Tallinn University
School of Digital Technologies
Human-Computer Interaction

USER ACCEPTANCE OF INFORMATION SYSTEMS IN WORK ENVIRONMENT

A CASE STUDY IN TELIA EESTI AS

Master thesis
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Author's Declaration

I declare that apart from work whose authors are clearly acknowledged, this manuscript is a product of the author's original work, and it has not been published before, neither is not currently being considered for publication elsewhere for any other comparable academic degree.

This master thesis document has been supervised by PhD Sonia Sousa (Tallinn University, Estonia).

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Abstract

This thesis main goal is to study the adoption of an information system at Telia Eesti. It aims specifically to find the underlying issues when adopting new environments and proposing steps to overcome them. To address that a mixed method approach study was implemented. This case study consisted of three main parts. (1) A survey to understand users' technology adoption. (2) A system usability study, to identify major usability issues that prevent users to adopt it. And (3) an interview to be able to answer some questions arisen from previous results. Results confirmed that the Technology Acceptance Model can be a useful model to support findings in information system adoption. It was confirmed that the studied system is easy to use and learn and users, in general, have a positive attitude towards the solution. The study also enabled to pinpoint areas, why the Online Help Environment has not been used by Telia Eesti workers as a primary technical support tool. With it, a baseline draft was created to propose future developments. Developments, like more feedback, needs to be provided by the system. We also found that implementation of new tools in an organization of 1600 people requires a lot of effort. Management needs to be persistent and clear on what they wish to achieve in introducing new tools and systems. In sum, emphasis needs to be put on planning and continuous support of adoption processes through management and other relevant methods.

Acknowledgements

I wish to thank my thesis supervisor Sonia Sousa, PhD of the School of Digital Technologies, Tallinn University, Estonia. She has provided me with all the support necessary during the study and writing period. I received quick and sufficient answers to all my questions and feedback on my writings was prompt and thorough.

I would also like to thank Telia Eesti AS for providing me with the necessary tools and time to finish the thesis. I was able to use all the necessary objects and environments that were required for performing the study. I would also like to thank all the participants, who took the time and gave their feedback during different stages of the study. Hopefully, the results can be put to good use in the future.

Finally, I would like to thank my family and closest friends, who provided me with all the support needed to complete the research and perform the study. They provided me with the necessary motivation to carry on. Thank you all!

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1 INTRODUCTION

This initial section contains information about the research problem and its significance and an overview of the entire thesis. In this chapter, we are going to discuss problem statement and its significance for the Information Systems studies. It also addresses the main research questions as well as addresses the objective and purpose of this research dissertation. It ends by describing the organization of this document.

1.1 RESEARCH PROBLEM AND SIGNIFICANCE

A software was developed to be used as a technical customer support system in Telia Eesti. But, very few specialists have adopted the system. We are trying to find out what are the factors that lead to this lack of adoption. From the literature review, we found that similar problems were better understood with the support of Technology Acceptance Model (TAM), proposed by Davis, (2003). As well as examining the Diffusion of innovation, presented by Rogers (2003).

As much of the work of service employees are supported by IT, the quality of the service often depends on how the technology is used (Walczuch, Lemmink, & Streukens, 2007).

Expenditures on information systems technology continue to increase concurrent with increasing information systems capabilities, practitioners and researchers are striving to better understand how to maximize the benefits that these technologies offered (Workman, 2005).

Most employees only use a fraction of the functionality available on their desktop (Walczuch et al., 2007). Because of their increasing complexity, information technology use/non-use is being actively researched (Workman, 2005).

We feel that this software provides the company with a means to

- Provide faster resolution time for tickets;
- Increase ticket resolution quality; and
- Reduce unwanted customer contacts.

And by making users adopt it, we will

- Increase effectiveness;

- Cut operations costs; and
- Reduce customer churn / Reduce training time and cost.

Thus, the main research goal of this project is to find out: How to increase the adoption of new SW in a customer support organization?

The expected outcome of the study can contribute to, and complement user acceptance and information system, adoption in Telia Eesti AS, as well as can support the resolution of similar studies in the future.

1.2 RESEARCH GOAL AND MOTIVATION

The main goal of this study is to collect and study approaches to foster Telia Eesti AS employees to adopt a technical customer support system. We wish to apply TAM model as a research framework to identify which approaches should be adopted to increase the use of such software. We want to find out, why such a technical customer support system is not adopted by users. We also wish to propose improvements to the existing work environment, and eventually, in the near future support the people who are implementing the recommendations. This will in turn, as addressed before, create better opportunities for future adoption of such information systems and processes.

In sum, we wish to improve the adoption of a technical customer support system among Telia Eesti AS employees in a way that users would be able to

- Manage their time better
- Identify and solve customer issues quickly and
- Continuously improve their competences

1.3 RESEARCH QUESTION

This research includes two main research questions:

RQ1: What are the most common issues that prevent users to adopt technology?

The sub-research questions associated with the question above are.

S-RQ1.1: What are the most common difficulties in adopting new technologies?

S-RQ1.2: Why are users using/not using the artefact?
S-RQ1.3: What problems users encounter when using the artefact?

The second research question aims to understand:

RQ2: How to overcome those common adoption issues?

The sub-research questions associated with the question above are.

S-RQ 2.1: What can be done to promote information system adoption?
S-RQ 2.2: How does the artefact help them in their work?
S-RQ 2.3: What are the UX weak points of the artefact?
S-RQ 2.4: What could help to increase the adoption of the artefact?

1.4 RESEARCH PROCEDURE

The research methodology builds to serve the research goals. The table below illustrates above-described research procedures (Figure 1).

Phases	**Research objective**	**Research question**	**Method**
Phase 1	Study similar studies of technology adoption Existing models - Similar research on the topic Similar studies are done - What exists in the literature on technology adoption in work environment	What are the most common difficulties in adopting new technologies? What can be done to promote information system adoption?	Literature review - scoping study.
	Technology Acceptance Model	How can TAM help on identify my problem? How can TAM help on identify select a solution?	

Phase 2	Define artefact purpose	What is the artefact meant for?	
	Current user behaviour	Why are users using/not using the artefact?	Interviews, usability assessment, and survey
	Detect challenges (usability issues) in artefact usage	What problems do users encounter when using the artefact?	
	Define positive aspects of the artefact	How does the artefact help them in their work?	
	The user experience of the artefact	What are the UX weak points of the artefact?	Interviews, experiment (UX study)
Phase 3	Define main weak points of the artefact	What are the UX weak points of the artefact?	Analysis of the UX study
	Define user attitude towards artefact	Why are users using/not using the artefact?	Analysis of the interviews
Phase 4	Recommendations for future development	What could help to increase the adoption of the artefact?	Analysis of the interviews and study

Figure 1 - Research Procedure, objectives and research questions

1.5 STRUCTURE OF THE THESIS

This thesis is divided into four (4) sections.

The Introduction section, which focuses on stating the whole research background. It describes research problem and significance, research goal and motivation, research question as well as the research procedure.

Further, the second section outlines the theoretical background. We look at relevant published literature and try to find the best method for tackling the problem at hand.

This section is followed by the technology acceptance study. The study consists of three different parts, which are described in detail separately. We describe the survey, usability assessment and the personal interviews. The results of the study are presented separately within the last section.

The final section addresses the overall discussion. There we will also provide suggestions for future improvement in technology systems adoption.

The list of references and appendix are also provided at the end of the thesis.

2 THEORETICAL BACKGROUND

In this section, we will look at different theories and models that help study user's acceptance of information systems. We used the scoping study method (Arksey & O 'Malley, 2005) to better understand the literature:

- What are the most common issues that prevent users to adopt technology?
- What are the most common difficulties in adopting new technologies?
- How can TAM help on identify my problem?
- How can TAM help on identify select a solution?

In the next sections, we will try to identify the main issues that prevent users to adopt the technology. This is done by identifying existing theories and similar case studies that address similar problems (i.e. studying technology adoption of an information system).

DIFFICULTIES IN TECHNOLOGY ADOPTION

In this section, we want to answer the question, what are the most common issues that prevent users to adopt technology? As well as we aim to give an overview of the main obstacles that need to be overcome when adopting the technology.

To get an overview of relevant literature, we conducted a scoping study. This besides provides an overview of what exists in literature also helped us to address the research problem, see section 1.1.

The procedure of the scoping study was as follow:

- included the use two information Resource Discovery Systems, Google Scholar search engine and Universities' E-databases to identify relevant articles.
- The main set of keywords used included: "technology adoption", "technology acceptance", "technology adoption in work environment", "technology adoption issues".

Overall results provided over 2 million responses. Then we applied selection criteria which included: using only articles that were among the top 10. We narrowed them down to 20 of the arguably most prominent and accurate.

Most relevant answers were found to keywords "technology acceptance", "technology adoption". Results were less relevant when we added the phrases "work environment" or

"issues" and often resulted in providing the same articles as we had found before. We also added time constraints to the articles and selected articles published after 1985.
The constraint was added to review more concentrated and relatively recent publications in the field. We also selected articles published in English and complemented with the full text of the article. Out of the 20 articles, most (at least 8) referred to use Technology Acceptance Model (TAM) as a frame of the study, some reviewed the model and criticized it and or complimented it. The following topics were concerning Innovation Diffusion, Theory of Planned Behavior, Theory of Reasoned Action and technology Readiness index.

