and 30-years old. This is due to the fact that these people use new technologies and online services frequently. Furthermore, they have already formulated different opinions, based on their rich experience with digital products. Furthermore, according to a research, conducted by Czaja, Sara J.; Charness, Neil, relatively younger generations are more willing to adopt the new technologies. [15] This is another reason for selecting these interviewees.

Most of the interviewees were from the author's personal network. Professionalism and completely honest answers to the questions were expected, avoiding the relationship between the author and the interviewee. In data collection chapter become clear whether this has been achieved or not and on what extent during this project.

2.2.1.2 METHOD IMPLIED IN THE INTERVIEWS

Considering the technique defined by Kvale [16] for holding interviews, in this project are used mix of semi-structured and face-to-face interviews. The form of the conducted interviews was trying to follow the spiral approach. This means that the questions and answers were revealing more information about the same subject but answered after going deeper in the user's explanations. Sometimes questions were asked as giving and proving statements then continue to the next one in order to conclude full statements and also for the interview to be directed in the way that could provide measurable outcomes. [16] Measurable in the sense of asking questions in order to check the theoretical framework. However, interviewed people were also encouraged to share their personal experience as well as to give additional suggestions. All the interviews were held face to face which helped for complete understanding the interviewees' point of view as well as supported by their behaviour and body language.

All the interviews started with a briefing about the project and also information in regards with the interview as for example that the conversation is recorded, only anonymous statements of the interview were quoted in the final report. The briefing also included a small introduction of the project itself as well as the purpose of the project. By this briefing interviewees were got familiar with the formulation of the project and the used terms in it.

After the interview "debriefing" was also made according to Kvale's suggestions for conducting an interview [16]. In the debriefing at the end of the interview participants were asked if they would like to add something additional and also how they feel about the interview. These questions were asked in order to achieve satisfaction in both sides - interviewee and interviewer, when they concluded the conversation.

According to Kvale [16] for a good semi-structured interview a script and user guide are necessary. Moreover, the user guide (also called "interview guide") helps with the sequence of the questions and also with different ways to explore deeper the interviewee's point of view. The interview guide for this project is kept in the appendix.

The first interview was also a test and assurance for the interview guide as if the questions are easily understandable according to the chosen people. Furthermore, supplementary changes were made after the first interview and questions were cleared during the next

two interviews as well. This was due to the fact that part of the questions were too analytical and academic and the participants were confused how to answer.

On the other hand, part of the answers were revealing different and broader aspects of e-boks which required a revision of the interview guide and adding new questions for receiving coherent qualitative outcome from the next interviews. However, depends on the interview itself and respective answers couple of more questions were asked in the individual cases that are not part of the guide. The reason for these extra questions was to follow up the stories and go deeper in the interviewee's understanding and perception of the Danish digital post system.

In order to help the abstract questions to receive more meaning interviewees were given examples. Moreover, these examples were leading the answers in a certain direction which is considered as a taken bias to the project and also evaluated in the findings of the interviews described later in the project.

In the improved questions guide both dynamic and thematic questions were asked. However, more of the questions were in a dynamic dimension [16] and were kept as short as possible with understandable language to the interviewees. Moreover, the people being interviewed were stimulated "to talk about their experiences and feelings" [16] related to e-boks service and their personal stories about it.

Another result from the first interview was to improve the order of the questions and add ones concerning people's understanding about the service in the beginning. In this way, supplementary basic order for further questions were created which was also a big help for the interviewees to predict and easily follow the idea of the questions. This helped the participants to feel comfortable by introducing their point of view as the most meaningful one. On the other hand, it also helped the author to start building the individual profile of the users and with this to better understand the recruiter's point.

Questions about improvement interface solutions that might be relevant to the future development of e-boks service was kept for the end of the interview as well as the recommendations from the users' themselves.

2.2.2 CONTACT WITH THE VENDOR

In order to take into consideration all the sides involved in the digital post service system an attempt for a contact with the e-boks vendor has been initiated. Their perspective could explain their reasons for the decisions they took when creating the service. Furthermore,

they could also contribute with new ideas and additional impressions for the future implementation.

After a month waiting for respond, e-boks had decided to help the project by answering questions via exchanged emails. E-boks.dk encourage the communication and had promised to consider the questions if they answer them or not in the scope of the project.

After e-boks.dk' vendors received and considered the asked questions, they have announced that the subject is too sensitive and the requested information is qualified as confidential. In the end they have not expressed further interest and decide not to get involved in this particular project.

2.3 USED METHOD

At the start of this project a broader topic has been defined. This topic has aimed to examine and explore whether or not a relation between privacy, user experience and information overload exists. While maturing the project has evolved to the idea of investigating the user's perception to e-boks' value preposition. This narrowing down process brought clearer baseline for the project. Moreover, the uniqueness of the project is in the value of the user's statements. Those statements, on the other hand, are typical example of raw empirical data that need to be understood.

There are different methods and techniques for analysing raw data. In his work Thomas [17] discusses the observation how most of the researchers and investigators are usually looking for basic steps and flow to be pursued. At "*A General Inductive Approach for Analysing Qualitative Evaluation Data*", Thomas said:

"I have found that many researchers and evaluators, who are unfamiliar with any of the traditional approaches to qualitative analysis, wish to have a straightforward set of procedures to follow without having to learn the underlying philosophy and technical language associated with many qualitative analysis approaches."

Induction and inductive method are very helpful in these cases to formulate simple and easy to follow organised structure. On the other hand, according to the critical view of

Bendassolli [18] the inductive approach has the major drawback to take one fact and make conclusions on it. Even though the fact might change or may never occur the same again. In induction there are uncertainties that are arguable if they can be taken as solid base for making further decisions. In Bendassolli words:

"The debate centres around how we justify that what we know is valid" [18]

Despite Bendassolli's critical view induction helps to organise this project in the best possible way. This is due to the fact that the project is focused on user's statements about their experience. Further, when one of the users face a major problem for instance as lack of functionalities it is inevitable that other users have also faced the same or similar issue at some point.

That is why inductive method for structuring the project and analysing the qualitative raw data has been selected. Other approaches was also considered but shortly discarded due to not fitting into the flow of this project's specifications.

Inductive approach also means that first gathering data and observation are conducted and later followed by analysis with implemented theories. The specific of induction as stated earlier is that starts from the example and build the hypothesis and conclusions based on the qualitative data.

To avoid underestimating theory section this project follows Bendassolli's idea of relation between theory and empirical data (induction) [18]. Usually, deductive method is the one that mainly focus on the theory which is proven or refuted after observing. However, in the case of inductive analysis is important for scientific paper after observing the qualitative information theories to be implied. These theories further develop the understanding of the examples and support building the final recommendations and hypothesis.

Figure 2 below demonstrate the differences between the inductive and deductive method which are introduce as opposite approaches one starting from the common and going to the particular case (deductive) and the other starting from the examples and building up grounded understanding about the common situation.

Inductive Reasoning vs Deductive Reasoning

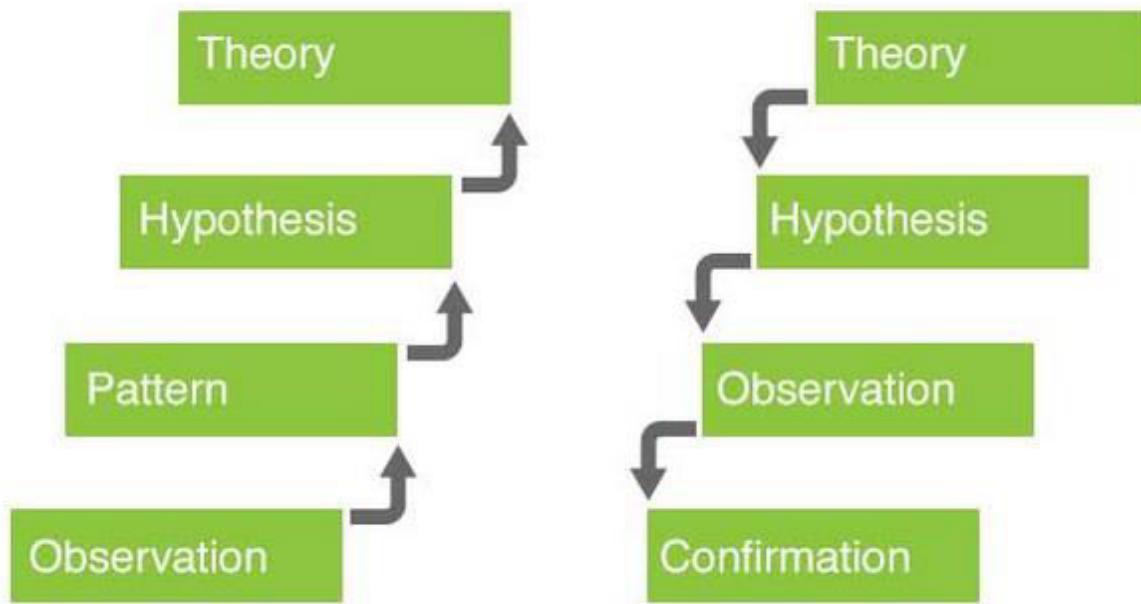


FIGURE [2] – INDUCTIVE VS. DEDUCTIVE REASONING [19]

However, figure 3 presents the inductive method adapted to this project after considering its' concept and technicalities.

The first step was to collect the empirical data with interviews as presented on figure 3. Details about these interviews and the process of gathering have already been introduced earlier in the chapter. [19] [20]

After observation it was time to structure the data and summarise the found materials. This is presented in the chapter data collection with interviews outcome and findings.

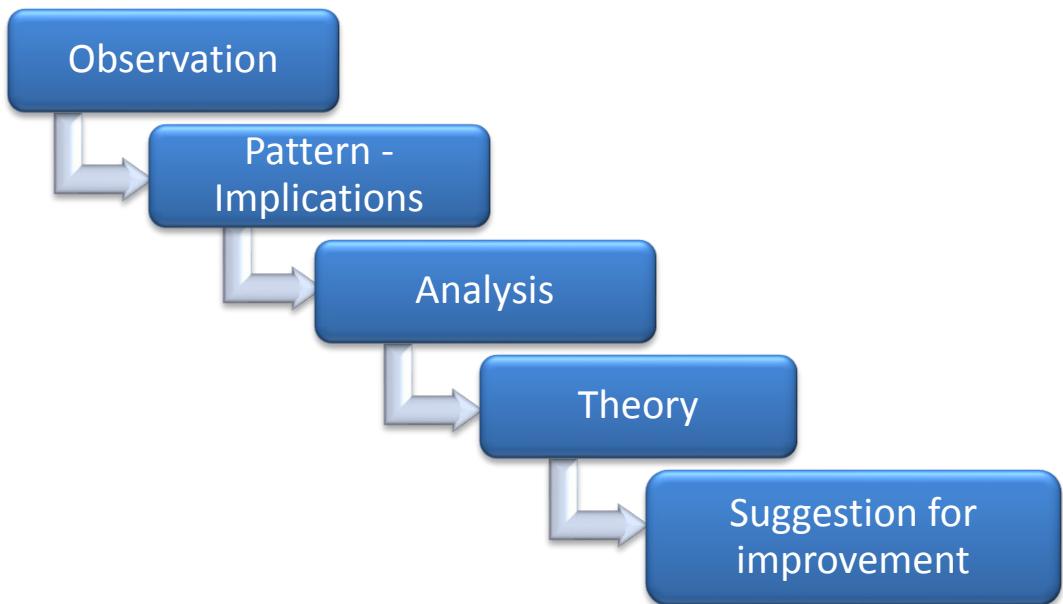


FIGURE [3] – METHODOLOGY FOLLOWED IN THE PROJECT

The next step was to analyse the raw data and comport with theories. As also pointed earlier it is vital the theories to correspond and supplement the empirical findings in order to create a coherent paper. Chapter 5 of the project correspond to this section.

As a final step on the figure 3 is presented a stage called suggestions for improvement. This stage includes the user requirements announced during the findings and aims to suggest a technical solution for each one of them. Depends on the requirements the proposals are mostly addressing topics related with the interaction between the user and the system. Chapters from 6 to 10 contains and bring out all the recommendations, suggestions and conclusions.

After clearing all the methods and the structure that is followed for the project is time to describe the particular case in depth.

3. CASE DESCRIPTION

The existing project of e-boks.dk and how the system operates are explained in greater details in this chapter. Further, in the chapter the technical overview of authentication and implemented security measurements in e-boks.dk are apprised. The chapter ends with a discussion about the current situation and raised issues. Those issues are taken for a baseline for further developing of the project.

3.1 EXISTING PRODUCT – E-BOKS.DK

E-boks.dk as a company organisation was founded in 2001, Denmark. They were selected to create an online replacement of the paper post in Denmark. Figure 4 present Sparekassen Thy's outlook on e-boks.dk. They presented the service as paperless post. [21] The idea of e-boks was also to be part of the new e-government initiative of the country. At their web site page e-boks.dk creators advertise their services by a short video [22] that presents the service as much secured and easy to collect all the information from public authorities. However, e-boks.dk are recognised mostly as replacement service of the paper post and by this they also are taking care of the environment.



FIGURE [4] - E-BOKS.DK = PAPERLESS POST SERVICE [21]

Back in 2005 and 2006 according to their history [6] e-boks.dk was used by a million of people and offered a digital signature service to their users. There are evidences provided by the Danish newspapers and articles [23] that people are more willing to read their digital post compared to the paper one. With this e-boks achieved success by offering online service.

On the other hand, this does not change the fact that digital post has been a mandatory service as well as Danish paper post for every Danish citizen since 1st of November 2014. [2] However, the digital post make the service much easier to be monitored. This is due to the fact, that digital service are traceable and have the possibility to track if a letter is opened or not by the receiver. For example, according to the Danish articles in Nationalt Berlingske (a Danish online newspaper) [24] [12] in 2015 about a quarter of a million people did not opened their emails due to different reasons. The statistics are clear and they are used by Danish authorities like one part of the sources that forms a baseline for further discussions and improvements. In the next section are presented more details about the purpose of e-boks.dk.

3.2 PURPOSE

The purpose of e-boks was to replace the Danish paper post office and in these terms also to provide a link for the public authorities to contact the citizens. Every Danish citizen over 15 has been obliged to sign up for e-boks since November 2014. [2] Working with Danish government e-boks service was equipped with the highest level of security and part of the NemID services.

Over the years [6] e-boks has been offering services like email client service, digital signature and free storage space for uploading personal document (cloud service) to their users.

Even offering all these services, the empirical data conducted in this project shows that e-boks still lacking features or a user-friendly approach. Most of the people understand e-boks as a mandatory service that is usually one-way directed in the communication.

Discussing the existing product e-boks here is the time to also present how the service works. At least the process of authentication and login in e-boks. It gives better understanding on the existed solution about strong security (the authentication method) and how the NemID technology affects the user experience by revealing more about the process.

3.3 AUTHENTICATION IN E-BOKS.DK

As a digital public service that pretend to be highly secured, e-boks.dk has implemented certain level of security.

Most of the web services nowadays are protected with minimum a single layer of authentication. [25] This means that after registering a username the user is asked to choose a password.

There are many ways to strengthen your password like including at least one character which might be uppercase or lowercase, including special symbols, numbers, etc. All these techniques together with extending the number of letters for a password increase the level of the password and respectively the level of security to access the system. Furthermore, these methods are frequently used and well recognized by the regular (without special IT and security background) users.

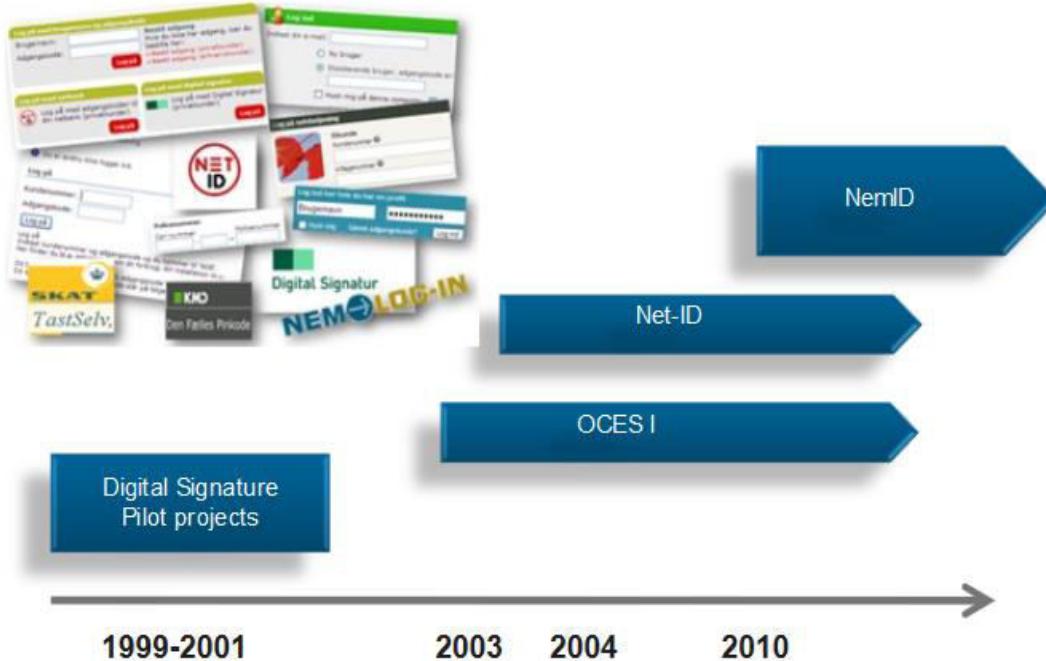
Another technique is a second layer of authentication to be added. The second layer means to append an additional code for verifying when accessing a system. This code could be provided in different ways as for example SMS code, email verification or one time password (OTP) hardware device or physical card holder. Representative of the OTP is the NemID technology which is explained below. [26]

A research held in 2013 by *De Cristofaro, Park, Park and Norcie* presented how different factors of authentication and different methods of securing a service were perceived by the users. In their research, factors as gender, age, income and education were involved to introduce the diversity of their results. Moreover, the majority of their interviewees were selected with poor IT and security background. They found out what is the motivation of people to use two factor authentication method (with email/SMS verification or OTP (One time password) code. [27] According to their survey [27] people are either willing to use OTP codes (approximately 30 percent of the results) or in the majority of cases are forced to use at least 50 percent respond that about their motivation.

