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PRINCIPLES FOR DESIGNING A PROACTIVE AND PERSONALISED 'ONE-STOP-SHOP' SERVICE FOR PEOPLE WITH REDUCED WORK ABILITY IN ESTONIA

Master's Thesis

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PRINTSIIBID PROAKTIIVSE JA PERSONAALSE ‘ONE-STOP-SHOP’ TEENUSE DISAINIMISEKS VÄHENENUD TÖÖVÕIMEGA INIMESTELE EESTIS

Magistritöö

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Tallinn 2017

Author’s declaration of originality

I hereby certify that I am the sole author of this thesis and this thesis has not been presented for examination or submitted for defence anywhere else. All used materials, references to the literature and work of others have been cited.

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Abstract

Currently, there are several issues in the field of reduced work ability in Estonia and author's idea in this thesis was to analyse the current situation and to propose the solution for improving it. The main goal in this thesis was to solve the main research question: **"How to support people with reduced work ability by the means of ICT?"** In order to answer the question, author conducted qualitative research, including in-depth interviews and descriptive case studies that helped to realize what requirements should the future solution satisfy. For requirements' elicitation, analysis, and representation, author used the agent-oriented modelling by Sterling and Taveter for designing distributed sociotechnical systems.

The results of the qualitative research validated author's understanding about the current situation as most of the stakeholders emphasized similar issues in the field as the author. All interviewees welcomed the idea of the 'one-stop-shop' e-service together with feedback for it, including recommendations and constructive criticism.

As a conclusion, author's proposes to create a proactive and personalised 'one-stop-shop' service using experience-based and emotion driven design together with AOM methodology. This will help to create a solution that satisfies different stakeholders needs and goals in the reduced work ability field. There are several other requirements that must be followed in order to be able to efficiently design such socio-technical solution and author created a list of these requirements in this thesis. Additionally, author created a solution prototype for a visual example how a customer could see the personalised and proactive service in real life together with goal models for it.

This thesis is written in English and contains 76 pages of text, 7 chapters, 18 figures, and 7 tables.

Annotatsioon

PRINTSIIBID PROAKTIIVSE JA PERSONAALSE ‘ONE-STOP-SHOP’ TEENUSE DISAINIMISEKS VÄHENENUD TÖÖVÕIMEGA INIMESTELE EESTIS.

Hetkel on Eestis vähenenud töövõime valdkonnas mitmeid murekohti ning autori eesmärk oli selles lõputöös analüüsida praegust olukorda ja pakkuda välja lahendus selle parendamiseks. Antud töö peamiseks eesmärgiks oli lahendada peamine uurimistöö küsimus: **“Kuidas toetada vähenenud töövõimega inimesi IKT lahenduste abil?”** Sellele küsimusele vastamiseks viis autor läbi kvalitatiivse uurimuse, sealhulgas süvaintervjuud ning kirjeldavad juhtumianalüüsid ning need meetodid aitasid mõista, mis printsiipe peaks tulevase lahenduse disainimisel järgima. Printsiipide loomiseks, analüüsiks ning esitlemiseks kasutas autor Sterlingi ja Taveteri poolt kirjeldatud agent-orienteeritud modelleerimist (AOM) hajutatud sotsiotehnilistele süsteemidele.

Kvalitatiivse uurimistöö tulemused valideerisid autori arusaama hetkelisest olukorrast, sest sidusgruppidest enamus rõhutasid valdkonnas samu murekohti, mida autor. Kõik sidusgrupid toetasid nn. “one-stop-shop’i” e-teenuse põhimõtet ning andsid sellele ka tagasisidet nii positiivsete soovituste kui ka konstruktiivse kriitika näol.

Kokkuvõtteks on autori ettepanekuks luua proaktiivne ja personaalne “one-stop-shop” teenus kasutades kogemuspõhist ning emotsioonidele orienteeritud disaini koos AOM metodoloogiaga. See aitaks luua lahenduse, mis rahuldab vähenenud töövõime valdkonnas erinevate osapoolte vajadusi ning eesmärke. Et sellist “one-stop-shop” ehk “kõik ühes kohas” teenust tõhusalt luua, on vaja järgida ka erinevaid teisi põhimõtted ning autor koostas lõputöös selle jaoks vastava põhimõtete listi. Lisaks koostas autor lahenduse jaoks eesmärgimudeli ning prototüübi, et anda visuaalne näide, milline võiks olla välja pakutud lahenduse puhul reaalne personaalne ja proaktiivne kliendi töölaua vaade.

Lõputöö on kirjutatud inglise keeles ning sisaldab teksti 76 leheküljel, 7 peatükki, 18 Figuret, 7 tabelit.

List of abbreviations and terms

AOM	Agent Oriented Modeling
EBD	Experience-based design
ECDP	The Estonian Chamber of Disabled People
EUIF	the Estonian Unemployment Insurance Fund
ICT	Information and Communications Technologies
IS	Information System
IT	Information Technology
MoSA	Ministry of Social Affairs
NHP	the National Health Plan
NGO	a Non-Governmental Organization
SIB	Social Insurance Board

Abbreviations: reduced work ability, e-health, e-service, agent-oriented modeling (AOM), socio-technical system, experience-based design, emotion-driven design, proactive service, qualitative research, interview

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1. Introduction

The topic of this thesis addresses proposing principles for designing a proactive 'one-stop-shop' service for people with reduced work ability in Estonia. The topic arose from the author's personal experience with the services provided for people with reduced work ability . While experiencing excessive bureaucracy during one particular service that was meant to mitigate the health issues, the author realised there is a definite need for improvements in the current system. The author has also had problems with finding general information about the topic and services in the field. It has been difficult to find sufficient information and it has been also challenging to understand the rights and possibilities a person has, as no one seems to provide such information proactively for a person in need. The author has found the information she has needed coincidentally through acquaintances or when asking possibilities from service providers by herself.

There are different stakeholders involved in the field of reduced work ability. The **author defines stakeholders** in the context of this thesis as different direct and main parties included in providing and using the reduced work ability service. **Service providers** are**:** Ministry of Social Affairs (*hereinafter 'MoSA'*) as a policy maker (they also manage the services they provide), the Estonian Unemployment Insurance Fund (*hereinafter 'EUIF'*), Social Insurance Board (*hereinafter 'SIB'*) and local governments as policy implementers/ service mediators, doctors and health experts as patient data providers and Specialty shops as sellers of special aid. **Service users** are**:** people with reduced work ability (including disabled people). Author refers to service users as a **target group.**

Currently, stakeholders who are providing the services have separate information systems ('silos') in use that are not integrated currently very effectively and this neither supports efficient service provision for the patient/client nor is efficient from the stakeholder's and state's point of view. There is currently the Work Ability Reform going on in Estonia that is already a step towards better e-service provision as it will improve the interactions between the stakeholders but the outcome of the reform is not meant to be a 'one-stop-shop' that the author of this thesis sees as the desired next level compared to the current service provision.

Unfortunately, the current bureaucracy overload holds back fast service provision. A person with health issues has to take many different time-consuming steps to obtain the required services, as there are several stakeholders, each of them with their individual work processes and information systems supporting their work, and a person needs to visit all of them and carry out different procedures. The author has communicated with different stakeholders throughout her experience and has also heard pain spots from the others, which shows that the topic is important and actual from different viewpoints. The author has searched for but has not found any previous studies about this certain topic and feels it really needs to be researched and also put into practice based on the research outcomes. Therefore this thesis will add a new perspective and offer an novel contribution for this field in Estonia. This thesis is also helpful for designing new or redesigning the existing e-services for the target group.

The main problems to be solved in the reduced work ability field are the following ones:

- bureaucracy overload of the services provided for people with reduced work ability;
- the gap of missing central e-service portal for people with reduced work ability;
- the lack of personalization and proactivity of services provided for the target group;
- accessibility issues for the services;
- inefficient data exchange between different stakeholders.

1.1. Research questions

The aim of this thesis is to propose principles for designing a collection of interrelated proactive e-services, forming the so-called ‘one-stop-shop’ service for people with reduced work ability in Estonia. As the author has experienced only some practical issues within the current service provision and lacks specialized theoretical and also practical knowledge about the topic, she had to find out through research what requirements this kind of ‘one-stop-shop’ should satisfy for stakeholders and what would be the most suitable way to design the IT solutions based on these requirements. As many people with reduced work ability also have disabilities, the author also had to find out what kind of special requirements need to be met by the e-services so that people with different disability could and also would like to use the services.

Considering the above, the main goal in this thesis is to solve the main research question (MQ1): **“How to support people with reduced work ability by the means of ICT?”** To help to answer this question, the following additional sub-questions (SQ) need to be addressed:

- SQ 1.1. What theories need to be considered for socio-technical health services?

- SQ 1.2. What requirements should an e-service meet?
- SQ 1.3. What do stakeholders expect from e-services of the future?
- SQ 1.4. Would stakeholder welcome the proposed ‘one-stop-shop’ idea for people with reduced work ability?
- SQ 1.5. What are the challenges for the proposed solution?

The author will answer these sub-questions throughout the thesis. The answers to these sub-questions serve as input for answering the main research question. As several methods such as theory and interviews can contribute to solving each single sub-question, the author has included the same sub-questions under different chapters.

Based on the author’s own experience as a part of the target group of the proposed ‘one-stop-shop’ service and rooted in the analysis of the current situation, author has formed the following **hypothesis: target group finds current service provision inefficient and the stakeholders would welcome the idea of ‘one-stop-shop’.**

1.2. Methodology

This thesis addresses a mixture of social, healthcare and technical issues. Traditionally, qualitative methods have been employed for social sciences but they have also much to offer for the research in health services (Pope & Mays, 2006). Therefore different healthcare stakeholders increasingly turn to the qualitative methods used in social sciences to enhance the understanding of health behaviour and services, and to improve the management and provision of health services (Green & Thorogood, 2004). The qualitative methods help to understand the meanings people attach to their experiences with the social world in their natural setting (Pope & Mays, 2006). As the topic is complex and includes different sides of social, health and technical issues, the author finds **qualitative research methods** to be purposeful and useful also for the research work reported in this thesis. Among the qualitative research methods, the author finds the methods of **case study research** and (**individual) in-depth interviews** as appropriate to cover the research issues in a comprehensive way, which in turn will help to find answers to the research questions. The method of case study research will be used for designing a ‘one-stop-shop’ service for people with reduced work ability. The method of interviews with stakeholders helps to obtain a deeper understanding about the current situation from the perspective of different stakeholders and to understand what are the main aspects deemed to be important by them. Interviews will also be used to evaluate the initial design of the ‘one-stop-shop' service. These methods will form a foundation for the requirements proposed in the thesis for the 'one-stop-shop' service.

The author chose to carry out qualitative research as she wants to really have the people sharing their experiences in current service provision and also their expectations towards future services. The in-depth interviews make up a good method for obtaining information that the author may not be able to obtain by other research methods, as during the interviews new unknown topics or aspects may emerge and the author could then ask further questions about these.

The qualitative research methods are backed up with the relevant theory. Also, the author's own experience will serve as a practical and valuable input. The author finds the combination of the described methods to be sufficient for a successful and validated thesis outcome.

For requirements' elicitation, analysis, and representation, the author will use the methodology of **agent-oriented modelling** (AOM) by Sterling and Taveter for designing distributed sociotechnical systems. The methodology for the thesis is summarized by Figure 1.

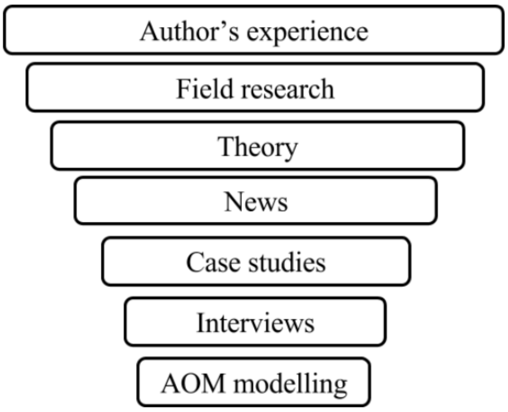

Figure 1. Methodology for the thesis

Additionally, the author will use quite a lot of resources from the news in this thesis, as this is important from the context of the topic of this thesis. Using the sources from the news also helps to give a more realistic and updated information as the topic of dealing with people with reduced work ability is under the reform at this moment and new aspects of the topic arise often.

1.2.1. Methodology of the interviews

The author finds that interviews need to reflect the stakeholders' viewpoints of the current situation and give feedback to the author's ideas towards desired process solution together with the recommendations by the interviewees. The author has compiled interview questions accordingly as targeted and problem-centered questions. This will help to answer the research questions and accept or reject the research hypothesis.

The author has conducted individual in-depth interviews (DiCicco-Bloom and Crabtree, 2006) and has prepared basic questions for the interviews with some variations depending on the role of each stakeholder in the field. The author also expects to discuss different angles of the topics, which would emerge during the interviews and would be different for each interview, depending on the stakeholder's role and personal experience with the service.

Preliminary field analysis and data collection often results in altering questions as the interviewer learns more about the subject (DiCicco-Bloom and Crabtree, 2006). The author has compiled the interview questions throughout the writing process and has changed them after receiving new knowledge about the topic. The author has also conducted a telephone interview with the policy maker at the beginning of her research work in order to understand the topic and it's wider context better before designing the interview questions.

According to DiCicco-Blob and Crabtree (2006) some questions, which are not effective for obtaining the required information, could also be dropped during the interviews. The authors has by-and-large followed this approach. The author has prepared the interview questions that can be roughly divided into the following **four clusters**:

1. **How do the stakeholders assess the current situation in the services available for the target group?**
2. **Have the experience and needs by the target group been considered in the design of the currently available e-services?**
3. **What are the expectations by the stakeholders for the e-services in general?**
4. **What is the feedback by the stakeholders about the proposed 'one-stop-shop'?**

These clusters contain several questions and the questions vary between the stakeholders. The idea by the author is not to ask too specific questions about each cluster, which should lead to the issues that stakeholders have observed by themselves.

The format of individual in-depth interview allows to delve deeply into social and personal matter, whilst the group interview allows to obtain a wider range of experiences without becoming as deeply personal (DiCicco-Bloom and Crabtree, 2006). The author's opinion is that it is most important to conduct individual in-depth interviews with the people with reduced work ability because the author would need to get information about their personal experience and opinions about the topic as they are the users of the service. Interviews with other stakeholders who are service providers can also be performed as group interviews, which were also conducted by the author with the representatives of two institutions.

The author did not assume an active leading role in conducting the interviews because this helps to get more information about the personal experience by the interviewees and may lead to new aspects of the topic. At the same time, the interview should involve the interviewer's self meaning that the author should offer some form of strict or complementary reciprocity, which is possible only if the interviewer is a former or a current member of the group under study (Johnson, 2001). This holds in case of the author of this thesis. The author finds that her own experience with reduced work ability helps her to connect with different stakeholders during the interviews.

The author has formulated the interview questions in a simple language and uses both closed and open questions, while the closed questions can still lead to deeper discussions, which is also to be expected. The interviews have been planned to begin with the introduction about the interviewer and her research work, and then with a more general question about the field but not directly about the goals of this research (Johnson 2001, p. 109).

The author has conducted three individual face-to-face interviews with the target group, and two focus group interviews with two stakeholders - policy makers (MoSA) and developers (EUIF), as it helped to cover the topic more comprehensively. Additionally, the author's own experience with the topic of this thesis can be seen as a part of the individual in-depth knowledge about the topic gathered during past years.

The questions used during the interviews are presented in Appendix 1, where the questions appear in their original form in the Estonian language as this may be useful for further research work in this field in Estonia. However, the questions are commented in English in sub-chapter 5.1.2. of this thesis.

1.2.2. Case study research methodology

Case study research is a preferred research method when the main research questions are **'how'** and **'why'** and when the focus of the study is a contemporary phenomenon that is investigated in its real-world context (Yin, 2014). Qualitative case study methodology enables to study complex phenomena and is a valuable tool for research in health science because of its flexibility and rigor (Baxter & Jack, 2008).

This thesis takes a look into a socio-technical system, where ‘human/social’ and ‘technical’ aspects interact with each other in the context of complex public social policies and health services. The author will analyse two case studies for this thesis by using the **descriptive case study research method** (Baxter & Jack, 2008) for both of them. The author will describe the current situation both case studies and will propose ideas for the desired solution. This is done based on the input from the interviews and on the author’s own experience with the services for people with reduced work ability over the past years.

In doing her research work, the author will consider the observation by Yin (2014), who emphasizes that the pitfall that novice researchers fall into is that they analyze the problem domain at the individual subunit level and thereafter fail to return to the global issue that they initially set out to address. Considering this, the author will analyze the two case studies together and will include them in a wider research analysis.

1.2.3. AOM methodology

The author finds that the AOM methodology (Sterling & Taveter, 2009) is a good input for designing socio-technical systems as it helps to represent in a holistic way goals and needs by different stakeholders and will provide a simple and clear design approach. The authors define the AOM software engineering methodology followingly: it is *a kind of software engineering methodology that uses the notion of agent or actor in all stages of its software engineering process (p. 339).*

A system needs goals to exists and capacities or functions to achieve these goals (Sterling & Taveter, 2009, p. 65). A goal model could be seen as a container of three components: functional goals (representing functional requirements of the system), quality goals (representing non-functional or quality requirements of the system), and roles (capacities or positions that the system requires in order to achieve its goals) (Sterling & Taveter, 2009, p. 66).

For proposing the desired solution, the author will create a goal model, role models and an organisation model on the basis of the theory by Sterling & Taveter (2009), which has been refined by Miller et al., 2011. Also, goal models will be complemented by emotional goals (Miller et al., 2015).

Emotions are considered to form a crucial part of user experience with electronic services and therefore should not be neglected in systems' design (Moldt & Scheve, 2001). Hartmut Millet has added that: "*... even if a design is elegant and functional, it will not have a place in our lives unless it can appeal at a deeper level, to our emotions*" (Esslinger according to Miller et al., 2015). The author also finds that emotional goals offer a remarkable additional value to the goal models as they reflect customer needs in a particular way and thereby make service design purposeful and wholesome. This is especially important in the case of e-services as there are no physical interactions during the service, which needs to be compensated by a personalised approach so that the users could still feel the emotional connection.

1.3. Outline of the thesis

Chapter 1 provides an introduction to the topic of this thesis and presents the motivation of this study. The author also points out the problems she sees that need to be solved in this field. This is followed by stating the research questions. Chapter 1 also describes the research methodologies applied in this thesis.

In **Chapter 2**, the field introduction is made together with the introduction of stakeholders involved in the service provision and the recent statistics overview. The author will also give an overview about the current relevant web portals in use for the target group users.

Chapter 3 will present literature overview about the topic, including experience-based design and design of proactive and personalised services together with the 'one-stop-shop' approach. The author will also point out a connection with another study made on a related topic last year. Chapter 3 is finished with listing the challenges of e-services from the perspectives of different stakeholders.

Chapter 4 presents two case studies, which will provide readers with a greater insight into the topic and the related issues. The first case study addresses seeking and receiving information and the second case study is concerned with buying orthopaedic shoes with state-provided discount.

Chapter 5 introduces the sample group for the interviews and presents the results of the interviews and analysis of the obtained data.

Chapter 6 proposes the desired solution by means of the goal and role models and organization model, and also presents an example of the solution. The author concludes this chapter with the discussion of the data protection issues.

Chapter 7 concludes the thesis together with the recommendations for the future research. Finally, the interview questions asked from different stakeholders along with the relevant figures illustrating the answers given are represented in the **appendices**.

2. Reduced work ability field in Estonia

Reduced work ability means that a person cannot work full-time or do every kind of work, or a person may not be able to work at all. This could be caused by health issues since birth or these may also occur later on, e.g. through a work accident. In the case of reduced work ability, the government will support a person in different ways. It is also stated in § 28 of the Constitution of the Republic of Estonia, that everyone is entitled to protection of his or her health, including people that are assigned incapacity to work, and people with disabilities enjoy special care of the national government and of local authorities (The Constitution, 2017). Several legislative acts regulate the reduced work ability field, because it comprises not only health care and work ability, but also a job and its safety environment. The author will not go deeply into the legal framework in this thesis as it would deviate from the purpose of this thesis and the legal framework has been covered thoroughly by other authors. The author still emphasizes the key importance of the legal framework, as this gives the possibility for data exchange and 'one-stop-shop' for people with reduced work ability.

Alguliyev and Yusifov (2017) discuss that *the establishment and use of new government services is mostly dependent on the development of electronic government (e-government) within the framework of national and international programs, as well as the demand of citizens for online use of electronic services*, and authors consider e-health as one of the segments of e-government.

In Estonia, comprehensive national strategies address the reduced work ability field, with a general aim to provide more efficient services. The main strategies are:

- **National Health Plan (NHP) 2009–2020** that sets out the strategic objectives for continual improvement of the health of the population and provides guidelines and recommendations (Ministry of Social Affairs, 2017c);
- **Health 2020 policy framework** for European politicians and policy makers, which includes main values and principles, and practical key strategic advice to support actions for health and well-being (WHO, 2013);

- **Welfare Development Plan 2016–2023** that focuses on the strategic objectives of labour market, social protection, gender equality, and equal treatment policies for the period (MoSA, n.d.);
- **Special Care and Welfare Development Plan for 2014–2020**, which aim is to create a strategic framework and to establish goals and devise activities for more efficient provision of special care and welfare services that would support the needs of persons with special mental needs. This strategy will be later integrated with the **„Social Security, Inclusion and Equal Opportunities/Mainstreaming Development Plan for 2016–2023“**, which aims is to ensure a common approach by various development plans in the social security sector. (Ministry of Social Affairs, 2017b).

The Estonian e-government well supports the strategies described above, but at the same time, the e-government is not yet fully efficient, which affects the actual use of the e-services. Currently the e-services are neither fully accessible for the people with reduced work ability nor proactive and personalised.

2.1. Stakeholders involved in the service provision

The field of reduced work ability in Estonia is governed by the **Ministry of Social Affairs** (MoSA) and the services are provided by its subdivision the **Social Insurance Board** (SIB) and also by **Estonian Unemployment Insurance Fund** (EUIF). Previously, all the related services were provided by the SIB, but since the 1st of January of 2017, the EUIF took the work ability assessment over as a part of the Work Ability Reform that is currently taking place. The purpose of this reform is to help people with reduced work ability to be involved in the society and to find jobs that they are capable of doing (National Audit Office of Estonia, 2017b). As the EUIF is an institution responsible for helping people to find jobs, it is also an appropriate institution in helping finding jobs also for people with reduced work ability. At the same time, the EUIF may lack some social welfare knowledge required for this purpose, but this can be adopted through training. However, the SIB will continue to assess the degree of severity of a disability (Ministry of Social Affairs, 2017b).

According to the Social Welfare Act (2017), **local governments** will continue to organize the provision of social services, social benefits, emergency social assistance, and other assistance to the people whose residence is registered to this particular county in the population registry.

There are also several non-governmental organizations (NGO) that provide information about the topic, especially for the disabled. The main union for providing information for disabled is **the Estonian Chamber of Disabled People**, which is the national cooperation and coordination organisation and acts as an umbrella organisation for 48 different sub-union. The goal of the Chamber is to help to raise the quality of life for disabled people in Estonia. To achieve this goal, the Chamber cooperates with governmental bodies and social partners in order to ensure that the Estonian legislative and governmental organisations seriously consider the perspective of the disabled people (Epikoda Portal, 2017).

On the 1st of January 2017, **the Health and Welfare Information System Centre**[1] was established with the aim to be a competent and informed IT partner in the health, social and labour policy areas and to ensure the quality of ICT services under the government of MoSA. (The Health and Welfare Information System Centre, 2017). The Centre has been established recently and their website (www.tehik.ee) is still at its early stage.

Ministry of Economic Affairs and Communications is included in a more indirect way as it is the governmental institution responsible for the development of public services, standardisation, and establishment of a user-friendly service environment (Ministry of Economic Affairs and Communications, 2017).