2.1 TECHNOLOGY ADOPTION MAIN FACTORS

There are three main factors in technology adoption. The users, systems and the environment. These play a part in the success or failure of adopting information systems. Despite rapid advances in hardware and software capabilities, the under usage of new systems is still present. From the users' perspective, it is important that perceived ease of use and perceived usability are positive. Venkatesh (2000), brings out that in addition to designing systems to better match job-relevant needs, improving the quality of their output, or making them easier to use is very important. Employees' optimism has a strong impact on PEU and PU. Users with little optimism seem to confront IT more openly and positively and are less likely to focus on its negative aspects (Walczuch et al., 2007). Innovativeness negatively impacts perceived usefulness. A possible explanation is that innovative people are more critical towards technology since they are aware of the newest developments and possibilities end expect all technology to fulfil highest demands (Walczuch et al., 2007). Management is also an important factor in the adoption of new information systems. Simply providing employees with IT plus standard training sessions may not be sufficient to gain full benefit from the investment. A manager can adopt his or her strategy on how to stimulate the use of the IS by employees, based on their personalities.

2.2 OVERVIEW OF RELEVANT THEORIES

This section gives an overview of relevant theories and models that address the user acceptance and technology adoption problem.

INNOVATION DIFFUSION

Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system (Rogers, Singhal, & Quinlan, 2014). Innovation is an idea, practice, or object perceived as new by an individual or another unit of adoption (Rogers et al., 2014). The diffusion of innovations centres not only on awareness-knowledge, but also on attitude change, decision-making, and implementation of the innovation (Rogers et al., 2014). Rogers originally defined five stages in the Innovation Diffusion process. These stages are 1) the (awareness-) knowledge stage when the individual (or another decision-making unit) is exposed to the innovation's existence and gains some understanding of how it functions, 2) the persuasion stage in which one may become interested in the innovation and starts forming a favorable or unfavorable attitude towards it, 3) the decision stage when activities are undertaken that lead to adopting or rejecting the innovation, 4) the implementation stage in which an innovation is put into use, and 5) the confirmation stage when an individual (or another decision-making unit) seeks reinforcement of an innovation-decision already made, but he or she may reverse this previous decision if exposed to conflicting messages about the innovation (Vermeeren & Cockton, 2013). To further illustrate Innovation Diffusion, Dearing & Meyer brought examples like when World Health Organization launched a worldwide campaign to eradicate smallpox; it was engaged in diffusion. When Apple launched I-POD, it was diffusing a new product. When Bob Dylan wrote "The Times They Are A-Changing," he was describing diffusion. Diffusion research is also distinctive in that the communication messages of study are perceived as new by the individual receivers. This novelty necessarily means that individual experiences a high degree of uncertainty in seeking information about, and deciding to adopt and implement an innovation (Rogers et al., 2014). Innovation diffusion also puts a lot more emphasis on time and interpersonal communications networks.

Innovation Diffusion is a field of communication studies that has many relevant connections with information systems and research and could thus be used to study why an information system as innovation is not adopted by the users.

TECHNOLOGY ADOPTION CYCLE

Technology adoption cycle refers to the sociological model that describes the adoption or acceptance of a new product or innovation, according to the demographic and psychological

characteristics of defined adopter groups. Technology adoption cycle was considered an important part of Innovation Diffusion by Rogers (Rogers et al., 2014). Rogers implemented the bell curve to describe the groups of people who adopt new technologies. Five groups were defined (innovators, early adopters, early majority, late majority, laggards) and used in describing how new ideas and technologies spread in different cultures.

THEORY OF PLANNED BEHAVIOR

The theory of planned behaviour (TPB) is an extension of the theory of reasoned action (TRA) made necessary by the original model's limitations in dealing with behaviours over which people have incomplete volitional control (Ajzen, 1991). The theory of planned behaviour is depicted in the form of a structural diagram as some factors that affect our behaviour (Figure 2).

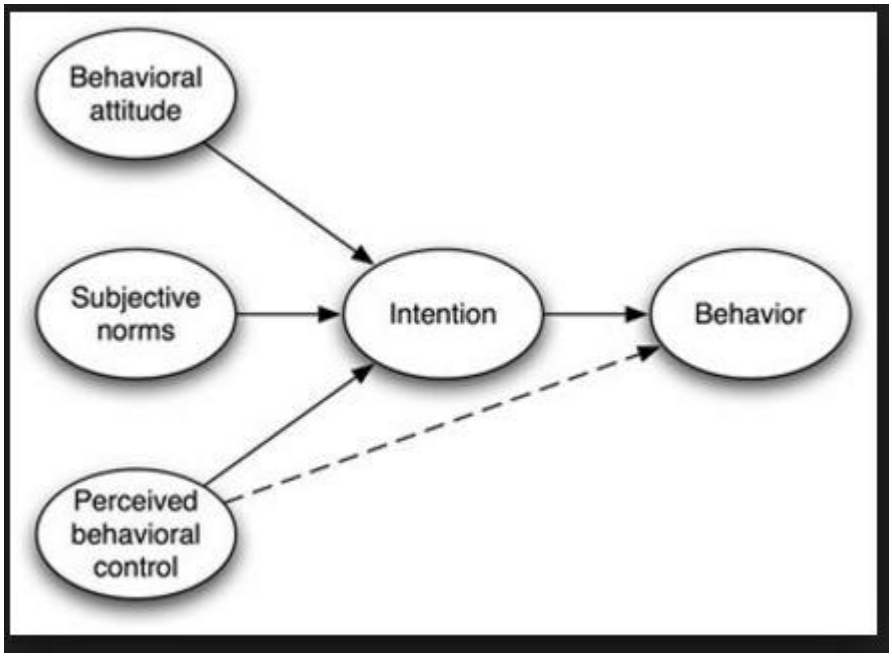

Figure 2- Theory of planned behaviour (Ajzen, 1991)

The central part of the theory of planned behaviour is the individual's intention to perform a given behaviour. Intentions are assumed to capture the motivational factors that influence behaviour; they are indications of how hard people are willing to try, of how much of an effort they are planning to exert, to perform the behaviour. As a general rule, the stronger the intention to engage in a behaviour, the more likely should be its performance (Ajzen, 1991). It must be

noted that intention is related to the performance of the behaviour through its voluntary nature, meaning the performance of most behaviours depends at least to some degree on such non-motivational factors as availability of requisite opportunities and resources like time, money, skills, the cooperation of others. Collectively, these factors represent people's actual control over the behaviour. To the extent that a person has the required opportunities and resources, and intends to perform the behaviour, he or she should succeed in doing so (Ajzen, 1991). Perceived behavioural control plays an important part in the theory of planned behaviour. In fact, the theory of planned behaviour differs from the theory of reasoned action in its addition of perceived behavioural control (Ajzen, 1991). The theory of planned behaviour can be used to study the potential performance of the behaviour and the factors that affect it.

TECHNOLOGY READINESS INDEX

Technology readiness index (TRI) measures an individual's readiness to use new technology, in general, using four personality traits: optimism, innovativeness, discomfort, and insecurity (Walczuch et al., 2007). The traits used in technology readiness index are general connections to technology and portrait an individual's beliefs towards technology. It must be noted that the extent of the beliefs does not automatically translate into competence in using the technology. Technology readiness index defines four groups of users separated by their prevailing personality trait with two factors being motivators of new technology use and another two being inhibitors; they are (Walczuch et al., 2007):

- Optimism: a positive view of technology. Belief in increased control, flexibility, and efficiency in life due to technology.
- Innovativeness: a tendency to be the first using new technology.
- Discomfort: needing control and a sense of being overwhelmed.
- Insecurity: distrusting technology for security and privacy reasons.

People with high technology readiness index levels score high on optimism and innovativeness. They feel comfortable using technology and only call for little proof of its performance. People with lower levels are more critical, they ask for help more often and feel uncomfortable with new technologies (Walczuch et al., 2007).

The technology readiness index can be used to further analyze how the personality of the user can affect adoption of technology. The model can provide new input into technology acceptance studies, focusing heavily on the user rather than the information system in question.

Technology Acceptance Model (TAM) is tailored to information systems contexts and was designed to predict information technology acceptance and usage on the job. Unlike TRA, the final conceptualization of TAM excludes the attitude construct to better explain intention parsimoniously (Venkatesh et al., 2003). The model incorporated three (3) core constructs to understand user acceptance of an information system in a work environment. The model has been widely used in numerous studies and has also been developed further by many scientists (i.e.Davis, Venkatesh etc.). TAM2 extended TAM by including subjective norm as an additional predictor of intention in the case of mandatory settings (Venkatesh, Davis, Smith, & Walton, 2000). TAM has been widely applied to a diverse set of technologies and users.

In sum, all the models and theories presented above were relevant and informative to the research questions we initially addressed. Also, we understand that there is a lot in common in some of the approaches like Theory of Planned Behavior (TPB) and Technology Acceptance Model (TAM) both originate from Theory of Reasoned Action (TRA). Both of the models proposed extensions to the original to provide a better fit with the expected field of study. TRA was drawn its roots from social psychology and is one of the most fundamental and influential theories of human behaviour. TPB added a new construct of perceived behavioural control, which addressed the voluntariness of technology adoption. TAM, on the other hand, focused clearly on information systems context. The model was designed to predict information technology acceptance and usage. Literature shows that it has been a consistent and widely used method which provides strong results in information systems adoption studies and that is also the main reason, why we wished to use TAM as the main approach for this study.