3.4 NEMID LOGIN IN E-BOKS

NemID is the Danish governmental solution of providing two factor authentication to all of the digital systems that require it. NemID is a product that similarly to e-boks.dk has started around 2000 and is also supported by the Danish government. Below on figure 5 is presented the evolving on the service according to a presentation made by Nets (Nordic provider of digital payments). [28]

Trying to find a solution that is accepted....



6 Geneva, 6-7 December 2010

Addressing security challenges on a global scale



FIGURE [5] – EVOLVEMENT OF DANISH E-GOVERNMENT SECURITY [29]

Figure 5 presents the progress and the initial idea for continuous improvement until reaching the necessary level of security and productivity. Around 2010, the last version of the progress called NemID was fully deployed and has started functioning. NemID was substitute of the digital signature and become the most trusted and secured way of accessing sensitive information such as bank or governmental institution information. [29]

All this development comes to show the evolution in the service and the similar product approached by Danish e-government.

Furthermore, NemID is a vital part of the user experience within the e-boks.dk digital service. Supplementary, this project is focused on the richness of the user experience even though the technology mechanisms are not important for the users. [33][36]

In e-boks.dk one of the ways that privacy and security are achieved, is the strict and strong authentication method with two factor authentication. As second layer in the particular case is used an OTP device – usually printed card with codes, or for a certain fee could be

purchased OTP device which produces one time codes in certain amount of time (a minute for example). As pointed earlier NemID is the representative of this OTP device which uses a card copy of 148 combinations of codes. After all cards are used Danish kommune is providing a next NemID card with new unique codes. [32] [33]

The principle of signing into e-boks.dk or any other system that use NemID is as followed: first username and password are typed onto the screen showed on figure 6 below.

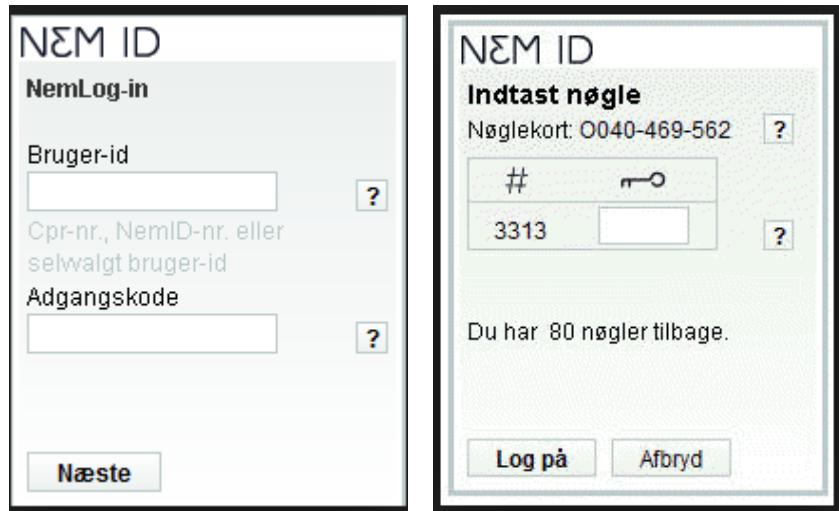


FIGURE [6] AND [7] – NEMID LOGIN PROCESS - FIRST AND SECOND SCREEN [30]

The second step includes a user to take his/her code and find a match after the system automatically gives the first 4 digits of the security code as introduced at figure 7 above. As a next step the user should find the right combination on the card holder and type the rest (OTP) 6 digits. An example of NemID card is given at figure 8. [36]

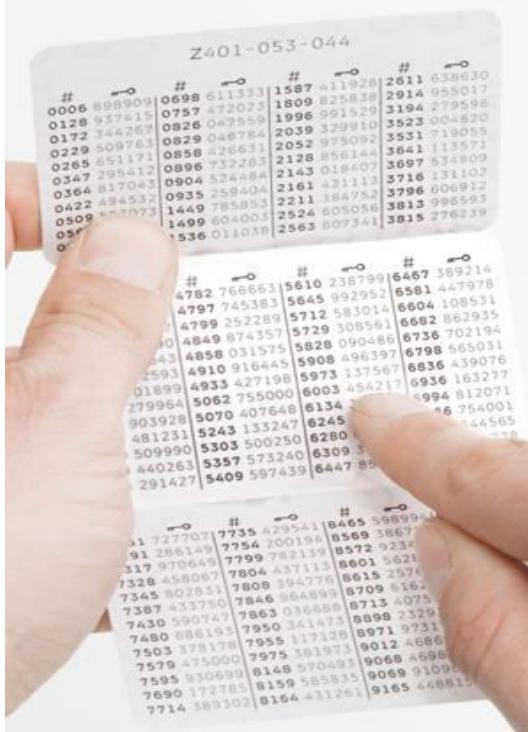


Figure [8] – NemID code card [31]

From user point of view this takes time and more steps that are sitting between the desired content and the user. [32] [33] In the data collection are presented examples about people's satisfaction about the login procedure. Moreover, in the user requirements chapter "secured login procedure" are also discussed as the first category of user's suggestions for improving e-boks.dk. [34][35][36] [37]

3.5 DISCUSSIONS ABOUT E-BOKS.DK

Another theory is the one that Skaarup [38] [39] suggests in his Ph. D. thesis about young people not being interested in dealing with public administration. In his Ph. D. Skaarup pointed out the fact that even as digital natives (term introduced by Prensky in 2001 [40]) young generation have the problem to deal with bureaucracy and public administration. This is the most important reason why this generation count on their parents to help them with governmental issues according to Skaarup's project. National and Plus [12] [10] (Danish e-newspaper) have also stated the problem of poor interest to e-boks as a reason for the low understanding of public administration. Even though these articles show interest of analysing the reasons they do not explain clearly why the interest is poor. They

pay attention to the long process of login and not really needed information. However, this project is aiming to explain the reasons causing poor interest.

CPH Post Online quoted Jesper Bull Berger who presented the idea of NemID procedure as “It simply requires too much typing, clicking and codes”. All these factors make the login procedure an obstacle for the easy access to the service. Another quote from Berger and the same article is: “The amount of work needed outweighs the potential gain of seeing if there is something important in the post.”

Berlingske Nationalt [11] and Business [41] present in their articles information about digital post considering to improve the process of login by NemID by 2017-2018. The e-government is ready to reconsider the usage of NemID and make it more applicable, however it is a big challenge since NemID is used by the public and private sector in Denmark, further elaborated the news.

To sum up, this chapter has presented most of the specifics of e-boks.dk. In depth have been discussed the purpose and the case description as well the method of authentication. All of these are later referred and analysed in chapter five.

4. DATA COLLECTION

In this chapter are presented the outcome of the interviews as well as summary of the recruitment process. Later in the chapter are introduced the different areas in which the interviewees gave their answers. The defined categories offer an overview of the asked questions and people's opinion about how they evaluate their experience as users within the e-boks service. Most of these questions have aimed to explore in greater extent the user's perspective. Furthermore, any impressions and different points of views were collected during the interviews. People were encouraged to share thoroughly their experience and their expressions about the service. These findings are also the solid baseline for the further performed analysis in the following chapter.

4.1 INTERVIEW OUTCOME

In order to collect qualitative data 10 interviews have been conducted with users of e-boks.dk. This was part of the process of gathering data about this project, together with the desktop research and the executed survey.

It has been already presented in the methodology the inductive method that requires to put the focus on the empirical data and start from the specifics and conclude about the common case. As a matter of fact, the qualitative interviews are considered as the most concrete and also the primary source for this project. This is due to the fact that the accomplished interviews are also strong representative of collection of empirical data. Those interviews have presented the clear view of the actual users of the system. As far as this project focuses on user's perspective, users' opinions and comments about their personal understanding and usage of the system was vital and with exclusive meaning for the idea of the project. The main purpose of the interviews was to research people's understanding of e-boks's value proposition and also whether their needs are contented or not. Moreover, to find out the user's satisfaction with the service in terms of implemented privacy and security. Furthermore, it has been explored the fulfilment and enjoyment of the offered service and if there are any essential needs of the users that are not covered by the existing product.

Additionally, these findings give the basis on which in the analysis part are built user requirements, and those requirements are later presented. Examples of suggestions coming from the users are how navigation and findability in the web service can be improved as well as further ideas about changing the login procedure. Those suggestions have been presented in the user requirements chapter.

Rules for recruitment of people for the interviews

- With different background
- Interested in new technologies and solutions
- Age group between 20 and 45 years old participants

Apart from only two interviews, the age group were between 24 and 30 and were students or junior professionals in their field. Their background was various – IT, Business oriented, law and political oriented people, as well as people in the field of human science and etc. The other two interviews were respectively 31 and 45-years old. In total the interviewees were distributed gender equally and were five female and five male representatives.

Interviewee Number	Age	Gender
1	24	Female
2	28	Female
3	45	Male
4	31	Male
5	27	Male
6	25	Female
7	26	Female
8	26	Male
9	25	Female
10	25	Male

Table [2] – Interviewees information

It is important to emphasise that answering the questions were usually broader than the limits of the questions. Usually one reply provided information for more than one research question. This however, make it difficult for dividing clear statements and those to be cut from the conversations since more ideas were covered in one answer. It also complicated the process of resolving and clarifying the outcomes of the project.

To achieve quality for this project I was following the Kvale's understanding: "*The primary task for both the doctor and interview researcher, however, remains that of obtaining descriptions so that they have relevant and reliable material from which to draw their interpretations.*" [16]

4.2 INTERVIEW FINDINGS:

Naturally couple of categories emerged as findings in result of choosing inductive reasoning and semi-structured interview questioning. All the categories that were not relevant for the narrowed down scope of the project have been discarded which happened in later stage. Below are discussed areas of findings related solely with user experience and privacy and security. Since the project tries to present the user's perception of e-boks.dk' value proposition a separate section is preserved for findings related with that. These findings are selected as the most impressive and valuable for the project. They present user statements about how users describe their experience while operating with the service. Another vital group of findings is related with the interaction between users and e-boks.dk interface. Finally, the last but not least group specifies more on security and its relation with interacting with e-boks.dk. The separated areas of findings and brief summary of their results are presented as followed.

4.2.1 WHAT IS THE PURPOSE OF E-BOKS ACCORDING TO THE USERS? HOW NEW FEATURES AND SERVICES (LIKE CLOUD STORAGE FOR EXAMPLE) ARE PERCEIVED?

All of the interviewees have been familiar with the service and they were using it before. Most of them qualified e-boks.dk service as a replacement of the regular paper post. Moreover, they have been asked to sign up compulsory since the service become mandatory in Denmark. The most common opinions are provided by the statements of Interviewee 1 and Interviewee 5 below:

"E-boks gives you access to the post sent from different governmental institutions. These are sent electronically to you." [In1.3]

And

"Actually for me this [e-boks.dk] is a way to skip the regular post service in Denmark... E-boks is just a platform where I can get my emails from public authorities." [In5.6]

Almost all the interviewees gave positive comments about the service. This is observable by first their body reactions and second by small details as for example Interviewee 5 [In5.6] who has explained his comfort and enjoyment of "skip"-ing the regular Danish post service. Another example is given by Interviewee 1 and her comment - "I think the system is really good" in [In1.6] and many more comments in the findings and analysis chapter

showing similar attitude from the interviewees. In general it has been noticed that people were able to explain what they like and they do not like in e-boks.dk. At least they presented personal reflections to all the areas and topics that they have been asked. On the other hand, they were encouraged to share their full range of experiences within e-boks.dk service.

Furthermore, almost all of the interviewees expressed the feelings of understating the necessary of the service, apart from the Interviewee 10. He was a bit distracted at the beginning of the interview and then from his answers it seems that he has not seen the reason why to use the service since all other authorities was reaching him in his Danish personal email.

"I don't know. I have never really felt that it [e-boks.dk] was important for anything. I have no idea what [e-boks.dk] is used for. OK, I mean I know it's [e-boks.dk is] like the public mail address so you have one official mail address which seems like really good idea but which instance doesn't have your standard email at this point. It just seems like you know what you call it - back-up plan which is good." [In10.3]

The comment [In10.3] showed the positive attitude to the service since he twice mentioned that it is "good". However, this does not changed the fact that Interviewee 10 had some confusion about the purpose of e-boks.dk. This confusion is thoroughly discussed in the following section about the purpose as well as in the analysis. Furthermore, his unfamiliarity provoked him to offer more reserved and even in a way negative answers in addition to the previous one. Negative in the sense of this particular user honestly admit that over the time he just did not feel the need to use Danish digital post. On top of his previous comment he mentioned that he was aware and signed up when it became mandatory but then he has never been encouraged to use the service. Or in his own words:

"Well to be completely honest, I forgot about its existence completely. I haven't been reminded of its [e-boks.dk] existence for years. I feel also you know if something urgent popped up there [e-boks.dk] on a frequent basis then I wouldn't have forgotten that it [e-boks.dk] exists in the first place." [In10.2]

The interviewee 10 claimed that he was not reminded for the service's existence. Moreover, firstly he affirmed the aspect about the lack of the service and the fact that this did not changed his life at any point. As a second aspect presented in the same statement [In10.2] it was interesting to be noticed the raising question of urgency and its importance in the e-boks service. This matter also helps to reveal what e-boks offer to their users and

whether or not the offered is enough for them. The same point of view was also expressed by interviewee 1:

"I don't think the purpose of this service is to inform you about very urgent things. If it is urgent, they will contact you in a different way." and later supported by the statement *"As far as I see it, people are forced to use it. As they are forces, the organizations, at least the letters are not really urgent. As for example, when I receive letters that the road is closed is not something that your life depends on or it is very important for you."* [In1.2]

Interviewees' opinions were clearly pointing out the idea that e-boks is not used for urgent situations. Moreover, it is used only for regular information. The reasons for that will be discussed in the analysis.

Another very interesting fact has been discovered at this stage while conducting the interviews. The answers in regards to what e-boks.dk is and how the service is used or for what purpose revealed different replies.

Furthermore, all of these replies have belonged to one of the three different categories as followed:

- 1) Related with function of storing and archiving documents from public authorities and private companies
- 2) Related with function of notifying people about different information affecting their lives
- 3) Related with creating communication channel between citizens and authorities

An example for the confusion raised in users is the Interviewee 7's opinion about e-boks.dk:

„I understand e-boks as a service which kind of make it easier for you to get everything together and have all your personal information and all the things you have to communicate with public services and etc. This is the way for me to communicate with all these institutions.“ [In7.2]

It is interesting how her puzzlement is discernible in her words when she tries to explain what e-boks.dk is. For the interviewee 7 is hard to define the service as one particular. Moreover, this is the reason why she combines all the features that she has been using in e-boks.dk and has explained the service as "everything together".

In order to disclose the different sub-categories of purpose according to the user, below are presented each one of them with more user statements and comments. The first one:

4.2.1.1 E-BOKS.DK AS AN ARCHIVE OR STORAGE PLACE

One of the most valuable comments about storage and archive functionalities was given by Interviewee 8. He clearly declared his needs of a summary of his bank statements. He expressed the feeling that for him in certain sense e-boks.dk is an archive repository. He was concerned about his financial status and was checking every 6 months personally his letters, as presented in the statement [In8.3]. The inconvenience of the service not to offer a summary of all the bank statements and also the fact that he was not able to download all the selected emails at once created bad experience for him.