2.2. Statistics

The National Audit Office of Estonia has recently audited state's readiness for the Work Ability Reform and has published the results in February of 2017 together with the statistics about the people who have reduced work ability status. According to the audit document:

- ‘there were **97,459 disability pensioners in Estonia** at the start of 2016 and their number increased by **61%** from 2005-2015’;
- 14,490 people were declared permanently incapacitated for work for the first time in 2015;
- 4,919 occupational accidents occurred in 2016 and 24 of them resulted in death. The circumstances of 160 cases are being investigated. The number of occupational accidents increased by **68%** from 2009-2016;

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[1] The official term may not be the same for this institution, as the author could not find the official translation for it in English. The Official name is: Tervise ja heaolu infosüsteemi keskus

- More than 300 million euros per year is spent on the social tax incentives of disability pensioners and work people with reduced work ability.' (National Audit Office of Estonia, 2017b)

As of 1.01.2016 there were 824 391 work age people and 1 314 370 citizens. **97,459** people with reduced work ability form **11,8%** out of work age people and **63% of them are not working and depend on pension**. As an example, amongst 1000 work age people in Jõgeva county, Kasepää borough, 404 of them have reduced work ability, which is as high as **40,4%** (this number was also the highest amongst all boroughs, but several were very close to to this)**.** (National Audit Office of Estonia, 2017b; Ministry of Social Affairs, 2017d; National Audit Office of Estonia, 2017c). Every year, more than 14, 000 new people receive the reduced work ability status and the growth of receiving it has been the fastest amongst the OECD countries in the last decade (National Audit Office of Estonia, 2017a).

Author finds the statistics concerning as the amount of people with reduced work ability is really high. Nearly 100 000 people is a large amount amongst total of 1,3M citizens and it is definitely needed to find the most effective way how to provide them efficient services.

One of the biggest issues why the target group cannot get to work lies on the readiness of employers to hire them, as audit revealed that the preparedness of employers to hire a person with reduced work ability is only 31%, 44% found it to be impossible and the remaining employers were uncertain (National Audit Office of Estonia, 2017b). At the same time, according to MoSA website and the Nortal Case Study of 'Helping people with reduced work ability return to the labor market' the preparedness was assessed opposite in the both cases, as according to MoSA website 68% and according to Nortal Study 69% of the employers are prepared to hire a person from the target group (Ministry of Social Affairs, 2017d; Nortal, n.d.). Author is not sure why there is such a big difference in this statistics but there could be used different methodology or the sample group, or the survey may have been conducted in different years (at the same time, it should still not cause such opposite results). In author's opinion, different parties should cooperate for such important topic and find similar approach for the researches. Author finds such differences could also cause misunderstandings and make the validation of further decisions and conclusions based on these statistics questionable as it may also seem that the state wants to show the readiness higher than it really is to be able to make further decisions based on it.

Katri Mandel has made a qualitative research to get to understand the reasons for this issue in her Master's thesis about 'Employer's attitude and readiness of effectuation work ability reform' in 2016. The main conclusions were that employers lack the knowledge about their role in the Reform and that employer's major concern with target group is productivity and absence of work. As employers have had different experiences with the target group then they have also different understanding and opinion about such workers. (Mandel, 2016)

The general statement from Audit Office is that the 'state is partially ready for the work ability reform', meaning that although state is capable of assessing the work ability and providing services and aid to people with reduced work ability, the state has not been able to establish an occupational accident and disease insurance system, which plays a big part of the success of the reform as it is important that employers are able to prevent the loss of work ability and that they would also hire people with existing reduced work ability (National Audit Office of Estonia, 2017b).

The audit brings out that the EUIF and the SIB have managed to make the services, such as rehabilitation, and also special aid, more accessible since 2016 (as it was set for them as a plan) and the contributions come to it from staff training programs and through the fact that Social Insurance Board started providing aid instead of 15 county governments. It is mentioned that this led to the disappearance of waiting lists and that people with reduced work ability usually get their aid within the prescribed 30 days. (National Audit Office of Estonia 2017b). Audit report enhances that previously it could take up to a nearly year to apply for some specifical special aid, but now every special aid could be reached similarly faster (National Audit Office of Estonia 2017a, p. 63). In the author's opinion this period could be usual when a person does not need the opinion of the health care specialist in the process. As some services depend on the health expert opinions, then often the regular queues to one health specialist could be from some weeks up to several months. Until these so called 'middle-men' are included in the service, the service for some people could be delayed for a very long period, and author finds this an issue as services and specialty aid provision are time-critical. Author will introduce an example of receiving a special aid in sub-chapter 4.2.

Although the Audit's result was that such services have been made more accessible, author cannot agree with this statement, especially in the light of recent issues raised in the field, as the budget for funding the whole year's rehabilitation service in 2017 ended already in the second week of the year and 40% of the people who were in the queue were children (Pealinn, 2017), which means that these people who were able to put themselves into queues are able to get the service in at least one year time. Author finds that the service is accessible only if it is also actually reached and accessible, not only seemingly so, e.g. by providing some new solutions. Author finds it an enormous issue as the rehabilitation service is time-critical and is a step towards getting people back to work. If such service is actually not provided for most of the people who are in need, or these people must wait for the service for such prolonged time period, then this is definitely not effective management and it is neither correlation with the Work Ability Reform. Currently, there is a situation that a Minister of Social Protection, who is responsible for the field, finds this issue is not the fault of the MoSA or the Minister itself, but of the officials at the SIB (Ibruk, 2017). It is clear, that there are management issues in the field, therefore it is needed that parties set clear responsibilities for each separate service and determine service owners, which could prevent current issues. Any Reform or novice e-service cannot solve the issues in the field if they are not managed properly, therefore author enhances the importance of the preliminary analysis and great cooperation so that people who are in the real need would not suffer.

One part of the previously mentioned audit also revealed that the present information system (IS) which supports the reduced work ability services (for Social Insurance Board) is inadequate, as some data are missing and the quality of others is poor. IS for assessing work ability did not start functioning as planned, therefore sharing service and allowance data is not functioning properly and this causes inconveniences for different stakeholders (e.g. doctors have to provide extra data, longer waiting time for people), and it can also cause errors in the data and service provision. (National Audit Office of Estonia, 2017b). At the same time, the developments of another information system (TETRIS - for the Unemployment Insurance Fund) that supports the work ability assessment and granting disability benefits have gone well (Nortal, n.d.). The idea of these information systems is great, as these are a great leap towards improving and optimizing the process - the main step is just to get both of the IS-s to function and collaborate.

Author introduced herself with auditor's recommendations towards improving the system but she did not notice any recommendations about developing e-services. The only recommendation that was proposed to Minister of Health and Labour was the suggestion to create an Internet environment where people with reduced work ability could approach to ask questions and where stakeholders could share their knowledge and advice (National Audit Office of Estonia, 2017a, p. 13 (section 41)). Minister replied to this recommendation that similar sites already exists, such as MoSA’s blog and involved stakeholders’ Facebook pages, where field related topics are posted and people could also ask questions and receive replies, and that people with reduced work ability have created their own Facebook pages for information exchange, too. Minister added that current stakeholders do also provide information and help people out but MoSA suggests that also the Estonian Chamber of

Disabled People (ECDP) should carry out the role of providing consultation services. (National Audit Office of Estonia 2017a, pp. 13-14 (section 41)). Author finds this as a lack of e-service approach that meets only very basics of what e-services can offer and neglects the core idea what can be possibly offered through e-services. Although blog and social media pages are useful, then this does not provide any personalised information nor proper interaction. Author finds that auditor's suggestions could have been more ambiguous and the Minister could have brought out not only the existing possibilities about the 'e-services' but he could have provided some future plans about new approaches and solutions for e-services as well.

2.3. Health information systems related to reduced work ability

Since 2009, two main health information systems were kick-started: the Electronic Health Record system Digilugu and the Digital Prescription Service on the Estonian State Portal (www.eesti.ee). Both of them have two sides of user roles: patients and healthcare professionals (Ministry of Social Affairs, 2017a). Additionally, there are also the Digital Registration and Digital Image projects (E-health Portal, 2017).

From now on, people with reduced work ability can fill the work ability assessment application together with the benefit application online on the EUIF's website (www.tootukassa.ee). This is a great solution towards more efficient applying process, but at the same time, it does not offer personalised and proactive service view for users, neither is it fully accessible, as it came out from one of the interviews that the application could not be filled in by a blind user with the help of speech synthesizer as the Information System has not been developed accordingly.

3. Literature review

The literature reviews helps to answer the following research questions:

- **SQ 1.1. What theories need to be considered for socio-technical health services?**
- **SQ 1.2. What requirements should an e-service meet?**
- **SQ 1.5. What are the challenges for the proposed solution?**

Various research work in the area of health-related e-services has been conducted but according to the best of the knowledge by the author, there are no previous studies addressing directly the design of e-services for people with reduced work ability. The author has studied many theories and based on that has come to the conclusion that the **theory of co-designing services** with the customer (patient) together with **experience and emotion design** most precisely apply to the topic of this thesis. **Proactive and personal service design** is another relevant research area, as this is the core idea of the 'one-stop-shop' service. The author will also take a closer look at the literature about **'one-stop-shop'** services. As the solution would be a **socio-technical health related service,** the relevant literature on socio-technical systems is also overviewed. Finally, the author will address **challenges and risks for e-services** from the viewpoint of different stakeholders, as this is a crucial part when designing services.

3.1. Co-designing services and experience-based design

Bate & Robert (2006) emphasize that the systems and services should not be designed around the patient but together with the patient. The author finds this approach really reflecting her own thoughts about service design. Bate & Robert (2006) have brought out that although patients have been included in the service improvements, service design has not been focused on the patient's unique experience - experience-based design (EBD) - , but has rather been just about their 'attitudes' towards the service. Authors also mention that the ideology of the 'patient-centered' concept often does not reflect the reality because the services are often just theoretically presented as patient-centered rather than being truly 'patient-centered' and they emphasise that co-designing service with the patient/customer is much more than just being patient-centered or promoting greater patient participation, meaning instead that the goals for patient/customer experience are placed in the centre of the design and are as important as the process and organisation goals, and instead of designing services, the designers are designing experiences. Bate & Roberts (2006) define *experience* as "how well people understand it, how they feel about it while they are using it, how well it serves its purpose, and how well it fits into the context in which they are using it". According to authors, this would need identifying the key moments and places where people come into contact with the service and where their subjective experience is shaped so that designers would know where it is important to establish desired emotional and sensory connection, keeping in mind the importance of cooperating with the front-line people who bring alive those contact points during the process. (pp. 307-308).

Although the idea by the author about the 'one-stop-shop' service would remove the label 'patient' from the target group and make them rather customers, the idea of co-designing the service together with the patients through their experience would remain the same. Also, the idea of taking away the 'patient' label whilst providing health services is supported by different authors as they emphasize that 'patient-centered care' puts a citizen with health needs in a subordinate relationship as the 'patient', while 'person-centred care' recognises person's full autonomy as a person in society (Rigby et al., 2015). Full autonomy means that a person is able to make informed decisions about, and to successfully manage, their own health and care, is able to make informed decisions and choose when to invite others to act on their behalf, and is then able to work together with a designated person to develop appropriate solutions (De Silva, 2014). To reach this, De Silva (2014) emphasizes that health care services must work in partnership to deliver care responsive to people's individual abilities, preferences, lifestyles, and goals. The author finds that combining person-centred approach and ICT in healthcare helps to better reach the goals by more independent customers. The European Commission's Report on eHealth in 2010 states that effective integration of eHealth applications and support services could improve citizens' quality of life by enabling safer independent living and increased social inclusion (Cabrera et al., 2004). The report was published quite a while ago and the author can say that at least in Estonia and based on her own personal experience, eHealth applications and services have improved the quality of life for the past years but there is still very much room for improvements. The author finds user experience to be crucial in the context of this thesis as it is truly important that the service would be designed considering the real needs of the people with various health issues and disabilities.

Bate & Roberts (2006) emphasize that *experience* can never be accessed or observed directly, but only indirectly through the words and language people use to describe it when they look back at it (p. 308). This means that the person who analyses the patient/customer experience must have great skills while translating indirect expressions into service requirements. The author finds that the combination of direct and indirect methods can be used for that purpose.

Co-designing services means partnership and shared leadership, where healthcare staff continues to play key part in leading service design alongside patients and customers, whose input is first-hand knowledge (experience) (Bate & Roberts, 2006, pp. 308-309). Bate & Roberts (2006) pay main attention to the real life services rather than e-services, giving example about including actors and role play, so the staff could obtain a deeper understanding about the situations and patient needs (p. 308). Against this background, the author of the current thesis finds that a similar approach needs to be introduced for the design of e-services, because this area also should include assistance for customers. This kind of assistance should meet the emotional well-being for the customers, including knowing how to deal with customers with possible special needs - e.g. a visually impaired person - and organizing the relevant training for the staff. It also has to be kept in mind that regular services for people with reduced work ability will still remain as an alternative, so a special training in “physical” service provision continues to be necessary.

Although the author has found some good sources about service co-design, she finds there is a lack of theory about co-designing public e-services together with the user/customer, especially in health care and with the aims of reaching intangible goals, such as emotional well-being, higher convenience and feeling cared about. This is also backed up by McClintock et al. (2016), who have pointed out that little is known about health care experiences among people with and without disabilities. Bate & Roberts (2006) have stated that disabled people experience specific challenges that are different from challenges experienced by regular people while obtaining health services and the authors enhance the need for improving health care coordination and the importance of self-advocacy.

Concluding this section, the author suggests not any more label a health service user as a ‘patient’, which is quite commonly used in the literature, as this term confines the person to specific frames and does not consider the person as a service user or customer, who is also a crucial actor in the process of service design. Sirendi and Taveter (2016) go further and discuss that the term ‘user’ has been overemployed and is also misleading, as it implies all service users being very much alike although this is not the case. Sirendi & Taveter (2016) suggest to discuss stakeholders of services rather than just users. The author finds that the approach by Sirendi & Taveter is also well applicable for the ‘one-stop-shop’ service to be designed for the target group. However, the author has used two different terms ‘user’ and ‘customer’ throughout this thesis, because currently there are service users and for the desired solution they would be unique customers.

3.2. Proactive and personalised service design

E-services were initially coined in the private sector, where they were focused on the needs of the particular company. Later on, the focus changed from the needs of the company to the needs of the customer. This client-based view has also been adopted in e-government initiatives, reinforcing the shift in government from the traditional model towards a more responsive model that provides services in a citizen-centred manner. The key requirement in providing citizen-centred e-government lies in the use of technology to produce and deliver services electronically, which help to deliver public services meeting the needs of citizens and to achieve administrative efficiencies in the functions of government (Scott et al., 2004). In addition to e-government services, the user perspective is often taken when discussing the adoption of technology in a more general sense (Janssen et al., 2013).

Sirendi and Taveter (2016) have discussed bringing service design thinking into the public sector to create proactive and user-friendly public services. Their viewpoint is that multiple stakeholders need to be taken into consideration when designing and implementing public sector services and processes. Sirendi & Taveter (2016) recommend the usage of the Agent-Oriented Modelling (AOM) methodology (Sterling & Taveter, 2009; Miller, et al., 2015) to reach proactive, user-friendly, and usable services of e-government, which helps to design better and more proactive services and promote service design thinking in the public sector. Sirendi & Taveter (2016) have conducted research about the family benefits' service, which bears a resemblance to the e-services addressed by this thesis. The author finds that currently there is a great deal of information kept in the governmental databases that has not been given the extra value it could have for offering truly personalised e-services.

Different authors express the need for central patient portals that enable peer communication between all stakeholders (Rigby et al., 2015). One one hand, many countries are moving towards the 'one-stop-shop' service (such as Finland (The Ministry of Finance, 2017) and Hungary (EPSA, 2017)), at the same time, the meaning of the term 'one-stop-shop' varies in different countries. Therefore a more thorough and comprehensive study is required for the usage of the term 'one-stop-shop' alone. The author can bring as an example the Republic of Malta health 'one-stop-shop' portal Health.gov.mt (Republic of Malta, 2017) that offers a great user experience because it does not make a user feel as a patient but as a customer and seems to offer a personalised view of the information and services (the author cannot access the personalised view as this needs a citizenship of Malta), whereas other countries find it rather as a centre for sharing descriptive information with citizens (such as South Africa government's website (http://www.gov.za/), as the author does not notice any place for logging in for a personalised view and the site is rather for providing descriptive information.

3.2.1. Connection with the study on designing a proactive service for the parents of disabled child

Although the author could not find exact previous studies about the topic in Estonia, Mariane Koplimaa has written a Master's thesis about "Designing a proactive service to disabled child's parents" (Koplimaa, 2016). Both of the topic of the work by Koplimaa (2016) and the topic of this thesis are closely related. The author was previously not aware of the situation about services provided for disabled children parents, but the author sees that some the main problems with the topics are very similar or even same: no central information about the service and possibilities, no proactivity, and the information is not shared between different stakeholders (in current thesis case some of the information is shared but not fully and not efficiently). Additionally, the research question of the thesis is quite similar: "how to design a proactive service for a disabled child's parents?" (Koplimaa, 2016). This shows that people in needs have very similar pain points about different services but at the same time it is not very surprising if the service experience is from same country and mainly from similar or same stakeholders. It confirms that people feel and see similar issues for different but interconnected services.

Also, the solution idea provided by different authors is similar: proactive e-service or collection of e-services (Koplimaa, 2016), which shows that people really feel the need of e-services, and especially proactive e-services, because these could ease the life of the people who are in new challenging situation, where they feel confusion not only in the beginning of the service but throughout the service, and they do not receive enough support or information by the stakeholders - therefore, proactivity and personalisation would ease the situation.

The author finds that each such health service group (reduced work ability, disabled children) could be provided at the 'one-stop-shop' and each of these services would need separate research for understanding what approaches are needed to be applied. The 'one-stop-shop' could act as a whole but at the same time there could be some variations between each sub-service.

The author did not immediately find the straight connection between services provided for disabled child’s parents and this thesis topic, but as there are many disabled work age people amongst people with reduced work ability, then it is crucial that needed services are provided for them already at young age (of course, then their parents or caretakers would use these services) so that later on they are already informed and that they could use the service the author proposes for work age people. At the same time, this is not the current case as even not all disabled children get needed services that are meant for them, such as critical rehabilitation service (Pealinn, 2017). The author knows also personally a woman who has a severely disabled child and who has therefore right for the personal assistant service for the child and if the woman asked that service from the local authorities who are responsible of providing it, she got the reply that they do not have any more funds for that (gladly she knew her rights and turned to the higher authority who dealt with the issue and she received the needed service). Such approach is unacceptable and shocking, and this should not be decided by the local authorities who provide the services - they must follow the rules and provide services that people have right for. This also enhances the difference between local authorities, as the author is rather sure that such incident may not happen at some other local government. The ‘one-stop-shop’ solution would help to avoid such independent decision making attempts that may be with intent to use the money for other goals or even conduct fraud.

Although author’s proposed ‘one-stop-shop’ solution is not only for disabled people, then these services need to be interconnected as the author’s proposed service is continuous service for the service provided for disabled child’s parents. If disable children could use the ‘one-stop-shop’ services independently when they reach work age it would be a big step towards lessening the burden from the parents and caretakers too that is a very important aspect from a wider viewpoint.

3.3. Socio-technical systems

Socio-technical perspectives focus on understanding the interaction between two interrelated systems, the technical system and the social system, within a particular environmental context” (Whetton & Georgiou 2010). Sterling and Norta define socio-technical system followingly: *It is a software intensive system that has defined operational processes followed by human operators and which operates within an organization, meaning it contains both a social aspect, which may be a subsystem, and a technical aspect* (Taveter & Norta, 2016, p.6).

Whetton & Georgiou (2010) bring out that socio-technical perspectives was advocated to health informatics as a means for understanding and mitigating the poor uptake and performance of information systems within health care. At the same time, according to the authors, the association between socio-technical concepts and health informatics practice and research is rarely articulated and the elucidation of the theories, concepts and principles that underlie socio-technical perspectives, or their particular application to the health informatics domain, are still limited and this is limiting the ability of health informatics academics and professionals to fully explore and apply socio-technical approaches in the increasingly complex environments of contemporary health care.

Coiera 2004 argued in 2004 that "if health care is to evolve at a pace that will meet the needs of society it will need to embrace this science of sociotechnical design." He added that: *Perhaps we begin the journey by designing a sustainable and flexible culture that does not fear innovation and sees the redesign of roles, processes, organisations, and careers as the first amongst all of its duties* (Coiera 2004). The author finds his approach good and the suggestions relevant and connected to this thesis, as such changes would need to happen in this field's context too.

Coiera (2004) emphasizes that although the technology plays important role in moving forward but the decision makers are still people who are affected by culture's beliefs and values that affect the system design. He argues that health systems have to treat proportionately more people with reducing resources and this means that we must design systems that are 'fundamentally sustainable, and this may require nothing less than the reinvention of health care'. Coiera enhances that for this, both the behaviour of complex systems and the science of system design must be understood and considered and this is also increasingly associated with the discipline of health informatics. Additionally, he points out that health systems as socio-technical systems cannot be designed independently of each other , meaning the 'organisational' and technical' part, but they must interact and designed together as a one system.

According to Harteloh, a sociotechnical approach is characterised as bottom-up, incremental, information technology facilitated and indicator driven and its purpose is to ground quality assurance in medical practice and to provide meaning to those directly involved, whereas meaning depends on information. Author suggests to develop quality indicators for the meaning of quality assurance in health care as it makes a system to a quality system and suits a sociotechnical approach by grounding the formal structure of the system in a social reality.' (Harteloh 2003). Author of this thesis finds that quality meaning could be well developed through AOM and it is especially suitable methodology for it as Harteloh brings out that it is needed to provide meaning to those directly involved (Harteloh 2003). AOM modelling involves representing quality goals of the system by taking consideration each stakeholder involved.

3.4. Challenges of e-services

Author seeks to get the answer for "**SQ 1.5. What are the challenges for the proposed solution?"** based on relevant literature about the challenger of e-services.

Challenges of e-services could be seen from different viewpoints of different stakeholders. There could be challenges from user side, challenges from middle men, such as reluctance towards new solutions, and challenges from the side of the development of the services. It is important to

3.4.1. Challenges of the policy makers and implementers

Anthopoulos et al. (2015) brought out the common e-government project failures, which are:

- design-reality gaps;
- ineffective project management;
- unrealistic planning.

This reflects also current situation at reduced work ability field, where are all previously mentioned issues taking place at the very moment.

E-government projects differ from other project categories, due to their complexity in terms of organizational size; corresponding resistance to change; novelty; end-users' impact and politics. Many e-government projects also combine technical features from both the construction and the ICT industries, which increase innovation and uncertainty. (Anthopoulos et al. 2015). Janssen et al. (2013) enhance that the large transformation projects, which possibly do not meet the desired project outcomes are characterized by a large number of stakeholders, many uncertainties and complexities, which need to be dealt with at the same time. This characterises well the projects related to reduced work ability field in Estonia. Authors concluded that the reason behind not meeting the desired outcomes is hindered by a combination of factors originating from the complexity and uncertainties in combination with too high ambition levels and the neglecting existing realities, and also because during the transformation process the initial focus on the users was lost and shifted towards an internal orientation. (Janssen et al. 2013).

According to Hyppönen (2007), there is also a vast literature documenting failures of health care ICT projects. He introduced two case studies and brought out that both of them had **the challenge of balancing different objects of development**, as the projects had inadequate forums, methods, and tools for a balanced co-construction of multiple objects and both lacked also analysis of and learning from the practices in which the technologies were to be implemented (pp. 207-209)

As we could see currently with the Work Ability Reform SKAIS 2 information system developments' example, different objects of development have not been efficiently balanced, as there was a lack of planning and analysis that postponed the planned due date for a whole year further and this has caused already 1,2 million euros extra costs (ERR News Portal 2017). Therefore, 'soft' side of ICT developments must play important role, taking into consideration different specifications of the certain ICT project that is being developed.