2.3 TECHNOLOGY ACCEPTANCE MODEL (TAM)

This section provides a more detailed overview of the creation, development and use of Technology Acceptance Model (TAM). Starting from the 1970's, many researchers became interested in predicting system use in organizations. This was mainly caused by growing technology needs and increasing failures of system adoption. In 1985 Fred Davis proposed the Technology acceptance model as a way of predicting system adoption (Davis, 1986). Out of all the theories in the information systems field, Technology Acceptance model is most influential and commonly applied theory. The articles on the model by Davis (1986, 1993) have been

widely cited, and by 2003 the number of citations was at least 698 (Y. Lee et al., 2003). During its history, Technology Acceptance Model has continuously evolved, and thus many variations have been proposed. Some of them will be described in this overview.

Davis further refined his theory and proposed a Technology Acceptance Model (Figure 3) where he suggested that user motivation can be explained using three variables. These variables were:

- Perceived Ease of Use
- Perceived Usefulness
- Attitude Towards Using

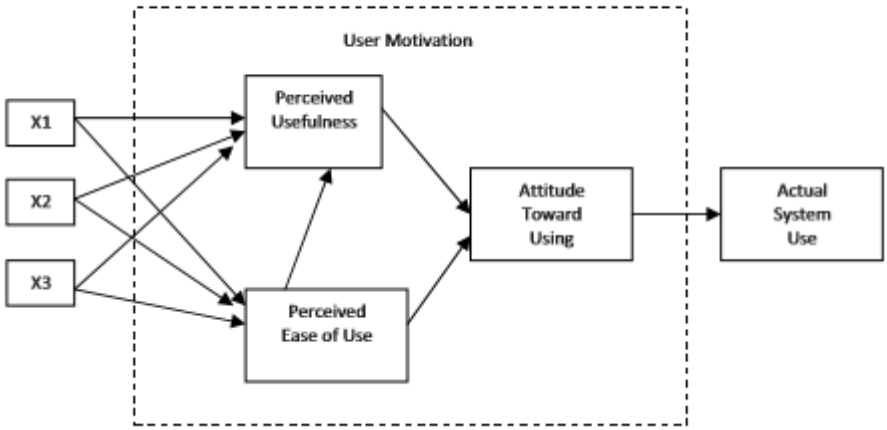

Figure 3 - Original Technology Acceptance Model proposed by Fred Davis (Davis, 1986)

One of the main influencing factors of whether a user would adopt a technical system was proposed by Davis (Davis, 1986) to be the attitude towards a system. That, in turn, was proposed to be influenced by two major factors. One of them was perceived usefulness. Perceived usefulness shows how much an individual believes that using an information system would enhance their productivity. The other factor was perceived ease of use. Perceived ease of use shows how much an individual believes that using a system would be free from physical and mental effort (Davis, 1993)

To measure perceived usefulness and perceived ease of use, Davis referred to psychometric scales used in psychology (Chuttur, 2009). The user was usually prompted to answer several questions, which can then be analyzed and used as an indication of the user's internal belief in the context considered. Davis developed his TAM related psychometric scales for perceived

ease of use and perceived usefulness in three stages: pre-testing phase, an empirical field study and a laboratory experiment (Chuttur, 2009).

To confirm the validity of the chosen scales Davis did several studies. By analyzing the results of the experiments, Davis found a positive correlation between the scales and self-predicted future usage. That, in turn, brought to an addition to the original Technology Acceptance model, where Davis suggested that perceived usefulness could also have a direct influence on actual system use. He also found that system characteristics could directly influence the attitude of an individual toward using the system (Davis, 1993).

The final version of the original Technology Acceptance Model (Figure 4) saw the removal of one significant part at the end of the 1980s. Attitude toward using was removed because a longitudinal study by Davis, Bagozzi and Warshaw (1989) showed a strong correlation between reported intention and self-reported system usage with perceived usefulness responsible for the greatest influence on people's intention (Davis & Venkatesh, 1996).

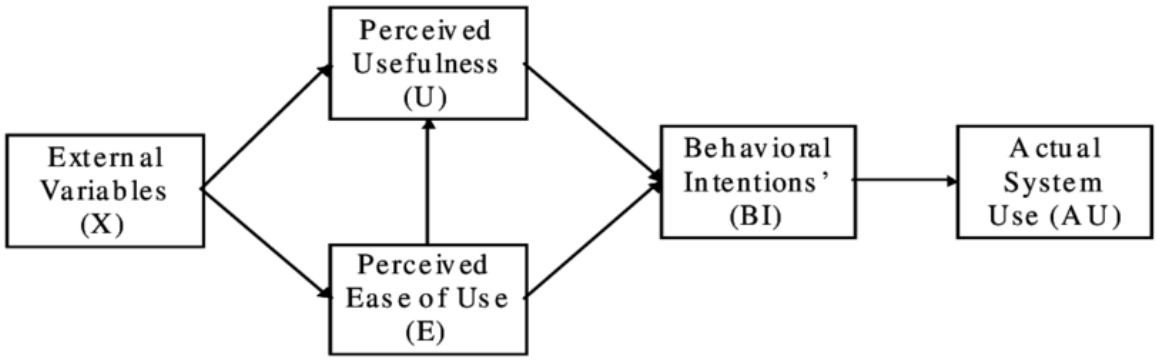

Figure 4 - Final version of the original Technology Acceptance Model (Davis & Venkatesh, 1996)

Since Technology Acceptance Model was very simple, it could not go beyond the general items that measured perceived usefulness and perceived ease of use. The model made it difficult to identify the reasons behind the perceived ease of use or perceived usefulness variables used in the model. Also, most research in Technology Acceptance Model focused only on voluntary environments. To address these shortcomings, an extended Technology Acceptance Model was proposed by Venkatesh and Davis (Venkatesh et al., 2000)

The Technology acceptance model extension was called TAM2 (Technology Acceptance Model 2) (Figure 5). Venkatesh and Davis identified that the original Technology acceptance model had some limitations in explaining the reasons for which a person would perceive a given system useful, and so they proposed that additional variables could be added as antecedents to the perceived usefulness variable in Technology Acceptance Model (Chuttur, 2009).

Technology Acceptance Model 2 reflects the impacts of three interrelated social forces impinging on an individual facing the opportunity to adopt or reject a new system: subjective norm, voluntariness, and image (Venkatesh et al., 2000). Subjective Norm was consistent with what was used as a theoretical underpinning for the original development of the Technology Acceptance Model. Subjective norm is described as a "person's perception of what most people who are important to them think they should or should not perform the behaviour in question" (Venkatesh et al., 2000).

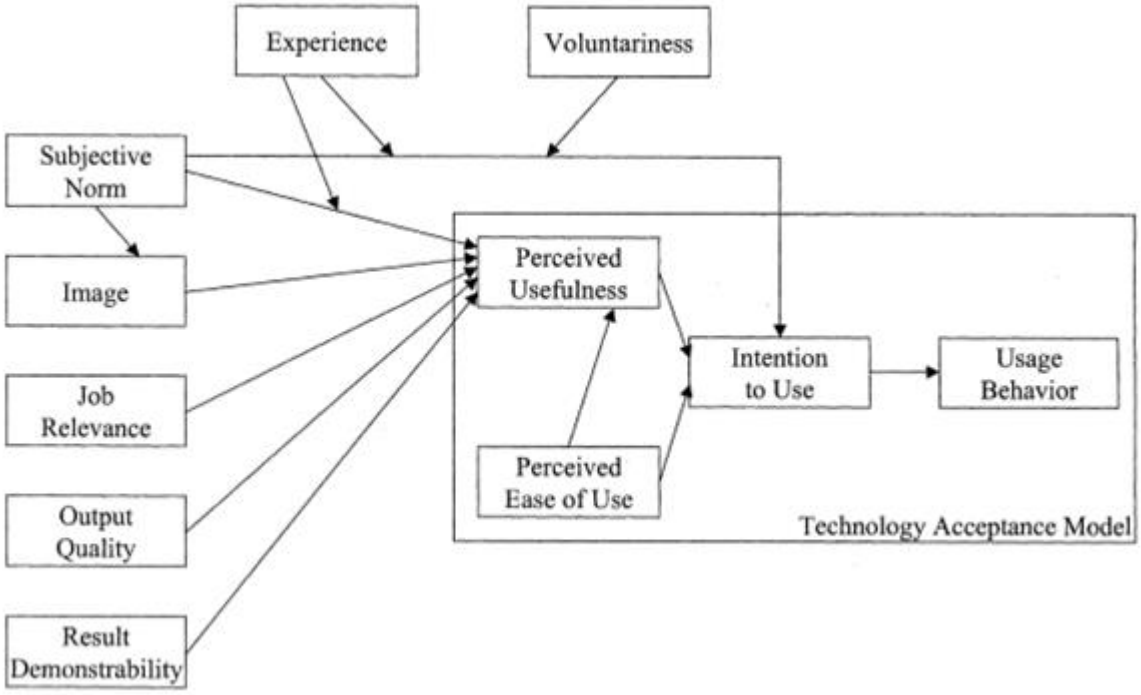

Figure 5 - Technology Acceptance Model 2 (Venkatesh, 2000)

Technology Acceptance Model 2 reflects the impacts of three interrelated social forces impinging on an individual facing the opportunity to adopt or reject a new system: subjective norm, voluntariness, and image (Venkatesh et al., 2000). Subjective Norm was consistent with what was used as a theoretical underpinning for the original development of the Technology Acceptance Model. It describes the Subjective Norm as an as a "person's perception that most

people who are important to him think he should or should not perform the behaviour in question" (Venkatesh et al., 2000).