"On the other hand, I guess at the end of the year for example when I am dealing with my taxes and read all my invoices – it will be much more comfortably if I am locally on my desktop and operate as I do with dropbox. This will be much easier to open all the pdf without sending them to my Gmail and open through my Gmail. I think this will be applicable in this case. For example today I was calculating the first 6 months – how much money I've received and also how much taxes was paid and so on and so forth. However, I do all this one by one – respectively looking for the payslips for the certain month and checking. And in case if I am in a folder similar to dropbox it will be much less time consuming" [In8.3]

To enrich the storage and archive functionalities e-boks vendors has also provided cloud storage service since beginning of 2016. However, this feature is comparatively new as it was presented in the introduction (Chapter1) and so far not so many people are aware of its existence. The cloud service is primarily promoted as "deposit box for keeping digital valuables". [7]

However, the empirical data for this project showed that almost all of the interviewees were not aware of this new feature. Furthermore, part of them express their concerns about why they will need such a new service implemented in e-boks.dk. In addition they were bothered by questions like how secure is the storage and whether the interviewees are willing to trust e-boks and with what type of files. For instance interviewee 5 and 9 are willing to "try" the service but only with not too private documents.

".... So in case we assume that e-boks will not give away my personal information then "why not" to try this feature. I am willing to trust them but in certain circumstances as if they are reliable in what they offer." [In5.7]

Interviewee 9 was the most open to the idea and she said she really needs to store somewhere her certificates but she uses other cloud services for other stuff like her personal photos.

"The cloud service that they offer – maybe I could use it. Because I actually have a problem with certificates – I don't know where to save them. Pictures and private things no. I use other cloud services for that. I usually use Google Drive cloud service." [In9.7]

Interviewee 4 raised the issue that he mostly interact with e-boks on his mobile phone and cloud storage has not yet implemented on the mobile application, this would create obstacles for him to use the service.

"I saw that [that e-boks offers cloud storage] but I haven't really look what is about. And it [e-boks cloud storage service] is a good point because maybe this [e-boks cloud storage] one is not really integrated with the mobile app. It might not noticed it [in case it is not implemented on the mobile app it will be hard to the user to try it]." [In4.4]

The most conservative answers similar to his previous responds was given by Interviewee 10. He commented that he does not see the point in such a service in e-boks. However, he kept developing his statement and he pointed out that according to his view maybe this feature is offered to accompany all the people who do not use any other cloud service in their life.

"umm, I can't think of a single instance in which that would be useful. I mean basically what they are offering people is a public cloud storage. I mean that's actually not a bad idea. On the other hand, uhh .. why? I mean it's .. They target now.. Now when I am thinking about it they targeted the audience as obviously people who don't really have other cloud things set up. Like dropbox for example, I mean in order for this to compete with dropbox it would have to have a client or windows storage." [In10.4]

4.2.1.2 SYSTEM FOR NOTIFYING OR INFORMING YOU FOR AN EVENT OR SITUATION

Couple of examples were given to support the idea of e-boks.dk as a notifying system. For instance Interviewees' 1 and 2 opinions. The core of the idea is that e-boks.dk informs citizens for events and situations that are closely related to them. On the other hand,

users can decide if they do not want to receive specific email on their digital post. In this case they have to pay for receiving it in paper. Supporting the idea Interviewee 2 gave her point of view:

"E-boks for me is the digital post that the Danish system is offering in order to you to be able to get access to information that is related to you as a person in regards of different things, for example regarding something from the kommune, or regarding something from hospital, or related with your work. So basically you get this letters that inform you that you need to do something." [In2.3]

Moreover, interviewee 1 emphasized that receiving information from authorities is very important to her since she signed to receive all types of notifications:

"I signed up to receive an email to my regular email and a text message when I have inboxes. So I receive multiple notifications" [In1.5]

There were also other comments related with this functionality. However, as it was explained before due to the fact that one answer from a user contained usually information about more than one asked question the extraction of statements and findings was complicated. On the other hand, those two statements highlighted the core of this area's importance.

The last sub-category that user's qualified e-boks.dk's service is:

4.2.1.3 CHANNEL FOR COMMUNICATION WITH PUBLIC AUTHORITIES

In general e-boks.dk has been created to replace the paper post. Since paper post was the official and common channel for communication between people but also between people and authorities this functionality has been inherited by e-boks.dk. In this sense e-boks.dk is the official and the only way of digital communication between different authorities and Danish citizens at one platform. Additionally, to remind statement [In10.3] where there is a possibility for people to contact a separate public organization individually through exchanging emails between the certain authority and a citizen's private email address. This does not change the fact that e-boks.dk offers a shared platform for communication between a list of the public and private companies. Interviewee 1 strongly support this idea by her comment:

"I think the system [E-boks] is really good. It connect you to the local ..uhm.. different governmental institutions. You are connected to them through something online and I think this is nice. Because a lot of times you don't have the time

physically to go and get the information yourself. So I think it's [e-boks service] good.”[In1.6]

Or the explicit quote by Interviewee 8:

“E-boks is usable but it is used only for one specific service to communicate with high level institutions. Yes we can write emails to each other but there is no point.” [In8.7]

Further, statement [In4.3] also enforces the idea of highly secured communication channel. The second half of the comment made by Interviewee 4 was suggestions and ideas how the security could be changed. Those discussions are kept for the following sections and the analysis chapter.

“I think e-boks could be used as normal daily email for sudden purpose. Not everyone using it for a daily email service. I am considering in case I have something important to send and if I could do this through e-boks. So that I know it is provided with high security. If e-boks can change the service like that – to make it more go two way [receive and reply options] it will be nice. I know that I can do it even now but they give me the notification about the security all the time. On the other hand, maybe the security could be there but they could encourage people by their visual graphics that users can send emails. Which is important for me, for example to use the system regularly. Then I think people will like the service more.” [In4.2]

Another statement also come in favour to the communication channel, however it has exposed an issue. According to the statement of Interviewee 9, e-boks.dk does not endorse communication in respond from users to senders (different authorities).

“I don't remember but it's usually only read emails. And if you have to do something you should call someone, usually you cannot send emails through e-boks. If I need to reply I reply in another system, I called and they said I need to push the button or something and then they will figure out what to do. Usually if I need to do something – I have to call somebody. I think it's possible to send an email, but it's not meant to do, this is not the purpose of e-boks.” [In9.6]

In summary, all the different types of services and different functionalities offered great variety to the users to perform different scenarios. On the other hand, the mix of services implemented in e-boks.dk challenge them to quickly adapt while performing on Danish digital post. Moreover, users are trying to be flexible with the service, however considering Interviewee's 9 opinion it is hard to achieve that. Her statements for this question is:

"So this is not nice to have a difference between the mobile and web version. It should be one platform. Not a difference between the web version and the mobile one. But actually it depends. Because my Feriepenge [Danish fund for vacations] I open it exactly from e-boks. I didn't go to another system. However, my mom – she open in another system. So, depends where you work and how the system is and so on so forth." [In9.4]

Those comment can also be used to introduce the fact that people feel disorient about how to react while dealing with Danish digital post. In case e-boks.dk offers a channel for communication should this mean that only authorities can actively participate in the dialog and users only passively read the information? Or in case of storing and archiving – how usable is the offered space since statement [In8.3] has clearly explained that information can be accessed and operated one by one. Finally, the last one – notifying functionality – when people assume what is the content of the letter how they are stimulate to check it. Since for instance with the pay slips the same information is accessed via personal bank profile and most of the time without the requirement of NemID second layer of authentication. All those questions about how users' comprehend the values proposition of e-boks.dk has been raised during conducting the interviews. Furthermore, together with findings about privacy and security they all will be discussed in greater details at the analysis.

At certain point this projected contained the assumption that the interface of e-boks.dk is not good enough and this is the reason why people do not want to check their letters or why they have difficulties while operating with the service. However, this assumption have been proven as wrong. Below are the highlights of those findings:

4.2.2 IS THE INTERFACE GOOD ENOUGH TO SUIT FOR ITS PURPOSE?

Almost all of the interviewees were sharing that the interface suits for its purpose. They were explaining that the service is easy to operate and almost all of them did not have any problems or issues while working with e-boks.dk.

"It [the interface] seemed pretty intuitive to me. It look like a pretty normal inbox – like not an email box but one of these public inbox where you know there is not that many things listed but that is because of the messages are so far apart. I can tell about the tabs works pretty intuitive as well.. It worked the way that you are expected to and it also worked the way I would have expected to." [In10.1]

Simple explanations describing the interface as "intuitive", "straight forward", "simple and works" by interviewees 10, interviewee 5 and interviewee 8. Each one of their statements

shows also how with their own word and expressions they have similar understanding and point of view about the interface of e-boks.dk.

"I think it's pretty straight forward. You can see one button from private, one button for business – it's pretty straight forward where you need to go. And you have the navigation menu on one side. And I think it is pretty easy to operate with. I haven't had any problems so far." [In5.5]

and

"The interface of the web version of e-boks is like older version of yahoo email client service. The other thing is that they offer interface in English which I think it's a good thing and enrich the service. The interface is simple and works. The menu is in the left side, then you have things on top – and e-boks is following a design of email client service." [In8.6]

In summary users were happy with the interface and they have not expected something else. Moreover, to support the web-version Interviewee 9 make the statement that e-boks is one of the few things that she uses her computer for. She enjoys the offered interface and it is much easier for her to read her information on the web application.

"For me the application is too small. And for me the stuff like my salary or some other information – it is not easy to see it in this resolution – it's too small. That is the reason why I always open it from my computer. It's good the application still saying you have some unread messages however I prefer to use the computer version. I prefer larger screen for e-boks. I think this is one of few things that I use my computer for. Facebook, emails, other social Media all is on my phone, but e-boks I use it only on my computer." [In9.5]

The idea of poor interface and consequently causing issues for users and their experience has been absolutely refuted with all those comments by the most of the interviewees. The qualitative data from the interviews drew e-boks.dk with simple interface that works for the simple requirements that e-boks.dk vendors placed when started the project.

The last sections are saved for the security implemented in Danish digital post. This findings focused on how people understand security in the service. Furthermore, how they feel about the executed level of security and do they have other suggestions.

4.2.3 HOW USERS UNDERSTAND THE OFFERED SECURITY (PROTECTING THEIR PRIVACY)? DOES IT AFFECT THEIR EXPERIENCE AT ANY POINT?

Most of the interviewees were agreeing with the fact that they like the security and that it is in place in e-boks.dk. It make them feel safer and more secured.

On security and privacy matters *Interviewee 4* and *Interviewee 8* had very close statements that presented how they treat their privacy and security in e-boks.dk.

“..But I wouldn’t like anybody else to know my Danske bank information...” [In4.1]

“I would like my privacy to be 100% protected...” [In8.1]

Both of them proclaimed very strong interest for protecting their individuals by the implemented security in e-boks.dk. Furthermore, Interviewee 1 raised the point that governmental services comes on a certain price and for e-boks.dk the price is the security and complicated process of login with the NemID code.

“Yes I receive emails that they don’t need to be so strongly secured, but as I see it as a service that provides you access to letters. It is not matter that these messages are more securely transmitted to you, it’s more about it’s a place from the government that comes on a certain price. Security is just part of the price. So these letters, e-boks is just a place where you’re contacted from public authorities and institutions. This is the easiest way to do that for them. Because you can also receive the paper which you could argue about the security level of that, too.” [In1.1]

The rest of the interviewees were less concerned about their privacy and they have just acknowledged the fact of its existence. Moreover, a common sense between most of the other interviewees was the fact that the security is “typical” for the Danish systems by the implemented regular protection method with the NemID code. However, Interviewee 9 clearly stated that she prefer the service to be user-friendly over to be secured.

“I think e-boks is more secured compared with the personal cloud services. I like that Dropbox is so user friendly. This is the purpose to use it for storing my data there. And it is so easy to save in your personal Dropbox folder. I prefer user friendliness and ease of use over the security. It should be both but nowadays, it’s very hard to say what is secured and what is not. Even services as Facebook – you don’t know the pictures that you are posting where they are going, where they are stored, and so on so forth. Either way, you have to be as “you don’t care, and do whatever you want to do” or take care of your information and spamming people. You don’t know what the spamming [In9.1]

Maybe the best point of view has been presented by Interviewee 8 who emphasized on the relation between the conflict areas of privacy and usability. He said:

Security in e-boks is pretty Danish standardized. And in case my mobile phone was able to remember my full credentials it would have been nice. Another thing is that iPhone has 6 digits pass, which is not the usual 4 that we are used to have. This app is coming with 6 digit requirements for password which confuses me as a user. But like this it's more secured. However, you can't do much if you open my e-boks on my mobile. You cannot write an email or anything else, you could only see my pay slip there and that's it. On the other hand, it depends the data leakage will be huge because you will see the amount, but also my personal cpr number, my address and other personal stuff. [In8.2]

He gave detailed explanation of the situation of passwords and the difference between password with 4 or 6 digits. Furthermore, he was able to capture the problem from vendor's point of view (cherishing privacy and security) and the user's position appreciating the easy access and usability of a digital service. The relation between privacy (achieved by implemented security) and usability (user experience) has been thoroughly discussed in the analysis.

Absolutely contradicting to that relation was Interviewee's 5 statement:

"I am saying that exposed privacy doesn't necessarily mean you will have bad user experience. Because for some users maybe the more privacy is implemented the better is the user experience. Depends on the users. E-boks is just a platform where I can get my emails from public authorities. Of course it needs privacy but I don't know for me the higher the privacy gets actually the user experience is better at least for me." [In5.1]

His comments [In5.1] and [In5.2] build him the profile of strongly supporting privacy and security within e-boks.dk. However, despite these statements Interviewee 5 discredited his original thoughts by telling me about his hypocrite actions. Hypocrite in the sense of the fact that this particular person showed many concerns and strong support to e-boks.dk and his security. Moreover, his own words were about he would not like anybody else to see his letters from the authorities and he like the security implemented in e-boks. It was a matter of trust and also a matter of risk according to him. This particular interviewee mentioned in the conversation that he is not willing to expose the content that he receive in e-boks.dk to no one else. However, (this is where the paradox happened) since he is a foreigner he anyhow needed to share his information with third party supplier in order understand it. On the other hand, these hypocrite actions just

discredit his previous statements and left questions about what is his actual perception of the security.

"This [translated functionality] will save me from copy the text and translate it in Google. Then actually if you have the NemID to protect you and quite a lot of layers of security but then in case you're a foreigner you anyhow put the whole text you received in a third party place – as for example Google translate or something like that. And then what is the point of the security in place in e-boks? In this way a person also expose his/her privacy." [In5.3]

Analysing his actions and contradicting thoughts is introduced in the following chapter. However, this interview raised very important question of how people think and how they actually react. Furthermore, it discovered a huge drawback of e-boks.dk as service that claim they provide strong security to their users.

Finally, this chapter come out with a few findings in relation with the implemented security or in other words the login procedure.

4.2.3.1 SUPPLEMENTARY TO THE SECURITY: HOW DO USERS FIND THE PROCESS OF LOGIN IN E-BOKS?

Almost all the users agreed that the login procedure makes it difficult to smoothly use the e-boks service. Even more, couple of them confirm by their statements that they would like to avoid the process. Moreover, this is the reason why they have been looking for alternative ways to sign up like the mobile application or Danske bank just to skip the NemID part.

"Using NemID is not comfortable for me and make using the service too complex, requiring always to keep the NemID with you when you have to open. Even more if I know the content of a letter, I don't want to waste the NemID code for it. I could eventually read the message the next time I open my e-boks for some more important message that I've received." [In3.1]

The catching part in this statement is about the idea of “wasting the NemID code”. NemID is card that when the 148 passwords are all used then another card is purchased and received by Danish citizens. The fact that the card is a physical appliance makes Interviewee 3 to think about saving the code and not wasting it for information that can be retrieved in different way or he consider “not important” and would not read it anyway.

To backing up the idea of avoiding the regular login procedure with NemID, Interviewee 5 said:

"it's a bit boring to use the NemID log in every time. And since the app is doing the job I prefer to use it. And I don't need to sign in every time and to switch on and off all the time" [In5.4]

And Interviewee 6 added that according to her the NemID is not 100% necessary in the case of e-boks.dk:

"I don't think the NemID login is so much necessary because for example in my e-boks I don't think I have such a valuable information there. It's valuable kind of because are pay slips and other money related documents that consist my CPR number inside. But still I don't know if I need to have the NemID in place, because even when I login to my bank account I don't need the NemID." [In6.3]

All these statements were critical for understanding people's perception of the digital post service. They provided different aspects and uncovered unexploited field for research.

To sum up, in this chapter have been presented the variety of findings that have been collected during conduction qualitative interviews. Moreover, all these statements revealed interesting information which now needs to be further researched and analysed.

5. RESEARCH ON FINDINGS, IMPLICATIONS AND (E-BOKS) SERVICE TESTING

This section introduces in depth research and beginning of analysis on the findings. User testing has been performed on e-boks due to fact that the system is accessible by every Danish citizen. For the testing my personal credentials and my Danish digital post box have been used. In this chapter are presented more of the interviewees' statements from the findings. Moreover, to each one of the described cases is added supplementary information in form of system testing or additional information like from the extra interview with Søren Skaarup. Where it is possible supplementary user comments are added to accompany the discussed case and achieve completeness. The point of the chapter is to gain extensive knowledge and understanding of e-boks as service based on user's feedback and testing of e-boks.dk.

The three sub categories being defined while collecting users' impressions about e-boks are presented in the first place (in Data collection). They are outlined in the first group "how people understand and react on e-boks.dk". Later, second main group of researches and reviews are examined. It is related with called "User's feedback and suggestions".