Loukis and Charalabidis (2011) have brought out software projects risk factors common to USA, Finland and Hong Kong. Authors concluded in their research that risk factors change with time and also depend highly on the cultural, socioeconomic and organizational context but they found several risks factors that were common to three different countries with different cultural, socioeconomic and organizational context. There risk factors are following (Loukis & Charalabidis 2011, 62):

- *Lack of top management commitment to the project*
- *Failure to gain user commitment*
- *Misunderstanding the requirements*
- *Lack of adequate user involvement*
- *Lack of required knowledge/skills in the project personnel*
- *Lack of frozen requirements*
- *Changing scope/objectives*
- *Introduction of new technology*
- *Failure to manage end-user expectations*
- *Insufficient/inappropriate staffing*
- *Conflict between user departments*

On the basis of current service provision the author finds these risk factors apply to Estonia’s context as well, but to be sure it needs a confirmative analysis. Author will introduce few current issues where these risks and challenges could be seen:

1. The work ability assessment was meant to use the data from new Information System SKAIS 2 that has had difficulties and which’ realization prolonged more than a 1,5 years because of different issues, including lack of analysis. Therefore, work ability assessment continues currently on the basis of the old data from the SKAIS 1 Information System that was updates but this IS does not have enough data about all clients (about 50% of the target group data is insufficient), which means that stakeholders must manually ask additional data from doctors, which means additional waste of resources (such as time, money), and also for the clients. The current situation is currently evaluated worse than stakeholders were expecting it to be (as they suspected there could be some issues). (Kaasik, 2017)
2. The changes in work assessment (from SIB to EUIF) have also left some disabled people without income for several months, which is a long time for a person who only income may be the benefits. The reasons of it are different, such as application need extra data or there are not enough data in Information Systems. Stakeholders cannot understand why income could have not continued until the new assessment decision. (Pärli, 2017) The author finds such a gap as a management issue and it seems this part was not analysed enough, as this should be dealt with differently and the people in need should not suffer because of the Reform.

The biggest challenge from middle men side is usually said to be the resistance of change as these people must make changes in their regular routine of work, which makes extra pressure and might cause stress. The communication between different institution may be also challenging.

The author would say that a good explanation work and training would be one of the preventing action for reducing the resistance.

3.4.2. Challenges of the user side

As big part of people with reduced work ability are elderly then they are not all computer and Internet users or at least regularly. Additionally, there is great amount of disabled people amongst the target group and this might cause a usability and accessibility challenges. The lack of computer and Internet use may exist also because of lack of training and also the lack of knowledge about the possibilities the Internet could offer. The author finds it is often in a way that people need a small push towards some new things and after they see the benefits they will be active users afterwards.

Author introduced herself with the 2006 year study about the use of Internet and e-services by disabled people in Estonia as there have not been conducted such studies in the recent years. According to the survey the use of computers and Internet by disabled people living in Tallinn was very low - only 29% of them use computers daily and 25% use Internet daily, and only 7% respondents assessed their computer skills very good (15% good and 25% satisfying). 6% of people answered that it is not possible to use computer because of their disability although many of the respondents told they did not know about assisting possibilities for their disability. Half of the respondents told that they feel the need for computer and Internet training. The biggest issues with using computers were for people with visual impairment as not all websites are adapted for them (there are some websites where assisting programs do not work, e.g. for reading out loud, especially when the text is on the pictures, also the pictures are very variegated and moving). Respondents made some suggestions about the e-services: training for elderly, disabled people should get cheaper Internet connection(as they have lower income) , less bureaucracy, more information about the services as many people are not aware of the services, and finally, that all information about the disability (including rights, possibilities etc.) would be easily accessed and understandable and simple for the users. (FocusIT 2006)

The specialists involved in the survey emphasized the following issues: the information is difficult to be found and not all information is correct; some ‘e-services’ are not really e-services, as only the form could be downloaded that still need to be sent by post or by e-mail with digital signature; Public Internet spots have accessibility issues; lack of resources for target group in order to be able to use computer and Internet. (FocusIT 2006)

As a suggestions, the respondents told to include different unions that represent different types of disabilities in service design process so the services are immediately suitable for everyone and there is no need to make costly redesigns later on. They also recommended that the information should be shared about new e-services or websites’ adjustments, and if not personally then at least to some representative unions who could pass this information on. Additionally, they suggested to translate more services, mainly into Russian and to provide computer and Internet training. In longer perspective it was hoped that different institutions databases/registries could be united for more proactivity and better usability for disabled people. The also respondents found that different benefit applications should be available as an e-service. (FocusIT 2006)

As these pain points and recommendations were already made more than 10 years ago then author would assume these changes to be fulfilled by the year of 2017 but sadly many of them still are not. One of the suggestions back in 2006 was the idea similar to ‘one-stop-shop’ that has not been realized yet and the author of this thesis will make suggestions to for the realization of this idea together with her added value.

4. Case studies

Case studies offer a good way to provide a practical insight into the current situation of e-services and the underlying business processes. Two case studies are presented in this chapter. The first case study is concerned with the information exchange in the field and the second case study addresses buying orthopaedic shoes with state-provided discount. The case studies will serve as input for answering the main research question of the thesis.

The author will provide examples of the services, which she has had experiences with as a part from the target group. The author is aware that different people can experience the same service differently, nevertheless, the personal experience by the author still provides a valuable insight into the problem area. The author will not conduct particularly separate interviews for these case studies with target group but she will carry out interviews with the aim of answering the wider research question. At the same time, the author will include related questions into the interviews, which results will act as a validation for these case studies.

The Case Study Two presents the desired business process model in Chapter 4.2.7., which should be seen as one part of the 'one-stop-shop' service and should not be viewed as a separate solution.

4.1. Searching and receiving the information

In the first case study the author describes the current situation of how people search for and receive the information about the topic of reduced work ability and what are the possible outcomes of searching for the information. Two specific examples are provided for understanding both seeking for and receiving the information. This case study is important as seeking for and receiving the information is the first contact point for a customer and provides him/her with the initial impression of the field.

In the opinion of the author of this thesis, a good e-service is a service that people are aware of and that provides information in a clear and simple way. Currently, the information about the topic of reduced work ability and services can be found from many different sources and people do not know exactly what is the most appropriate portal for finding even descriptive information about the topic itself and about the available services. In addition to the personal experience by the author, as is reported in sub-chapter 5, the interviewees pointed out several different websites (EUIF, SIB, MoSA, ECDP etc.) where people could find the needed information about the topic, which shows that also stakeholders feel there is no one central website for this purpose.

4.1.1. Searching for information

The first example is about what outcome people can achieve when they search for the required information on the Internet. The author will introduce the situation with one particular example: if a person is assigned reduced work ability, the person could want to know what monetary discounts he/she has. Currently, this information is really not shared with the target group and it is just generally mentioned that the target group could get discounts at some places but no one has mentioned what these discount are. It is written on the MoSA website that a person with reduced work ability has the right to receive discounts but that the previous discounts that the people with reduced work ability had before the ongoing reform will not apply automatically to people with reduced work ability. It is additionally mentioned that private service providers are independent and may apply different price policies (Ministry of Social Affairs, 2017d). The author finds this as a very unclear information, which may be confusing for people who have been receiving certain services with discount. The author understands that the discounts are up to private service providers, but it should not mean that the target group is left in the information hole.

The author would not say that services offering financial help are the most important ones for a person with health issues as there are also, for example, health rehabilitation and work assisting services offered to them, but financial help also matters, especially as the target group has lower income.

It would be beneficial to provide such information from the viewpoint of the service provider as well, as it would enlarge their clients base and there is a high chance that a person will stay loyal to the same service provider when she/he regains higher work ability together with higher income. It is also important to make the services (both, physical and e-services) accessible for the target group as according to Ernst & Young (2013; 2015) this is currently an issue and the author finds it needs to be tackled.

Providing the information about the discounts, e.g. in sports halls, would also act as a preventive measure because physical exercising helps in rehabilitation as well as in prevention. The author can bring a personal example that if she does not get training for her leg and back for some period then soon she will not be able to sit at work or stand for a longer than few minutes as this causes strong pain. The author thinks there are many people who can relate to her. The author is of the opinion that that the state should even more promote different training programs and try to find cooperation solutions with the training providers, as it would decrease many possible health issues, such as a very common back pain, which costs the government a lot of money in the form of sick days and reduced work ability. Insufficient physical training may not seem as a direct cause for people being assigned reduced work ability but it can definitely lead towards this. Basically, doing physical exercise would act as a preventive measure and therefore the state should be concerned about sharing the information about the related discounts.

The author looked up from the Google search engine what discounts a person may get in general and the answers were not really sufficient. The author searched for (as of 06.03.2017) the "discounts for incapacity pensioners" and "discounts for people with reduced work ability", which are in Estonian transliterated as "soodustused töövõimetuspensionäridele" and "soodustused vähenenud töövõimega inimestele". The search results are presented as the figures Appendix 2: Figure 8 and Appendix 2: Figure 9.

It is also interesting to remark here that the search results were mainly and firstly leading to different forums where people asked where to get discounts and regular people shared their personal information that they knew about discounts. This shows that there are many people who find this part confusing and who cannot find the necessary information.

4.1.2. Receiving information

The second example is sharing important information with the target group. The author will introduce the situation with one particular example: sharing the Work Ability Reform with the target group. This changes a lot for all the people who are currently "incapacity pensioners" and are now becoming "people with reduced work ability" instead, but there is no information shared with the target group at a personal level. For example, as the author is also personally affected by this Reform, she expected a personal notice about it that would explain all the changes involved. The current stakeholders have her personal details such as the address and e-mail, as these are required while applying for reduced work ability, but she has not still received any information about the Reform, although it has been already going on for more than a year, as according to the MoSA website the EUIF and SIB started providing new and updated services since the 1st of January 2016 (Ministry of Social Affairs, 2017d). The author does not know personally what these new services are and no one has mentioned these to her either.

The author proposes that this information would be sent to the target group proactively and personally, including the general information about the services, special aid, training courses, discounts, and changes in the field, such as new services introduced or news about the domain in general. The desired situation in the information exchange is introduced in the solution example in sub-chapter 6.2.

4.2. Buying orthopaedic shoes with state-provided discount

In the second case study the author introduces the steps that are needed to be taken currently by a person with reduced work ability to buy orthopaedic shoes with the state-provided discount. The author has experienced this process recently and has gone through the excessive bureaucracy, which made her realise the strong need for improving the process as a whole. This case study is important because a large number of people with reduced work ability need some sort of special aid for improving their health condition. Therefore this case study is concerned with the majority of the target group. In the description of the case study, the author will use the terms "pension document" and "Social Insurance Board office" as she has received the 'old' document from the SIB office before the Work Ability Reform took place. Currently people get instead the "Work Ability Card" from the EUIF but the process for buying shoes remains the same for its content. The author starts describing the process from the stage a person has already been assigned with the reduced work ability status due to some health issue.

4.2.1. Current situation and the process model

Separate information systems exist for each stakeholder in this process and currently these information systems are embedded in 'silos' and are not efficiently integrated (this is also backed up by interviewees T.A., MoSA, and EUIF), which causes confusion and information loss for **all** the stakeholders involved.

The current process of buying orthopaedic shoes with a state-provided discount has a high level of bureaucracy and many paper-based documents and procedures involved (also the interviewees P.K., T.A. and V.U. confirmed that). This is definitely a negative thing because people may forget to bring all their paper-based documents to the relevant offices (or lose them) and without presenting all the needed documents they cannot proceed with the process due to bureaucratic rules.

The process is currently triggered if the person, who has the right to buy the discounted orthopaedic shoes (hereinafter „shoes“), notices the opportunity to buy them by himself/herself, as there does not exist any personalised notifications for it (it was also confirmed by interviewees P.K. and V.U.). There can also exist other triggers, such as a friend or acquaintance who has bought special aid with discount mentioning the possibility for it, but this information is not really shared from the service providers or service mediators, which is an issue.

4.2.2. Business rules for the current process

In order to be eligible for discounted shoes, a person must meet criteria presented in Table 1. A client can only buy the shoes with the state-provided discount if all the rules are met.

Table 1. Business rules for Case study One current process.

1. Person must have been assigned **reduced work ability**	2. Person must have his/her **own initiative** to notice the relevant online information about the opportunity to buy shoes with state-provided discount	3. Person **must notice a the need to make a GP visit**	4. Person must visit a **specialised physician**	5. Person must receive **a proofing letter** about his/her health condition from the specialised physician	6. If all the aforementioned rules are met and the person presents all the aforementioned documents at the Social Insurance Board, he/she receives a **Special Aid Card**	7. If all the aforementioned rules are met and the person presents all the documents at the specialised shop, he/she can buy shoes with a state-provided discount

We can see that the current situation has very many rules: some rules are imposed because there is no personalised or automated process and other rules exist because of double activities required, such as visiting doctors twice, even if the health condition is permanent (e.g. full blindness). However, a person is only eligible to buy discounted shoes if all the rules are met.

4.2.3. Current process model

Figure 2 shows the process that a person must pass through in order to receive the shoes with a state-provided discount. It can be well seen from Figure 2 that there are several parties involved in the process and the process itself includes very many steps.

Currently, the process can end negatively in many different ways: for example, a person does not notice an opportunity to buy shoes with state-provided discount, or a person forgets to bring all his/her paper-based documents to the relevant office. As different governmental institutions and their information systems do not properly interact, a person can experience extra inconveniences if the stakeholders are not aware of all the information. This may mean that people with health issues may get wrong documents and they need to return another time with the correct ones, as was the case with the author.

Person must also pass the duplicate step of visiting the doctors again for improving their condition. The author find such step in unnecessary for simple special aid as the person has already visited doctors and had assessment by them while receiving the reduced work capacity. It could be pointed out that if a blind person needs special aid then he/she must also go and get the proofing letter from a health specialist (optometrist), although a fully blind person would never even visit the optometrist as their condition cannot be improved. This step must be particularly taken to receive the special aid even though the patients’ health condition (full blindness) is already known to the personal doctor and whilst applying to the reduced word capacity. This will postpone the process for several months because of the waiting queues to the health specialist. If one wants to fasten the process they could go to the doctor for a fee that is 60 eur (Interviewee P.K. and magazine Sinuga 2017, p. 20) that is mostly impossible, as this amount of money is too much for such a low income target group.

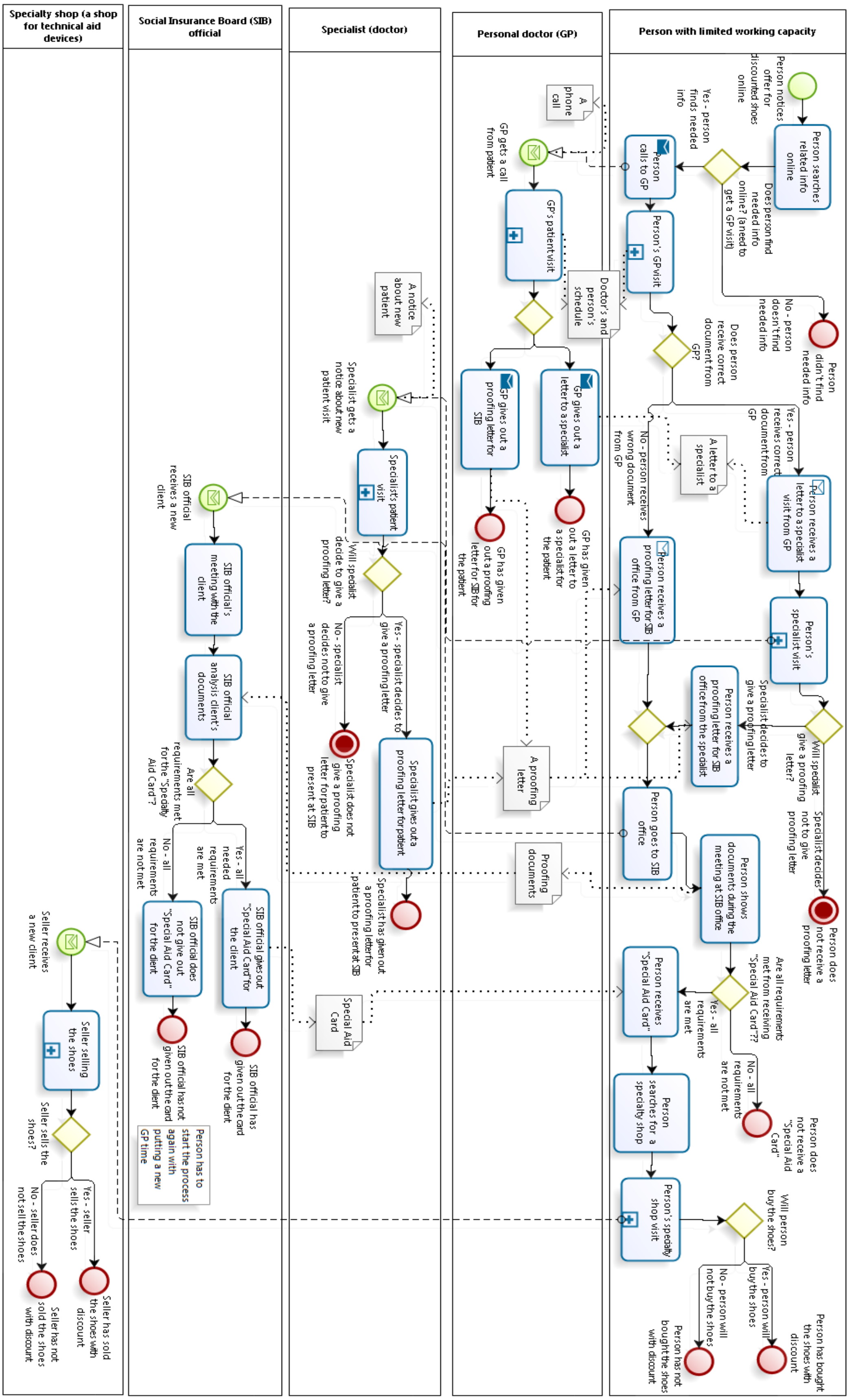

Figure 2. A model of the current process of buying orthopaedic shoes with state-provided discount.

4.2.4. Sub-process models within the main process

As the process depicted in Figure 2 includes six sub-processes, which cannot be shown well in a single model, the author will add the sub-process models into Appendices. All the process models of sub-processes can be found in Appendix 3, from Figure 10 up to Figure 15.

4.2.5. Desired solution and process model

In sections 4.2.1.-4.2.3., the author has explained the importance of getting the discount for the shoes. Now she will propose the ideas for improving the process.
In order to design a desired process model, it is needed to define the goals to be achieved. The author will present some general goals in this chapter to better explain this case study but she will design more specific goal models for the ‘one-stop-shop’ service in Chapter 6.1.

The goals for the desired solution in this case study are following:
Tangible (measurable) goals:

- To get more positive process endings;
- To reduce process time;
- To reduce cost.

Intangible (non-measurable) goals:

- Higher convenience for all the stakeholders.

Author finds that the **goals models** make up a useful tool for defining the goals, as well as for setting specific objectives, measures, targets, and initiatives for reaching the goals, and evaluating the attainment of goals. Goal models will be addressed in Chapter 5.

These ideas for service improvements involve excluding as much excessive bureaucracy in the current process as possible. In the desired solution, the information about the possibility to buy orthopaedic shoes with state-provided discount should be **proactively** directed to the person through so called ‘one-stop-shop’ service, based on his/her **personalised** needs and preferences. If a person is willing to receive information through other channels or visit the relevant office, he/she would still have an opportunity for this as an alternative. This would not mean that he/she would receive less efficient service, as the service for all the other stakeholders would be improved and personalised, as well.
As the complete assessment of reduced work ability for a person has already been initially made before applying for buying shoes with a state-provided discount, the author sees no need

for having the appointments again. It is also because during the currently required double visit the health specialist do not actually assess the person but the patient instead tells the doctor for what special aid he/she would need the proofing letter. Moreover, people, who actually help to choose appropriate shoes are anyway present at specialty shops. In more complex cases some counselling may be needed but the author thinks that a compulsory double-step is not necessary in a general case.

The desired solution would be also decrease a burden for health experts who have anyway a very high workload, so that they could concentrate more on the people who actually need counselling. The desired solution would also mean that when health experts assess a person's health condition initially, before a person applies for the reduced work ability status, they could perform this process in a more detailed way and fill in a special form so that a person does not have to go to visit doctors again later on for receiving a special aid. As such double-steps currently include three different stakeholders, they can prolong the process from a few months up to more than half a year.

The 'one-stop-shop' solution should be automatically connected to the Estonian governmental ICT architecture X-Road, so that a patient could log into the service with his/her ID-card. As the right to get the Medical Aid Card is anyway connected with the person's reduced work ability status, then all the related rights for discounts and special services could be automatically issued in a 'digital form'. As an ID-card is anyway mandatory in Estonia, the author does not see absolutely any need to issue any separate card for people with reduced work capacities as it is currently done. The new kind of service provision for people with reduced work ability could be united through a special 'One-Stop-Shop' that has a personalised view for **all** related stakeholders.

4.2.6. Business rules for the desired solution

In the desired solution, in order to be eligible for discounted shoes a person must meet the criteria represented by rules included by Table 2.

Table 2. Business rules for Case Study One desired process.

1.Person must have been assigned reduced work ability	2. Person must have special feet-related condition	3. Person must be included in a special list at the 'one-stop-shop' information system and receive an automated message about the right to buy shoes with discount	4. Person must present his/her valid ID card at the specialty shop in order to buy the shoes with discount

As Table 2 reflects, in the desired solution there are less rules because the process is more automated and there are less middle-men. The author finds this makes the whole service more straightforward and clear.

4.2.7. Desired process model

In the desired process model[2] in Figure 11 in Appendix 4, all the people who are eligible to buy shoes with state-provided discount, can do it basically at any time, as a person only needs to carry the ID-card with him/her for this purpose. There is a complex system of interconnected information systems behind the service, but for the customers the process is much simpler than the current one. Goldstein et al. (2002) also argue that regardless of how the organization defines its service and how customers perceive it, a delivered service should function seamlessly for customers, as customers have a preconceived notion of what a service is, even if they have not experienced it previously. Designing this kind of service is a complex process, as for even relatively simple services, numerous decisions have to be made from the idea stage through the design phases until a delivered service (Goldstein et al., 2002). These decision are made at several levels in the organization, from the strategic level to the operational levels, and the major challenge is to ensure that all the decisions are consistent and result in a **customer-centric** service. Therefore the service concept is the key driver in service design decisions at all levels of planning (Goldstein et al., 2002). The author finds that in the current system in Estonia there is a strong issue with making such decisions, because the decisions made at different levels are not consistent with each other, and therefore the services are not provided in an efficient and unified manner.

4.2.8. Analysis of Case Study Two

The tangible goals set for the desired solution in sub-chapter 4.2.5. were to get more positive process endings, and to reduce process time and costs. As a directly non-measurable quality goal, it was expected to also provide higher convenience within the process for all the stakeholders. As the desired process model is targeted at only a specific segment of customers and most of the process is carried out in the digital system, this results in an increased number of positive process endings. As there are also less stakeholders involved, the whole process becomes much faster. This also means that the cost efficiency can be achieved through a process change (Scott et al., 2004). The author thinks that such large process changes are cost

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[2] Modelled in Bizagi modeler

efficient especially in a long term view as it takes some time for different stakeholders to get used to the new service solution, and this needs training and changes in one’s mentality. As a result, there will be higher convenience for **all** the stakeholders, especially for people with reduced work ability who are the target group in this process and who currently have to deal with many different inconveniences, involving various qualitative and emotional aspects of their well-being.