The second social force, voluntariness, was missing from the original Technology Acceptance Model and thus needed to be taken into account. Thirdly they added the internalization of Social Influence, by which they meant the ability of an individual to incorporate surrounding beliefs into one's belief system. For example, if a superior or co-worker suggests that a system might be useful, a person may come to believe that it is useful, and in turn form an intention to use it (Venkatesh et al., 2000).

Venkatesh and Davis (Venkatesh et al., 2000) hypothesized that social norm has a positive effect on the image as well. If important members of a social group believe that the individual should use an information system or perform a behaviour, then adhering to that would elevate the individuals standing within that group. The experience was also one factor that had not been considered before. The direct effect of social norm on intentions may subside over time with increased system experience. Venkatesh and Davis (Venkatesh et al., 2000) also added Job relevance, where perceived usefulness is directly impacted by individual's perception regarding the degree to which the target system is applicable to his or her job, and output quality, where individuals are to decide on how well a system performs a job-relevant task.

Finally, result demonstrability was added as a factor in individual's system acceptance. This means that if a user does not see the usage of the system producing effective job relevant results, they will unlikely understand, how useful a system is.

In summary, the proposed TAM2 encompasses social influence processes (subjective norm, voluntariness, and image) and cognitive instrumental processes (job relevance, output quality, result demonstrability, and perceived ease of use) as determinants of perceived usefulness and usage intentions (Venkatesh et al., 2000).

The main criticisms of the Technology Acceptance Model usually fall into three categories (Chuttur, 2009):

1. The methodology used for testing the TAM model
2. The variables and relationships that exist within the TAM model
3. The core theoretical foundation underlying the TAM model.

Methodology-wise, Chuttur (Chuttur, 2009) points out three main issues. First, the use of self-reported data. It is subjective and unreliable. Secondly, several studies make use of students as participants in a controlled environment, and therefore cannot be generalized to the real world

(Y. Lee et al., 2003). And finally, a large number of Technology Acceptance Model studies try to explain and predict the voluntary use of systems, rather than mandatory (Yousafzai, Foxall, & Pallister, 2007). In real life settings, most organizations usually require users to use the system available with little choice for alternatives (Y. Lee et al., 2003).

The Technology Acceptance Model has been very widely used and accepted in the field of information systems. The main reason behind it is that the Technology Acceptance Model is fairly simple to use to determine users intentions. Bagozzi (Bagozzi, 2007) points out that the simplicity of the Technology acceptance model has been its main strengths, but is arguably one of its main weaknesses. It is unreasonable to expect that one model, and so simple, would explain decisions and behaviour fully across a wide range of technologies, adoption situations, and differences in decision making and decision makers (Bagozzi, 2007). For purposes of organization, Bagozzi (Bagozzi, 2007) maintains that the primary shortcomings of Technology Acceptance Model reside in...

(1) two critical gaps in the framework,

(2) the absence of sound theory and method for identifying the determinants of PU and PEU, as well as other bases for decision making,

(3) the neglect of group, social, and cultural aspects of decision making,

(4) the reliance on naïve and over-simplified notions of effect or emotions, and finally

(5) the over-dependence on a purely deterministic framework without consideration of self-regulation processes.

The critical gaps are intention-behaviour linkage and the linkage between individual reactions to using information and intentions (Bagozzi, 2007). The first issue suggests that intentions do not immediately suggest that certain behaviour will follow. That means that individuals don't set the goal to be the behaviour or the usage itself, but the adoption is often a step towards a much larger or distant goal. There are some factors that affect particular behaviour. The second gap is individual reactions. For example, a person can recognize and even accept that perceived usefulness or attitudes are favourable criteria for deciding to act, but have no desire to act and even explicitly decide not to act in the face of these reasons (Bagozzi, 2007). Bagozzi (Bagozzi, 2007) also points out that we should not study technology adoption by analyzing users as individuals acting in isolation. Decisions about technology acceptance and actual usage are often done collaboratively or with an aim to see how they fit in with or affect other people or

group requisites (Bagozzi, 2007). Thus Bagozzi (Bagozzi, 2007) critiques that Technology Acceptance Model is conceived largely as a framework for explaining decision making by individual persons.

The final shortcoming that Bagozzi (Bagozzi, 2007) points out, is the purely deterministic framework. This suggests that an agent is unable to self-regulate and thus always reacts to stimuli determinedly. Bagozzi (Bagozzi, 2007) proposes that a decision maker is capable at times of choosing to act in a way that is neither impulsive, compulsive, habitual, coerced, nor bribed, but rather results as a different intentional result.

TAM USEFULNESS IN IDENTIFYING OUR PROBLEM

Technology Acceptance Model is parsimonious, simple, robust and you can use the model and theory to study many different information systems from communication systems, general-purpose systems, office systems, to specialized business systems. TAM can successfully predict Informations Systems acceptance behaviour under different technologies and different situations. Also, Technology Acceptance Model was found to be a much simpler, easier to use, and more powerful model of the determinant of user acceptance of computer technology than TRA (Y. Lee et al., 2003).

BENEFITS OF USING TAM

Technology acceptance model can provide us with an insight on what are employees attitudes towards using a new system within a work environment. It can also provide data on what is perceived to be the useful and not so useful features of the system. Users can provide us with information on how they perceive the ease of use of the system and what should be changed to implement the system better throughout the company.

THE ARTEFACT

The artefact is a technical system that was developed to help customers and employees to localize and resolve technical service issues more effectively and with better quality.

BACKGROUND

Telia Eesti is a telecommunications company that provides customers with broadband, mobility and IT services throughout Estonia. Telia Eesti belongs to Telia Company, a telecommunications group that operates mainly in Scandinavia and Eastern Europe. Telia Eesti is the antecedent of two separate telecommunications companies: Elion and EMT. These companies provided mainly broadband and mobility services respectively in the Estonian market. After the two companies were united, a question of efficiency came to the forefront. Everything was duplicated, the shops, call centres, business units etc. It was important to consolidate these services and effectively manage them within one company.

To provide unified customer support, the company needed to converge two separate customer support channels and tools necessary to provide quality support. There was also the question of competences. Each side used different customer relations and technical tools. It would have been difficult to just combine the two competences and expect customer support representatives to accumulate twice as much knowledge.

It was also an important goal to bring many customer transactions online. Telia wanted to be a company that is easier to approach for the customer and to do that some online environments and new capabilities needed to be created.

ARTEFACT PURPOSE

One of these environments was the Online Help environment that was meant to be a universal tool for both Telias customers and employees alike. The tool was supposed to provide effective and automatic technical customer support 24/7 and allow customers to solve the majority of their issues without ever needing to contact customer support.

The other goal of the Online Help environment was to provide Telia's customer support agents with a clear, easy-to-use technical environment that would allow aiding the customer quickly and efficiently in the majority of technical inquiries. The system was built up so, that the user would need only basic technical knowledge to provide customers with the necessary steps in

solving their technical issues. There is also an automatic diagnostics system built in to help localize any issues with customer services (Figure 6).

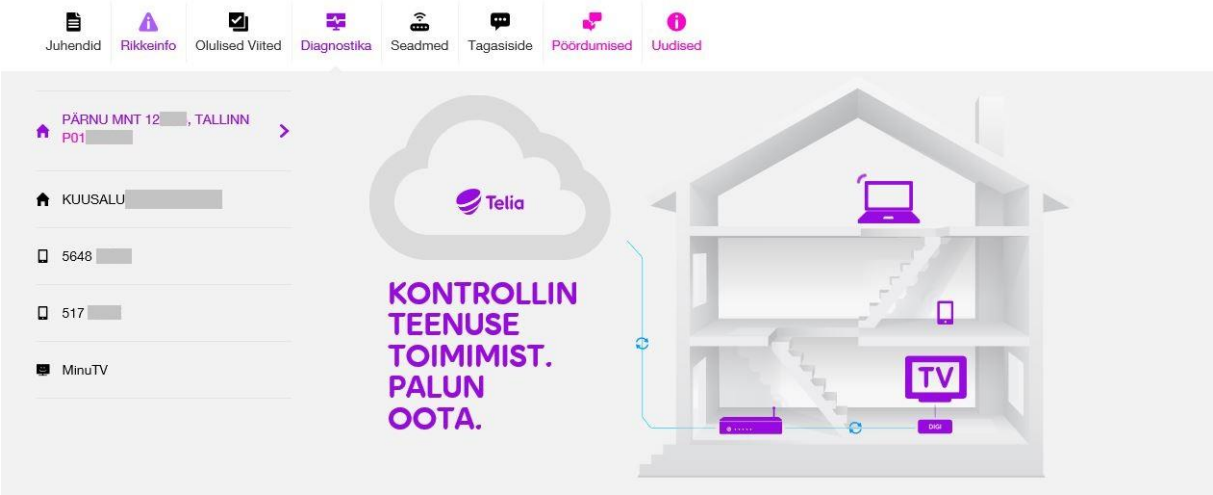

Figure 6 - Online Help Environment Diagnostics Tool

Majority of the user interface is a step-by-step guide on various relevant technical issues that might occur while using Telias broadband, mobility or IT services (Figure 7). The guide is mainly similar to the customer and employee with only minor differences. The main difference is that a customer support representative can see customer related technical data alongside the step-by-step guides. That should allow the representative to have a better overview of the status of the service and make further relevant decisions if necessary.