5.1 HOW USERS UNDERSTAND AND USE E-BOKS

Findings in regards of this section were introduced in the previous section. Those findings however, revealed an interesting reflection which worth to be deeper researched. It includes 1) Research the archiving and storing functionalities of e-boks.dk, 2) Research the notifying and informing functionalities of e-boks.dk, and 3) Research e-boks.dk as a communication channel as followed:

5.1.1 RESEARCH THE ARCHIVING AND STORING FUNCTIONALITIES OF E-BOKS.DK

At first, is discussed the situation about the variety of functionalities performed by e-boks. However, this variety created difficulties in users to deal with the system. For example the first difficulty is the difference between the user expectations and the actual status of the system in regards with storing and archiving in e-boks. Clear statement, supporting the situation is provided by Interviewee 3 who explained that the system did not perform in the way that he expected while he was storing his letters:

"Why when I do folders and categories in e-boks for example from my bank or from the commune the emails don't go there automatically? Especially, when it is not an unfamiliar sender, and it is not the first time to receive an email from the place. I need to drag and drop in the folder, and it is frustrating to do so, especially when you already set up the folders once." [In3.3]

Additionally, Interviewee 8 stated:

"some automatic categories and payslips for example or these income stuff to go straight there [straight to a predefined folder]". [In8.5]

Interviewee 3 and 8 need - whenever they received a letter from a register sender, this letter to go to a specific folder named after the sender's name. For example, all emails coming from a Danske bank (one of the Danish banks) to be respectively separated from the other emails and kept in a special folder called Danske bank.

In relation with the first sub category about arching and storing a testing of the e-boks functionalities have been made. According to the e-boks section "Archiving rules" showed on figure 9 there is the possibility to receive letters in predefined folder automatically and avoid user to take care of that by moving letters. Furthermore, the screen (figure 9) shows that e-boks offered more than 1 options to please their users.

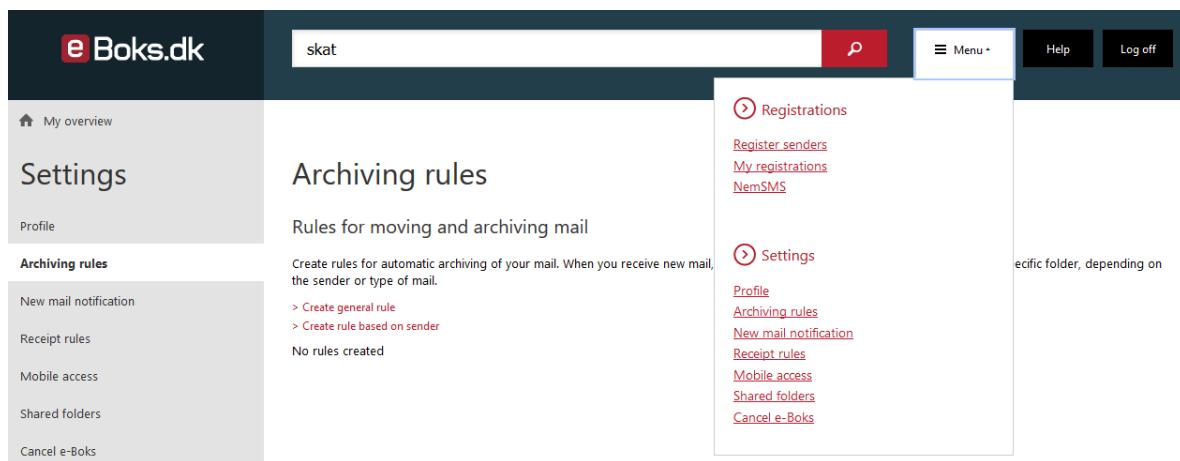


FIGURE [9] – HOW TO SET UP YOUR FOLDERS AND ARCHIVING RULES

When selecting the option of creating general rule and check for guidance e-boks offer instructions to support the user. Surprisingly, when following the "help instructions" offered on the e-boks.dk service presented on figure 10 the mentioned elements have not been found at the web page.

Help

Archiving mail

With the Archive function you can easily move your mail from the Inbox to archive folders which you choose yourself. You just have to decide yourself in advance where a document from each sender has to be moved to.

Select a folder as an archive folder as follows:

1. Select the **Registrations** tab
2. Click the **Update** button next to a registered sender
3. Select one of your archive folders as the **archive folder** for every type of mail
4. Click **OK**

If you want your mail to be archived automatically when you receive it, you must also select **Archive automatically**.

You must select an archive folder for each sender you want to use **Archive** for. If you have not selected automatic archiving, you must use the function as follows:

FIGURE [10] – GUIDANCE FOR ARCHIVING

For example following the introduced (from figure 10) and executing them on the web page, figure 11 introduces strange situation. The place described in the instruction was not on the screen. Due to no more details in the guidance a user cannot be sure how to perform the archiving opportunity offered by e-boks.dk. The way of presenting the information was not clear and regular user would also be misguided and frustrated by the fact like Interviewee 3.

My testing ended up with the conclusion that I was also not able to follow the instructions and create the archiving folder in my personal e-boks folder. On the other hand, in case I have been able to create the folder following my personal understanding of the service – I have not been informed that I have done this action. Therefore, I assume I was not able to create the desired folder. This testing is a strong evidence for the dramatically increasing needs of the “Help” part of e-boks.dk to be overseen again and changed respectively.

Registrations

Register senders

Search for a sender...
Show all senders in alphabetical order

Selected senders

alka CODAN PD

- Registrations
 - Register senders
 - My registrations
 - NemSMS
- Settings
 - Profile
 - Archiving rules
 - New mail notification
 - Receipt rules
 - Mobile access
 - Shared folders
 - Cancel e-Boks

FIGURE [11] – NO UPDATE BUTTON ON THE SCREEN

5.1.2 RESEARCH THE NOTIFYING AND INFORMING FUNCTIONALITIES OF E-BOKS.DK

The second discussion (about how people evaluate and understand e-boks) was specified as notifying and keeping informed people. During collecting findings from the interviews an interesting issue has been raised in the same regards. The issue is about e-boks and how they threat urgent messages – according to users the service is not used to “save lives” only to support the daily occupation of the Danish citizens. It has been observed that according to people (statements [In10.2] and [In1.2]) e-boks is not used for urgent notifications. It is usually used for informing, communicating and storing. All of these operations do not encouraged immediate respond. This fact was further supported by a conversation in person with Søren Skaarup who finalized his Ph. D. thesis about *The Mediation of Authority* in June 2016. [38] According to his research and theories Skaarup has provided proofs that “receiving an e-mail” nowadays is accepted as a rather slow way of communication. This is also showed in the project of Kyle Emmons and the research of Tirus Muya Maina which both have discussed the different ways of communication and their efficiency. [44][45] Both Emmons and Maina examined the fact that in a regular basis “a reply” of an email is acceptable to be received in couple of days, sometimes even weeks. This fact however, does not imply as the fastest way of communication. Comparing e-mail with instant chat messaging, a phone call or a SMS - the rest are much faster forms of communication. Hence, in terms of urgency, communications via e-mails is sitting low in the list after the other types discussed above.

Therefore, considering all of the mentioned researches, together with the specifics of e-boks – focussed only on sending letters via emails, it is understandable why urgent information is not offered by the service. At least not in the sense as Interviewee 1 said in her statement [In1.2]: “[E-boks.dk]...is not something that your life depends on...”. It seems like the interviewees very well caught this aspect and further, they do not expect this characteristics from e-boks. This further has supported the idea of how people intuitively adapt to the service and the provided features.

While stating the users’ comments about how they perceive e-boks’ value proposition the last sub category was formed as:

5.1.3 RESEARCH E-BOKS.DK AS A COMMUNICATION CHANNEL

It was interesting to analyse interviewees’ opinions [In4.2] and [In9.6] about

“If e-boks can change the service like that [combine receive and reply options] – to make it more go two way it will be nice.”[In4.2]

or

"I don't remember but it's usually only read emails." [In9.6]

With those statements they both have alluded the possibility of lack of "two way communication" in e-boks.dk. "Two way" should be understand as having communication going from the authorities to the users and from users to authorities or in other words the both sides are able to transmit information over the communication channel. It is illustrated on figure 12. The figure 12 illustrates the user's point of view, because e-boks users read and receive the letters from the senders. Then later the same users are not able to write and send letter back to the authorities.

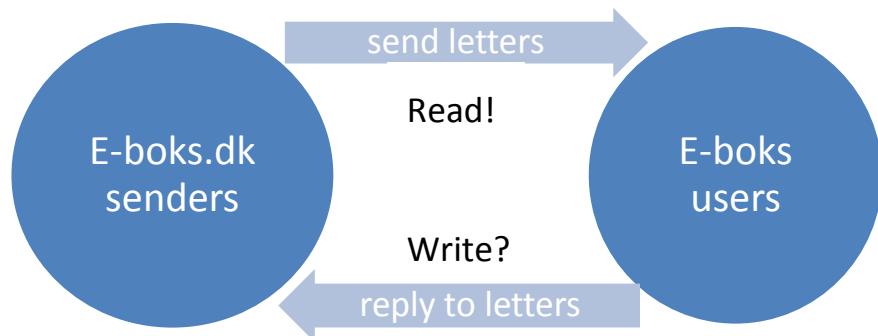


FIGURE [12] – TWO WAY COMMUNICATION

Moreover, interviewees also have shown interest in their statements for empowering the channel with two-way communications. Otherwise, according to their comments e-boks.dk is the only part that can communicate actively and the users are not able to respond via sending email letters.

These statements and implications persuaded me to perform supplementary testing of the „reply“ functionality in e-boks.dk in order to check user's comments. The results are presented below on figure 13 and 14.

They showed that in case when letters consist bank statements, or any other informative data, further they only need to be acknowledged do not provide the option to be replied. Even though on figure 13 the "reply" button is accessible and enable to be selected the following action does not lead to a new draft window for sending back a letter which is presented on figure 14.

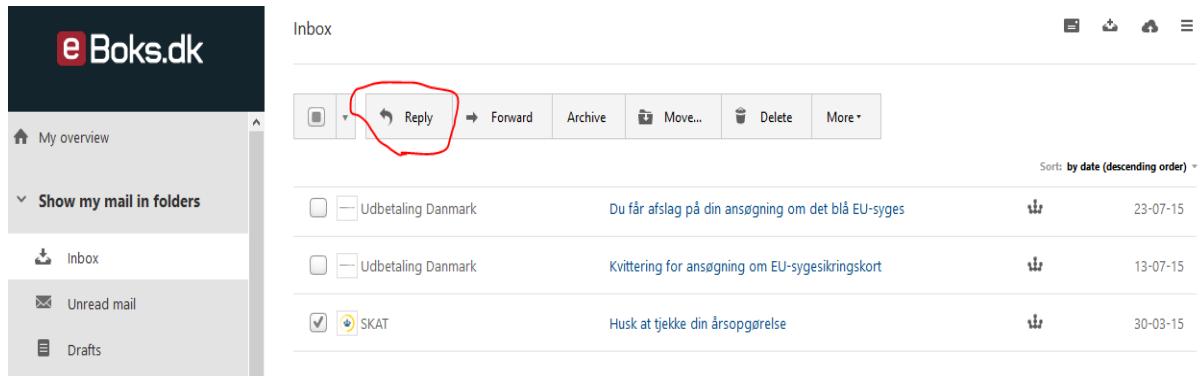


FIGURE [13] – HOW TO OPEN AN EMAIL

Therefore, the problem has occurred when the button “reply” has been selected. Then, a new pop-up message appeared on the monitor screen. The message is introduced by figure 14.

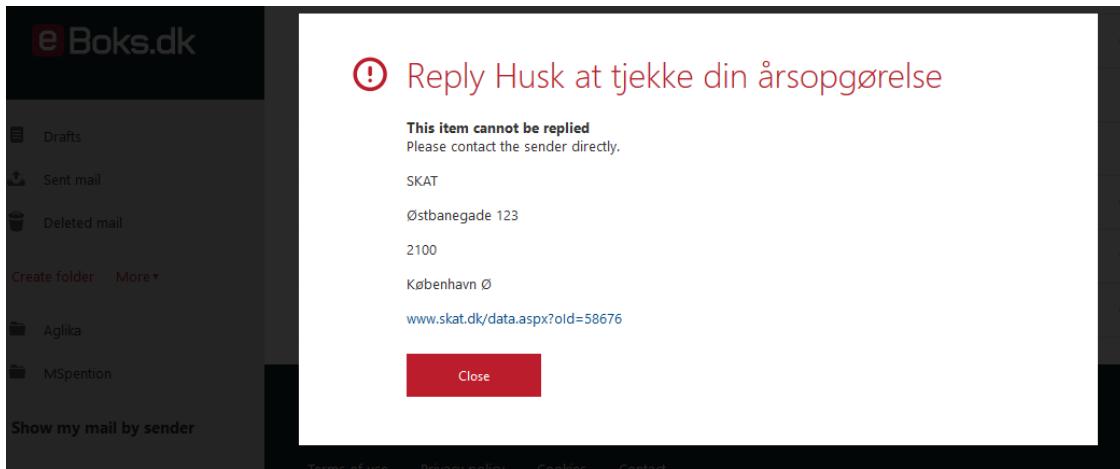


FIGURE [14] – DENIED ACCESS FOR REPLYING A SERVICE

The message has informed users with the contact of the sender and its address. However, the phone number is missing as well as any option to reply on the message. Hence it looks like there is lack of coherence between the service and people are not encouraged to communicate with certain sender through e-boks.dk. This fact looks confusing since e-boks’ mission is provide secured channel between public authorities and Danish citizens. [5] At least according to Erik Abildgaard Knudsen, product manager for the Nordic countries [46] who claims that: e-boks.dk offers a secure channel for communication between the authorities and citizens (users). [47] The small testing has displayed that the user concerns about only one way communication, have correctly placed.

5.2 USERS' FEEDBACK AND RECOMMENDATIONS

This part includes all the user's feedback for the particular situation which users have experienced. Moreover this section also includes users' ideas for improvements. Since interviewees were firmly encouraged to share their experience and their suggestions for change. It consists of 1) Feedback and implications Related with "findability" and usability of e-boks and 2) Feedback and implications Related with implemented security (NemID).

5.2.1 FEEDBACK AND IMPLICATIONS RELATED WITH "FINDABILITY" AND USABILITY OF E-BOKS

The first category of users' feedback and requirements are the one that the main proposals for future improvement are based on. These suggestions are also the ones that create the value of the project. It was interesting that each one of the following statements was revealing more about the user experience of the interviewees' life and moreover their additional needs.

Furthermore, the following statements were based on experienced issues with the system. These situations, helped to analyse the confusion about the purpose of e-boks.dk and what the system brings to its stakeholders.

To begin with the position of interviewee 2. She experienced difficulties while following the consequence order of signing up her regular email to receive notifications. She expressed her confusion and the case that when a person does not set up right their email for notifications, and furthermore is not informed that there is a problem with the setup, can be absolutely misguided. The regular organization of the notification system is simple - if you are not notified you do not go and check the service. For interviewee 2 this was crucial in the sense that she was not aware of the existed situation for setting up her normal email and she missed a doctor's appointment because of that.

"I haven't had any problems with the interface so far. It was more about the steps like ... in the sense not with the understanding and being able to go through the emails that there are there. It was more regarding the notification and setting [her personal] email. When I had to go through I was not sure. Exactly, it was not clear enough that you have to follow the steps. And that I got let say a bit confused."
[In2.2]

Interviewee 2 had no idea that something went wrong while registering her email. Then she assumed that everything is fine and the fact she does not receive notifications indicates that there is no emails in her e-boks. When she decided accidentally to check her

email she was surprised that her doctor make appointment for the same day and same hour which she could not participate, because she was not aware.

In regards with easy exploitation and findability of e-boks.dk at least half of the interviewees pointed different obstacles that they faced while working with the system. Issues as lack of search functionality, need of responsive interface that provides for example automatic storing of emails in pre-categorize folders. Interviewee's 3 statement [In3.3] was in this regards and have already commented in section 5.1.1.

Another impressive case was raised by interviewee 4 in regards of experience with search functionalities in e-boks.dk. Interviewee 4 described his frustration while looking for a particular email send a while ago. He commented and suggested the service to be checked and respectively changed. Below is his statement:

"Yes, in this case I need to scroll a lot. Some days ago I was exactly searching in my e-boks and one specific transaction and I needed to find the letter. And then I had to scroll it down, scroll it down, scroll it down to find in like back two years ago. I think there it could be some improvement – feature in there. And I could easily find my email by sender or by specific time period. This will be easier for me, rather than scrolling down in the list. Because scrolling it takes time and it's kind of boring" [In4.3]

Furthermore, the idea of poor search functionality has been further researched. Testing on the "search bar" was made to check the situation. As presented on figure 15 below a simple test was proceeded. An item name was typed and search in the list of received emails. The system has shown that such an item does not exist in the list.