Kalvet et al. (2013) have researched the effectiveness and impact of using e-services in Estonia. The main conclusion by Kalvet et al. (2013) was that users find that e-services have clearly positive impact on them as e-services to a large extent help to save time and make the administrative procedures needed for interacting with the state more accessible. The conclusion by Kalvet et al. (2013) was that the Estonian state has achieved remarkable time and money savings through developing and updating e-services. At the same time, Kalvet et al. (2013) brought out that it was difficult to get precise data for calculating cost-effectiveness of e-state investments and therefore, the authors recommend to set out more precise and measurable goals and carry out more thorough cost-effectiveness analysis before the initiation of new e-government projects. According to Kalvet et al. (2013), Key Performance Indicators (KPIs) could be used to be able to measure the cost-effectiveness of e-services. The author finds that e-services are good investments, especially in a long term view, but only if the services are well designed and developed and are accessible for everyone. It is difficult or sometimes impossible to force changes, such as security or accessibility, into the existing services later on, and therefore a strong problem domain analysis and planning phases are crucial. The author finds that the ‘one-stop-shop’ solution would also impact the target group positively, as one of the greatest values would be the saving of their time, money and making services more accessible, which in turn would meet the non-measurable goal of higher convenience set earlier.

4.3 Conclusion of case studies

Both case studies emphasized the existence of excessive bureaucracy and the lack of proactivity and personalisation. Although these case studies were largely based on the author’s personal experience, both of the case studies were validated by the validated by the outcome of the interviews addressed in Chapter 5. First, the target group respondents reported about the difficulties with finding the information and that no one proactively provides the information for them. Secondly, the other stakeholders reported that the special aid services had excessive bureaucracy and there is a need for improvements.

The solution for tackling these issues would be the author’s proposed ‘one-stop-shop’ service, which one could log into by the ID-card (or Mobile-ID) and that would considerably reduce bureaucracy. The author will offer an initial design for the ‘one-stop-shop’ service in Chapter 6 - Desired solution.

5. Interviews

In this chapter the author will introduce the main results from the interviews in correlation with the research question and sub-questions 1.2.-1.5 proposed in Chapter 1.

5.1. Interviews with stakeholders

The role of stakeholder involvement should be an essential component of the implementation strategy of e-government in general in order to develop realistic and achievable expectations for capability and function of citizen-centric e-government (Scott et al., 2004), including different public services. Considering this, the author conducted interviews with different stakeholders. The interviews with the stakeholders also make up a validation for this thesis, as they confirm or reject if the stakeholders see similar issues with the current situation and if they would welcome the idea of this thesis as a solution for improving the current situation.

5.1.1. Sample group

The author was willing to cover the viewpoints by different stakeholders and create a purposeful sampling for the interviews to maximise the depth and richness of the data (DiCicco-Bloom and Crabtree, 2006). The author included stakeholders from the policy makers (MoSA), mediators - EUIF, a representative organisation for the disabled - The Estonian Chamber of Disabled People, and also the people who have been assigned reduced work ability. More detailed view of interviewees' could be seen in Table 3.

Two professionals were separately interviewed from both the EUIF and MoSA. Therefore the answers by the representatives of either of them will represent one entity in the sample group (DiCicco-Bloom and Crabtree, 2006).

Table 3. Interviewees list and interview details.

Interviewee	**Description**	**Duration**
EUIF IS department (2 interviewees)	EUIF representers	Duration: 65 minutes
T.A. (head specialist)	The Estonian Chamber of Disabled People (ECDP) representative	Duration: 70 minutes

Policy makers (2 interviewees)	Ministry representers	Duration: 65 minutes
P.K.	Person with reduced work ability and visual disability	Duration: 65 minutes
V.U.	Person with reduced work ability and mobility disability	Duration: 55 minutes

5.1.2. Results and analysis of the interviews

The author's aim was to get an input from interviewees towards answering the main research questions. In particular, the author seeked to answer following sub-questions based on interviews:

- **SQ 1.2. What requirements should an e-service meet?**
- **SQ 1.3. What do stakeholders expect from e-services of the future?**
- **SQ 1.4. Would stakeholders welcome the proposed 'one-stop-shop' idea?**
- **SQ 1.5. What are the challenges for the proposed solution?**

Sub-questions SQ 1.3. and 1.4. would receive direct answers from the interviews and answering the SQ 1.2. would also get input from the theory, case studies and the author's personal experience. SQ 1.5. would get its main input from the literature review but also from the interviews with the stakeholders. Additionally, the results from the interviews will also provide an indirect input towards answering the sub-question SQ 1.1.

The author will include the answers by the stakeholders in the goals models and design models for the 'one-stop-shop' service to be presented in Chapter 6.

The author managed to get the answers to the most of the questions that were planned for the interviews. As some stakeholders did not have a wider overview about the topic and its challenges, some of the clusters of questions were not fully covered. As a general assessment, the author is very pleased with the end result of the interviews. The author was able to make this conclusion based on different answers by the interviewees but there were still differences in viewpoints.

The author introduced four clusters of the questions to be asked from the stakeholders in the introduction in Chapter 1. In the following parts of this sub-chapter, the author presents and analyses the results according to the same structure. Additionally, the author has added the results of the topics that have emerged during the interviews.

1. Cluster One: How do stakeholders assess the current situation of the services for the target group?

The stakeholders - especially the ECDP representative and people with reduced work ability themselves - had quite a comprehensive understanding about the services provided for the target group. This allows to assess the services in a more wider context. The author also interviewed the information systems' team of one of the mediators, who thought they had a rather narrow understanding about the service context as a whole as they concentrate on a specific field, but their answers reflected that they actually see the wider context quite well. Policy makers were represented by one particular department, meaning they are dealing with services of a certain type within reduced work ability field, and according to them their knowledge was rather specifically related to services of this particular type.

All the stakeholders told there were some issues with the service provision, although **policy makers** did not express too strong criticisms towards the current services but they stated that the system/services can never be 'fully' efficient and there are currently issues that need to be dealt with. They brought a few examples, such as information systems have been developed independently (in 'silos') in different institutions and are not currently integrated. They also mentioned the differences in local governments as people in need do not always receive too much required information from their local governments and not all local governments provide information about the services that people actually have right for. According to the policy makers, this is currently a pain point and they emphasized that for governmental services the situation is better. They also mentioned funding issues but with these some progress has already been made and services are now more need-based and not provided automatically for everyone as was the case before the Work Ability Reform.

The information systems' department of the EUIF brought out that some e-services are more used than some others and there is a lack of user convenience for some e-services, such as the need to fill in long applications. There are also currently issues with the data exchange, because not all institutions share information as they are supposed to do. Additionally, local governments have capacities at varying levels, including in information systems.

The uneven capacities and service provision by local governments was also emphasized in the conclusions by the National Audit Office (National Audit Office of Estonia, 2017a) on assessing the state's readiness with the Work Ability Reform. The National Audit Office of Estonia (2017a) stated that the uneven social service provision ability of local governments was not considered when planning the Work Ability Reform and that different financial models should be applied for different local governments depending on their service provision ability and the number of people with reduced work ability as this is very different among local governments (National Audit Office of Estonia, 2017a).

The target group emphasized that since they became disabled, a lot has changed. **V.U. told:** *"Back then it was more difficult to get information* [meaning 19 years ago when he became disabled] *as then there were no websites and I had to go to different places or call them to receive any information. Now it is much more convenient. At the same time, back then the process of receiving the disability decision by stakeholders was much easier as doctor just made the decision and additional proofs were not needed. At the same time now I think these additional steps to prove the disability are needed."* **P.K. added:** *"A lot has changed during that time, mainly in technology".* He is of the age 59 and has had the disability since birth - meaning that back then there were no such special assisting aid available as now. Like V.U., also P.K. added that the process of receiving a disability decision was easier when he got it, as that time a doctor decided it and there was no need to pass any other procedures and take any additional steps but now there are additional applications required for it.

T.A. brought out that he cannot praise the current situation a lot because at the moment the state has implemented a reform that does not pay attention at details, but these details are especially important in the eyes of target group. He added:

"Different databases do not communicate with each other. A person must start again from zero at each institution and this causes a lot of bureaucracy and inconvenience for disabled people. This is justified with the Data Protection Act, meaning that such communication between databases cannot be performed because of the data protection. I find that this could be solved if a person gives his/her consent to share his/her data. Currently one must constantly prove his/her situation and needs." T.A. added that there exist also accessibility issues.

Interviewer asked T.A.: "Do you think there are enough e-services for the target group"?

In general, T.A. found that currently there are enough e-services, but the problem is that not all members of the target group know how to use them, as two thirds of the disabled people are old retired peopüle. T.A. pointed out that this target group also needs paper-based information materials. He added that the need and demand for training courses exist as he has carried out such courses at his previous work place and these courses were popular. He added: *"The attention should be turned to basic skills as this would also help the state to use the existing resources. There is also a concern how to raise a person's awareness about the service in general. The elderly people would need handbooks about the topic but often decision-makers* *do not see point for that as all the information anyway exists online. It should not be presumed that everyone knows how to use the computer and where to find the information."*

T.A. adds: *"The lack of information starts from already from an early stage when a child is born with disability - currently there is no early 'intervention system' where the state would immediately provide information and assistance for the parent who is in an emotionally difficult situation. One must be very aware by himself/herself to cope."* T.A. introduced the interviewer with a handbook that the ECDP has developed and which should support the parent having a child with special needs. The author finds this handbook as a very good start for improving the system and providing emotional support for the parents.

T.A. brought out that he is able to find all the information at the moment by himself as he has been involved in the system for a long time and knows where to find something and different stakeholders update them with the information but if a person is new to the system then it is definitely difficult to know where to find information and who to turn to. He added: *"It would be good if the information could be found compactly from one place."*

T.A. brought out that the ability of local governments is very different and they are not very keen to provide the information at the moment and often only a narrow choice of services are offered that may not guarantee the person's well-being. For example, if a person needs a personal assistant then he/she may be told that she/he will receive the funding for this purpose but should find the assistant by himself/herself. It is also because there are not many social workers. The ECDP works on raising the awareness of the disabled people and if they pass the information about new services etc. to their subunits then the information should reach about 20 000 disabled people, who are members of different subunits of ECDP. The author finds that with the help of such an umbrella organisation, more people become aware of the services but at the same time people without disabilities, who have reduced work ability because of some other reason, are still in information loss and would need targeted help by some other institutions **or by proactive and personalised services**.

The interviewer asked if there were any services that would be additionally needed?

T.A. replied that he cannot think about any additional service at the moment and that it would be more important to provide current services in larger volumes, as at present more and more people are assigned reduced work ability but the service provision level has remained the same. This is also a reason why disabled people move to the capital city, which he referred to as "service-tourism", because in the capital city are more opportunities for them, but at the same time the volume of the offered services has remained the same because the budget has remained the same for this target group. It could also be said that the choice of services is wide but they are not accessible and this does not satisfy current expectations and needs.

The **representatives of the MoSA** mentioned that last year they mapped the process how people move between services and the conclusion was that there were even too many services, and therefore the current services should be mapped and developed so that these would be better and more flexible and that such developments are also currently in progress. They added that they also monitor service providers. In general, the representatives of the **MoSA** did not think there was a need for new services.

The interviewer asked from all interviewees: "What website is the one you turn to if you wish to find information about the topic?" The author of this thesis thinks there is no central website and wanted to get the viewpoint of the stakeholders about it. The results confirmed the understanding by the author.

The author did not ask this question directly from the **EUIF** but they referred during the interview that EUIF the website should cover the topic quite well.

T.A. replies: *"It is difficult to think of one central website, perhaps four main ones are those by the MoSA, EUIF, SIB and ECDP. There have been attempts to develop a central website for few times but these has not been successful."*

The representative of the MoSA also brought out different websites, such as the State Portal, EUIF, SIB, ECDP and local government portals. Additionally, there are also specialised sites such as Peaasi (www.peaasi.ee), which is targeted for people of younger generation, who have mental health problems. The MoSA also brought out phone calls to the SIB as this was the main place where people used to turn and also phone calls to the MoSA as the calls to them are common.

P.K. replied that he is very involved in the topic and does not have to really seek for the information and he told that the problem is that there is information overflow and that the information is not always correct. He added: *"It is not clear what is the best site where one can find the information but I guess if one reaches the EUIF website then he/she will receive the information because even if the information is not on the EUIF website, the person is referred to the correct place. I would personally call to SIB or EUIF. And it would be good if someone directs a person."*

V.U. replied: *"I prefer to call to SIB as it is difficult to find needed information. At the same time, I have not got all of the required information by calling to the SIB because the workers there do not see all the information about me, e.g. what are the specifics of my disability.*

Neither exist there a possibility to log into the SIB site to get to see the needed information about myself and about the services available for me.” At the same time V.U. added that sometimes it is more convenient to do everything at the office because if additional questions arise, it is easier and quicker to solve them on the spot. V.U. added: “*For me the question is not so much about the accessibility of e-services* (he can use computer but with difficulties as he has no strength in fingers) *but rather the complicacy in the content.*”

The interviewer asked which services have currently the most complicated content? and V.U. answered: *“The disability assessment process is the most difficult. I tried and started to fill it on my own but the questions in the application were so difficult that it was easier to go to the SIB office and do it there.”* Therefore, it can be said that people would use online services more often if they were simpler and more easily understandable.

The author finds that the answers to the questions of the Cluster One reflected in general similar issues that she sees in the current situation. The author received information about more emotional and real-life issues from the target group, and she also got to understand some issues more deeply, such as accessibility issues for a blind person (as he also showed how he uses computer independently and how the issues may arise). The author is of the opinion that without individual face-to-face interviews she would not have reached such a deep level of understanding the current situation.

2. Cluster Two: Have the experience and needs by the target group been considered in the current design of e-services?

The representatives of the MoSA and **EUIF** brought out that the target group has been involved in the service design process. The representatives of the EUIF added that the target group has been involved in the development process of the recent work ability assessment application development and also in the user experience assessment research. They also added that the website of the EUIF can be adjusted for visually impaired people.

T.A. believed that current e-services have followed standards for accessibility. He added that the EUIF has consulted with the target group and believed that the EUIF had considered their experience for both regular and e-services (including solutions for visually impaired people etc.) and additionally when designing the information materials. T.A. was not sure if all health related e-services are currently accessible for people with different disabilities and he enhanced that the biggest obstacles definitely exist for visually impaired and blind people. He added that if all accessibility standards would be followed then the outcome should be good.

The author made later on research about the accessibility of the public sector websites in Estonia and the outcome was a worrying one. According to the research performed by Ernst & Young in 2013 and 2015 (Ernst & Young, 2013; 2015) most of the public sector websites in Estonia did not meet the minimum level requirements of the WCAG 2.0 standard that establishes website accessibility requirements. The level of the accessibility of the public sector websites has three levels depending on how many requirements a website follows for accessibility. These levels are A, AA, and AAA, AAA being the maximum level. None of the researched websites met the maximum accessibility level in 2013 and only **13%** of the governmental websites met the A or AA level, and only **3%** of the local governments' websites met the level A (Ernst & Young, 2013). In 2015, most of the public websites (**94%)** still did not meet the minimum level requirements (this percentage is so high mostly because of the low accessibility of the local governments' websites). At the same time, in 2015 there were more governmental websites that met the A or AA level - this time **28%**. However, the situation with the websites of local governments has got even worse as in 2015 only **1%** of the local governments' websites met the A level requirements (Ernst & Young, 2015). The studies conducted in both years emphasized that the main issue that was the absence of the support modules for the users with special needs (Ernst & Young, 2013; 2015). The author sees this as a very big issue that needs attention and should be mainly directed towards the Ministry of Economic Affairs and Communications that is the responsible party for the development of public services, standardisation, and establishment of a user-friendly service environment (Ministry of Economic Affairs and Communications, 2017).

The interviewee V.U. told that the accessibility of the websites in public sector has been improved after years of efforts with it and he has been also included in mapping the accessibility situation and has provided ideas for improvement, although his personal attention has been mostly on physical accessibility, as he is in a wheelchair. He added that the 'accessibility' section must be brought out separately on websites so that a person could get the required information about it.

The author also interviewed a fully blind man who was very keen to use his computer alone and was interested in visiting different websites and it is sad to see that such a motivated person is limited to do it because the accessibility standards are not followed in the public sector. The fully blind person **P.K. replied to the question by the interviewer:** *"No, the real experience has not been considered enough."* P.K. recently tried to fill in the new work ability assessment application together with the disability assessment and he could not do it as the forms were not suitable for him (he is using a speech synthesiser). Then he received the assessment decision and this was neither readable for him. He contacted the SIB who, in turn, contacted the developers about the new assessment forms, and the developers got in touch with him and he was able to show the issues to the developers.

The author finds that it is very good that people who have such issues speak out as otherwise improvements would not happen at all but it was still very surprising to learn that the new forms were initially not designed correctly, following the applicable standards as there have been many discussions on how the Work Ability Reform should improve the accessibility.

P.K. emphasized the struggles with too innovative solutions: *"Now they add text on pictures or turn the documents into the 'pdf' format. There are also many moving banners. For example, sometimes I need to make confirmations that require me to insert an alphanumeric code but I cannot read this code as it is on a picture* (with the goal to make sure that the user is not a robot) *and they use this solution also when applying for the ID-card and on the Business Registry websites. I cannot access these solutions. The same is true for job offers - there are so many offers on pictures that I cannot see and the problem is also that these offers cannot be found by searching. I find that different accessible solutions should also be made available for smartphones."* Another example by P.K. was that if there are queue machines in offices then he cannot use them as he would not know when it is his turn or to whom he should turn and no one is very keen to help him with that either.

The author remembers that one bank in Estonia recently changed this system and replaced the machines with people, and although Estonians did not welcome this solutions too much, the author understands now that this solution would make the like mush easier for blind people. The author finds that, for example, job offering sites should consider this issue and actually also provide the job offers that could be considered by the visually impaired people.

The conclusion from the interviews of Cluster Two is rather contradictory. On one hand stakeholders who are service providers do include the target group in service design but on the other hand, the answers by the target group, especially by a blind person, reflected that the contributions by them are not very much reflected by the reality. The interviews reveal that experience-based design may have been included in the design process of some services but it has not been included at every process stage. Therefore, if, for example, a blind person is involved in initial service planning but not any further in the service design process, the solution will not be a holistic one and may not be accessible for the blind. Also, if only some institutions involved in a service include stakeholders in the service design process and the others do not do it, the outcome is not a holistic service either. The author therefore finds the

service context as a very important aspect that needs to be clearly defined. The author finds that such approach is still missing at the present moment from the Work Ability Reform, as there are metaphorically being put together ‘different pieces of the puzzle that do not match each other as some are circles, a few are triangles, and the rest are squares’ and if separate approaches are continued for the development of individual ‘pieces’ without seeing and understanding the wider context around them, the ‘pieces’ cannot ever be forced to match.

3. Cluster Three: What are the expectations by the stakeholders for the e-services in general?

Expectations by T.A.: *“Simplicity, clarity, and concreteness”* He added: “*There could be a central place where to get information and the databases should communicate with each other. Currently there is a central State Portal but I do not know how personalised this is. There could be an option that a person could adjust the website by himself/herself and then the website could show the most visited services as Internet browsers currently do. It could also be proactive and offer things and I could just decide if I want to accept them or not. There could also be notifications if something expires, e.g. when the reduced work ability period expires.”* The interviewee brought out these expectations with the reduced work ability topic in mind although the interviewer did not specifically ask about these expectations. Neither had the author at that time yet introduced the idea for her solution described in Chapter 6 of this thesis and therefore it is interesting to observe that the descriptions by T.A. were quite similar to the solution idea introduced in Chapter 6.

The expectations by the EUIF: *“User experience, proactivity and personalisation.”*

The expectations by the MoSA: *“Simplicity, fastly perceivable, proactivity. It would be also important that if one visits the website, he/she could easily understand how to get around there. For users with special needs the website should be presented in a simple language”*

Expectations by P.K.: *“Accessibility and that there would be more solutions like digital prescriptions* (meaning that one could buy medications with the ‘right’ provided by a digital prescription). **P.K. added:** “*Also that they would be more convenient, as currently I cannot prove my blindness in public transport with my ID-card or with my pension document, as my level of blindness is not marked on them. This is why I must carry a paper-based A4 proofing document with me all the time. This system really needs updates.”*

The author asked further **if P.K. finds it important that the e-service would be personalised?** P.K. answered that this is definitely also important for him (he initially mentioned the e-prescription example by himself, which reflects it as well). P.K. added: *"It is also important that I would find the information. Currently I find things quite well on the SIB portal but after they have updated the EUIF portal, I could not find some things any more, as they have structured the information at several levels, corresponding to different rehabilitation service providers, and the main level does not list all the needed information but just brings a few examples."*

Expectations by V.U.: *"Simplicity and that I would get notifications to my e-mail, e.g. that my disability decision will soon be expired. It should be similar to the current appointment with dentists who let you automatically know a few days before the appointment that your appointment will soon arrive."*

The author asked all the stakeholders if the current e-services provided to the target group were proactive and personalised?

The general answer was "no". At the same time, representatives of the **EUIF** brought out that the regular services the EUIF provides are based on the particular needs and personalised. They added that the people whose reduced work ability period is soon about to expire receive letters by post about the need to go to the EUIF for re-assessment. The answer by the representatives of the **MoSA** was also "no" but they emphasized that now there is a more personal approach for regular services.

T.A. replied: *"No, person must find everything by himself/herself and have high awareness to receive all the services he/she has rights for."*

P.K. answered: *"No but this would be a good solution, e.g. if they send me relevant information to my e-mail. It could work if I gave them my consent beforehand, e.g. during submitting the work ability and disability application."*

V.U. replied: *"I do not receive any information personally but this would be good. I receive other information because of my work but this is not relevant for me personally.*

The author finds that some things 'ran through' the answers by different interviewees in Cluster Three. Namely, main expectations by the stakeholders were *simplicity* (both in design and language), *clarity*, *personalisation* (in different forms), and accessibility.

The author finds these expectations reflect the core idea of the 'one-stop-shop'. At the same time, the author heard some expectations by the interviewees that she did not think of initially about the ‘one-stop-shop’, such as directions how to use the service in the beginning, fastly perceivable services, and that a person could see her/his recent choices on the front page of the ‘one-stop-shop’ service.

When the author asked the interviewees whether the current e-services provided for the people with reduced work ability reflect their own expectations for e-services, the answer was ‘no’, which clearly indicates the need for improvements. The author finds her approach of asking these questions (what does one expect from the e-services? and if the current e-services fulfill these expectations?) straight after each other as a very good method because the respondents can compare their expectations with the current situation very well like that. Therefore the author suggests to use such method by other researchers, as well.

4. Cluster Four: What is the feedback by the stakeholders about the proposed ‘one-stop-shop’ service?

The author received a very good feedback about the ‘one-stop-shop’ service from all the interviewees. The author asked about possible challenges for this kind of service before and also after presenting her idea in order to get more critical answers. In the author’s opinion this approach worked very well.

T.A. told that it would be a good idea. Representatives of the **MoSA** and **EUIF** also welcomed the solution. Representatives of the **MoSA** added that they have also ideas about proactivity and personalisation for services and that the SKAIS2 information system will have a similar approach but it would not mean that all the benefits are automatically provided as they have to be based on individual needs. Such needs should be analysed together with the case manager and such evaluation is easier to perform during a face-to-face meeting, as the online solution for it would be very complex. Therefore, in their view attaching “e-” to every service is not always the best solution.

P.K. and **V.U.** liked to solution and told it would be useful for them and both of them emphasized that it would save their time. P.K. added: *“I would not need to call or visit the offices as much any more. It would simplify my life. It would be important that all the other websites (SIB, EUIF, etc.) would refer to that central portal.”* The author finds this as an important aspect to keep in mind - wherever a person goes to a related web page, the website in question would lead him/her to the ‘one-stop-shop’ service.