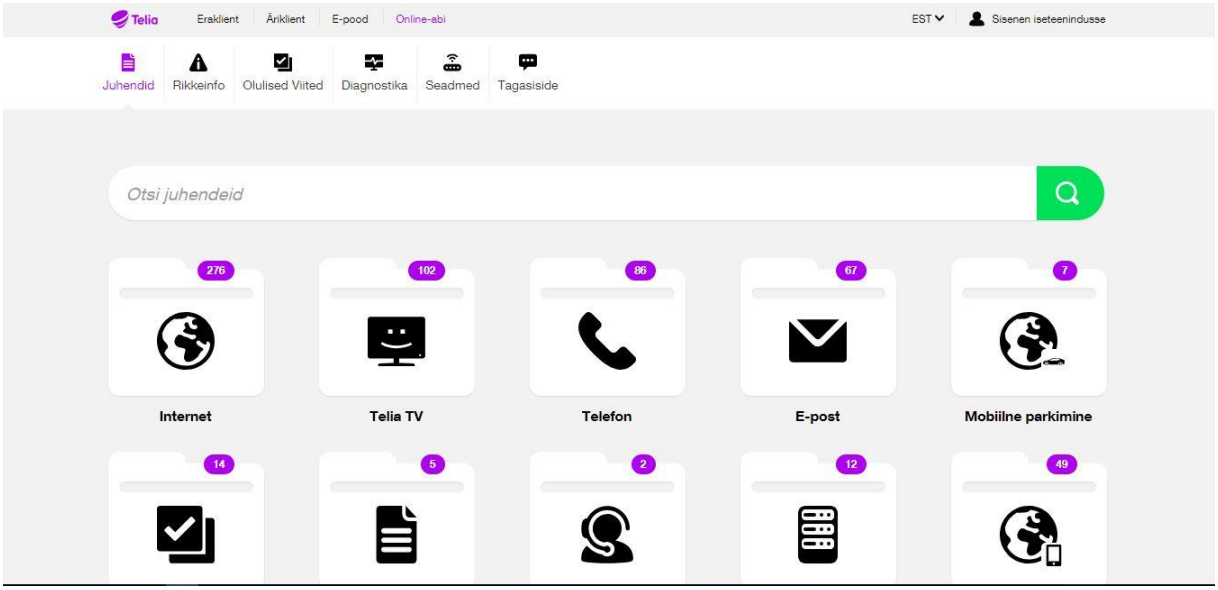

Figure 7 - Online Help Environment topic selection

The environment was also set up in a way that all steps performed by either the customer or customer support representative, are automatically saved to make registration of customer contacts easier and more efficient.

USERS AND TECHNOLOGY ADOPTION

In this paragraph, we are going to take a closer look at some of the studies done in the field that support the use of described methods. We wish to find out, what can be done to promote information system adoption.

To improve the understanding of user adoption behaviour, Venkatesh and Davis (Venkatesh et al., 2000) performed a series of tests to develop and extend the original TAM model. Their longitudinal tests were to see if the extended model TAM2 would be supported by the results. Within these tests, they collected data from four different systems at four organizations. One important development was that two of the organizations and systems involved voluntary usage and the other two mandatory usages. The results were strongly supportive of the extended TAM2 model. Both social influence processes (subjective norm, voluntariness, and image) and cognitive instrumental processes (job relevance, output quality, result demonstrability, and perceived ease of use) significantly influenced user acceptance (Venkatesh et al., 2000).

To investigate teachers decisions regarding the use of educational technology, a study was carried out to identify teachers intentions (J. Lee, Cerreto, & Lee, 2010). The theory of planned behaviour (TPB) had been used for this type of study before, and it had resulted in inconsistent results. Lee (J. Lee et al., 2010) hypothesized that this inconsistency might be due to overly broad definitions of the target behaviour and tried to remedy the issue with closed-ended questions to be used. The results provided specific information that can be used to design effective teacher development programs and remind TPB researchers of the importance of using specific definitions of the target behaviour.

Walczuch, Lemmink and Streukens (Walczuch et al., 2007) performed research on the relationship between personality and technology acceptance. They combined the technology readiness index (TRI) and TAM into one model. Specifically, they measured the relation between TRI's personality trait dimensions – optimism, innovativeness, discomfort, and insecurity – and the cognitive dimensions of TAM. They were able to show that personality makes a difference in the adoption process of IT and this may help to explain how its adoption may be influenced by the personality of the user as well as the characteristics of the technology

(Walczuch et al., 2007). Optimism was one of the factors with the highest impact on perceived ease of use and perceived usefulness. Also, discomfort and innovativeness affect negatively perceived ease of use and perceived usefulness. The study also pointed out managerial implications. According to Walczuch (Walczuch et al., 2007), It is very important for a manager to be aware of the relationship of their employees towards technology use. This allows for better planning and support when implementing and adopting new information systems. All in all, the analysis revealed that personality traits had the expected impact on user perceptions (Walczuch et al., 2007).

2.4 FINAL CONSIDERATIONS

In our literature review, we found that information system adoption has been thoroughly studied in the last decades. There have been a lot of different approaches proposed to study and overcome popular adoption issues. Some of those models like Theory of Planned Behavior, Technology Acceptance Model, Technology Readiness Index, Diffusion of innovations have been described in the review. We found out that main issues of adoption are concerning three factors: the users, systems and the environment. All of these play a part in the success or failure of adopting information systems. There is also a larger set of more specific factors used in these models above, including attitude towards using, perceived ease of use and perceived usefulness etc. We found that Technology acceptance model allows us to focus on our current predicament and find out what might be the issues that prevent the adoption of Online Help environment in Telia Eesti. TAM can help us find out whether the issues lie in the environment and the perceived attributes of it, or is it the attitude or even the intentions. As the literature review showed, TAM has also been used to study similar adoption issues, which have proven to provide useful results. With the help of TAM, we can also try to see if there are some environmental or social factors which are affecting the adoption process and propose steps to overcome these issues.

3 THE STUDY

To better address the above-defined problem, we adopted a mixed method research strategy. This included collection of quantitative and qualitative data. A more detailed approach to the methods, instruments and procedures adopted are described in the next lines of text.

3.1 OVERALL RESEARCH METHODOLOGY

As addressed before our main aim is to find out, why a technical customer support system built for Telia Eesti employees is not being adopted. We also wish to propose improvements to the existing work environment, and eventually, shortly support the people who are implementing the recommendations. For this research methodology, we adopted a mixed method research strategy which consists of three parts (Figure 8).

- First, we will conduct a survey, where we will ask all the proposed users of the proposed technical support system to answer a questionnaire, which is based on the TAM model and relevant studies.
- Secondly, we will perform a usability test by inviting users to participate in a live user experience evaluation.
- Finally, we will ask users for a personal interview to find out underlying issues that affect their adoption and usage of the technical support system.

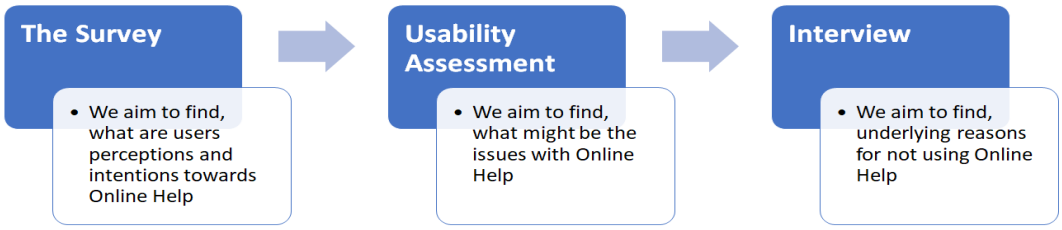

Figure 8 - Schema of the study

There are two main research questions and five sub-questions that we wish to address in our study.

RQ1: What are the most common issues that prevent users to adopt technology?

S-RQ1.2: Why are users using/not using the artefact?

S-RQ1.3: What problems users encounter when using the artefact?

and

RQ2: How to overcome those common adoption issues?

S-RQ 2.2: How does the artefact help them in their work?

S-RQ 2.3: What are the UX weak points of the artefact?

S-RQ 2.4: What could help to increase the adoption of the artefact?

3.2 SURVEY

To design the survey procedure we adopted Park, S. Y. (Park, 2009) Theoretical model. The model is supported by the Technology Acceptance Model from Davis (Davis, 1986) and proposes some constructs that measure users' technology acceptance. This model was used to measure user's technology acceptance towards e-learning artefacts.

The objective of the survey was to understand "What are the most common issues that prevent users to adopt the Online Help environment?" The survey enables us to better analyse the following constructs:

- Perceived usefulness (PU);
- Perceived ease of use (PEOU); and
- Attitude towards using (ATU) the artefact.

In the survey, besides questions to measure above constructs, we also included basic background questions to better understand the participants. The questionnaire was created in two languages, English and Estonian. The main reason being that most of the employees speak Estonian as their first language. The questionnaire is available in Appendix A.

PROCEDURE

The population of the study consists of technical support specialists working in Telia Eesti AS. There are a total of 45 specialists. From those, we were able to obtain answers from 33% of

participants. The survey questionnaire was created and shared through a web environment, google forms. All participants used the information system more than one time. A timeframe of two weeks was set to collect the responses, with a one-week reminder.

As refereed before this survey instrument was developed by Sung Youl Park (Park, 2009).

Our questionnaire consisted of two (2) main parts. The first part was designed to identify demographic attributes of the respondents. The attributes included items such as age and occupational experience in the current position in years.

Part two included questions were addressed on Sung Youl Park (Park, 2009) research which was adopted from Davis's (Davis, 1986) Technology Acceptance Model. The second part consisted of eleven (11) questions. Three measured perceived usefulness construct, 3 measured perceived ease of use construct, three measured attitude towards using construct and two measured intentions toward using. Most of the answers were given in the form of a Likert scale from 1 to 5, where one means "strongly disagree" and five means "strongly agree".