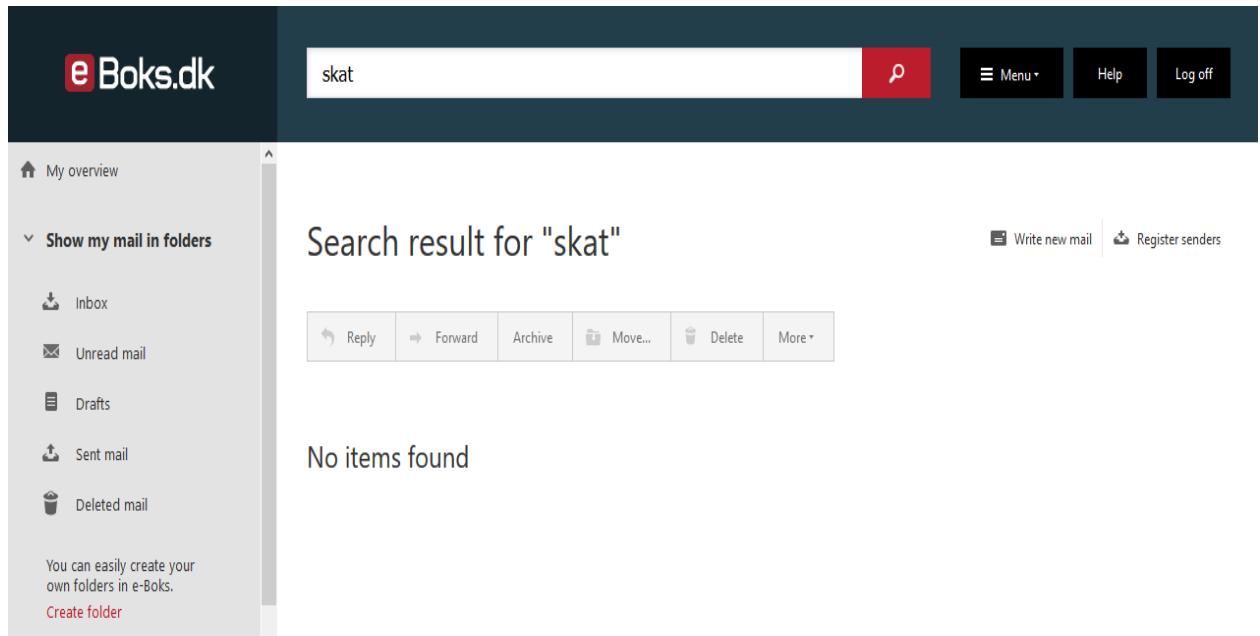


FIGURE [15] SEARCH - NO ITEM FOUND

However, the item skat was actually existing on the list as pointed on figure 16. The test was further repeated with upper and lower case also, with full name “skat.dk”, as well as changing the typing language in case this is also kind of limitation in the service. The result was the same – there was “no item found” in the search.

From	Subject	Date
Udbetaling Danmark	Du får afslag på din ansøgning om det blå EU-syges	23-07-15
Udbetaling Danmark	Kvittering for ansøgning om EU-sygesikringskort	13-07-15
SKAT	Husk at tjekke din årsopgørelse	30-03-15

FIGURE [16] ACTUAL STATUS OF THE EXISTING EMAIL

This test proves the fact that even existing the search bar the functionality is questionable. Moreover, it could be improved and proper functionality to be implemented.

One of the most valuable findings of this project was Interviewee's 5 statement [In5.3] and elaborated with [In5.3] presented again below:

"For me if the information in the pdf that I receive is in Danish and English it will be nice. This will save me from copy the text and translate it in Google. Then actually if you have the NemID to protect you and quite a lot of layers of security but then in case you're a foreigner you anyhow put the whole text you received in a third party place – as for example Google translate or something like that. And then what is the point of the security in place in e-boks? In this way a person also expose his/her privacy. They should have this translating service embedded in the sense of offering the information in Danish and English to be recognizable by every person in Denmark. Because in the other case e-boks violate people's privacy by not offering them another chance to read the information in English for example." [In5.2]

This statement presented the case of absolute mismatch between what the user words and actions are. The fact that his actions are totally opposite and against everything he had talked about raised a significant question. Question about what are people's reason to do these actions and more precisely which one is more important for them security (and privacy) or usability of the service.

Furthermore, Interviewee 8 and his quote [In8.3] are another vivid example of person who claim that cherish his privacy and then send all his emails to Gmail in order to easy access and download them from there. This ideas have been further used in the analysis.

The situation that Interviewee 6 gave her feedback was on how she could unsubscribe from receiving a letter. In her words:

"No I haven't done that. I am really too lazy to check how I have to do that. Because I know if I have to do that I would have to spend probably 10 minutes to do it and I am too lazy to do that. Even though the interface is nice and everything – some of the things I think there are too much I think. Because I really don't know how to sign out from special types of letters for example from the kommune that are sending me letter that they are building an IKEA next to my apartment." [In6.2]

The user need a simple way of unsubscribing from receiving letters. However, here is not clear can she unsubscribe from receiving digital post or this means that she is going to receive the same letter but in paper and have to pay for the physical service. Since Interviewee 6 did not distinguish which one is the case, more discussions cannot be made on this basis.

Other very typical email-client service functionality is "mark as important" option.

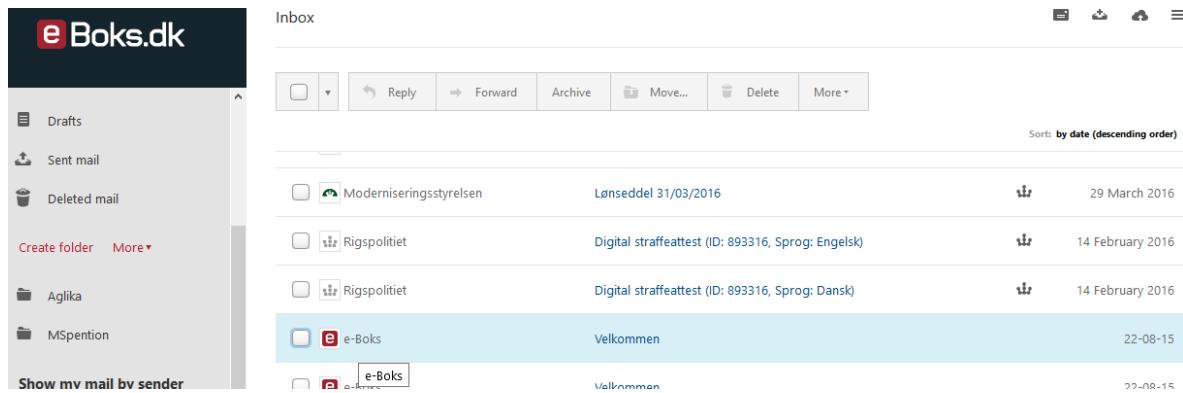


FIGURE [17] – NO OPTION OF PUTTING A STAR ON E-BOKS

Pointed out by Interviewee 8 in [In8.4] and tested on the e-boks.dk interface no star sign have been found. The only one possible option is to select more and there to choose “add comment” part.

As second last feedback about usability and findability is introduced by Interviewee 9. She briefed me with her interest to the e-boks cloud storage place. However, this additional development could happen only in case e-boks.dk decide to provide this type of services. Her plain words were:

“I think it is a very simple system. It is not so much... IT’s not like, Dropbox and Google Drive there is a lot of features. But with e-boks you cannot do much, just read emails. Maybe if they have features as Google Drive, I could use that instead of Google Drive. But with e-boks you cannot decide, you have to use it as it is given. It is a mandatory service.” [In9.3]

The last feedback for this sub category is offered by Interviewee 7. Her comments was in regards of help support section and support desk people of e-boks.dk.

“The way of contacting them [e-boks.dk] should be improved. Both the call centre service and the email replies to customers. Just to be effective and kind of react on time. Because the case you’ve describe [I wrote a request to service support and then the reply came as a no-reply letter. However the reply needed a further communication and a new request has been created and it reverted to the previously discussed matters.] is as a vicious circle just get back to square one – so it’s not really working. In case there is a person you’re going to talk to they should be able to solve the problem right away and not to make you write another request and so on and so forth. And if you kind of submit a written request should be answered for sure.” [In7.1]

Interviewee 7 expressed her opinion in favour of creating a strong communication channel for feedback and help with the e-boks service desk. This channel is required because the

communication between a user and e-boks.dk support should be accessible by the people. This last case is supplemented by another testing of the system.

5.2.2 FEEDBACK AND IMPLICATIONS RELATED WITH IMPLEMENTED SECURITY (NEMID)

This part of the paper discusses the user's feedback in relation with the implemented security (NemID) and how people's experience is affected by it. After all, this project targets users' point of view and tries to look at the system from user-centric perspective. Therefore, the relation between usability and user-friendliness of NemID login procedure was essential to be added in this project. Essential, in the sense of enriching and thoroughly discussing the user's experience within e-boks system. Furthermore, Organisation for Economic Co-operation and Development and Danish Agency for Digitisation published in the past years information [51] about the future development of the service. This information encourage talks about Danish e-government and in particular e-boks.dk service provider and what are their future plans for upgrading the service. In order to reveal more about what are people's impression about the security special section of comments and feedback is introduced below.

Gathering users' feedback showed common understanding between the different interviewees that e-boks achieved strong security in their service. This was further underpinned by the implemented NemID security method. Most of the interviewees felt much secured about the service and they have not been hesitant to keep their personal information stored there. Only interviewee 1 questioned the embedded security by the statement:

"Hopefully [e-boks also has implemented good encryption and couldn't access people's content]. I assume that as they [e-boks.dk] are such a big organization that handle very sensible information, they [e-boks.dk] of course focuses a lot on the security. I would assume that they [e-boks.dk] do evaluate people's privacy. On the other hand, the governmental part they have to have something to back up to access that in cases of investigations and staff like that, any kind of emergencies, but I think that is still a very secured service." [In1.4]

Despite the strong understand of the interviewees for the security measurements taken by e-boks.dk', as it was briefed earlier, NemID is also a vital part of the user experience. Most of the interviewees was having mixed comments about the complexity of the NemID login process. Even though they appreciate that it offers them protection and keeps their privacy safe, most of them expressed feelings of dislike and irritation while going through

the login process. As a user requirement most of the interviewees pointed their interest of removing the NemID login or at least changing it to less effort-consuming one. A strong requirement was pointed by few of them as presented below:

"If I could have it [e-boks without NemID] without – I would prefer to have it without the NemID. The thing is I wouldn't also install the app because of the NemID. I don't want another app on my smart phone. And it will be nice if the NemID is in a way gone." [In6.1]

Supplementary interviewee 9 also expressed her desire for simplifying the process of login by saying:

"But sometimes could be irritating to have the NemID all the time with you. If you going to fix the NemID login it will be perfect" [In9.2]

Interviewee 5 added that his dissatisfaction of NemID made him to look for a way to avoid the procedure. According to his opinion – he kind of tricks the system by using his mobile device instead of the web service. This is due to the fact that there is a difference between the login procedure on the web version and the one accessible on smartphones. Only in the beginning there is an activation code which is required to register the smartphone with the corresponding user profile. When a mobile device is registered at first, then there is no further need for the second layer of authentication provided by the NemID hard copy card. This lack of typing the additional NemID code is preferred by the interviewee:

"I prefer to use the mobile version, it's very good app. Because by using the mobile app, I avoid using the NemID. The first time actually you have to put a specific code from the web version to your personal mobile device in order to get access to e-boks on your mobile phone. Afterwards, on the mobile device there is no need for NemID codes when you log in. I think it is secured. Because nobody else can't use your mobile device because it is protected by the password." [In5.8]

In figure 18 is showed the login screen in the mobile app. It shows that required information is the first factor authentication the civil registration number (CPR) and password. For one time password ensuring the second layer of security is used the activation code that is provided by the web version.

The screenshot shows the 'Mobile access' settings page of the eBoks.dk website. On the left, a sidebar lists 'My overview', 'Settings' (which is selected and highlighted in grey), 'Profile', 'Archiving rules', 'New mail notification', 'Receipt rules', 'Mobile access' (which is also highlighted in grey), and 'Shared folders'. The main content area has a heading 'Status: Activated'. Below it, there are fields for 'Civil registration number' (with '(Display)' in parentheses) and 'Password' (with '***** (Change password)' in parentheses). At the bottom, there is a field labeled 'Activation code:'.

FIGURE [18] – WEB SERVICE PROVIDE ACCESS TO MOBILE DEVICES AFTER VERIFYING THE DEVICE WITH ACTIVATION CODE

Furthermore, figure 19 presents the screen of the mobile application and the requested credentials for registrations the device.

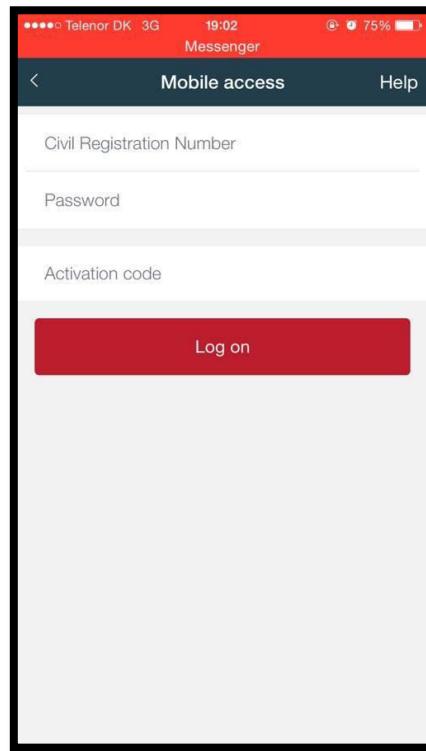


FIGURE [19] – ACTIVATION CODE REQUIRED ON MOBILE APP SCREEN

This however raise extra questions about the coherence between the web version and the mobile application in the offered service. The question is in case e-boks use this activation code just once and then only one factor authentication is enough does the web version needs the extra OTP (provided by NemID) every time when users login? Moreover, the mobile app is considered as well as very protected and secured. In analysis are discussed the differences and later in recommendations – suggestions are made.

To support the same idea interviewee 3 added argument indicating his feelings about the login procedure and his confusion of the different standard while using different opportunities to sign in in the service. Here is interviewee's 3 comment:

"One thing that annoys me is when you use your bank you can automatically log in into e-boks using the NemID code. However, contacting other authorities – the system log out and needs new password and identification conformation with NemID code." [In3.2]

From the users' point of view the NemID login is unnecessary complicating the process. Moreover, it creates the feeling of lack of coherence between the systems. According to the interviewee 3 the NemID code should be available for certain period of time and not redirecting to new login in case a user has already signed in into the system. However, this could be considered as part of the NemID product and not so strongly related with the functionalities of e-boks.dk. On the other hand, it provokes questions about integrity and consistency between the all services part of Danish e-government.

To enhance the situation with the physical NemID card interviewee 10 revealed his impression. For him the login process was creating obstacles. Interviewee 10 has faced the situation of uncertainty while using the hard copy of the NemID code card in public. This uncertainty was coming from the fact how social and public environment influence the usage of NemID. Moreover, interviewee's 10 statement questions the form of the physical device providing the security NemID codes.

"I don't remember but if it's just NemID stuff, it's [the login process of e-boks] not complicated but it is slightly annoying. I mean like it is not when you do it at home but when you have do it outside – it's pretty annoying to set there. You almost, when you pull out that card [with the NemID codes] you are almost announcing to the whole world: "Hey, I am accessing private information on this easily steal-able device right now" [In10.5]

All of the above commented cases and situations were in relation with NemID and how people interact with it via e-boks.dk. However, in his statement interviewee 10 also presented supplementary fact that the NemID card is a physical appliance. On the other

hand, this bring other challenges like caring the appliance, keep it physically safe and as it was mention earlier avoiding “wasting” codes. In his feedback [In10.5] Interviewee 10 has expressed the point how careful should be a person while dealing with sensitive personal information.

Interviewee 2 shared similar concerns about the physical appliance. Furthermore, she had considerations about a back-up plan for the security in e-boks. She was raising the case: “What if someone knows your information and is able to get your NemID card?”. In her comment she pointed out that in the case of e-boks and NemID regular preventive measures does not have the same value. In her words:

“I was thinking about the security. I don’t know how or what else you could do in regards of that [security measurements] because basically security is whenever you log in to your profile or as I perceive it. So for example if somebody finds your password, but then they still need your NemID [card] also. And then in the case actually, if they are able to do that, can you somehow block the access of the person. For example, if you have a [bank] card and someone enter your account, you can just call the bank and block it. The bank will block your finances. Could you do something like this for this digital post? Is it possible to have this blocking a profile option? So I am just thinking in the case now there is some personal information but is not that much. And it could point everything about that person. But in the case in which it will be and for example, if you lose your NemID [card] and somebody gets your password or something like that. If you could do something to block the access to that 3rd person and all the information that is there.” [In2.1]

Her comment showed issue of how to protect your privacy from physical attacks. However, simple actions as to report the NemID card and order new one are applicable in the case. On the other hand, additional research have been conducted and figure 20 presents the information about cancelling e-boks. In the figure 20 is said that there is a chance to cancel e-boks, but there is no other option for temporary blocking.