The author also asked stakeholders for their recommendations for the 'one-stop-shop' service and for the ideas to be furthermore researched:

Representatives of the EUIF suggested to research what are all the institutions that should be cooperating and exchanging data and to which information systems or databases should all the queries be made to make such proactivity possible. Another possible research question was to which institution should all the questions and errors be forwarded, as the 'one-stop-shop' service is offered collectively by many institutions. Representatives of the EUIF added that it is also important to decide which services should be provided through the 'one-stop-shop' and these decisions should also be justified, as it would be important for the users to understand why some services are there and some others are not - e.g. the ones that need face-to-face assessments. Respondents emphasized such aspects need a lot of analysis and it would also need the change in mindset, for the people and for the institutions. It would be also important to think from what sources should this portal be funded.

Representatives of the MoSA recommended to research the target group's needs and to include them in the service design.

The author asked from interviewees: What would be the biggest challenges for that portal?

In the opinion by T.A. the biggest challenge would be efficient data exchange between all institutions. **The people from the information systems' department of the EUIF** thought the execution of such idea seemed complicated, as there could be challenges with the data exchange and with the capabilities of the Estonian governmental X-Road architecture. The information systems' department emphasized that for new work ability application solution the new information system was developed and just to enable the person to make the payment that information system communicates with 14 different databases and uses 28 different services by the X-Road. Additionally, the cost for such system would be definitely very high. There could be also issues with the data input by the stakeholders as currently it does not happen efficiently, and this part may need updates in policies and legislation.

Representatives of the MoSA brought out that the challenges would involve data protection issues, such as obtaining the user consent, and that the solution would be very expensive and it would need a strong security. Another challenge in their view would be data exchange and deciding with which systems such solution should and could be integrated.

The author asked from all the stakeholders: What would be the most important thing that you would like to see on the 'one-stop-shop' service portal? *(the author asked this question after explaining the solution)*

T.A. replied: *"Local government's information, including services and rights. Also, the most used services should be visible. Additionally, I would like to choose what I would exactly like to see on that page. Also, the possibility to make an objection (in the form of an application) should be available if one does not agree with the reduced work ability or disability assessment decision."*

Representatives of the MoSA mentioned the possibility to get to choose notifications and the local government contact person's information. In general, the solution should be very clear and simple so that a customer would not have to seek for the the information.

V.U. told that he would like to see several options for notifications so that he could choose from the list of notifications the ones he would like to receive. Additionally, he would like to see all different applications submitted by him on that website.

P.K. replied: *"Such site should start with the introduction - what and how I can do? Also, depending on the personally relevant information for the user, for example, I know a very technologically advanced blind student and this portal should show him all the rights and possibilities related to becoming a student and studying at a university. There should be also a link to the advisor contacts from the university side."* P.K. added that there could also be job offers presented that would consider disabled people. He emphasized that such portal cannot be made in a hurry and someone has to be responsible for it and the information must be updated constantly. He also mentioned that sometimes it is easier to develop a new solution and make it initially accessible instead of updating the old one. P.K. added: *"All the workers (meaning also at offices) must be well-informed and workers at offices should also suggest this solutions for the people who visit the offices. Currently such suggestions are not made as workers have a very narrow knowledge only about the service they personally provide. I have also taught them about that."* At the same time P.K. told that he finds that all the workers are currently doing a good job. He added that he has personally shared information about the e-library to the local governments so that they could pass this information on if they are dealing with blind people. The author finds this as a great initiative as this really facilitates spreading the needed information.

The author thinks that the answers by P.K. reflect very well the idea of the 'one-stop-shop'. The site should be personal and proactive. The site should also be well managed. The suggestion by P.K. also reflected the need to develop a new solution rather than updating the current ones because the current state information systems are already old.

The author asked from all the interviewees: What would you think of the idea if a visually impaired person logs into the system and the website would automatically adjust for him/her?

The stakeholders really liked this idea, although the information systems' department by the EUIF was rather critical about it as they thought this could cause data protection issues and make people feel uncomfortable as the website would recognize them. They added that it would be perhaps more important to prioritise developing such services that are missing and that are needed and not to make special solutions. At the same time, the EUIF was not against the idea in a wider context.

T.A. replied: *"I think this would be a good idea, although I guess visually impaired people should also use special aids that are efficient. I think this solution would help to raise user experience."*

The author asked from the interviewees: What would you think of the idea if one could order special aids straight from the 'one-stop-shop' without paying double visits to physicians?

T.A. told that getting special aid is a problem at the moment, especially for blind people as they need to get the proofing letter from the health expert. Often health experts do not even assess the person's condition when people tell for what they need the proofing letter and then the health expert just provides the letter for the person. T.A. replied to the question: *"The state proceeds from the logic that disability changes in time and therefore a person may need different special aids after a while. Also, special aids change in time. But it would be a place for discussion if a person has a disability of the kind that does not change, e.g., the leg has been amputated. I prefer when the person's condition is assessed, fixed, and then the most appropriate solution would be found as you never know the possible changes in one's health condition. At the same time, there are nuances that could be addressed and the process could have less bureaucracy".*

The author agrees with that reply but emphasizes that an online solution could be introduced with simpler and more single-valued special aids that do not need assessments by health experts and for which a person would receive assistance at a specialty shop (e.g. soles for the shoes or orthopaedic shoes).

V.U., P.K. and **MoSA** liked this idea, but also only for simpler special aids as the assessment is needed for more complex cases. The representatives of the MoSA and V.U. added that such solution could be introduced for the people whose health condition does not change. P.K. added that an online solution would be possible if there were health experts at specialty shops.

Interviews of the Cluster Four provided the author with a positive outcome because all the interviewees welcomed the ‘one-stop-shop’ idea and everyone made also recommendations for it. The stakeholders also shared the challenges they saw for the solution. Receiving constructive criticism was indeed one of the initial intentions by the author, as she finds this helps to make her solution idea more realistic.

As a conclusion for this chapter, the author received different input from the interviewees, which broadened her understanding of viewpoints of stakeholders, especially by the means of accessibility challenges by the target group interviewees. It is because of the author could also be involved in their everyday life activities, such as a blind person using independently a computer and public transport or a person in wheelchair driving independently a car (together with getting into the car). The author did not initially have the plan to interview disabled people in particular because a person may have reduced work ability without being disabled. However, during the process of writing the thesis, the author understood that such people are most severely affected by the accessibility to services and she definitely got a more emotional and realistic understanding of the accessibility issues through face-to-face experience.

The author will incorporate the outcome from the interviews into the desired solution to be described in Chapter 6.

6. Desired solution

The essence of e-health changes in time together with technology and new possibilities. For the author of this thesis, e-health means provision of health information and services through ICT, which includes interactions between different stakeholders, including patients, doctors and ‘middle-men’, and promoting independency of patients. At the same time, a particular e-service on its own does not benefit stakeholders too much, especially at the state level, and there is a need for a collection of e-services. Currently, people speak about e-services even if there is just some descriptive information on a website and no two-way interaction is possible. According to the author, this does not reflect the real meaning of e-services, as an e-service should provide at least some sort of interactions between a customer and service provider.

The desired solution would be a personalised and proactive ‘one-stop-shop’ that would support efficient interactions between different stakeholders. The ‘one-stop-shop’ would act differently from the current services as the current portals provide a lot of information that is really not relevant for a person, e.g. child care support possibilities in some other county where a person does not live, information about schools etc. A person needs to realise himself/herself what information is meant for him/her and also needs to locate the relevant information among all the other information.

The proposed solution would show some general information about the reduced work ability service for everyone but if one logs in it would show only personalised services offered to him/her. The author is of the opinion that this kind of portal should not provide excessive information but should rather provide personalised and focused information. Otherwise people are not very likely to use the service.

In the context of the reduced work ability field it is quite straightforward what services to offer for these people as there are some general services that are appropriate for everyone and then there are more specific services that are related to one’s health condition. As reduced work ability is assigned to a person according to his/her health condition, this information could be offered automatically within a specialized service. For example, if a person has visual impairment then while logging into the ‘one-stop-shop’ service[3], the service should

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[3] When a person has not logged in, he/she would still have a chance to adjust the website (as automatic adjustments would be connected to one's ID-code) or they may use their own special aid to assist them, such as magnifying lense, which they need for using computers in general.

automatically recognise the person and adjust the webpage accordingly for this particular person. Another example is that if a person has strong back issues and has been assigned a reduced work ability because of this health condition, a service should automatically offer back-supporting special aid products to this person together with the state provided discount. Currently a person may have these kinds of conditions but no one ever offers her/him a possibility to buy supporting products with state-provided discount, about which the person should find out by himself/herself. These were just a few examples of proactive services. A person in need as well as the state gain from providing more proactive and personalised e-services, as it also takes off a great deal of burden from administrative officers and this way helps to decrease the costs of the state budget.

It must be kept in mind that since 1997 there is the ‘once only’ principle followed in Estonia for gathering information from citizens, companies, and NGOs, meaning that state could only collect certain standard information from citizens once (OECD, 2015) and then share it through the state data exchange architecture (X-road) to other public institutions, so that citizens do not need to provide the same information over and over again. The author finds that this principle helps to achieve better service provision because different public entities must make efforts towards better communication and information exchange, which leads to more efficient service provision, as the information passes between governmental institutions quicker. This also means that an appropriate legal framework is needed to make the data exchange possible. At the same time, this principle does not work well in healthcare in Estonia, as healthcare institutions are afraid of patient’s data privacy breaches and therefore the patient’s data is not fully shared at the moment. This was also emphasized by one of the interviewees who mentioned that data protection is used as an excuse for avoiding data exchange, although the interviewee thought this could be solved with one’s consent. The author has personally experienced inconvenience because the data has not been shared between hospitals, which means replicating data and also medical tests and procedures that means also higher health risk for the patient.

The ’one-stop-shop’ service would act as the central national centre for different personalised services but the author has introduced it in a certain context from the viewpoint of people with reduced work ability.

The author also thinks it is important to think ahead towards the future because it is not efficient to create some new solutions having only current users in mind. The system also needs to be adaptive in order to be beneficial also for the users of the next generation.

6.1. Goal, role and organization models

According to Miller et al. (2011), stakeholders have to be included in the modelling of the systems as much as possible as this improves the quality of the final system and helps to detect inconsistencies and discover incorrect behaviours at early stages of system design. Cook et al. (2002) emphasize that "*It is essential to focus on the underlying factors that determine how the service is perceived, and of at least equal importance, remembered*". Cook et al. (2002) add that when attempting to understand human issues in service design, the range of customer emotions must be considered, in particular delight and outrage (Cook et al., 2002). Goal models describe the goal hierarchy of the system to be developed, starting with the main purpose of the system, which is decomposed into subgoals (Sterling & Taveter, 2009, p. 65). The author has compiled a goal model describing the purpose of the system with its subgoals and quality goals and emotional goals, which need to be considered when achieving the functional goals. The author will also present the role models and organizational model. The author will not go further into the AOM as Koplimaa (2016) has already presented a comprehensive domain model in her work, which can be largely reused in the problem domain of people with reduced work ability. The author will instead present a mock-up prototype of the 'one-stop-shop' service to give a visual example of the possible solution.

6.1.1. Hierarchic goal model of the ‘one-stop-shop’ service

The main goal of the ‘one-stop-shop’ is to provide a service for people with reduced work ability. The main goal is divided into three subgoals, each of which represents a particular aspect of achieving the higher-level goal: *provide information*, *provide advice* and *provide services*. Functional goals have quality goals and emotional goals attached to them. The goal model also includes the roles of main stakeholders involved in the service, attached to the corresponding functional goals. The author has created visual goal models for the proposed ‘one-stop-shop’ service using the yEd program. The main goal model for providing a service for people with reduced work ability is represented in Figure 3.

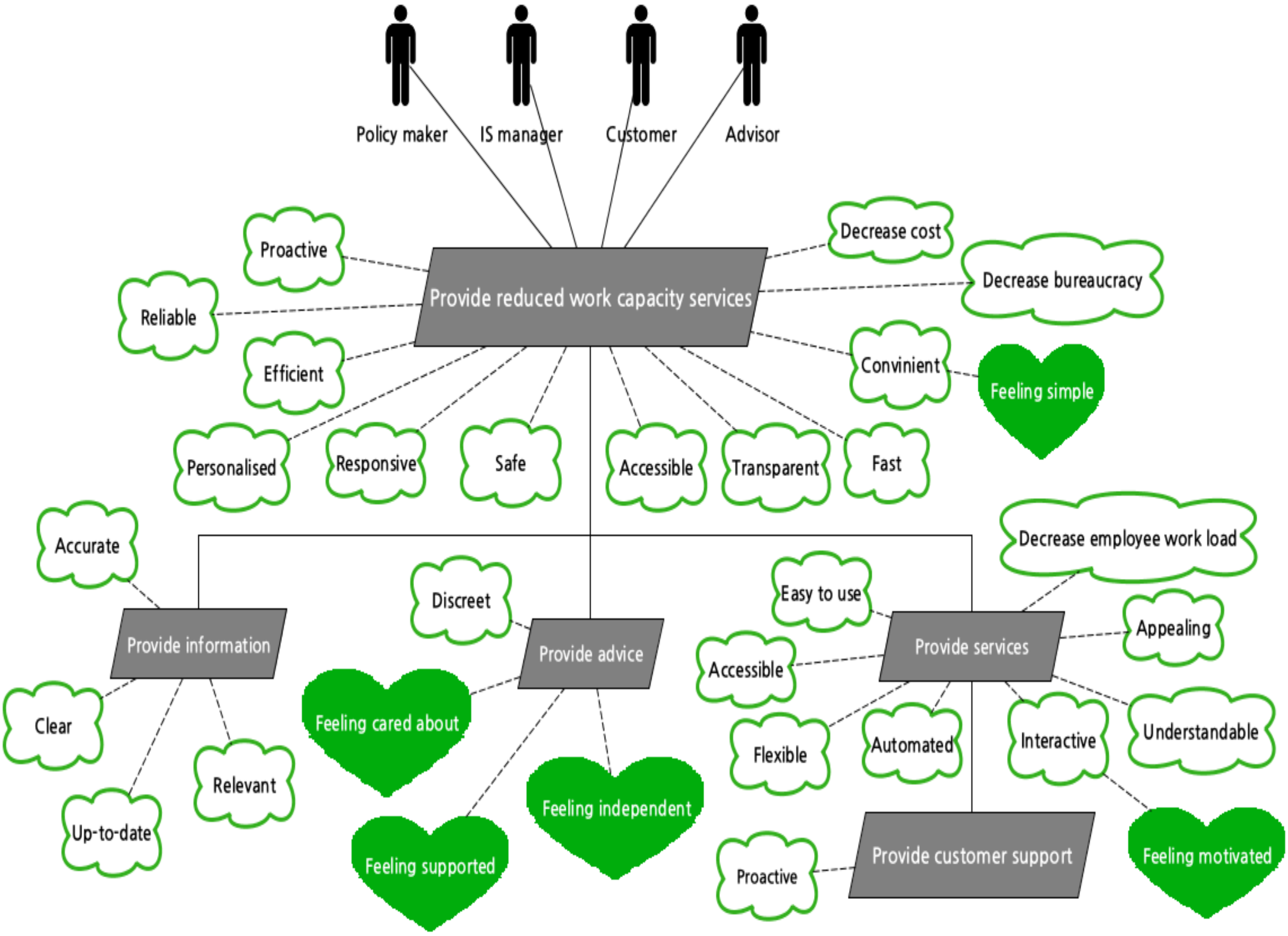

Figure 3. A goal model of the ‘one-stop-shop’ solution.

The main goal model is continued with the goal models for the ‘Provide information’, and ‘Provide advice’ sub-goals, which are elaborated into additional lower-level sub-goals. The goal model for ‘Provide information’ is represented in Figure 4 and the goal model for “Provide advice” in Figure 5.

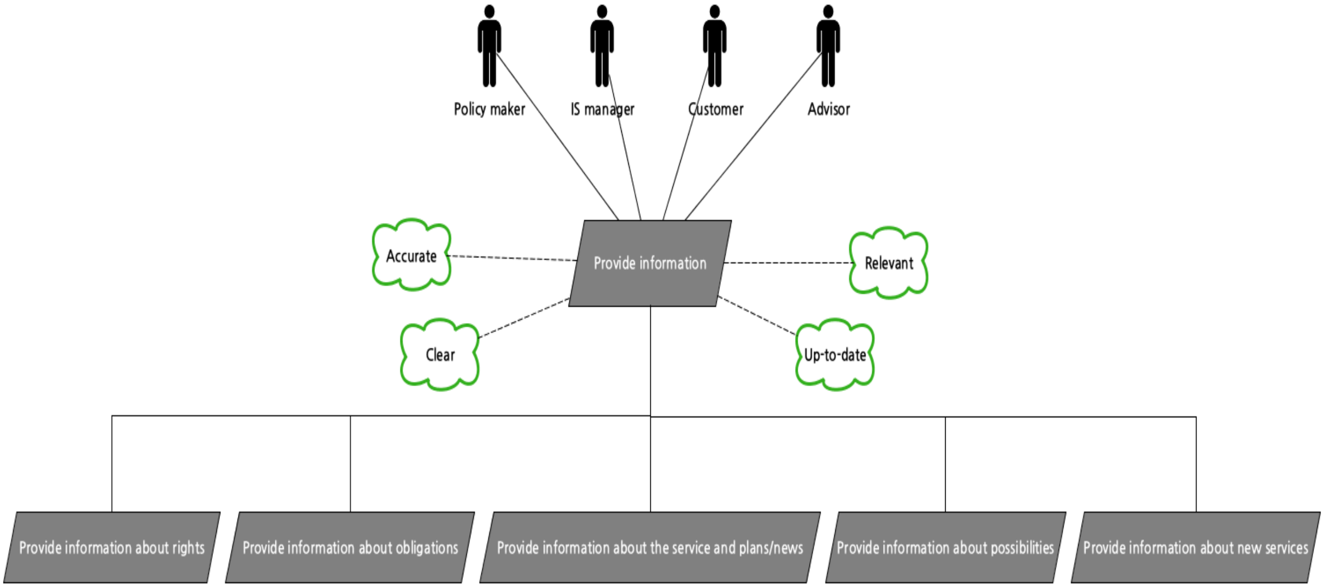

Figure 4. A concretization of the goal model part ‘Provide information’.

Providing information include different aspects about it: providing information about the services, plans and news in the field of reduced work ability, the information about new services, and also about the customer’s rights, obligations, and possibilities for the services.

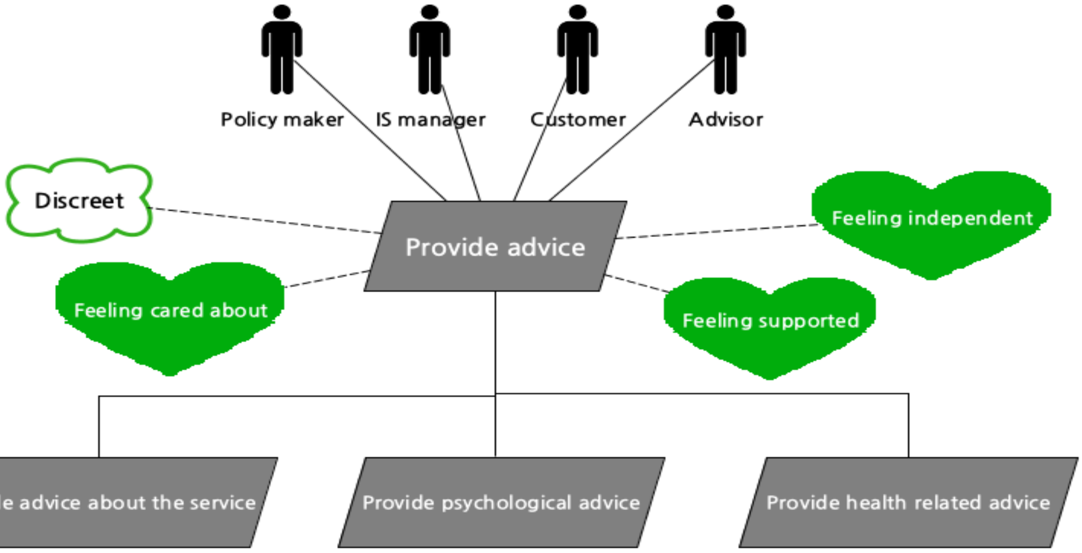

Figure 5. A concretization of the goal model part ‘Provide advice’.

Providing advice includes providing advice about the services, health-related advice, and also the psychological advice.

The author finds that the goal models represented in Figures 12-14 form a good and necessary tool for discussing the desired ‘one-stop-shop’ service being designed with different stakeholders, as a goal model captures different layers and sides of stakeholder goals. As different types of goals may have different importance for different stakeholders, goal models created from different perspectives need to be considered for designing a holistic solution.

Miller et al. (2015) emphasize that otherwise functionally-complete products will not be adopted if they do not appeal to emotions and reflect what users want to feel about a system. Therefore emotions need to play a key role in software engineering methodologies (Miller et al., 2015). In the author’s opinion, many current services/e-services lack both the quality goals and emotional goals and both of them must definitely be fulfilled for the ‘one-stop-shop’ service, as they are critical for efficient and good service provision.

6.1.2. Role models

Role models represent the responsibilities and constraints of individual roles required for achieving the goals by the socio-technical system to be designed. Roles are determined from the goals, and roles may share common goals, including quality goals and emotional goals. Roles are also partially defined through their relationships with other roles. (Sterling & Taveter, 2009, p. 68, p. 73-75). The idea of the ‘One-stop-shop’ is efficient data exchange and tight cooperation between the involved institutions, which are modelled as organisational roles. Therefore these roles have many common goals as otherwise the ‘one-stop-shop’ service would lose its core idea because **each** involved organisation - stakeholder - needs to provide the customer with the relevant information and also guarantee data protection. The author has not divided main roles into more specific ones, but the author acknowledges there are different additional roles, such as project manager, marketing manager, data protection specialist etc., which for the final solution must be all defined and connected to the appropriate goals.

A model for each role includes the Role name, Description, Responsibilities, and Constraints (Sterling & Taveter, 2009, p. 73). The author has created role models for four main stakeholder roles for the ‘one-stop-shop’ service, which can be found in Table 4 - Customer role model, Table 5 - Policy maker role model, Table 6 - Advisor role model and Table 7 - IS manager role model.

Table 4. Customer role model.

Role name	**Customer**
Description	The role of the consumer of information and services
Responsibilities	- Log into the portal - Obtain provided information - Provide profile data - Notice the relevant party if some of the personal information is incorrect or missing - Give feedback about the service
Constraints	- Need to have ID-card - Must have access to computer or cell phone with Internet connection - Some customers must have special aid products to be able to use the computer

Table 5. Policy maker role model.

Role name	**Policy maker**
Description	The role of decision making and management of the service and providing service information
Responsibilities	- Provide and update policy framework - Manage service provision - Guarantee efficient service transformation process - Monitor the service delivery process and customer satisfaction, analyse the data and update the service when needed - Cooperate with other stakeholders - Guarantee data protection
Constraints	- Follow laws

Table 6. Advisor role model.

Role name	**Advisor**
Description	The role of the first contact point who provides the information and advice about the service
Responsibilities	- Provide integrated service - Provide information about the service - Provide advice about the service - Provide health information - Cooperate with other stakeholders - Guarantee data protection - Organize training for efficient service provision - Deal with unexpected situations
Constraints	- Follow organizational regulations and law

Table 7. IS manager role model.

Role name	**IS manager**
Description	The party who is responsible for keeping the IS in work
Responsibilities	- Guarantee effective working of the system - Update the system - Guarantee great user experience of the service - Guarantee cyber security - Cooperate with service manager - Guarantee data protection - Deal with the emergency issues - Follow rules of designing the service (including for disabled users)
Constraints	- Follow organizational regulations and law

6.1.3. Organization model

There can be *control*, *benevolence*, and *peer* relationships between the roles and these relationships are represented by the organization model. Later on, these models will be helpful for designing interactions for the sociotechnical system (Sterling & Taveter, 2009, p. 75). The author has created an organization model involving the main roles of the service to be designed. The organization model can be found in Figure 6.