Data analysis followed the following procedure; brief descriptive analysis obtains answers to better understand participants user profile. For the remaining questions, we group the questions related to each construct and calculate the average for each answer. Then clustered the results in three main attitude groups: positive, neutral and negative. The main aim of this analysis was to better understand where we could find less positive attitudes towards the measurement constructs. Further details are presented in the results and the discussion section.

RESULTS

All together we got 15 responses to the questionnaire. That is 33%of all the recipients. 93% of the recipients answered all 13 questions including two demographic questions. One of the respondents opted not answer to one of the demographic questions concerning age. All of the respondents answered the questionnaire in Estonian.

The demographic answers complemented two relevant factors

- First demographic question inquired about the years of occupancy in current position, which would also indicate experience on using different systems in the workplace.
- The second one inquired about the age of the respondents.

As the figure below illustrates 47% of respondents have been working in the current position between one (1) and three (3) years, 20% have worked in the position for three to five (3-5) and

over five (5) years. 13% of the respondents have been working in the current position for under a year (Figure 9).

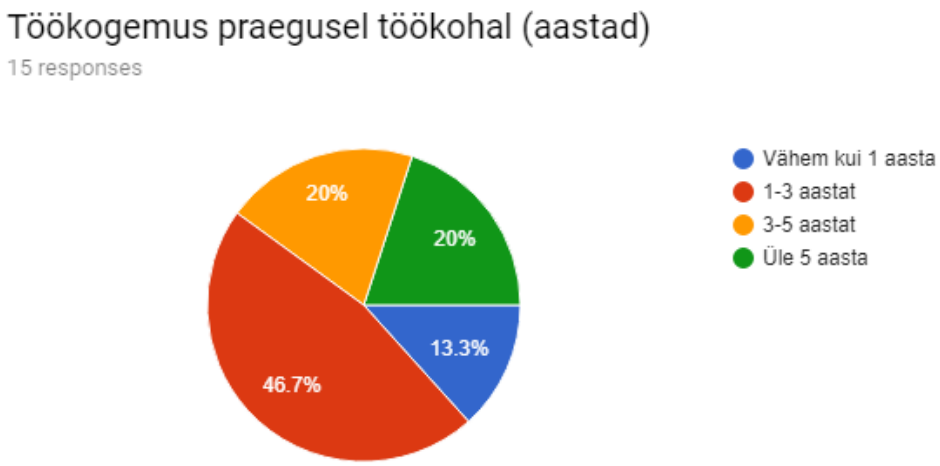

Figure 9 - Occupation in current position (years)

The age of the respondents was quite different, ranging from 21 to 49 (Figure 10). That suggests that we have a good cross-section of the users.

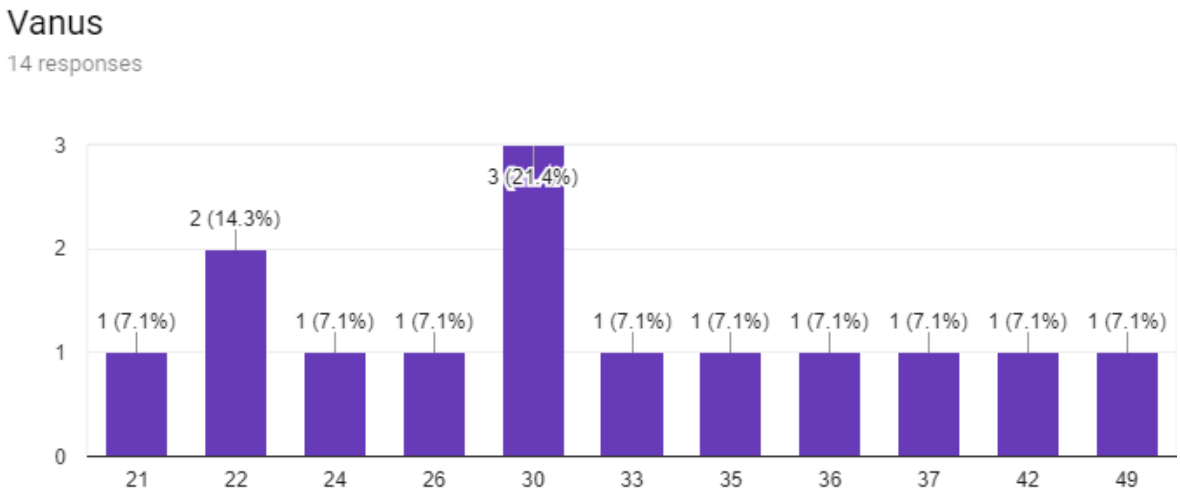

Figure 10 - Age of the respondents (years)

The questions were divided into largely four groups so that they would answer to perceived ease of use, perceived usefulness, attitude and behavioural intent. Perceived ease of use

provided relatively positive feedback. 53 percent of respondents answered that the Online Help environment is easy to use and 60 percent responded that the environment is easy to learn. Also, 60 percent of respondents found positively that it is easy to become a skilful user of Online Help environment.

While perceived ease of use was relatively positive, perceived usefulness provided different results. Only 20% of respondents rated positively that the environment would improve work performance (Figure 11). Negative results were also provided to the question if Online Help environment would increase work productivity. 53% of respondents stated that they do not see the effect as positive (Figure 12).

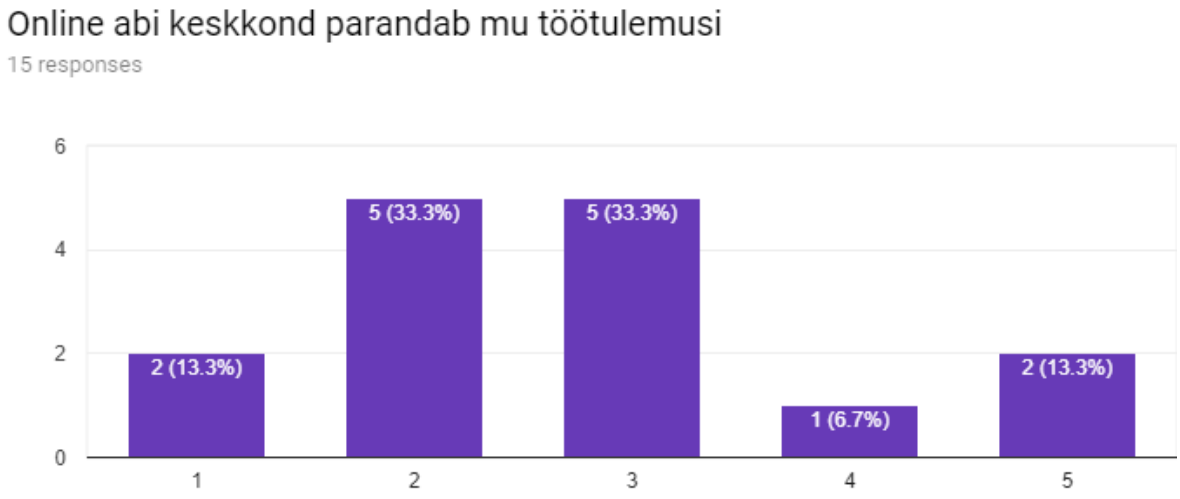

Figure 11 - Online Help environment would improve my work performance

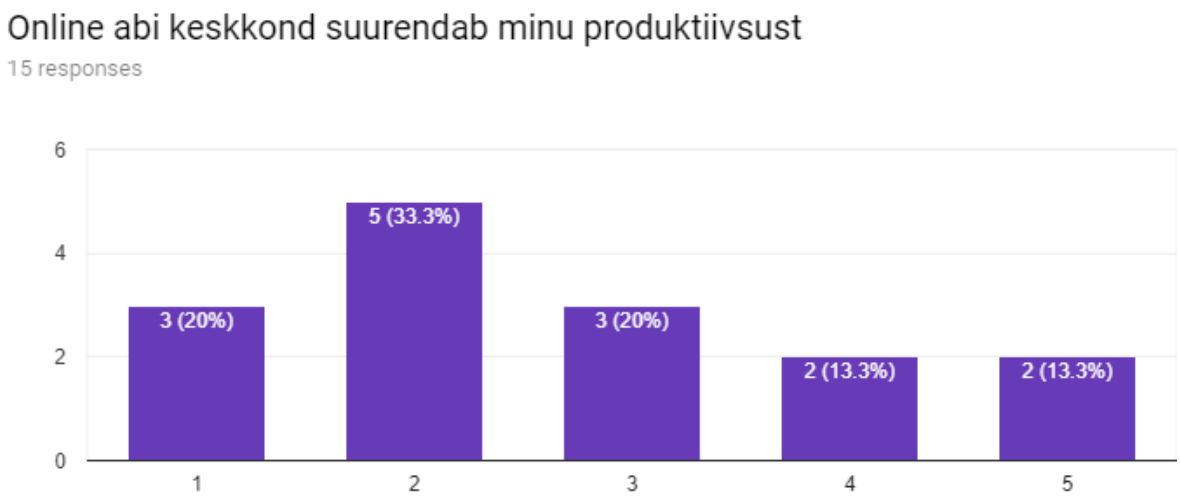

Figure 12 - Online Help environment would increase work productivity

Again, from questions that addressed the intentions, respondents stated that only 20% intend to use Online Help environment to check technical information from frequently (Figure 13). Also, the same amount of respondents were positive when stating their intent I to be a heavy user of Online Help environment system.