How do I cancel e-Boks?

If you no longer wish to receive Digital Post, you can cancel e-Boks/Digital Post. There are certain restrictions, however, that apply to any cancellation.

Cancelling e-Boks

To cancel e-Boks, and therefore the receipt of Digital Post from private senders such as banks, insurance companies, etc., go to **Settings**

Select the tab marked **Settings**

Select the menu item **Cancel**

Click **OK**

Cancellation can only be performed if you have deleted all mail from e-Boks.

Please note that some banks may require you to use e-Boks as part of your customer agreement. You must contact the relevant bank regarding this.

Cancelling Digital Post

In June 2012, the Danish Parliament enacted the Public Digital Post Act, which makes it compulsory for citizens and companies to be able to receive mail from public authorities digitally. The transition to Digital Post takes place on 1 November 2013 for all those in Denmark with a CVR number. For citizens, the transition takes place at the end of 2014. This means that after this date, it will not be possible to cancel Digital Post. It is compulsory for you to be able to receive Digital Post from public authorities. However, there are rules on general exemptions from the receipt of Digital Post.

e-Boks bruger cookies til at sikre, at du får den bedste oplevelse på vores hjemmeside.

OK

Read more

FIGURE [20] – CANCEL E-BOKS

This discussion and example put the end of this chapter. Here have been presented more detailed researches of the findings, as well as implications and system testing of the different case. All of them helped to better perceive the Danish digital post and how it works. In the next chapter those findings and implications are analysed and supported by theoretical background.

6. ANALYSIS AND SUPPORTING THEORY

This chapter contains the analysis of the empirical findings collected at the interviews. Furthermore, the analysis includes detailed explanation of the presented users' comments in Data collection and research chapter. All the pointed statements from the findings have been thoroughly discussed and analysed and further supported with solid theoretical backing. The theory helped also to better apprehend the described cases and situations by the interviewees.

6.1 ANALYSIS

The analysis follows the sequence of the gathered empirical data, detailed researches and system testing in the previous chapter. This chapter consists of applying theories to complete the understanding of e-boks. Therefore, it firstly checks the reasons and drivers for people to work with the service. Then, the chapter continues with discussion about the interface and finishes with arguments and theories about the balance between user experience and privacy (which is achieved by strong security and implemented NemID).

To begin with the first section:

6.1.1 ANALYSING THE STATEMENTS ABOUT THE PURPOSE OF E-BOKS.DK

The first statements in the findings has revealed people's positive attitude towards Danish digital post. Even more, people felt comfortable during the interviews and focused on presenting their comments with positive manner. As it was mentioned in data collection their body language was friendly and in the majority of their comments they have defined the service as "good", "simple" and the interface as "good" and "straight-forward". This pleasing environment was also explained in Boyce's paper [42] and Holm-Hansen's article [43]. They both emphasized on its importance. For example, Holm-Hansen set the first requirement for conducting an interview as "*Maintain a positive attitude and be enthusiastic.*" [43]

Furthermore, Boyce's paper offers another theory that has been applied in this project. He calls his method of gathering qualitative research "*in-depth interview*". Selecting small number of people and collecting their "*in-depth*" experiences and implications in order to encourage further development of a particular service are in the base of Boyce's text. However, the same technique is used for this project which is absolutely covering Boyce's idea. Boyce suggests the possible drawbacks of the method which were also noticed and presented in the methodology chapter. Drawbacks as for instance, people who try to emphasize their strong pre-defined opinion "for" or "against" the examined system (e-boks.dk). However, interviewees in this particular master thesis project were carefully

selected and all the statements that have shown deviation from the regular behaviour of the specific interviewee have been noted and carefully treated. One example of partly negative and very conservative opinion is the presented by Interviewee's 10 statements. On the other hand, his comments offered different perspective which has also enriched the variety of this project.

Moreover, all these different points of view helped to thoroughly research and deeply analyse the possible and existing situations within e-boks.dk. Together with the performed research and system testing, the empirical data ensure solid foundation for the project. Later, all the collected data also have helped to build up recommendations and suggestions for improvements based on interviewees' statements.

On the other hand, all this gathered material progressively built up the question about the purpose of e-boks.dk or more precisely how people apprehend the e-boks' value proposition. Analysing statement [10.2] and the whole "section of confusion" bring more clear view of what is users' experience while exploring e-boks.dk as a service. Furthermore, all the statements in the findings and the whole testing help to better define the reasons for the people's reactions and behaviour. As for example, one explanation could be the variety of services and the fact that those services requires contradicting actions. In plain English, one type of letters are coming only to be acknowledged and do not require further action, another type of letters is coming and requests "two-way" communications (calling a phone or some other action). Another example is hard process or creating an archive folder that should simplify users' experience. Third example is how the system is created to keep updated people and consists of sensible personal data but the information is not considered to be urgent or time sensible which further blur idea behind. All those variety of mixed functions reflect on the user experience and usability of the service.

However, as second reason for people's confusion and behaviour can be analyse their attitude towards the system. A strong argument in favour of poor motivation is presented by Alan Cooper's theory about goal-directed design. [48] Cooper's theory is based on the fact that people (personas) are usually driven by their goals. Moreover, users try to achieve their goals in different ways while developers aim is only to accomplish different tasks. In order to explain better what is the difference between goals and tasks Cooper is providing couple of cases. As the most important outcome of Cooper's theory is the fact that the user is unseparated part of the interaction. In the case of goal-directed design there are two components required – a person (user) that will perform actions and his/her goals that the system implements. Here is coming the question about what the difference between goals and tasks are. According to the goal-directed design tasks does not require

a user fulfilment or user satisfaction from the service. However, designers and systems mostly followed the “task-directed” designing according to Cooper’s research. This is further supported by the following statement of Cooper’s:

“Too many developers approach design by asking, “What are the tasks?” While this may get the job done, it won’t come close to producing the best solution possible, and it won’t satisfy the users at all. Designing from tasks instead of goals is one of the main causes of frustrating and ineffective interaction. Asking, “What are the user’s goals?” lets us see through the confusion and create more appropriate and satisfactory design.” [48]

Moreover, Blomkvist strongly support Cooper’s ideas and further develop them. [50] He pointed out in his article that “user” and “person” are too blurred as definitions. Additionally, in case designers decide to work with goal-directed instead of task-directed approach they need to create real personas (people) with strong personal values and goals. This will further help them to easily construct the interface and base the interaction with the system on personas’ needs. [50]

Another paper [49] also supports the fact that today’s system are not easy to be controlled and maintained due to poor goal-directed design. Furthermore, systems performing goal-directed design are much more refundable in financial and social way. All of these researchers have solid foundation to claim that systems which are not designed to achieve users’ goals have major problems to keep the good performance and the financial profit high. [49]

On the other hand, most of the presented statements (in the Data collection and the further research and testing) bring out the fact that people face the problem of lack of achieving goals. Simple goals as for example to communicate with authorities (not only to passively receive letters), also to find their letters or to organise their digital boxes with their preferences.

In summary, of the presented arguments also comes the Cooper’s words:

“Boiled down to its essence, computer programming is the creation of a detailed, step-by-step description of procedures. A procedure, of course, is a recipe for accomplishing a task. Good programmers, of necessity, see things procedurally, or task-wise. Ultimately, the tasks must get done to achieve the business goals, but there are different emphases and different sequences of doing them. Only some sequences satisfy user’s personal goals.” [48]

6.1.2 ANALYSING THE STATEMENTS ABOUT FINDABILITY AND USER INTERFACE

The theory of goal-directed design is also relevant to the interface and findability features offered by e-boks.dk. Furthermore, there are number of researches that discuss the relation between findability, user experience and goal-directed design.

For instance, according to Sarantis, Charalabidis, Askounis [52] there are big number of attempts for implementing e-government in different countries. However, due to different reasons most of them have not been successful so far. In their research Sarantis, Charalabidis, Askounis point out that benefits of the IT should be completely explored in order to offer full range of functionalities.

„Governments must get the fundamentals of IT right if they want to harvest the huge potential of going online“ [52]

On the other hand, the most important reason referred in their article [52] is the “goal-driven management” of the e-government systems. According to Sarantis, Charalabidis, Askounis without this type of management it is very hard for any systems to achieve optimal performance. Furthermore, good interface, implemented findability and regular functionalities (for example search, translate, pointing importance (star) and etc.) are vital elements to a system. Collecting the empirical data for this project showed that those functionalities are also significant to exist in e-boks.dk as well.

Since findability was used couple of times it is place to explain its meaning. According to Findlater and Mcgrenere they define findability as follow:

“the speed with which the user can locate a function she knows exists. The set of findable functions includes those the user has already used, those the user has heard about from others or from documentation, those the user has used in a previous version or reduced-functionality version (or layer) of the same application, and those the user has a strong basis for believing exist (e.g., Save is found in most document-centric applications).” [53]

In other words findability is related with the time consumed to reach a certain functionality. As presented by Findlater and Mcgrenere this functionality does not necessary has ever been used before by the user. For example, particular functionality that is provided by e-boks is the archiving (storing). Users know that the service offer it and expect to find it easy on the system’s interface.

Another similar article that helps to understand findability is the one in “How to reduce friction with good design” [54]. Cao discussed different definitions of friction but qualified

friction as “*any thought involved in the task that isn’t required*”. [54] In other words, any delay or distraction of achieving the goal that is caused by the interface or the system is called friction. Friction is also for instance - clicking multiple times before finding the desired functionality. In the specifics of this project friction and findability are expressing the same situation. Moreover, friction and findability can be further used to explain most of the cases introduced in findings about complications in performing functionalities in e-boks.dk.

On the other hand, all the statements discussing the interface have not proved my biased opinion that the interface does not fit its purpose. This statement was subjective. However, the results showed that this opinion is not applicable for the case and needed to be discarded. In contrary, the empirical data showed that users find the interface “intuitive” [In10.1] and “straight forward” [In5.5]. All those statements completely dropped off the idea of e-boks’ interface does not fit for its purpose. However, users have expressed other obstacles as presented earlier which was not caused by the interface but caused by other factors.

6.1.3 ANALYSING THE RELATION BETWEEN USABILITY AND PRIVACY (IMPLEMENTED BY SECURITY)

Important and interesting outcomes went out from the findings and testing. Users have described their experience while dealing with the implemented security in e-boks.dk in their comments. This implemented security however, is the one that helps to achieve protecting privacy of the people. Furthermore, this experience was considered by interviewees as part of the Danish digital post system. For users the fact that NemID is the tool through which they reach their letters supported their impression. This on the other hand, obliged the relation between user experience and security to be further and deeply analysed.

Firstly, explanations of the different components are presented in order to be correctly investigate all the gathered empirical data.

Usability is the first one to be elaborated. According to Kainda, Flechais, and Roscoe [55] usability has many definitions. However, they summarise usability as:

“To consolidate all definitions of usability, it can be stated that usability consists of effectiveness, efficiency, satisfaction, learnability, and memorability” [55]

Furthermore, Kainda, Flechais, and Roscoe emphasise that all definitions of usability are “contextual”. In other words the explanation of usability is unique for each service due to the fact that each service focus on performing different component or the balance between “*effectiveness, efficiency, satisfaction, learnability, and memorability*”. [55]

Comparing with usability, user experience represents the human side of one system. It includes people’s emotions towards a system/interface. [56] In his paper Bevan introduces the different measurements that evaluate usability and user experience. Bevan supports the impression that user experience is more focused on the feelings and physical experience of the users. In order to evaluate user experience, according to Bevan’s research, the following should be measured: “*Likability, Pleasure, Comfort and Trust*”. [56] From his paper it become clear that usability (referred to ISO standards) represents the system point of view as effectiveness, efficiency, satisfaction and etc. These definitions presented the usability and user experience. This definitions are respectively used in order to examine the relation between usability and security.

After describing usability and user experience is turn to privacy. A definition is offered by International Association of Privacy Professionals and Hibbard in [57] as:

“the appropriate use of personal information under the circumstances. What is appropriate will depend on context, law, and the individual’s expectations; also, the right of an individual to control the collection, use and disclosure of information.”
[57]

Supplementary to privacy and also applicable for this project is the Moor’s theory of “greased information”. The theory can be described as how easy is to retrieve information about other human beings on the Internet. Similar is the discussed case by Schultz, Proctor, Lien, and Salvendy [59] of how accessible is the information for anyone nowadays. This on the other hand, raise also questions about how e-boks protects people personal data safe.

Finally, the last definition describes security. Security according to Moor in his paper [57] is:

“People have a basic right to be protected, which from the point of view of our computerized culture, includes privacy protection.”

Moreover, security can be perceived as the technical aspects and measurements taken in a that to keep safe the people.

All of the definitions were introduced separately in order to present the difference between the components, since all of them participate into the relation. However, for the purposes of this project, the model of “user experience and usability” vs. “privacy and usability” is simplified to only usability vs. security. It is further accepted that user experience and usability are very close in their meaning. On the other hand, it is analogous with privacy and security. This is due to the fact that privacy is achieved in e-boks via the strong implemented security (NemID) in the system. Moreover, for the purpose of this project it could be elaborated that user experience is not a measurable characteristics while usability can be at least presented by positive or negative. Very similar is the perception for privacy and security, since security offer techniques and methods that can be measured – as length passwords, adding supplementary activations code for increasing security and etc.

Most of the interviews claimed connection between the implemented security in e-boks and the usability of the system. Majority of their statements introduces their point of view and their actions in favour of usability over privacy and security. For example, [In6.1], [In9.2] and the actions described in [In5.3] and [In8.3]. Figure 21 below illustrates the dependency between security and usability of e-boks according to most of the interviewees' experience.

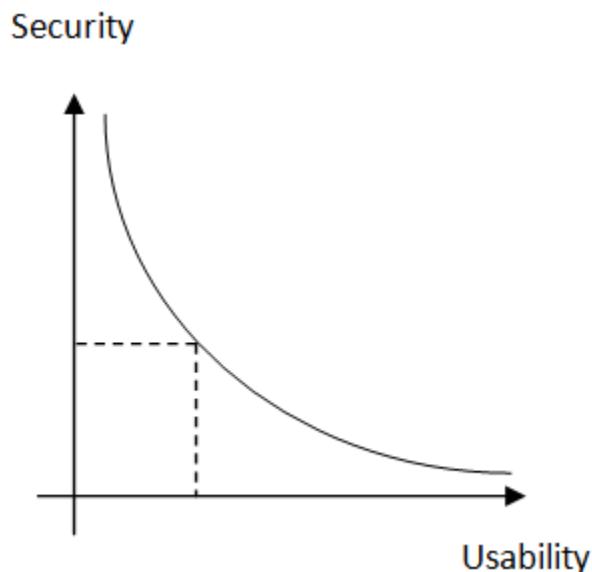


FIGURE [21] – SECURITY VS USABILITY [60]

On figure 21 is presented the idea of how high level of implemented security cause low usability of the system and vice versa. In other words the figure 21 shows that to achieve maximum usability and good security at the same time is very hard. That is why it is very important to be defined the balance point between security and usability. Moreover, during the last two decades more and more researches have worked on finding the right balance. On the other hand, the balance that they offer is to design and build secured and usable system at the same time.

Examples of such researches are the book of Tryfonas and Askoxylakis about Usable-security. [61] In their book Tryfonas and Askoxylakis made suggestions about creating a service that can incorporate usable security and secure usability in a digital system.

Something similar has been mentioned by interviewee 5 which has been supported by Tryfonas and Askoxylakis' book. His statement is repeated once more for clarity:

"I am saying that exposed privacy doesn't necessarily mean you will have bad user experience. Because for some users maybe the more privacy is implemented the better is the user experience. Depends on the users. E-boks is just a platform where I can get my emails from public authorities. Of course it needs privacy but I don't know for me the higher the privacy gets actually the user experience is better at least for me." [In5.1]

Balance between usability and security is also in the core of the human-computer interaction & security or also called HCISec. More precisely this field of HCI focused on the fact how secure can be one system without affecting users' usability and in the same time how usable can be a system avoiding security violations. Very good example is provided in article [68] as:

"Imagine if you didn't even need to log in to your email to check it. That would be extremely easy for users – it would have a high degree of usability – but it would have no degree of security. Now imagine that in order to access your email you had to type in a password, decipher a visually encrypted code, then type in a one-time code sent to you by SMS. That would have a high degree of security but an extremely low degree of usability."[68]

As far as HCISec focuses on the balance between it is important to point out which aspects are important for the different parties. So far the "conflict" between security and usability is actually conflict between users and the system. However, in the case of e-boks.dk system implemented security to be able to protect their users' privacy.

On the other hand, privacy has always been a tricky part of each online service. In their research [69] Acquisti, John and Loewenstein makes the following statement:

"However, while privacy decision-making is, no doubt, partly strategic, there are reasons to believe that individuals' preferences for privacy may not be as stable or internally consistent as the standard economic perspective assumes."[69]

Adding the majority of the interviewees' comments about how they treat their privacy, lower than the usability (they want from the service), the statement made by Acquisti, John and Loewenstein looks relevant.