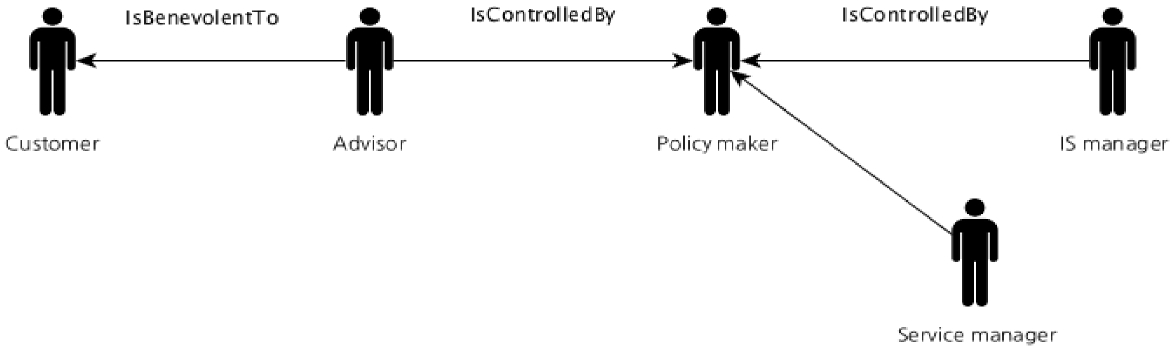

Figure 6. Organization model for the 'one-stop-shop' service.

6.2. Solution example

The idea of the 'one-stop-shop' service is that a person does not have to search for information or services from different places but there is a central place where everything has been gathered. Moreover, such service is proactive, meaning that it is tailored for each individual and offers him/her information based on the person's profile, preferences, background, and life events. The author finds that one of the biggest value of such 'one-stop-shop' service is that the service does not depend on 'time' and location' and a person with health issues is able to use the service at the time and place preferred by him/her, which saves a great amount of resources.

The access to the service would be through the Estonian ID-card or Mobile-ID. In particular, the latter option also allows for a mobile access, which can be important for people with disabilities.

The citizen-centric service delivery would require significant cross-functional service integration and data availability (Scott et al., 2004), which need to be supported by the appropriate legislation. The solution should be connected to the X-Road technical architecture of the e-government of Estonia.

The user interface of the 'one-stop-shop' service to be designed has been visualized[4] by the author in Figure 7. The author thinks the user interface should be simple and clear but it must still cover all the important information. The author designed the user interface in Estonian as she has used Estonian for conducting the interviews. The user interface presented in Figure 7 would be automatically rearranged for a visually impaired person with the relevant permission by him/her.

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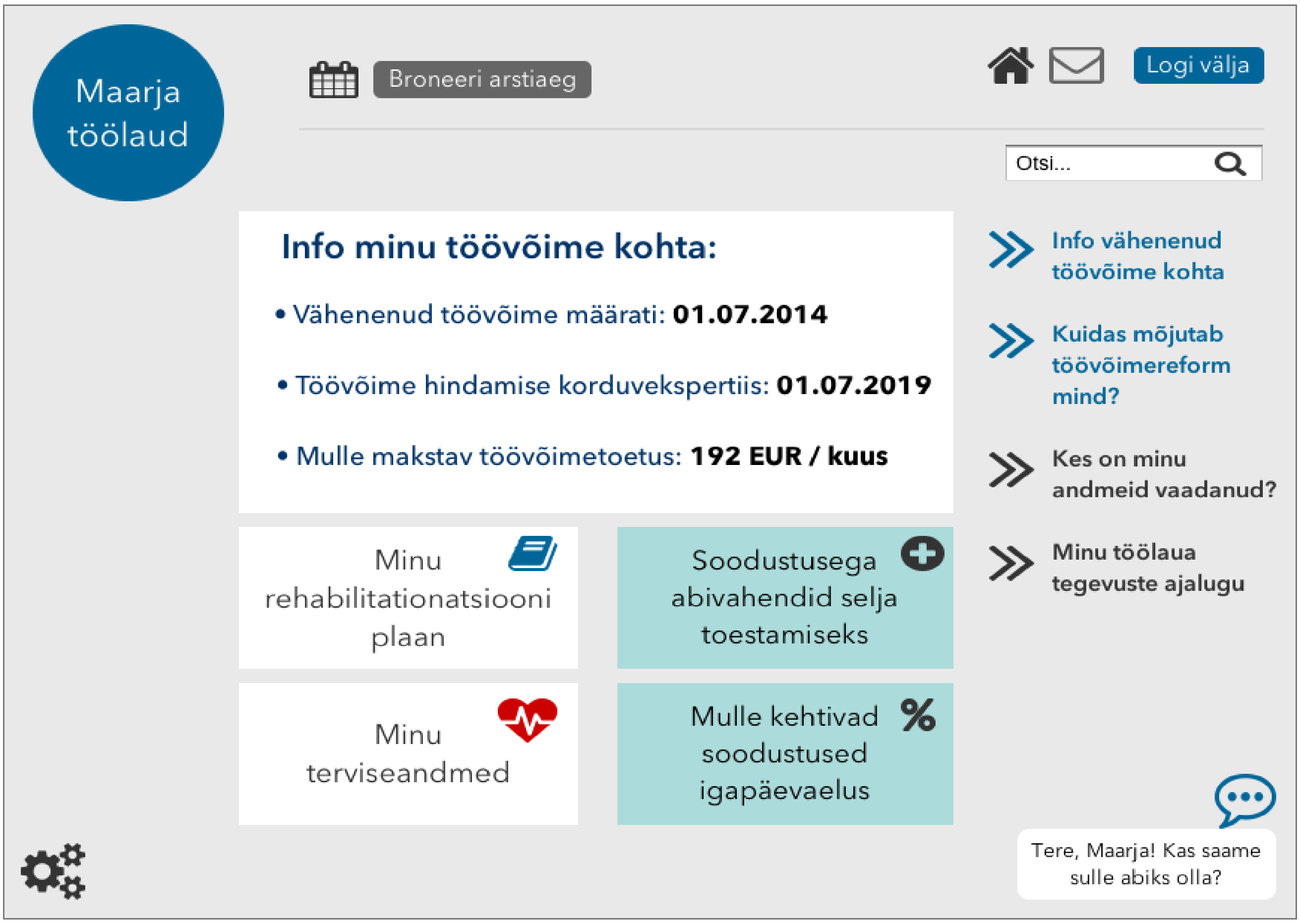
[4] In Axure RP 8 software

The prototype example depicted in Figure 7 includes the most important information such as dates, benefits to be received, personal health data and rehabilitation plan, and also information about the applicable discounts. A person using the service would also get suggestions as to what aids could benefit her/his health condition, based on the person's health issues that were fixed during his/her work ability assessment. Most of the special aid, such as special shoes which were used as an example in Chapter 4, could be ordered directly from the 'one-stop-shop' service or could be bought from a specialty shop. However, some special aid of a more complex nature would require a visit to a specialised physician and a proofing letter by the physician, which the physician can issue in a paperless form by means of the same 'one-stop-shop' service. The example for the corresponding sub-page of the user interface of the 'one-stop-shop' service is presented in Figure 17 (in Estonian) of Appendix 5.



Info minu töövõime kohta:

- Vähenenud töövõime määrati: **01.07.2014**
- Töövõime hindamise korduvekspertiis: **01.07.2019**
- Mulle makstav töövõimetoetus: **192 EUR / kuus**

Tere, Maarja! Kas saame sulle abiks olla?

Figure 7. User interface of the 'One-stop-shop' solution.

The customer would also have more general information on the 'one-stop-shop' service available through the same service, such as descriptive information about the service, and news and plans for its further development. The customer is also able to see her/his history on the page and can also obtain precise information about who has accessed his/her information together with the reasons explaining the access, as this would raise the transparency and increase trust. An example view of this part of the ‘one-stop-shop’ service can be found in Figure 18 of Appendix 6.

There should also be a proactive chat function that asks a person if he/she needs any help. The service would also offer a feature enabling to book online a visit to a physician (currently some hospitals offer this service, but there is no unified service for this purpose). If a person does not work, personal recommendation for job offers would also automatically appear on the service. Another feature available could be objecting to the decision by the experts if a person does not agree with the assessment results.

There could be several additional interaction possibilities available in the future, such as online physiotherapy sessions. As was already emphasized earlier, health services, including physiotherapy are time-critical and the current inefficient system in Estonia needs to be fast reformulated. Of course, the main step would be to tackle the current political issues and get the rehabilitation accessible for the people who need it and introduce the right to receive the service, but assisting e-solutions for conducting physiotherapy and for other purposes should also be made available because the current state of the technology fully enables that.

Also, sharing up-to-date information between the stakeholders is a feature necessary for the ‘one-stop-shop’ service. The stakeholders of the type healthcare professionals also need some assisting features that enable, for example, to compare different medications to detect if they interact with each other.

It must kept in mind that the employees who represent the organization offering a service play an important role in the eyes of the customers and therefore, service change cannot take place without organizational change and the latter cannot take place without the employees changing (Cook et al., 2002). In the context of this thesis, this issue is concerned with face-to-face, call-line or Internet advisors, who would have direct contact with the target group. It is a must that these employees receive an efficient training in a unified manner.

The author finds that although user experience plays an important role in services offered by the public sector solutions, the design part of services is often forgotten. Cook et al. (2002) add that service encounter design can be approached with the same depth and rigor found in goods production and that service encounters can be designed to enhance the customer’s experience during the process and their recollection of the process after it is completed.

Janssen et al. (2013) emphasize that the user should be carefully managed in large transformation projects as user adoption is necessary for making the transformation work. The author of this thesis finds this to be an important aspect to keep in mind as without user adoption a service does not have a reason to exist and it would be an enormous waste of resources. The goal models represented in Figures 11-13 serve as a great tool enabling better service design because it enables efficient and precise mapping of stakeholder needs.

6.2.1. A list of requirements for the 'one-stop-shop' service

The author has created a list of requirements that must be followed for efficient 'one-stop-shop' service design.

First and foremost, a policy and legal framework needs to be further developed so that it would better support the 'one-stop-shop' service. In addition, the following aspects are crucial for the efficient implementation of the 'one-stop-shop' service: efficient planning, analysing, management and execution of the transformation project; determining service owners and if needed service component owners; and strong data protection. These aspects would form a strong foundation for the 'one-stop-shop' service.

On the basis of the literature overview, current situation analysis, interviews, and the author's personal experience as a person with reduced work ability, the author has formed the following **list of requirements for the design of a proactive and personalised 'one-stop-shop' service:**

- ***The involvement of different stakeholders and tight cooperation at all stages of service design*** *(the service planning, design, execution, maintenance, monitoring and updating, including systematic brainstorming for new ideas)*
- ***Defining service context and designing services in a unified and holistic way within this context***
- ***Determining the challenges and risks related to the service from different stakeholders viewpoints***
- ***Providing information by all stakeholders and constant information exchange between the stakeholders***
- ***Re-training the employees***
- ***Turning 'patient' focus into unique 'customer' focus***
- ***Making service fully accessible*** *for the target group, following the accessibility standards of Estonia and EU*
- ***Experience-based service design***
- ***Emotion driven service design***
- *The use of the* ***AOM modeling methodology for facilitating experience-based and emotion driven service design***

6.3. Data Protection

As the desired ‘one-stop-shop’ service would include and process a lot of sensitive personal data, the security of the service is highly important. The access to the data must be based at the highest-level security methods possible.

While developing and maintaining the system, data protection standards of the highest level need to be considered, including soon to be applied ‘general data protection regulation’ by the EU that will be implemented across EU countries. The regulation will require better organization of the data and it will give users more rights to decide about the availability of the date about them (European Council, 2017). It makes the implementation of the ideas at the level of member states much easier if the countries follow similar standards and unified legal requirements for developing the e-government systems.

The author finds that blockchain technology should be used as an important part of the solution, as this technology would help to reach better transparency and would lead to higher trust and security towards the service and the data. Blockchain technology also helps to decrease the risk for fraud. For example, it is suspected that during the domestic economic crisis in Estonia in 2009, different governmental institutions were involved in fraud for receiving the incapacity and monetary benefits as the number of people claiming disability benefits grew remarkably during the period in question. It was suspected that thousands of people received incapacity certificates and the related benefits without any real reason. This cost the government millions of euros (Nortal, n.d.), and it has been also an ethical issue. Since then, Estonia has already taken steps towards using blockchain technology, as the citizens’ health data available at the health-related portal “Digilugu” is managed by blockchain technology, which keeps track on any activity by any stakeholder in the system and leaves the related audit trail. This solution was also awarded the prize of the best technology solution at the World Government Summit 2017, where it was stated that Estonia is known to be the only country that uses blockchain technology for managing health data. (Lõugas, 2016 and Board of the Riigikogu, 2017).

Blockchain technology enables to leave audit trail and this way helps to identify the points, where the corruption may have taken place and would also create a strong evidence about it. This, in turn, would provide people with one more reason not to act in a corruptive way.

For another example, in March of 2017 there were news about a large-scale schema about how middle-men stole money from the state through presenting fake bills for selling the discounted special aid provided by the state (Pihl, 2017). Unfortunately, current information systems allow for such schemas to take place but already in the near future information systems would not allow for such high-scale human actions because of the audit trail created the system itself. The system will be able to detect inconsistencies and keep track on the usage patterns in order to prevent fraud. Applying blockchain technology greatly facilitates designing such highly secure systems. At the same time, blockchain technology by itself alone will not guarantee the full security as it also needs organisational measures to be in place and to be followed.

7. Summary

Although the Estonian government has already taken steps towards making services for people with reduced work ability more accessible, and the policy leaders realise the need for e-Health solutions (Must, 2017) and the investments in digital skills of workers (Peets, 2017), there is still a lot of further work to be done in order to make the services efficient, convenient and accessible for all customers.

The main goal in this thesis was to solve the research question "How to support people with reduced work ability by the means of ICT?" To answer this research question, the **author proposes to create a proactive and personalised 'one-stop-shop' service using experience-based and emotion-driven service design facilitated by the AOM methodology.**

Based on in-depth interviews, the **author received enough proof to accept the hypothesis stated at the beginning of this work**, which was: the target group finds current service provision inefficient and the stakeholders would welcome the idea of the 'one-stop-shop' service. Interviewees from the target group did find inefficiencies in current service provision, such as accessibility issues, and the lack of personalised and proactive approach. All the stakeholders welcomed the idea of the proposed 'one-stop-shop' service.

The author acknowledges that the number of the interviews conducted was not large. At the same time, as the thesis employs qualitative research methods, the answer given to the main research question is valid also in a wider perspective and the answer therefore should be taken into account when actually developing the desired 'one-stop-shop' service. Moreover, although the author has proposed the solution using the example of reduced work ability, the solution should be developed in a wider context, as a national personalised 'one-stop-shop' service for everyone. The author has proposed to use the AOM methodology for requirements elicitation for such 'one-stop-shop' service and designing the service, as AOM is a helpful methodology for holistic service design. The author has already started designing the 'one-stop-shop' service by creating AOM goal models for the design, which should be considered when continuing with the design of the actual service.

There are several requirements that must be followed in order to be able to efficiently develop, manage and maintain a proactive and personalised ‘one-stop-shop’ service for people with reduced work ability. The added value offered by the author of this thesis next to AOM goal models is a list of the requirements for designing the actual service together with the solution prototype that gives a visual example of how a customer would see and experience the personalised and proactive service.

The author finds that it is important that there would be no large differences in a society, such as large differences in salaries or unequal life quality in small areas as compared with the cities, and therefore it is important to enable all people with different needs to use e-services. It should not be the case that some big target groups are left behind and a country is moving towards an e-society only together with these people who are fast enough to learn by themselves and who do not need some special assistance while using the services. This would help the target group also to be more involved in the society and furthermore to find work as it would raise their competences, in compliance with the aims of the current Work Ability Reform. Raising awareness about the current and future e-services would be the first step towards improving the situation and decreasing social inequality. Reducing differences would have great effects not only in the form of intangible results for the people with reduced work ability but it would also benefit the state.

The author finds further research is needed about different angles of the topic of providing e-services for people with reduced work ability and the other related stakeholders. The main issues with the ‘one-stop-shop’ service is whether it would be possible to develop it based on the current architecture and capabilities of the Estonian e-government X-road and what would be all different institutions that should be connected to provide the ‘one-stop-shop’ service. The author of this thesis is of the opinion that the approach to be taken should not be either too wide or too narrow, meaning that people would get information about and access to all the needed services but they would not be overloaded with services that are not personally relevant for them. The approach of the ‘one-stop-shop’ service would fulfill a wider purpose to provide services for different target groups and actually individually for each person. Therefore further detailed problem domain analysis is needed before setting out to designing the ‘one-stop-shop’ service.

Also, it is important to check if the current political and legal context would support such ‘one-stop-shop’ service, because even currently there are issues with data exchange between different institutions. Also, a closer look at service design taking into consideration different disabilities is crucial, including performing more research in different disabilities and opportunities and challenges in order to be able to make the services accessible for everyone.

Additionally, a marketing strategy for such ‘one-stop-shop’ should be developed, which is also a research-intensive task.

Carrying out a comparative analysis with other countries is also recommended. The author is of the opinion that the solution depends on each country’s social, political and legal context and therefore each country would need its own unique approach. However, recommendations based on the solution in use in a specific country can still be made to other countries.

While this thesis is based on qualitative research, there is also a scope for performing quantitative research in this field, because more and more data, including open data, is available for conducting quantitative research related to the proposed ‘one-stop-shop’ service.

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Appendices

Appendix 1 - Interview questions

Interview questions for policy makers:

- *Kas te olete teadlikud, milliseid kõiki erinevaid teenuseid (mitte vaid e-teenuseid) vähenenud töövõimega inimestele pakutakse?*
    - *Missuguse üldhinnangu te praegustele teenustele annaksite?*
- *Kuidas te hindate praegust e-teenuste taset vähenenud töövõimega inimestele?*
    - *Kas teie arvates on hetkel piisavalt e-teenuseid, mis on otseselt suunatud vähenenud töövõimega inimestele?*
- *Kas ministeerium otsustab, kuidas erinevad osapooled, nt. Töötukassa peaks e-teenuseid looma, või iga osapool otsustab seda ise?*
- *Kas ministeeriumil on plaanis luua vähenenud töövõimega inimestele ka uusi e-teenuseid?*
    - *Kui jah, siis milliseid?*
- *Kas te ise olete püüdnud leida mingite kindlate vähenenud töövõimega seotud teemade kohta infot Internetist?*
    - *Kas te olete vajaliku info alati leidnud?*
- *Mis veebiportaal on teie silmil hetkel peamiseks allikaks, kust inimene saaks leida infot vähenenud töövõime kohta?*
- *Kas seniste teenuste loomisesse on kaasatud ka erinevaid osapooli, sh ka vähenenud töövõimega inimesi?*
    - *Kas teie arvates on praeguste e-teenuste loomisel arvestatud piisavalt vähenenud töövõimega inimeste kogemustega e-teenuste kasutamisel (mitte pelgalt nende arvamusega)? (ehk uuritud kogemust lähemalt, sh mis emotsioone erinevate inimeste kogemused endas hõlmavad jm)*
- *Kas teie teadmiste kohaselt on praegused tervise e-teenused täielikult sobilikud ka erineva puude liigiga inimestele (nt. vaegnägijatele)?*
    - *Mida te arvaksite sellest, kui vaegnägija logib kuskile portaali sisse ning veebileht kohalduks talle automaatselt ümber, mitte, et ta peaks seda iga kord uuesti tegema? (kindlasti kliendi nõusolekul)*
- *Kas teie silmis on hetkel erinevate osapoolte vaheline info jagamine efektiivne?*
    - *Kui ei, siis mis põhjusel?*
- *Kas teie arvates on hetkel abivahendite soetamise protsess sujuv?*
- *Mis on teie isiklikud ootused e-teenustele?*
    - *Kas teie jaoks on oluline ka see, et e-teenus oleks sisse logides personaalselt just teile suunatud ning et teile oldaks ka vajadusel abiks?*
- *Kas teie arvates on praegused e-teenused, mis on suunatud vähenenud töövõimega inimestele piisavalt personaalsed ja proaktiivsed?*
- *Kas teie arvates oleks vajalik keskne portaal vähenenud töövõimega inimestele, kus oleks võimalik näha personaalset infot just konkreetse isiku kohta? (Näitan näidet*

töölaua kohta ja rõhutan personaalse info olemasolu ja proaktiivsust - lisaks ka võimalust tellida abivahendeid otse veebilehelt või kasutada ka nt. interaktiivset füsioterapeudi teenust)
    - *Mis on kõige olulisemad asjad, mida peaks teie arvates sellisel veebilehel kajastama?*
    - *Mis oleks sellise portaali loomisel suurimad väljakutsed?*
    - *Kas teie arvates oleks võimalik sellist portaali ka reaalselt luua?*
- *Kas ma võiksin selles lõputöös veel midagi uurida? Ehk on hetkel mingi oluline teema, mis siia sobituks?*
- *Mis viisil teile sobib, et ma teile lõputöös viitaksin?*

Interview questions for the EUIF:

- *Kas te olete üldjoontes teadlikud, milliseid erinevaid teenuseid vähenenud töövõimega inimestele pakutakse?*
    - *Kas teie arvates on hetkel vähenenud töövõimega inimestele suunatud teenused heal tasemel?*
- *Kuidas te hindate praegust e-teenuste taset vähenenud töövõimega inimestele?*
    - *Kas teie arvates on hetkel piisavalt e-teenuseid, mis on otseselt suunatud vähenenud töövõimega inimestele?*
    - *Kas on mingid teenused, mis võiks teie arvates veel olemas olla?*
- *Kas te ise olete püüdnud leida mingite kindlate vähenenud töövõimega seotud teemade kohta infot Internetist?*
    - *Kas te olete vajaliku info alati leidnud?*
- *Mis veebiportaal on teie silmil hetkel peamiseks allikaks, kust klient saaks leida infot vähenenud töövõime kohta?*
    - *Kus kohast võiks klient saada nt. infot selle kohta, mis asutustest ja kohtadest ta vähenenud töövõimekaardiga (varasemalt pensionitunnistusega) soodustusi saab?*
- *Nagu aru saan, siis Töötukassa peamiseks rolliks on töövõime hindamine - kas Töötukassa täidab selles protsessis veel mingeid olulisi rolle?*
    - *Kas Töötukassa rolli osas on tulevikus plaanis muutusi?*
- *Kas Töötukassal on ka plaanis luua vähenenud töövõimega inimestele uusi e-teenuseid?*
    - *Kui jah, siis milliseid?*
    - *Miks on otsustatud just need teenused luua?*
- *Kas töövõime hindamise teenuse loomisel kaasati protsessi erinevate osapoolte esindajad, sh ka vähenenud töövõimega inimesed?*
    - *Kas praegused TK kodulehte on võimalik kohandada ka vaegnägijatele?*
- *Mis on teie endi ootused e-teenustele?*
    - *Kas teie jaoks on oluline ka see, et e-teenus oleks sisse logides personaalselt just teile suunatud ning et teile oldaks ka vajadusel abiks?*
    - *Kas teie arvates on praegused e-teenused, mis on suunatud vähenenud töövõimega inimestele piisavalt personaalsed ja proaktiivsed ning vajadusel ollakse inimesele ka portaali kasutamisel abiks?*
        - *Kas hetkel antakse mingit kanalit pidi vähenenud töövõimega inimesele otse teada, milliseid teenuseid on tal võimalik kasutada?*
- *Kas teie arvates oleks vajalik keskne portaal vähenenud töövõimega inimestele, kus oleks võimalik näha personaalset infot just konkreetse isiku kohta? (Näitan näidet töölaua kohta ja rõhutan personaalse info olemasolu ja proaktiivsust - lisaks ka*

    võimalust tellida abivahendeid otse veebilehelt või kasutada ka interaktiivset füsioterapeudi teenust)
- *Kuidas veel saaks teie arvates minu lõputöö olla abiks tulevaste e-teenuste loomisel vähenenud töövõimega inimestele? (ehk mida veel selles osas uurida)*
- *Mis viisil teile sobib, et ma teile lõputöös viitaksin?*