Figure 13 - I intend to check technical information from Online Help environment frequently

From these results, we gather that many users are positively minded towards the environment. They find it easy to learn and use. The main negative feedback comes from the perceived usefulness. Respondents do not feel that the system contributes to their performance or helps them be more productive. Also, the intent to use the environment in the future received rather negative feedback. These are the topics we will focus on in the interviews to further find out, what is behind the user's perception as far as performance and productivity is concerned, and what are the main drivers to focus on to better develop the environment in the future.

3.3 USABILITY ASSESSMENT

The usability assessment aimed to answer the following sub-research questions.

- What problems do users encounter when using the artefact?
- What are the usability issues of the artefact?

For the usability assessment method, we used the following instruments:

- System Usability Scale (SUS) (Brooke, 1996).
- Observation sheets.
- Screen recording software OBS Studio.

PROCEDURE

Five (5) participants were invited to participate in the study. These participants were selected from the 45 specialists that had experience in using the system. The assessment took place in a lab condition settings, a closed office space. The assessment consisted of three main parts (Figure 14). The script that was used to carry out the assessment is available in Appendix B. First all participants were provided with a short description of the proceedings and setup of the assessment and also asked to sign a consent form. Then participants were asked to perform five tasks using the technical support system. The tasks were basic everyday steps that even a novice user of the system should be able to perform. The tasks included:

- Running service diagnostics and localizing any issues on a provided customer connection
- Locating customer network usage information
- Locating customer device status and warranty information
- Locate customer specific add-on services
- Finding relevant instructions to perform ad simple configuration change on the customer set-top-box.

During the tasks, users were asked to describe their actions and thoughts - Think Aloud Method. The performance and steps were recorded using screen recording software (OBS Studio). Finally, after performing the tasks in the Online Help environment, all participants were asked to answer a short survey. The survey consisted of ten (10) statements concerning the use of Online Help environment. The participants were asked to answer, whether they agree or disagree with a statement on a five (5) level Likert scale. The SUS study questionnaire is available in Appendix C.

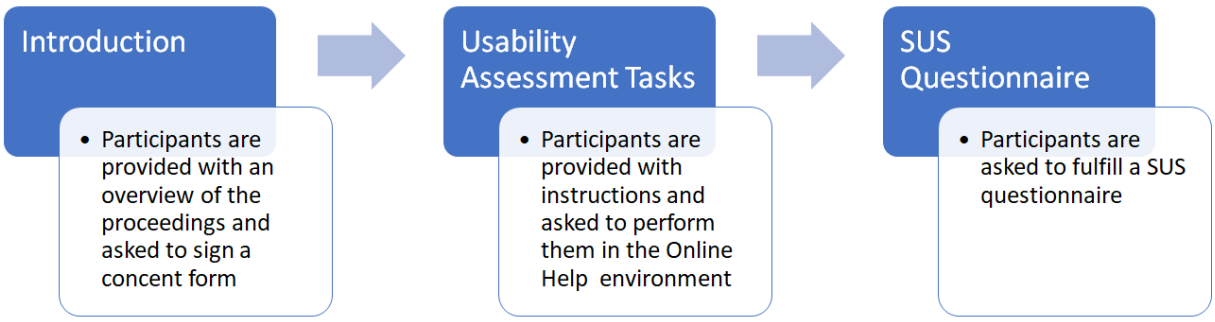

Figure 14 - A schema of the assessment proceedings

USABILITY ASSESSMENT RESULTS

In this section, we will provide an overview of the results gathered from the usability assessment. The results are presented in three parts, according to the method of collecting the data. We will provide an overview of the observation, Think Aloud method and System Usability Scale results.

OBSERVATION RESULTS

During the assessment, the facilitator wrote down three main measures to describe the success of the tasks performed. These included.

- Counting mouse clicks made to complete a task,
- the number of mistakes, and
- overall appreciation of the task.

In general, the data collected showed quite uniform results on these measurements among all participants. None of the participants failed any of the tasks, although two participants came to a halt during the proceedings to think thoroughly on the extent and logic of the system. Two of the tasks (tasks #2 and #5) provided some challenge to the participants. One participant followed a wrong path when performing task #2 and three participants took a wrong path when performing task #5. Three participants made at least twice as many clicks than necessary during

the fifth task, to find relevant information. Also, a technical system error occurred once for one of the participants, which was not counted as a mistake or failure to perform a task.

THINK ALOUD METHOD RESULTS

During the process think aloud method provided feedback on a set of issues the participants were facing. A summary of the main findings are provided below:

- Two of the participants commented on the automatic diagnostics function (task #1 in the assessment) of the environment and stated that it is a well-functioning part of the system.
- Although feedback from at least four participants was clear that the system diagnostics tool was too slow. One of the participants commented that the system seemed quite limited as far as possible tasks and provided information is concerned and that it was not immediately clear, what are the constraints of using the system.
- Three of the participants asked the same question during task #3. The task was to find services status of a customer's landline telephone, but three of the users automatically wanted to start searching for a mobile service.
- Task #5 provided somewhat of a challenge to at least three participants where they asked questions like "does the system allow to see such characteristics" and "where should I look for this type of information".

SYSTEM USABILITY SCALE QUESTIONNAIRE RESULTS

The questionnaire provided feedback on ten questions concerning the users' opinion after using Online Help environment. We counted scores of the responses to show whether the participants agree or disagree with a statement concerning the Online Help environment. The final scores are on a five-point Likert scale where one means "strongly disagree" and five means "strongly agree". To interpret the outcome, we calculated the scores to be presented on a 0-100 scale, as is common with System Usability Scale measurements. The SUS scores should be measured in a way that:

- 80.3 or higher is an A. Users love your site and will recommend it
- 68 or thereabouts is a C. Usability is OK but could improve
- 51 or under is scored an F. Usability has definite issues and needs attention.

The ease of use, integration of functions and learnability got very positive feedback. Participants' average rating to statements "I thought the system was easy to use" and "I found the various functions in this system were well integrated" was 4.6. Even higher average score

4.8 was received by the statement concerning learnability "I would imagine that most people would learn to use this system very quickly“. The users all agreed that they would not need the support of a technical person to use the system. The average score to “I think that I would like to use this system frequently” was 3.6, which suggests the future use of the system to be quite mediocre.

According to the SUS recalculated outcome, the participants rated the environment highly. The average result was 82.5 points, which puts the environment in the highest category. The environment was scored 95, 87.5, 87.5, 85 and 57.5 points respectively. That said, one of the participants rated the system as low as 57.5 points, which indicates, that there are some differences in opinion.

3.4 INTERVIEWS

PROCEDURE

The interviews were performed in the same controlled environment as the usability assessment. The interviews were conducted with five (5) participants. The interviews were conducted using Contextual Laddering Technique (Zaman, 2008) to find underlying values why users adopt or avoid adopting the Online Help environment. The interview consisted five main questions with one of the questions having three sub-questions. The questions were open-ended to provide a deeper understanding of participants' perceptions. The Interview questions are available in Appendix D. As we already had feedback from the survey that users do not feel that the system contributes to their efficiency and productivity, we wished to find out,

- What is missing from the environment that users don't feel that it is adding to their productivity or efficiency?
- What would trigger you to use the environment?

RESULTS

The interview provided similar attitudes towards the Online Help environment, as had the questionnaire and the system assessment. On the positive side, all participants felt that the system was clear and easy to use. Their feeling towards using the system was positive. They

commented the environment as being simple and logical. The environment encompasses step-by-step logic, which is easy to grasp and follow. They felt that the system was easy to use even without having significant technical knowledge. The options and capabilities of the environment are good as far as basic customer connection management is in question. The environment has nice and thorough instructions for the customer, and automatic diagnostics tool with simple adjustment capabilities makes it an easy tool to use.

On the negative side, participants were unable to determine, what the exact extent of the system capabilities is. Does the system check mobility services? Does the automatic diagnostics part provide feedback on all customer services? Although the participants found the build-up and logic of the system quite easy to understand, they also found that if one is not a frequent user, it will take a lot of surfing to find relevant information. There were also some logic errors where services are in a weird location for the participants and some services, and system functionalities are confusingly named.

After getting overall feedback, we asked the participants to give more concrete feedback on what would help increases their efficiency, productivity and quality when using the Online Help environment.

The biggest issue under efficiency was the overall speed of the system. Participants felt that the automatic diagnostics tool was too slow. Depending on customer network and setup, it took too long for them to obtain necessary service overview. This speed issue also affects customer support representatives because they need to keep the customer happy on the phone and waiting affects customer satisfaction. They wished that diagnostics and overall system speed would be increased. They also proposed that the step-by-step logic would allow the users to skip steps they find irrelevant for solving current issue.

Concerning quality, the participants felt that the system did not provide them with relevant information. When the automatic diagnostics is completed, the result is presented without reasoning on why the system came to a decision. This, in turn, does not provide the customer representative with enough background information to be confident in their communication with the customer. Some relevant information is missing in the environment overall.

To be more productive, the participants wished to see the system developed further in a way that would provide advanced information. The basic nature of the environment is seen useful for the customers but not so for the specialists. The participants wish to have an advanced diagnostics tool, which would provide more data on the services and quality than the system

does today. Also, they found the addition of mobility systems and services diagnostics to be necessary.

Comments on future development and suggestions followed the same theme as the questions before. The primary requirement for the participants is increased system speed. Using current alternative tools, they feel more efficient and see more relevant information concerning the customer. The system is perceived as much slower than the alternatives. The participants also feel that the system should have more integrated information and tools. Alternative tools provide extended views on overall network quality, network incidents etc. They feel that this information should also be available in a new system they adopt. The participants also felt that the system was sometimes cumbersome and asked users to do unnecessary steps. They also felt that the system did not provide sufficient feedback on what happens to customer tickets when they are forwarded from the system.