Furthermore, usually companies and organisations, business as whole have more rules and regulations to keep information safe either for their clients or for their employees. This is also similar in e-boks since they are taking care of the information while people prefer to avoid the login process. On the other hand, users are not in the most of the time aware of the problem of privacy that they can face. For users usually their experience is prioritized higher than the privacy threats while privacy is overrated and left behind usability.

This the reason why privacy should be considered in this case as the necessary good for Danish citizens while using NemID technology.

The final discussion about security implemented in e-boks is about the difference in the login procedures while operating the system on different devices. From a technological point of view the two layer authentication can be achieved by different type of one time password (OTP) appliance. [33][36] Either this could be one time activation code received as text message on the phone or every single time to type the NemID code.

From the users' statements [In5.4] And [In4.5] interviewees 4 and 5 and also 8 preferred to use the mobile app daily basis while the web version of e-boks.dk. Even more, the login process on the mobile app is equal to the web NemID version of e-boks. They both open the digital folder.

On the other hand, Cristofaro in his research [27] focus on the fact two factor authentication is nor preferred by users when they can use the regular password base security with further supplemented code (token) for postpone second layer of authentication. This has been also observed in the conversations with the interviewees who mostly used e-boks on their mobile devices. They showed satisfaction of the fact that their login does not require the NemID card. Furthermore, in case a letter is too sensitive they are ok this letter to be locked and supplemented password to be requested. This has been supported with figure 22 and 23 below. The picture presents the main screen of the

mobile app where a letter with lock has shown to the user that the letter is not accessible. When clicking on the letter figure 23 is showing up on the screen, saying that further security level is required in order this information to be retrieved.

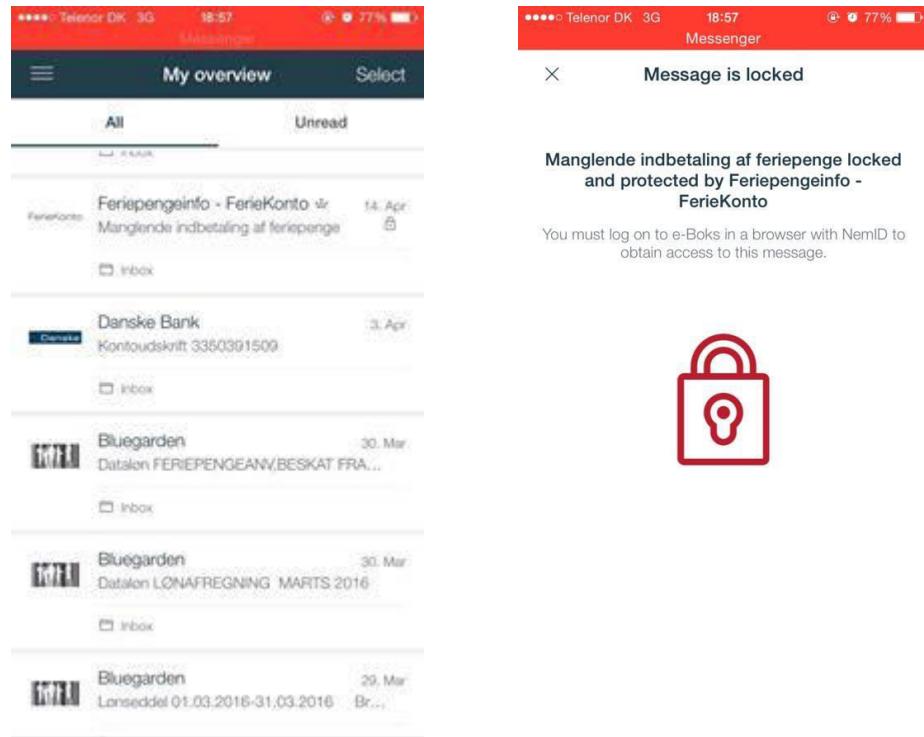


FIGURE [22] AND [23] – LOCKED LETTER ON THE MOBILE DEVICE, REQUIRE ACCESS ONLY WITH NEMID ON WEB

These examples and Cristofaro's paper create a baseline of how people prefer to sign up layer by layer and to have the choice to decide when and where to open the sensitive information. Moreover, this also provides higher usability or at least user control over the process over the security measurements.

In conclusion, the balance between security and usability is very fragile in e-boks.dk. It consists of well understanding of the implemented security and careful actions in the usability part.

7. USER REQUIREMENTS

In this chapter are presented details about user requirements. Firstly is presented a common understanding of what user requirements consist and then are introduced the user requirements defined for this project.

There are different types of requirements in a software engineering. Usually requirements can be divided on user and system requirements. The system requirements are based on displaying "*detailed descriptions of the system's functions, services and operational constraints.*" [64]

On the other hand, user requirements are important since they present the user's point of view. For this particular project user requirements are the vital outcome of the conducted research and analysis. Moreover, it is perceived that user requirements are created from users and in favour to users, according to Bevan. [63] User requirements are created from user's feedback together in collaboration with developers to achieve better performance of the existing system. As it was explained in the goal-directed design user requirements can help better formulate personas and personas' profiles. [56] Furthermore, again the users will experience and enhance the benefits of the improved system. Bevan explained the idea as followed: "It is important to establish and document the user requirements so that they lead into the process of designing the system itself". [63]

Below are presented the user requirements for the e-boks service according to the 10 interviewees:

- The system must provide storing and downloading on couple of letters at the same time;
- The system must provide opportunity to users to mark their letters as important (with appropriate signalizing means).
- The system must provide search by different elements;
- The system should provide easier access to the service; If possible to avoid the NemID;
- The system must provide same functionalities in all supported interfaces – for personal computers, mobile devices, tablets and etc.
- The system must provide channel back for users to be able to contact authorities via interactive digital form;
- The system must provide proper support and help service;
- The system must provide complete and up-to-date instructions and guidance for the existing features to the users;

- The system must provide option and corresponding tools for people to understand the information in English in case they need that;
- The system must provide the option to users to receive their letters in predefined folders;
- The system must provide coherence and relation with other public and private companies and help users to smoothly go between them;
- The system must always provide easy access to different features and the way to reach those features to be transparent.
- The system must provide option for temporary cancelation.

All those requirements have already been discussed and analysed in the previous chapters. Here they have only been clearly defined.

8. RECOMMENDATIONS FOR DEVELOPMENT

This chapter presents recommendations for changes and development of e-boks.dk. It includes suggestions for features or new services that can be added by e-boks' provider. Those suggestions are based on the user statements and the formulated user requirements. Moreover, they are titled in three different groups: security related, related with findability and related with notifying and alerting messages.

8.1 SECURITY RELATED

1) Almost all of the interviewees united their opinions that they do not want NemID code in the way it is now. Moreover, most of them expressed their desire the security to be removed. In case this is not possible to at least the NemID process to be simplified.

After collecting user statements it become clear that people prefer to have the layers of implemented security one by one. This is visible by the fact that people prefer to use the mobile application over the web version with the NemID module. At the mobile app there is a onetime activation code at the beginning and no extra codes after that.

Here possible implementation in order the system wants to keep the strong level of security could be supplementary locking of sensible emails with additional code. E-boks.dk can decide should this code be the NemID or just an additionally selected password by the users. However, this additional second layer is postpone in time and also not time sensible to be opened immediately.

2) Another suggestion is based on statement [In2.1] about the “blocking” the e-boks account temporarily. This idea is recommended due to the fact that the performed testing did not show clear result this is possible. However, there are still chances your device to be stolen and someone to try to gain access over the information contained in the folder.

8.2 RELATED WITH FINDABILITY IN THE SYSTEM

Number of suggestions are presented under this heading:

1) Implement simple search functionality – searching by topic and by sender. This recommendation is coming to support statement [In4.3] and his problem of “scrolling down” on the menu.

2) When discussing statement [In8.3] about summary of bank information or any other group of letters that need to be stored together a solution can be proposed. As classical suggestion is simple storing all emails send by the same sender in separated folder in e-boks. Furthermore, option of selecting and printing all of selected letters at once is what [In8.3] talked about. Another idea for implementation of solution in this regard is implementing interactive chart that adds the information of the last bank statement and constant update the information (for the past six/twelve months) selected by the users.

3) Suggestion about the archive functions as well as any other support function is to be checked and upgraded to stage that it performs the promised functionalities. It should be also further supported with proper explanation and guidance to users. So far guidance is showed on the page of e-boks.dk, however the description is not clear and does not match on 100% with the interface of the service.

4) Improving the links between different systems and creating one common and coherent platform that can fulfil the user needs at once without automatically signing in and out from the different components (banks, e-boks, and etc.). This suggestion helps fixing the issue described in statement [In3.2].

5) Following [In5.2] there is a clear need of implementing translate functionalities in e-boks.dk. Similar translator has Google in Gmail. E-boks can decide if they would like to develop such a translator themselves or to pay to third party to maintain the service for them.

6) One very simple thing that could be improved immediately is the fact that when the cursor is on the sender's name nothing happened. Usually, letters can be open by clicking on the name of the sender or on the topic. However, this action of e-boks could mislead the access to a certain letter can be achieved solely by clicking on the topic and in no other way.

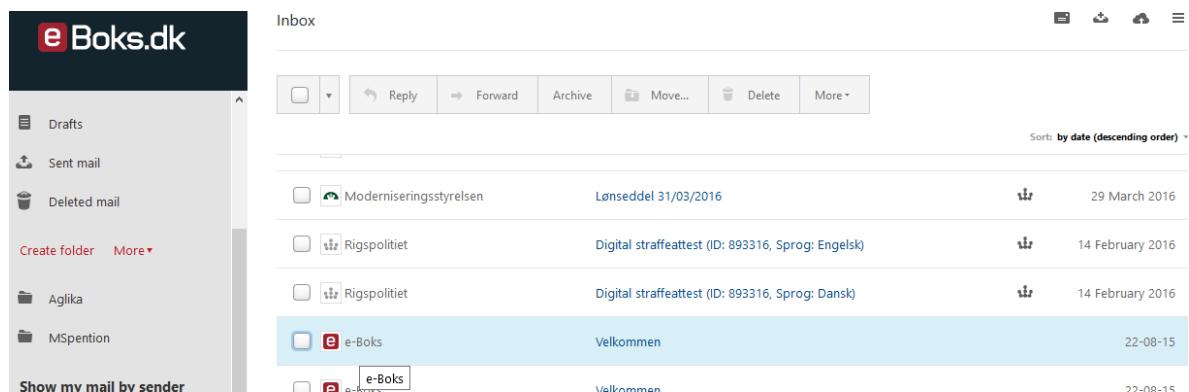


FIGURE [24] – HOW USER CAN SELECT A LETTER IN E-BOKS.DK?

8.3 SUPPLEMENTARY DOCUMENTATIONS AND ALERTING

- 1) In case of problems with verification the notification alerts presented at statement [In2.2] a proposal could be for example a popup message on the desktop saying: "*Sorry, you haven't verified your email, please check again the menu how to do that.*" The flow of the process should also appear on a message like regular notification or popup message. In any of the cases e-boks.dk should inform the users of their processes and also how far the users got while doing.
- 2) In the case of [In6.2] better screen notification is required for the user.

To sum up, all those recommendations can be used by e-boks.dk in order achieve better user experience and greater service performance.

9. DISCUSSION

This master thesis has focused on exploring the users' perception of the e-boks' value proposition. In order to achieve that 10 qualitative interviews have been conducted. The interviewees have been selected carefully to have interest about new technologies and to be between 24 and 45. Their background was not so important however, part of them were with IT background.

The study has presented their feedback about e-boks.dk. Moreover, their statements have shown that e-boks is a digital post service with a lot of place for improvement.

First of all interviewees' comments have introduced the problem of e-boks as mix of service with contradicting functions. E-boks has been perceived as channel for communication with public authorities and private companies, an archive repository place and a system notifying about different administrative and personal information. These three functions of e-boks have also been pointed out by Søren Skaarup who defend in 2016 his thesis about "The Mediation of Authority". [38] Furthermore, a face-to-face interview with him was also conducted in order to receive deeper understanding about the case and his project in relation with e-boks. On the other hand, the findings from the users' interviews has shown that users are not feeling comfortable with the diversity of the functions.

This was caused by different reasons. As for example, poor performance of the services that created obstacles for people to use the system. Furthermore, users have been mostly goal-driven while the service proved that has been not. Goal-driven theory has been presented in the project as part of the explanation about the user's confusion about comprehending e-boks. [48]

As a second major case that have been pointed out by interviewees was the relation between their experience and the implemented security by e-boks.dk. Different opinions have been presented, however the majority of users has united to the fact that they do not like the login procedure. Moreover, the login procedure is "typical" Danish security measurements and their solution - NemID. Even though, NemID is individual organisation with individual goals, for the interviewees in this project NemID has been comprehended as part of e-boks.dk. Most of users' comments showed that they do not distinguish their experience from the one expressed for e-boks' service.

All the discovered findings provoked further in depth research and system testing. This has been done in order to check interviewee's clarity and purity of their opinions. Since most of the interviewees have been selected from my personal network some questions

about the assessment of their answers have been raised. To prove the quality of their statements, these further testing and researches have been performed.

The system testing and implications from the users' findings showed that there are couple of serious issues that need to be directed shortly by e-boks. Examples, of such issues are:

- the fact that the communication channel is mostly for receiving letters by user, however not really encouraged to reply/send back letters,
- the search functionality failed the test of finding an existing sender,
- creating a group of senders went questionable and with no clear result in the end of the testing,
- lack of good guidance or poor guidance exists on the supported pages.

All of this supplementary research also proved the clarity and transparency of the interviewees' comments.

After gaining all this knowledge and understanding of e-boks, the project continued with analysis. The point of the analysis was to support the findings with theoretical comprehension. Furthermore, the analysis also needed to ground the reasons of the existing and presented issues.

On the other hand, e-boks.dk was also invited to take action in this project. However, they have decided that the discussed cases consists too much sensitive information for them. Moreover, they refused the offer for collaboration with the explanation that the commented questions are confidential for their company and they cannot participate.

Acknowledging their decision I was still able to find publicly available information about their awareness of the existing problems. There are different indications as for example the material published by Digitaliseringsstyrelsen (the Danish Agency for Digitalisation) that e-boks.dk have been aware of the future needs of improvements. As for example, according to Berlingske' information [65] e-boks has already created already a plan for improvement. They have worked on improving the service, however the article does not state anything stable information. Moreover, in the published information are also pointed out future scenarios that the Agency for Digitalisation has considered about the next version of NemID. [66] Finally, supplementary material in this regards is the presentation held by Danish Technical University' student – Joe Kiniry in 2013. His presentation was about the sensitive areas that need to be changed not only in e-boks but in all digital service in Denmark. [67].

Despite the fact that e-boks.dk rejected my proposal this project is still valuable with its collected empirical data. Furthermore, after analysing all the chances and possibilities this project contribute with updated user requirements and suggestions for development.

Those user requirements have been based on the user statements and summarised the most sensible areas of problems. Moreover, in the recommendations for development all the requirements that were able to be address, have been introduced as proposals.

Like that this project has been able to go out of its borders and present not only investigation and research of the case. It has further created and provided new user requirements and recommendations for development.

The results of the project has shown that in case those user are going to be implemented in the e-boks, the user satisfaction should increase rapidly.

10. CONCLUSION

In this chapter are presented the conclusion of the report and future development implementation.

The project has shown that e-boks.dk faces some significant problems in their performance. These situations were caused by different reasons. For example, the variety of services created obstacles for people to easily adapt to the service. Moreover, lack of goal-directed design of e-boks reflected in poor interest in the service since users' goals have been very hardly achievable. As third factor of inconvenience has been discovered relation between the implemented security and the usability of the service.

To confirm the pointed issues a research and testing has been performed to the interface and the functionalities of e-boks.dk.

On the other hand, people expressed their positive attitude towards the system and their satisfaction of the existence of the service. Furthermore, interviewees presented their requirements in order the system to be able to accomplish their needs.

In terms of providing best achievements however, e-boks need to carefully take care of the balance between the users' needs and their interests. Moreover, privacy is an unrealised need of the users that the results have shown that they usually neglect over user experience and usability of the service. This makes e-boks's task challenging but still achievable in case the balance is kept.

10.1 REFLECTION

When evaluating the project it seems that selecting inductive reasoning it has been beneficial for the project due to its specifics. However, summarising the process came into view that clarifying the users' opinions and finding out the patterns of users' actions or problem, has not been an easy process. On the other hand, since the project has been focused on users' perspective this was the only observable way to be accomplished.

Moreover, collecting more empirical data it might be beneficial for detecting the patterns, however as drawback has been considered the time consumption which was limited for

this project. Despite that fact in case of more resources for this project it should be interesting the results after collecting more empirical data.

Therefore, the benefits and drawbacks of the size of empirical data have been evaluated. As potential drawback has been considered the fact that individual opinions have very strong reflection on the end results due to the small number of participant. However, as benefit and also discussed by Boyce paper [42], in depth analysis of small number of participants has let focusing on people's opinion and their implications.

Furthermore, the project has presented the users' point of view and their experience which was extremely valuable outcome. However, it would have been nice if e-boks were also participating in the project. This would have given another approach at the structure and the outcome of the project, in case they would have decided to cooperate and contribute in this regards. On the other hand, the performed system testing would have been more centralised and focused in case e-boks guided it. However, the presented results are still representative enough for this project.