Interview questions for people with reduced work ability:

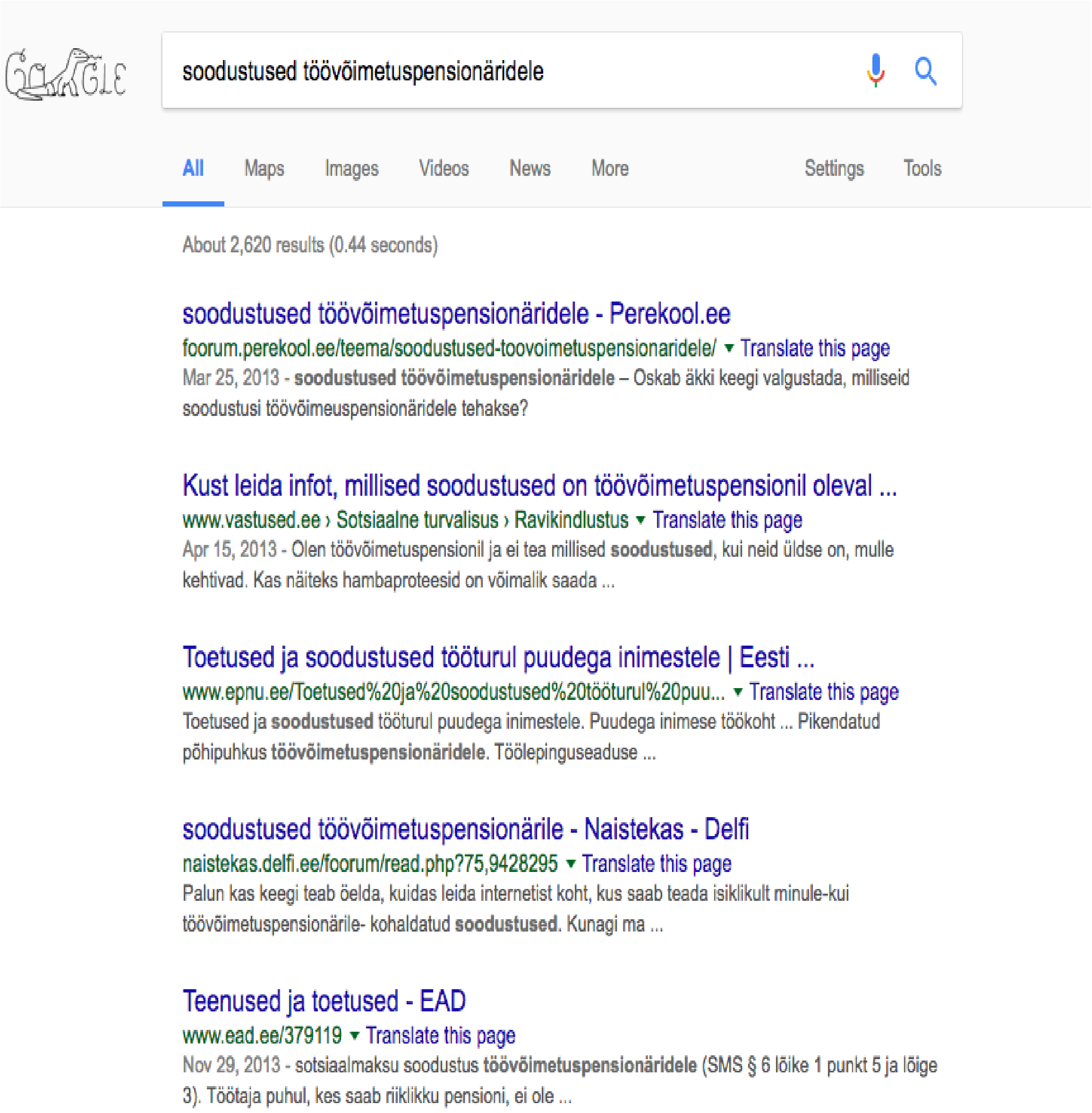
- *Ehk võib alustuseks küsida, kui pikalt teil on vähenenud töövõime juba olnud? (Pimedale intervjueeritavale - kas ta on täispime või mingil määral näeb?)*
    - *Kas selle aja jooksul on toimunud ka teenuste osas olulisi muutusi?*
- *Kui teil on vaja infot või abi seoses vähenenud töövõime teemaga, siis kuhu kohta te tavaliselt pöördute?*
    - *Kas teie jaoks on selge, kust te peaksite hetkel kõige paremini infot leidma?*
    - *Kas te olete siiani infot pigem lihtsalt või keeruliselt leidnud?*
- *(Pimedale intervjueeritavale: Kas te saate ka mingite abivahendite abil ka arvutit kasutada? - Kui jah, siis mis abivahendid need täpsemalt on?)*
    - *Kas te kasutate mingeid e-teenuseid, mis on suunatud vähenenud töövõimega inimestele?*
    - *Kui te ei kasuta e-teenuseid, siis mis põhjusel?*
- *4. Kas teie teadmiste kohaselt on praegused tervise e-teenused täielikult sobilikud ka erineva puude liigiga inimestele?*
    - *Mida te arvaksite sellest, kui vaegnägija logib kuskile riigi poolt pakutavasse veebiportaali sisse ja see kohalduks automaatselt teile sobivaks? St. te ei peaks iga kord otsima, kus kohast on võimalik veebilehte teile sobivaks muuta. (Kui ei ole, siis võib ikka selle kohta arvamust küsida)*
- *Kas teie arvates on hetkel piisavalt e-teenuseid, mis on otseselt suunatud vähenenud töövõimega inimestele?*
    - *Millistest teenustest te kõige enam puudust tunnete?*
- *Kas teie arvates on praeguste e-teenuste loomisel piisavalt arvestatud vähenenud töövõimega inimeste reaalset kogemust?*
- *5. Kas te olete soetanud mingeid abivahendeid riigipoolse hüvitisega?*
    - *Kui jah, siis kas see protsess on olnud teie jaoks sujuv?*
    - *Kas teile on isiklikult teada antud, mis abivahendeid on teil võimalik riigipoolse soodustusega soetada? Kui jah, siis mis kanali kaudu?*
    - *Kui abivahendeid oleks võimalik otse Internetist koju tellida, siis kas te kasutaksite seda võimalust?*
- *6. Mis on teie isiklikud ootused e-teenustele?*
    - *Kas teie jaoks on oluline ka see, et e-teenus oleks sisse logides personaalselt just teile suunatud ning et teile oldaks ka vajadusel abiks?*
        - *Kas teile on antud otse teada, milliseid e-teenuseid teil on seoses vähenenud töövõimega võimalik kasutada? Nt. kas teid on teavitatud selles osas, mis teenuseid Töötukassa täpsemalt pakub?*
        - *Kas teie jaoks oleks selline teavitus vajalik? Lisaks ka muude teenuste osas (nt. mis abivahendeid on just teil võimalik soodustusega soetada jm).*
- *Kui oleks olemas keskne veebileht vähenenud töövõimega inimestele, kust te saaksite kasutada erinevaid e-teenuseid ja teile pakutakse personaalset infot just vaid teie kohta, siis kas te oleksite huvitatud seda kasutama? (Näitan näidet ja rõhutan personaalse info olemasolu ja proaktiivsust ning pimedale intervjueeritavale selgitan)*
    - *Kas selline veebileht oleks teile isiklikult abiks?*

    - *Mis väärtust selline portaal teile kõige enam annaks?*
    - *Mis on kõige olulisemad asjad, mida te sellelt veebilehelt leida sooviksite?*
- *Kas teil on mulle soovitusi, mida veel selle teemaga seoses uurida?*
- *Mis viisil teile sobib, et ma teile lõputöös viitaksin?*

Interview questions for the representator of the Estonian Chamber of Disabled People:

- *Kas te olete üldjoontes teadlikud, milliseid erinevaid teenuseid (mitte vaid e-teenuseid) vähenenud töövõimega inimestele pakutakse? Jah, olen teadlik*
    - *Kas teie arvates on hetkel vähenenud töövõimega inimestele suunatud teenused üldise hinnanguna heal tasemel?*
        - *Kui mingi teenus ei ole heal tasemel, siis milline ja mispärast?*
- *Kuidas te hindate praegust e-teenuste taset vähenenud töövõimega inimestele?*
    - *Kas teie arvates on hetkel piisavalt e-teenuseid, mis on otseselt suunatud vähenenud töövõimega inimestele?*
    - *Kas on mingid teenused, mis võiks teie arvates veel olemas olla?*
- *Kas te ise olete püüdnud leida mingite kindlate vähenenud töövõimega seotud teemade kohta infot Internetist?*
    - *Kas te olete vajaliku info alati leidnud?*
- *Mis veebiportaal on teie silmis hetkel peamiseks allikaks, kust inimene saaks leida infot vähenenud töövõime kohta?*
- *Kas teie arvates on praeguste e-teenuste loomisel piisavalt arvestatud vähenenud töövõimega inimeste reaalset kogemust?*
- *Kas teie teadmiste kohaselt on praegused tervise e-teenused täielikult sobilikud ka erineva puude liigiga inimestele (nt. vaegnägijatele)?*
    - *Mida te arvaksite sellest, kui vaegnägija logib mingisugusesse riiklikku portaali sisse ning koduleht kohalduks talle automaatselt ümber, mitte, et ta peaks seda iga kord ise uuesti valima? Ma mõtlen siinkohal, et inimeselt küsitaks kindlasti enne nõusolekut.*
- *Kas teie silmis on hetkel erinevate osapoolte vaheline info jagamine efektiivne?*
- *Kas teie arvates on hetkel abivahendite soetamise protsess sujuv?*
    - *Kas teie silmis oleks hea, kui oleks võimalus abivahendeid soetada ka täielikult Internetipõhiselt? (seda ilma topelt arsti hindamiseta)*
- *Mis on teie isiklikud ootused e-teenustele?*
    - *Kas teie jaoks on oluline ka see, et e-teenus oleks sisse logides personaalselt just teile suunatud ning et teile oldaks ka vajadusel abiks?*
    - *Kas teie arvates on praegused e-teenused, mis on suunatud vähenenud töövõimega inimestele piisavalt personaalsed ja proaktiivsed? - Ei ole, inimene peab ise näpuga joont ajama, mis millal kuhu.*
        - *Kas te olete teadlik, kas hetkel antakse mingit kanalit pidi vähenenud töövõimega inimesele otse teada, milliseid teenuseid on tal võimalik kasutada?*
- *Kas teie arvates oleks vajalik keskne portaal vähenenud töövõimega inimestele, kus oleks võimalik näha personaalset infot just konkreetse isiku kohta? (Näitan näidet töölaua kohta ja rõhutan personaalse info olemasolu ja proaktiivsust)*
    - *Mis on kõige olulisemad asjad, mida peaks teie arvates sellisel veebilehel kajastama?*
    - *Mis oleksid teie arvates sellise portaali loomisel suurimad väljakutsed?*
- *Kuidas veel saaks teie arvates minu lõputöö olla abiks tulevaste e-teenuste loomisel vähenenud töövõimega inimestele? (ehk mida veel selles osas uurida)*
- *Mis viisil teile sobib, et ma teile lõputöös viitaksin?*

Appendix 2 - Search engine Google results for Case Study One



soodustused töövõimetuspensionäridele

About 2,620 results (0.44 seconds)

soodustused töövõimetuspensionäridele - Perekool.ee
foorum.perekool.ee/teema/soodustused-toovoimetuspensionaridele/ ▾ Translate this page
Mar 25, 2013 - **soodustused töövõimetuspensionäridele** – Oskab äkki keegi valgustada, milliseid soodustusi töövõimeuspensionäridele tehakse?

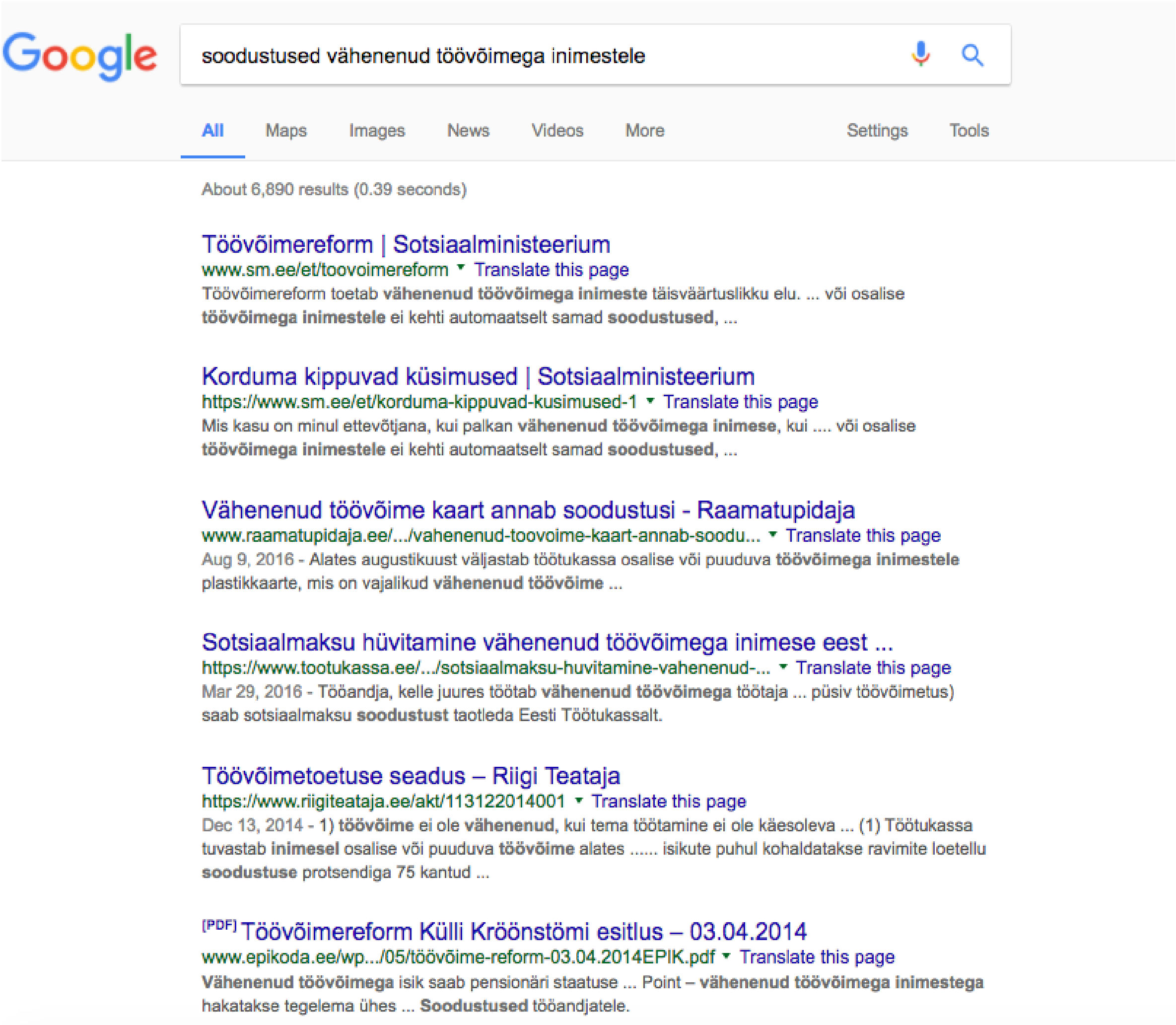
Kust leida infot, millised soodustused on töövõimetuspensionil oleval ...
www.vastused.ee › Sotsiaalne turvalisus › Ravikindlustus ▾ Translate this page
Apr 15, 2013 - Olen töövõimetuspensionil ja ei tea millised **soodustused**, kui neid üldse on, mulle kehtivad. Kas näiteks hambaproteesid on võimalik saada ...

Toetused ja soodustused tööturul puudega inimestele | Eesti ...
www.epnu.ee/Toetused%20ja%20soodustused%20tööturul%20puu... ▾ Translate this page
Toetused ja **soodustused** tööturul puudega inimestele. Puudega inimese töökoht ... Pikendatud põhipuhkus **töövõimetuspensionäridele**. Töölepinguseaduse ...

soodustused töövõimetuspensionärile - Naistekas - Delfi
naistekas.delfi.ee/foorum/read.php?75,9428295 ▾ Translate this page
Palun kas keegi teab öelda, kuidas leida internetist koht, kus saab teada isiklikult minule-kui töövõimetuspensionärile- kohaldatud **soodustused**. Kunagi ma ...

Teenused ja toetused - EAD
www.ead.ee/379119 ▾ Translate this page
Nov 29, 2013 - sotsiaalmaksu soodustus **töövõimetuspensionäridele** (SMS § 6 lõike 1 punkt 5 ja lõige 3). Töötaja puhul, kes saab riiklikku pensioni, ei ole ...

Figure 8. Search engine Google results for "discounts for incapacity pensioners".



About 6,890 results (0.39 seconds)

Töövõimereform | Sotsiaalministeerium
www.sm.ee/et/toovoimereform ▾ Translate this page
Töövõimereform toetab **vähenenud töövõimega inimeste** täisväärtuslikku elu. ... või osalise **töövõimega inimestele** ei kehti automaatselt samad **soodustused**, ...

Korduma kippuvad küsimused | Sotsiaalministeerium
https://www.sm.ee/et/korduma-kippuvad-kusimused-1 ▾ Translate this page
Mis kasu on minul ettevõtjana, kui palkan **vähenenud töövõimega inimese**, kui .... või osalise **töövõimega inimestele** ei kehti automaatselt samad **soodustused**, ...

Vähenenud töövõime kaart annab soodustusi - Raamatupidaja
www.raamatupidaja.ee/.../vahenenud-toovoime-kaart-annab-soodu... ▾ Translate this page
Aug 9, 2016 - Alates augustikuust väljastab töötukassa osalise või puuduva **töövõimega inimestele** plastikkaarte, mis on vajalikud **vähenenud töövõime** ...

Sotsiaalmaksu hüvitamine vähenenud töövõimega inimese eest ...
https://www.tootukassa.ee/.../sotsiaalmaksu-huvitamine-vahenenud-... ▾ Translate this page
Mar 29, 2016 - Tööandja, kelle juures töötab **vähenenud töövõimega** töötaja ... püsiv töövõimetus) saab sotsiaalmaksu **soodustust** taotleda Eesti Töötukassalt.

Töövõimetoetuse seadus – Riigi Teataja
https://www.riigiteataja.ee/akt/113122014001 ▾ Translate this page
Dec 13, 2014 - 1) **töövõime** ei ole **vähenenud**, kui tema töötamine ei ole käesoleva ... (1) Töötukassa tuvastab **inimesel** osalise või puuduva **töövõime** alates ...... isikute puhul kohaldatakse ravimite loetellu **soodustuse** protsendiga 75 kantud ...

[PDF] Töövõimereform Külli Kröönstömi esitlus – 03.04.2014
www.epikoda.ee/wp.../05/töövõime-reform-03.04.2014EPIK.pdf ▾ Translate this page
Vähenenud töövõimega isik saab pensionäri staatuse ... Point – **vähenenud töövõimega inimestega** hakatakse tegelema ühes ... **Soodustused** tööandjatele.

Figure 9. Search engine Google results for "discounts for people with reduced work ability".

Appendix 3 - Case Study Two sub-processes

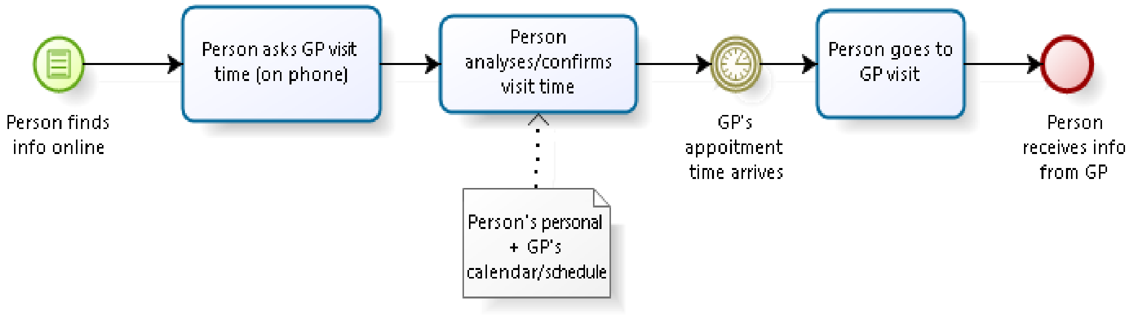


Figure 10. Sub-process: Person's GP visit.

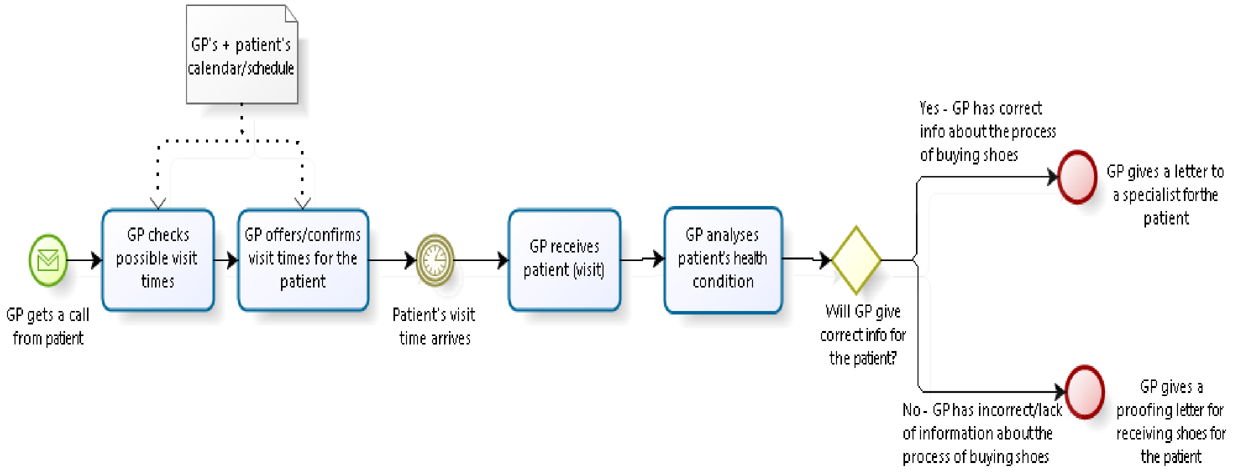


Figure 11. Sub-process: GP's patient visit.

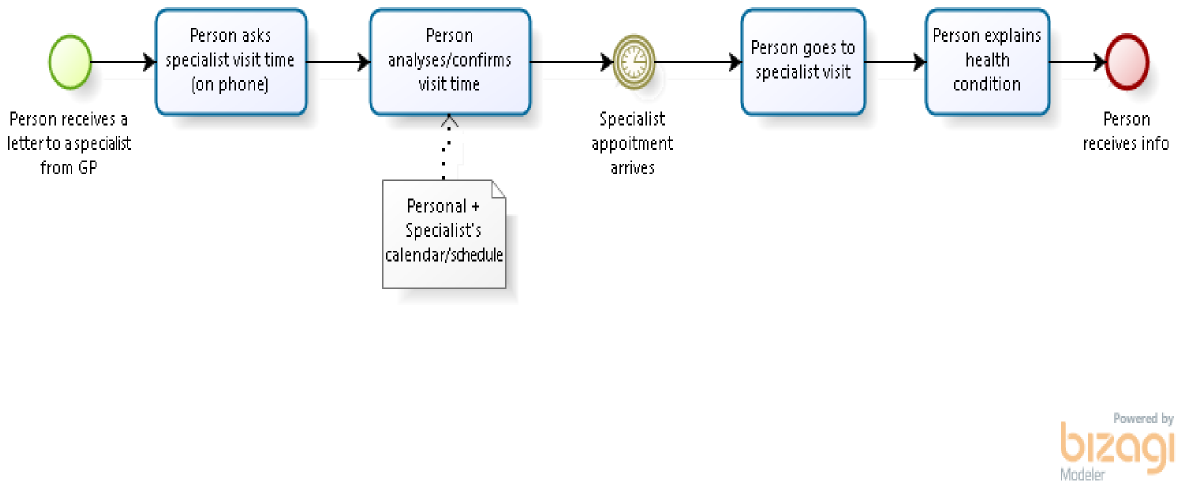


Figure 12. Person's health specialist visit.