10.2 FUTURE PERSPECTIVE

Future perspective for this project is to be able to offer all the conducted information to e-boks as feedback and valuable research. The project is useful with its gathered empirical data and system testing. The analysis can offer e-boks.dk different point of view. Furthermore, the user requirements and recommended development can be beneficial for the Danish digital post. This master thesis project can give e-boks.dk impression of where citizens need more attention and in what extent.

Moreover, the collected empirical data and system testing can save e-boks time and effort or at least can be a starting point to check in which areas they need improvements.

Furthermore, this project can also offer e-boks good list of recommendations in terms of findability.

For the project itself future development can be perceived as any further progress in regards of achieving better functionalities in e-boks accompanied with improved usability.

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11. APPENDIXES

INTERVIEWS STATEMENTS:

Interviewee 1:

"Yes I receive emails that they don't need to be so strongly secured, but as I see it as a service that provides you access to letters. It is not matter that these messages are more securely transmitted to you, it's more about it's a place from the government that comes on a certain price. Security is just part of the price. So these letters, e-boks is just a place where you're contacted from public authorities and institutions. This is the easiest way to do that for them. Because you can also receive the paper which you could argue about the security level of that, too." [In1.1]

I don't think the purpose of this service is to inform you about very urgent things. If it is urgent, they will contact you in a different way." and later supported by the statement "*As far as I see it, people are forced to use it. As they are forces, the organizations, at least the letters are not really urgent. As for example, when I receive letters that the road is closed is not something that your life depends on or it is very important for you.*" [In1.2]

"E-boks gives you access to the post sent from different governmental institutions. These are sent electronically to you." [In1.3]

"Hopefully [e-boks also has implemented good encryption and couldn't access people's content]. I assume that as they [e-boks.dk] are such a big organization that handle very sensible information, they [e-boks.dk] of course focuses a lot on the security. I would assume that they [e-boks.dk] do evaluate people's privacy. On the other hand, the governmental part they have to have something to back up to access that in cases of investigations and staff like that, any kind of emergencies, but I think that is still a very secured service." [In1.4]

"I signed up to receive an email to my regular email and a text message when I have inboxes. So I receive multiple notifications" [In1.5]

"I think the system [E-boks] is really good. It connects you to the local ..uhm.. different governmental institutions. You are connected to them through something online and I think this is nice. Because a lot of times you don't have the time physically to go and get the information yourself. So I think it's [e-boks service] good." [In1.6]

Interviewee2:

"I was thinking about the security. I don't know how or what else you could do in regards of that [security measurements] because basically security is whenever you log in to your profile or as I perceive it. So for example if somebody finds your password, but then they still need your NemID [card] also. And then in the case actually, if they are able to do that, can you somehow block the access of the person. For example, if you have a [bank] card and someone enters your account, you can just call the bank and block it. The bank will block your finances. Could you do something like this for this digital post? Is it possible to have this blocking a profile option? So I am just thinking in the case now there is some personal information but is not that much. And it could point everything about that person. But in the case in which it will be and for example, if you lose your NemID [card] and somebody gets your password or something like that. If you could do something to block the access to that 3rd person and all the information that is there." [In2.1]

I haven't had any problems with the interface so far. It was more about the steps like ... in the sense not with the understanding and being able to go through the emails that there are there. It was more regarding the notification and setting [her personal] email. When I had to go through I was not sure. Exactly, it was not clear enough that you have to follow the steps. And that I got let say a bit confused." [In2.2]

"E-boks for me is the digital post that the Danish system is offering in order to you to be able to get access to information that is related to you as a person in regards of different things, for example regarding something from the commune, or regarding something from hospital, or related with your work. So basically you get this letters that inform you that you need to do something." [In2.3]

Interviewee 3:

“Using NemID is not comfortable for me and make using the service too complex, requiring always to keep the NemID with you when you have to open. Even more if I know the content of a letter, I don’t want to waste the NemID code for it. I could eventually read the message the next time I open my e-boks for some more important message that I’ve received.” [In3.1]

“One thing that annoys me is when you use your bank you can automatically log in into e-boks using the NemID code. However, contacting other authorities – the system log out and needs new password and identification conformation with NemID code.” [In3.2]

“Why when I do folders and categories in e-boks for example from my bank or from the kommune the emails don’t go there automatically? Especially, when it is not an unfamiliar sender, and it is not the first time to receive an email from the place. I need to drag and drop in the folder, and it is frustrating to do so, especially when you already set up the folders once.” [In3.3]

Interviewee 4:

“..But I wouldn’t like anybody else to know my Danske bank information...” [In4.1]

“I think e-boks could be used as normal daily email for sudden purpose. Not everyone using it for a daily email service. I am considering in case I have something important to send and if I could do this through e-boks. So that I know it is provided with high security. If e-boks can change the service like that – to make it more go two way [receive and reply options] it will be nice. I know that I can do it even now but they give me the notification about the security all the time. On the other hand, maybe the security could be there but they could encourage people by their visual graphics that users can send emails. Which is important for me, for example to use the system regularly. Then I think people will like the service more.” [In4.2]

“Yes, in this case I need to scroll a lot. Some days ago I was exactly searching in my e-boks and one specific transaction and I needed to find the letter. And then I had to scroll it down, scroll it down, scroll it down to find in like back two years ago. I think there it could be some improvement – feature in there. And I could easily find my email by sender or by specific time period. This will be easier for me, rather than scrolling down in the list. Because scrolling it takes time and it’s kind of boring” [In4.3]

“I saw that [that e-boks offers cloud storage] but I haven’t really look what is about. And it [e-boks cloud storage service] is a good point because maybe this [e-boks cloud storage] one is not really integrated with the mobile app. It might not noticed it [in case it is not implemented on the mobile app it will be hard to the user to try it].” [In4.4]

“I’ve opened it a day ago. Because I got a letter from someone. It was triggered by a notification from my mobile banking. It is a mobile app for my bank and they are cooperating with e-boks. So when I log in to my mobile I can see that I have a letter in e-boks. And if I click it I don’t need to go to the log in process. Like this I can just click it and go to e-boks.” [In4.5]

Interviewee 5:

“I am saying that exposed privacy doesn’t necessarily mean you will have bad user experience. Because for some users maybe the more privacy is implemented the better is the user experience. Depends on the users. E-boks is just a platform where I can get my emails from public authorities. Of course it needs privacy but I don’t know for me the higher the privacy gets actually the user experience is better at least for me.” [In5.1]

“For me if the information in the pdf that I receive is in Danish and English it will be nice. This will save me from copy the text and translate it in Google. Then actually if you have the NemID to protect you and quite a

lot of layers of security but then in case you're a foreigner you anyhow put the whole text you received in a third party place – as for example Google translate or something like that. And then what is the point of the security in place in e-boks? In this way a person also expose his/her privacy. They should have this translating service embedded in the sense of offering the information in Danish and English to be recognizable by every person in Denmark. Because in the other case e-boks violate people's privacy by not offering them another chance to read the information in English for example.” [In5.2]

“This [translated functionality] will save me from copy the text and translate it in Google. Then actually if you have the NemID to protect you and quite a lot of layers of security but then in case you're a foreigner you anyhow put the whole text you received in a third party place – as for example Google translate or something like that. And then what is the point of the security in place in e-boks? In this way a person also expose his/her privacy.” [In5.3]

“it's a bit boring to use the NemID log in every time. And since the app is doing the job I prefer to use it. And I don't need to sign in every time and to switch on and off all the time” [In5.4]

“I think it's pretty straight forward. You can see one button from private, one button for business – it's pretty straight forward where you need to go. And you have the navigation menu on one side. And I think it is pretty easy to operate with. I haven't had any problems so far.” [In5.5]

“Actually for me this [e-boks.dk] is a way to skip the regular post service in Denmark... E-boks is just a platform where I can get my emails from public authorities.” [In5.6]

“.... So in case we assume that e-boks will not give away my personal information then “why not” to try this feature. I am willing to trust them but in certain circumstances as if they are reliable in what they offer.” [In5.7]

“I prefer to use the mobile version, it's very good app. Because by using the mobile app, I avoid using the NemID. The first time actually you have to put a specific code from the web version to your personal mobile device in order to get access to e-boks on your mobile phone. Afterwards, on the mobile device there is no need for NemID codes when you log in. I think it is secured. Because nobody else can't use your mobile device because it is protected by the password.” [In5.8]

Interviewee 6:

“If I could have it [e-boks without NemID] without – I would prefer to have it without the NemID. The thing is I wouldn't also install the app because of the NemID. I don't want another app on my smart phone. And it will be nice if the NemID is in a way gone.” [In6.1]

“No I haven't done that. I am really too lazy to check how I have to do that. Because I know if I have to do that I would have to spend probably 10 minutes to do it and I am too lazy to do that. Even though the interface is nice and everything – some of the things I think there are too much I think. Because I really don't know how to sign out from special types of letters for example from the commune that are sending me letter that they are building an IKEA next to my apartment.” [In6.2]

“I don't think the NemID login is so much necessary because for example in my e-boks I don't think I have such a valuable information there. It's valuable kind of because are pay slips and other money related documents that consist my CPR number inside. But still I don't know if I need to have the NemID in place, because even when I login to my bank account I don't need the NemID.” [In6.3]

Interviewee 7:

“The way of contacting them [e-boks.dk] should be improved. Both the call centre service and the email replies to customers. Just to be effective and kind of react on time. Because the case you’ve describe [I wrote a request to service support and then the reply came as a no-reply letter. However the reply needed a further communication and a new request has been created and it reverted to the previously discussed matters.] is as a vicious circle just get back to square one – so it’s not really working. In case there is a person you’re going to talk to they should be able to solve the problem right away and not to make you write another request and so on and so forth. And if you kind of submit a written request should be answered for sure.” [In7.1]

„I understand e-boks as a service which kind of make it easier for you to get everything together and have all your personal information and all the things you have to communicate with public services and etc. This is the way for me to communicate with all these institutions.“ [In7.2]

Interviewee 8:

“I would like my privacy to be 100% protected...” [In8.1]

Security in e-boks is pretty Danish standardized. And in case my mobile phone was able to remember my full credentials it would have been nice. Another thing is that iPhone has 6 digits pass, which is not the usual 4 that we are used to have. This app is coming with 6 digit requirements for password which confuses me as a user. But like this it’s more secured. However, you can’t do much if you open my e-boks on my mobile. You cannot write an email or anything else, you could only see my pay slip there and that’s it. On the other hand, it depends the data leakage will be huge because you will see the amount, but also my personal cpr number, my address and other personal stuff. [In8.2]

“On the other hand, I guess at the end of the year for example when I am dealing with my taxes and read all my invoices – it will be much more comfortably if I am locally on my desktop and operate as I do with dropbox. This will be much easier to open all the pdf without sending them to my Gmail and open through my Gmail. I think this will be applicable in this case. For example today I was calculating the first 6 months – how much money I’ve received and also how much taxes was paid and so on and so forth. However, I do all this one by one – respectively looking for the payslips for the certain month and checking. And in case if I am in a folder similar to dropbox it will be much less time consuming” [In8.3]

“Mark a letter as important” – [In8.4]

“Some automatic categories and payslips for example or these income stuff to go straight there [straight to a predefined folder]”. [In8.5]

Interviewee 9:

“I think e-boks is more secured compared with the personal cloud services. I like that Dropbox is so user friendly. This is the purpose to use it for storing my data there. And it is so easy to save in your personal Dropbox folder. I prefer user friendliness and ease of use over the security. It should be both but nowadays, it’s very hard to say what is secured and what is not. Even services as Facebook – you don’t know the pictures that you are posting where they are going, where they are stored, and so on so forth. Either way, you have to be as “you don’t care, and do whatever you want to do” or take care of your information and spamming people. You don’t know what the spamming [In9.1]

“But sometimes could be irritating to have the NemID all the time with you. If you going to fix the NemID login it will be perfect” [In9.2]

"I think it is a very simple system. It is not so much... IT's not like, Dropbox and Google Drive there is a lot of features. But with e-boks you cannot do much, just read emails. Maybe if they have features as Google Drive, I could use that instead of Google Drive. But with e-boks you cannot decide, you have to use it as it is given. It is a mandatory service." [In9.3]

"So this is not nice to have a difference between the mobile and web version. It should be one platform. Not a difference between the web version and the mobile one. But actually it depends. Because my Feriepenge [Danish fund for vacations] I open it exactly from e-boks. I didn't go to another system. However, my mom – she open in another system. So, depends where you work and how the system is and so on so forth." [In9.4]

"For me the application is too small. And for me the stuff like my salary or some other information – it is not easy to see it in this resolution – it's too small. That is the reason why I always open it from my computer. It's good the application still saying you have some unread messages however I prefer to use the computer version. I prefer larger screen for e-boks. I think this is one of few things that I use my computer for. Facebook, emails, other social Media all is on my phone, but e-boks I use it only on my computer." [In9.5]

"I don't remember but it's usually only read emails. And if you have to do something you should call someone, usually you cannot send emails through e-boks. If I need to reply I reply in another system, I called and they said I need to push the button or something and then they will figure out what to do. Usually if I need to do something – I have to call somebody. I think it's possible to send an email, but it's not meant to do, this is not the purpose of e-boks." [In9.6]

"The cloud service that they offer – maybe I could use it. Because I actually have a problem with certificates – I don't know where to save them. Pictures and private things no. I use other cloud services for that. I usually use Google Drive cloud service." [In9.7]

Interviewee 10:

"It [the interface] seemed pretty intuitive to me. It look like a pretty normal inbox – like not an email box but one of these public inbox where you know there is not that many things listed but that is because of the messages are so far apart. I can tell about the tabs works pretty intuitive as well.. It worked the way that you are expected to and it also worked the way I would have expected to." [In10.1]

"Well to be completely honest, I forgot about it existence completely. I haven't been reminded of its [e-boks.dk] existence for years. I feel also you know if something urgent popped up there [e-boks.dk] on a frequent basis then I wouldn't have forgotten that it [e-boks.dk] exists in the first place." [In10.2]

"I don't know. I have never really felt that it [e-boks.dk] was important for anything. I have no idea what [e-boks.dk] is used for. OK, I mean I know it's [e-boks.dk] is like the public mail address so you have one official mail address which seems like really good idea but which instance doesn't have your standard email at this point. It just seems like you know what you call it - back-up plan which is good." [In10.3]

"umm, I can't think of a single instance in which that would be useful. I mean basically what they are offering people is a public cloud storage. I mean that's actually not a bad idea. On the other hand, uhh .. why? I mean it's .. They target now.. Now when I am thinking about it they targeted the audience as obviously people who don't really have other cloud things set up. Like dropbox for example, I mean in order for this to compete with dropbox it would have to have a client or windows storage." [In10.4]

"I don't remember but if it's just NemID stuff, it's [the login process of e-boks] not complicated but it is slightly annoying. I mean like it is not when you do it at home but when you have do it outside – it's pretty annoying to set there. You almost, when you pull out that card [with the NemID codes] you are almost

announcing to the whole world: "Hey, I am accessing private information on this easily steal-able device right now" [In10.5]

CONTACT E-BOKS

Contact with e-boks.dk vendors were conducted couple of time

10th of May 2016 – First email was send from their contact list – to their advertisement team with request for help and redirecting in case they don't find my request possible

2nd of June 2016 – I called e-boks on their telephone number. After selecting an option from a menu - I was connected to a call desk. When I explained what I am calling the lady from the other side put me on hold and said will connect me with service support team.

After 2 minutes - A guy from support team heard my request and put me on hold to talk with someone else about my asking.

After another 2-3 minutes the same person was again on the phone and said that they don't have email address but guided me how to send a request to their team through e-boks.dk contact support page. He also advise me to send my request in short time in order for them to fetch it from the pile.

I did send them what I needed to say in the next 15 minutes.

3rd of June 2016 – I received and email that my request needs more time to be handle and in couple of days I will receive answer

8th of June 2016 – I received and answer that my request is sent to the respective team and I was asked till what time our talk should happen in case e-boks.dk agree to cooperate. However, there were no place for me to contact back and reply so I needed to write a new request to the support team – on 11th of June.

INTERVIEW GUIDE

Purpose of the interviews is to explore people's opinion about their user experience about e-boks.dk.

Rules for recruits

- With different background
- Interested in new technologies and solutions
- Age group between 20 and 45 years old participants

Usability (user experience) focused questions

The questions were divided in couple of areas – questions about people's understanding about privacy and information overload within e-boks service. Questions related with their experience as users and any issues that they eventually faced during using the system. How they find the login process? Which version of the e-boks they prefer to use and why is that? How they evaluate the service and do they think it is satisfying for its purpose?

Technology driven questions:

What is people's perception of cloud service technologies? Furthermore, interviewees were also asked to compare the personal cloud services with e-boks. How they find the system for notification and do they have experienced any problems in this aspects?

Questions about their personal experience:

How people find the process of login with NemID? Have they experienced information overload and in which sense? How they describe it? Have interviewees had any problems with the service and if yes how they manage with them?