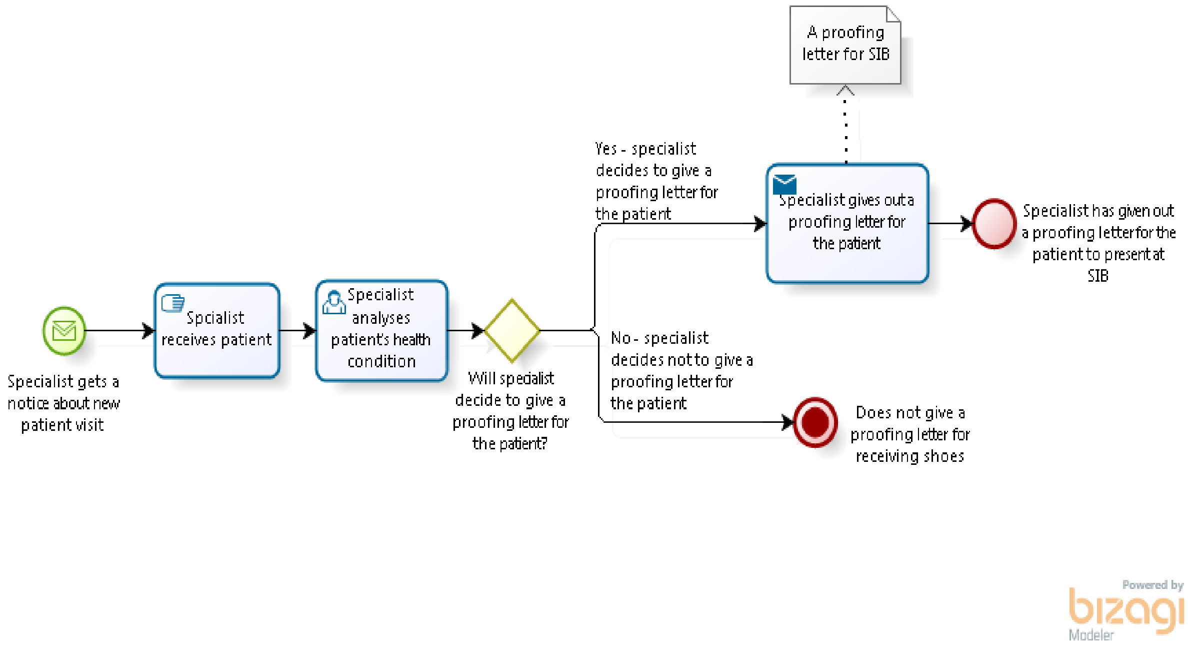


Figure 13. Health specialist's patient visit.

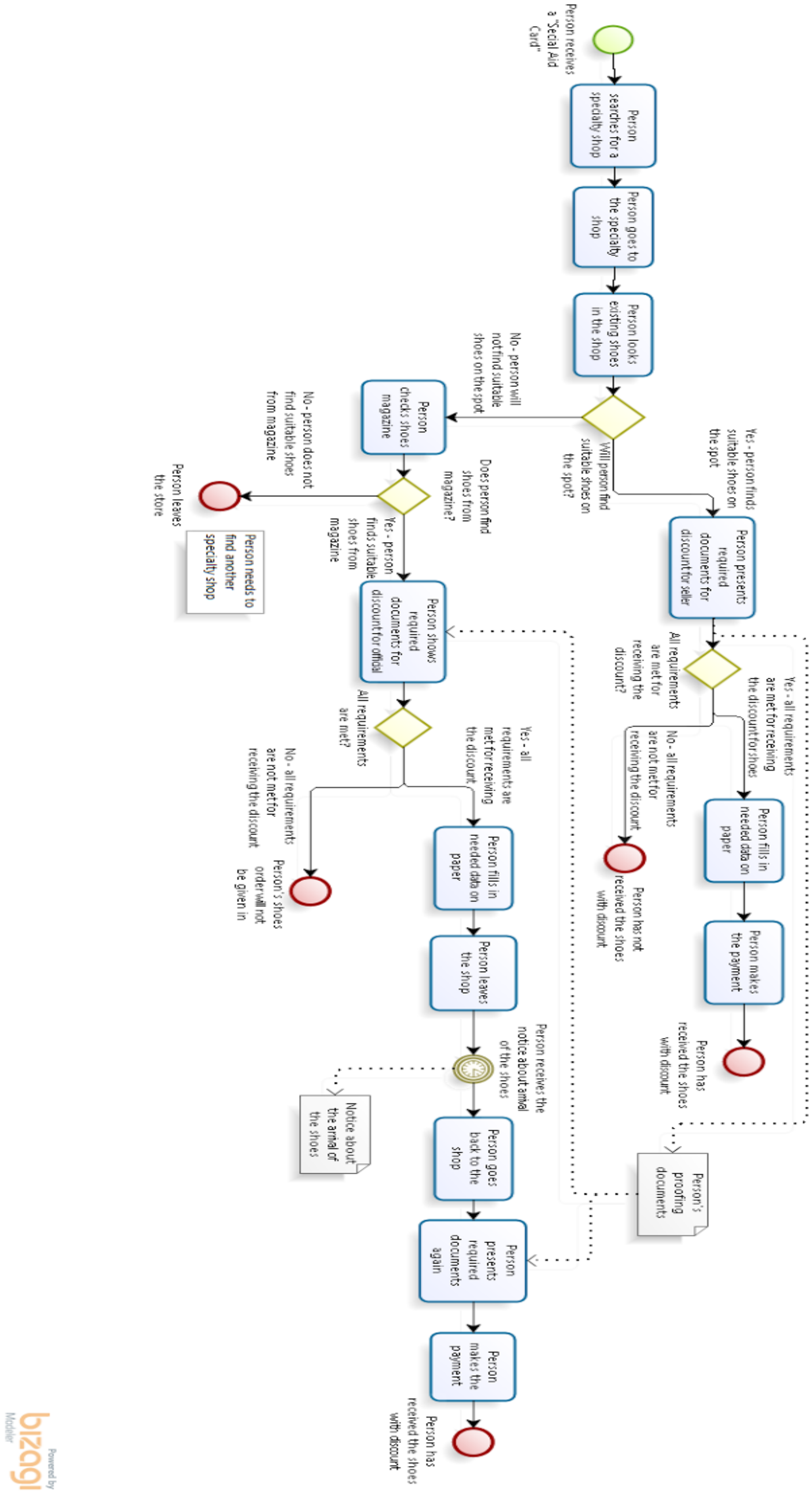


Figure 14.Person's shop visit.

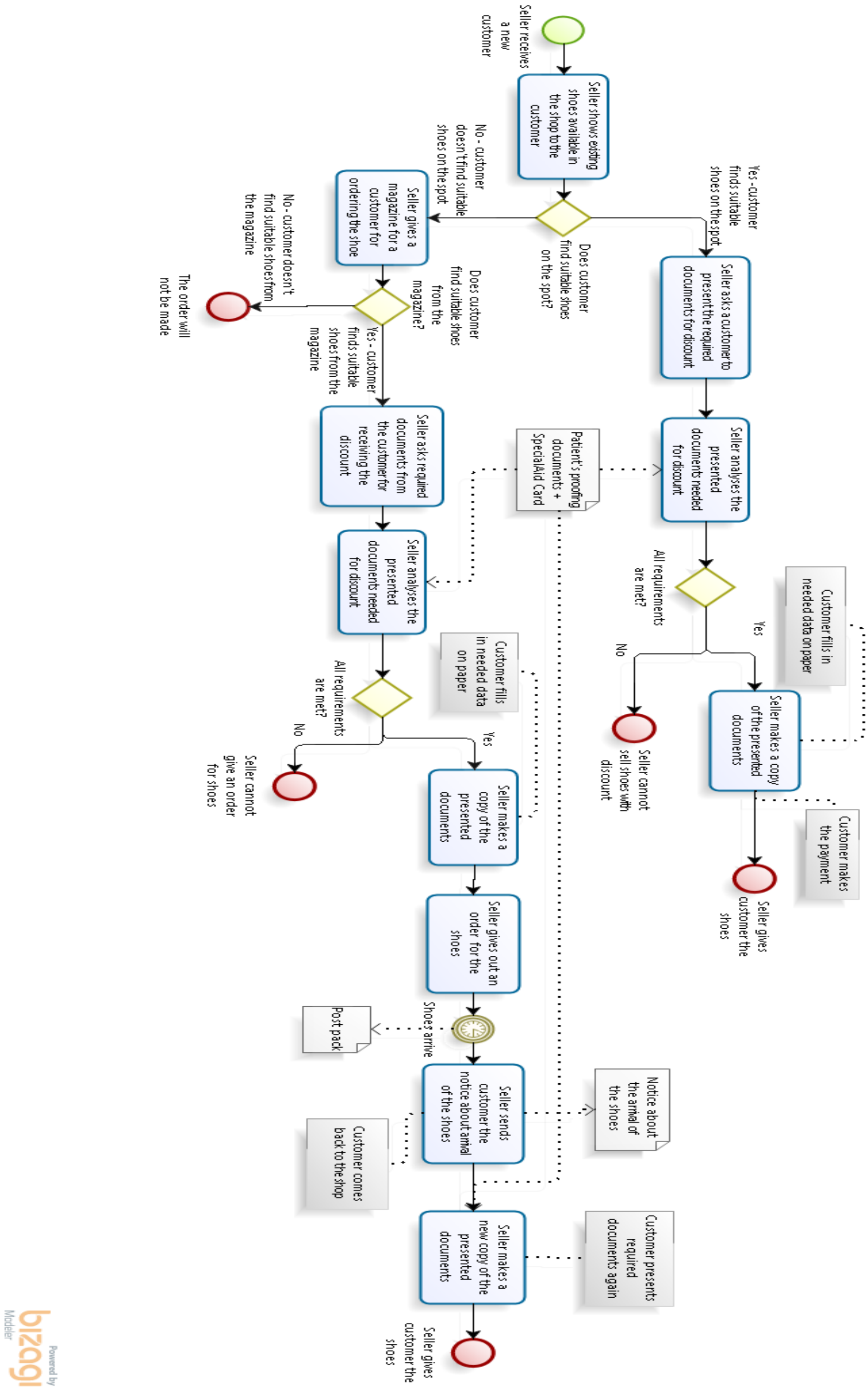


Figure 15. Sub-process: Specialty shop seller selling the shoes.

Appendix 4 - Desired process model

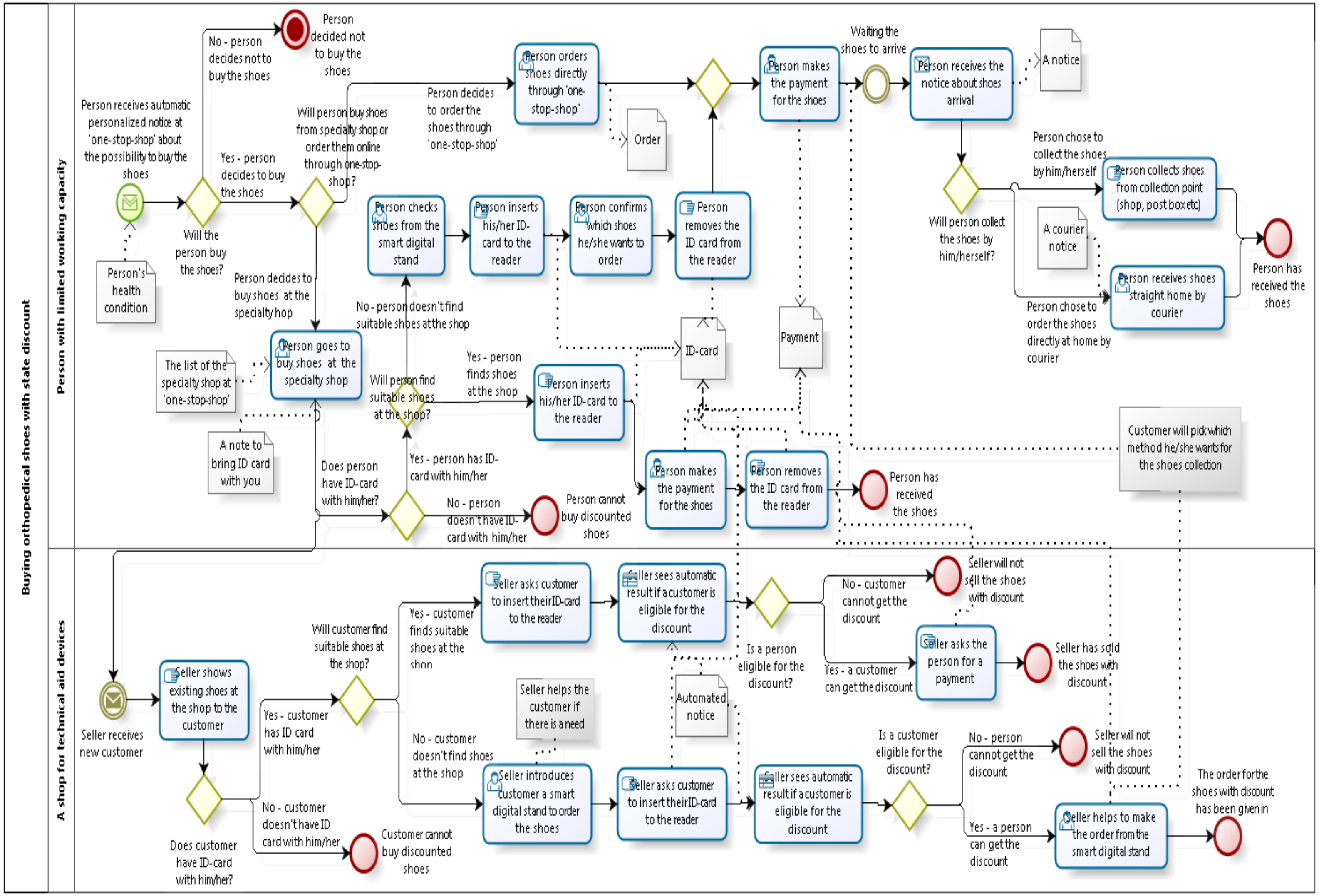
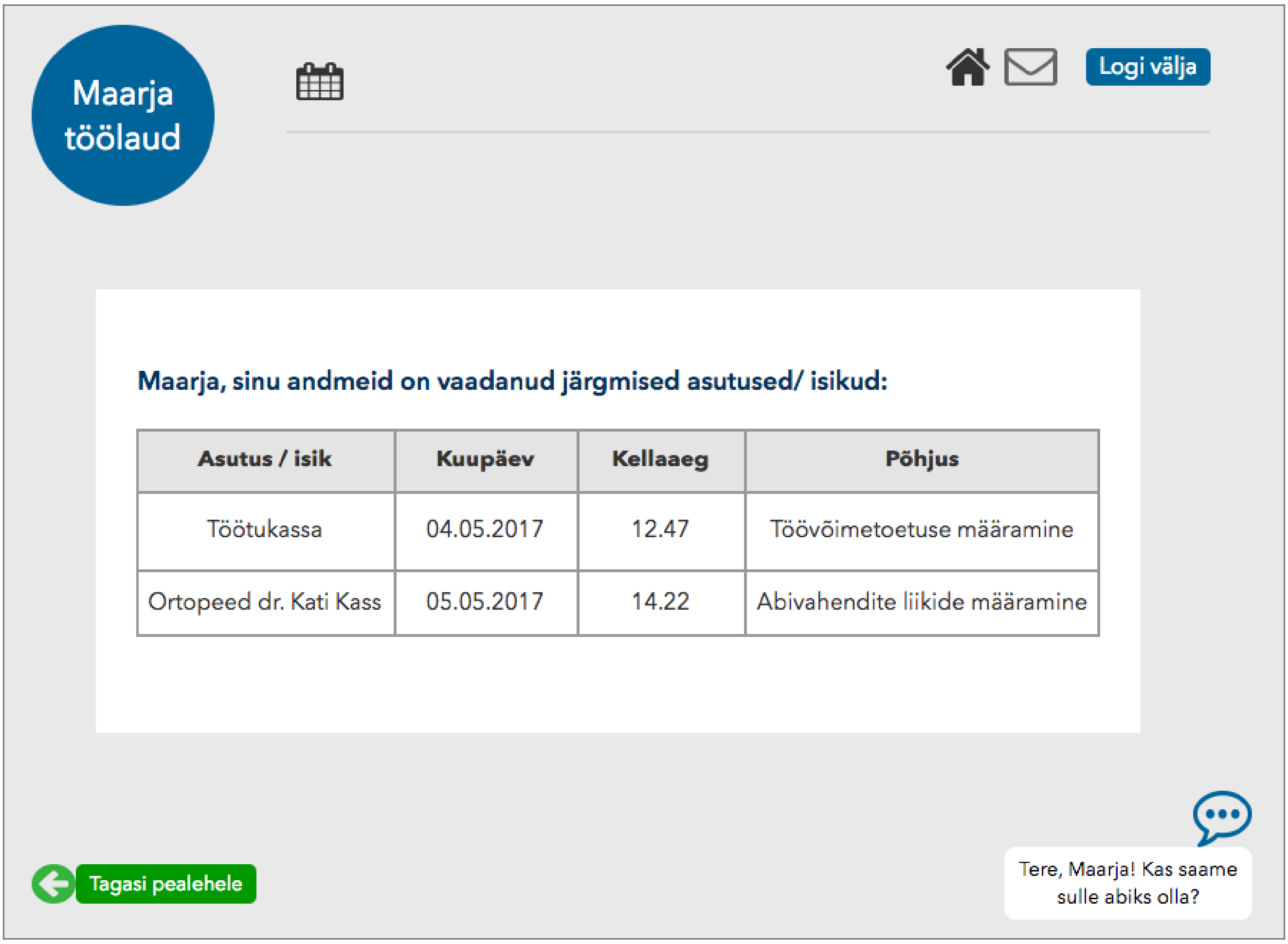


Figure 16. Desired process model.

Appendix 5 - Solution example: subpage (1)



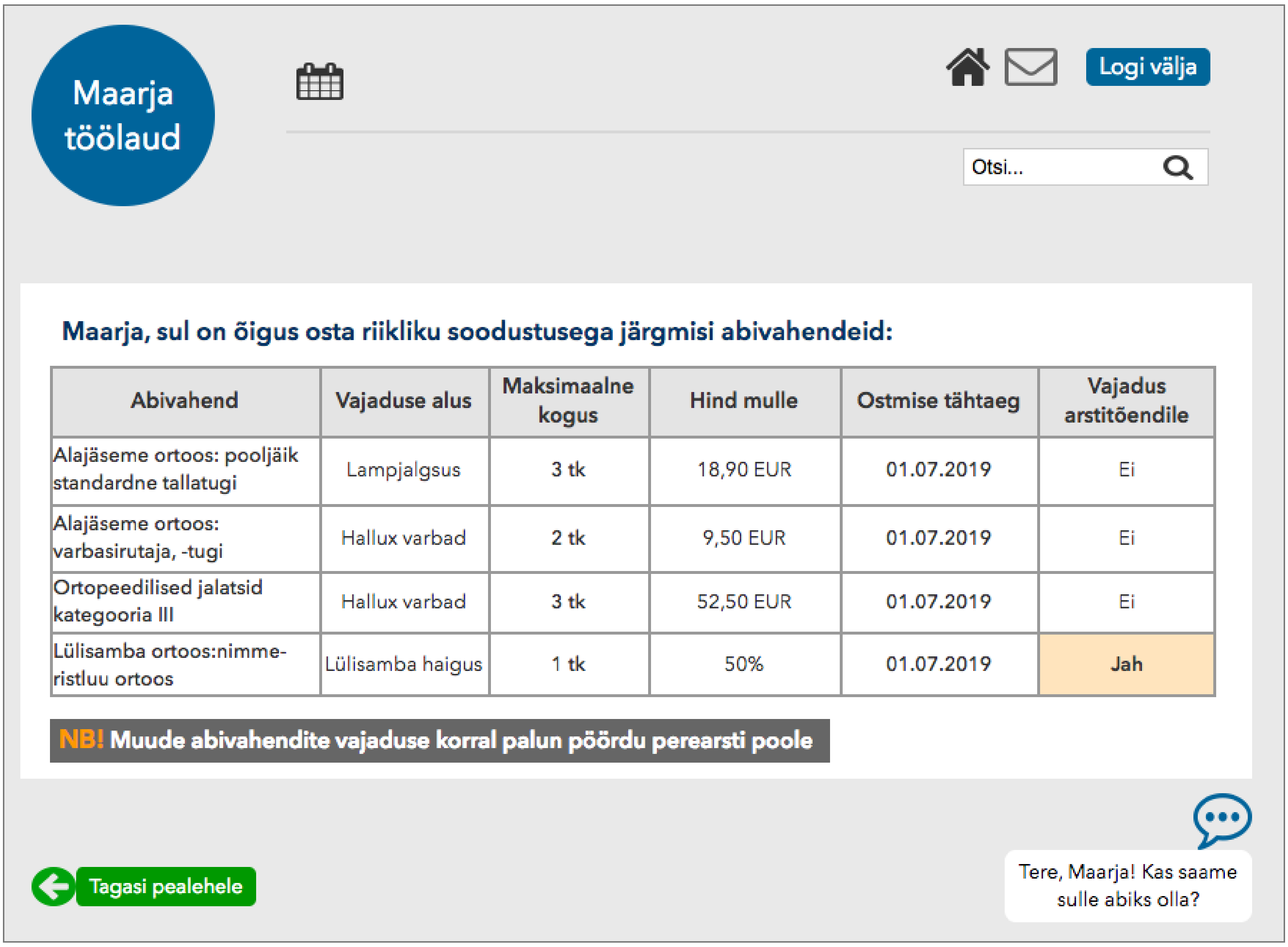
Maarja, sinu andmeid on vaadanud järgmised asutused/ isikud:

Asutus / isik	Kuupäev	Kellaaeg	Põhjus
Töötukassa	04.05.2017	12.47	Töövõimetoetuse määramine
Ortopeed dr. Kati Kass	05.05.2017	14.22	Abivahendite liikide määramine

Tere, Maarja! Kas saame sulle abiks olla?

Figure 17. Solution example: subpage (1).

Appendix 6 - Solution example: subpage (2)



Maarja, sul on õigus osta riikliku soodustusega järgmisi abivahendeid:

Abivahend	Vajaduse alus	Maksimaalne kogus	Hind mulle	Ostmise tähtaeg	Vajadus arstitõendile
Alajäseme ortoos: pooljäik standardne tallatugi	Lampjalgsus	3 tk	18,90 EUR	01.07.2019	Ei
Alajäseme ortoos: varbasirutaja, -tugi	Hallux varbad	2 tk	9,50 EUR	01.07.2019	Ei
Ortopeedilised jalatsid kategooria III	Hallux varbad	3 tk	52,50 EUR	01.07.2019	Ei
Lülisamba ortoos:nimme-ristluu ortoos	Lülisamba haigus	1 tk	50%	01.07.2019	Jah

NB! Muude abivahendite vajaduse korral palun pöördu perearsti poole

Tere, Maarja! Kas saame sulle abiks olla?

Figure 18. Solution example: subpage (2).