One universal feedback concerning Online Help environment usage and development concerned the lack of information. Firstly many of the participants were not aware of the developments that had been done in the environment. They felt that they were not informed of the system capabilities or functions. The participants also felt that their superiors did not support the use of the system. The system has not been properly introduced, it has not been promoted as a new tool that they should be using, and thus the users have not approached it also.

3.5 FINAL CONSIDERATIONS

We performed a mixed method approach study to understand why users are not using the Online Help environment as their technical support tool. We also wanted to find out what problems they encounter while using the environment. By using mixed method approach, we were able to get users feedback on their perceptions through a web-based questionnaire and from that feedback we were able to go deeper into their underlying questions and issues in adopting the new system by inviting users to participate in an interview. We also performed a system usability assessment to complement the survey and interviews.

From the survey, we found that users are positively minded towards the environment. They perceive it as an easy-to-use system which is also easy to learn and master. Unfortunately, users do not see the system as being relevant in their work. They do not feel that the system increases their productivity or their effectiveness. That in turn also affects intentions towards using, which showed that many of the users do not see themselves using the system frequently in the future.

The system usability assessment confirmed that the system is indeed easy to use in everyday situations and did not bring up any significant usability weak points. The participants of the assessment performed all the tasks successfully with only minor deviations. The overall feedback from the test was that the system is easy to use and simple, but that was also one of the main caveats in the users' eyes. The participants felt that the system is too basic for specialist use and does not support more complicated tasks.

In the interviews, we were able to go deeper into the feedback of the questionnaire and usability assessment where we wanted to find out what could help to increase the adoption of Online Help environment. We found that although users were positively minded, they had many requirements for development of the environment before they would consider it to be a valuable and useful tool that would help them in their work providing technical customer support. System speed, portrayed information and environment logic being prominent points that arose. All in all the biggest finding was that the system adoption was not supported by the organization. Team leaders and other superiors did not support the adoption in a way that would allow for the user base to grow. The system development is not communicated, system use is not promoted or supported, and overall attitude towards the system is not positive.

4 CONCLUSION

In the last section of this paper, we will provide an overall view of the results and focus on discussing the results gathered from the study. We will discuss, how they affect adoption of information systems according to the literature selected and also provide opinions on why some of the issues in adoption seem significant and propose steps to overcome them.

Technology acceptance model suggests that perceived ease of use, perceived usefulness, attitude towards using and behavioural intent are the main factors in information system adoption. Our study went gradually deeper into these underlying issues presented by the model and identified which ones affect users and looked for hints on how to improve future system adoption. The study consisted of three parts.

First, we asked system users to answer a survey. The questionnaire provided us with overall feedback on our main focus factors so we could plan our following steps. The questionnaire showed that users perceive the system easy to use and easy to learn and master. This suggests that the build-up and overall simplicity of the system are on a high level. This would also suggest that both new and experienced users would easily be able to start using the system without major training.

The questionnaire also pointed out two major issues with using the system:

- The majority of the users did not perceive the system useful.
- The users did not see that the system would increase their productivity or efficiency, and thus did not seem too willing to use it.
- Users answered that they have no intentions of actually using the system frequently in the future.

Therefore, we needed to further research and identify the main reasons for this perception. Those were addressed in the interview part and the usability assessment.

Second, we also carried out a usability assessment to better understand the initial results of the survey. The assessment results enable to better identify any major usability issues that needed to be addressed in the system. Overall the results of the assessment were positive, no major usability issues where found. Participants managed to fulfil the required tasks successfully in a reasonable timeframe. There were some issues with environment logic and navigation that users confronted, but overall the results in the assessment show that indeed the system is easy to use, even for individuals that are not frequent users of the environment.

Third, the interview feedback was useful. Here the users were asked open-ended questions to allow them to explain, what are the biggest problems that they perceive with the system and system usage. We also asked them to describe issues that they perceive when adopting the system or using it as a daily technical support tool. First the question of perceived usefulness. Users feel that the system does not affect their efficiency or productivity. They pointed out that although the automatic diagnostics tool is useful and informative, it takes too long to use. That, in turn, requires users to fulfil the diagnostics time talking to the customer, without having anything relevant to say. The participants also pointed out that their main focus is on efficiency and productivity. They need to solve customer contacts as quickly as possible. These goals are implemented and constantly followed by dedicated specialists, which in turn creates a situation where users keep to their existing methods and tools without bothering too much on testing new solutions. Participants also pointed out that since the Online Help environment is built in a way that customers can use the tool in the web on their own, to resolve their issues with their services, then it is built to be as simple as possible. This means that specialists see the system as a good tool to do diagnostics and perform very simple tasks, but don't see it as a tool for providing complete and thorough technical support.

For instance, the environment provides answers and an analysis of customer services but does not provide technical specialists with deeper information, how that result was achieved. This means that they do not understand the inner workings of the system and even when the environment states that customer services are working properly, some quality issues might still be present for the customer. The basic nature of the environment turns specialists towards alternative systems, which do not provide such automated diagnostics or results but, instead provide them with a much wider overview of the service quality and metrics. This approach favours specialists that are more experienced.

By not using the system as an everyday tool, experienced specialists create a situation where entering specialists take their input on how to solve customer issues from their practice. If nobody uses the system than it is very difficult to make new specialists adopt it.

Additional the literature review pointed also provide additional hints and how to improve the system. For instance, according to Walczuch (Walczuch et al., 2007), it is very important for a manager to be aware of the relationship of their employees towards technology use. During the interviews, we also had feedback that implementation of the system had not been a huge focus. Many of the users had no feedback from their managers on whether the environment should be

used. Participants also pointed out that they had no information about the developments done in the system. This means that the technical specialists had not received any information on the environment development, they were unaware of new capabilities, they did not know how to escalate tickets from the system etc. Overall, it seems that the Online Help environment has not been promoted universally to all the specialists, and thus has not received much attention. To adopt the system better, it had to be supported by management and promoted as a focus tool for technical customer support. Further proposals on what steps to take will be presented in the discussion (Chapter 4.2).

4.1 DISCUSSION

We feel that using TAM as the primary approach for studying information system adoption in a work environment has provided generalizable results that can be used as a baseline for future studies and improvements. We managed to obtain input on users' attitudes, intentions and perceptions, which provide a clear set of focus points on which to improve.

First, we would like to bring out the biggest shortcoming of the system: that is the speed.

Speed was an important adoption feature, as the users pointed out. A slow system complicates their job routine and makes it uncomfortable to successfully satisfy the customer's needs.

Proposition for improvements 1: The speed of the system diagnostics in Online Help environment needs to be faster.

Solutions: This can be done in many ways.

- By optimizing the diagnostics tool and increasing computing power. All these are costly improvements. Obviously, systems still need some time to diagnose the status of running services, and thus we propose that the diagnostics of incoming customer contacts are performed automatically already when the customer is waiting on the line for the customer representative to answer.
- Then the specialist can be provided with the diagnostics information before or at the start of the customer contact.

Proposition for improvements 2: the system more adaptive.

- User feedback was that Online Help had been made to provide very basic information. The main reason behind it is that customers can use the system as well. To make it simple and usable for regular computer users, it has been simplified to the very basics.

On the other end, it takes away all the necessary information that a technical customer support specialist might need to get a good overall picture of the customer's service quality. We propose to make the system adaptive in a way that users or managers can decide on what amount of technical information is shown on the screen. It can be modular, where users can simply select toolbars or extra widgets to be shown on the different screens of the Online Help environment or even selected on a rights management level, where certain user types have specific configurations of the environment. Either way, users need to be provided with more relevant information in the environment to get them using it for providing technical customer support.

Proposition for improvements 3: to plan actively, support and monitor the implementation of new information systems.

- The results show that the promotion of the system has not been carried out well. Users are aware of the existence of the system. They have used the system. They have even suggested the system to customers, friends and family, but do not use it themselves as a technical support tool. They perceive alternative systems more efficient and better as far as information obtained from the systems is concerned. The users are also unaware of the ongoing development of the system. They do not know what are the new system capabilities or when have they been implemented. Some of the users were even unaware that the system allows them to register and forward tickets to the 2nd level and experts, what they otherwise have to do via a separate customer relations management tool that has no technical diagnostics capabilities. To remedy this lack of information a concrete plan should be agreed upon, when, how and by who certain implementation steps are carried out. There should also be agreements on how to monitor the usage of the system, how to collect user feedback for bugs, proposed features and future developments.

We would also like to point out that users' goals and provided tools, like the Online Help environment, should be viewed together as the means to fulfil a goal. Today the goal was to provide efficient technical customer support and do it by using the new system. It should have been discovered quickly that users saw a much more consistent connection between efficiency and the tools they had used before. This complicated issue needs persistent management participation in new tool development and implementation processes. The managers need to be aware of the current situation and goals in their teams and also what the tools that help them achieve those are.

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Kokkuvõte

Käesoleva magistritöö peamine eesmärk on uurida infosüsteemi rakendamist ja kasutuselevõttu Telia Eesti ASis. Töö on keskendunud spetsiifiliselt juurpõhjuste väljaselgitamisele, mis takistavad uute keskkondade kasutuselevõttu ning teeb ka ettepanekuid nende probleemide vältimiseks. Juurpõhjuste väljaselgitamiseks kasutati uuringu läbiviimisel erinevaid metoodeid. Uurimus koosnes kolmest peamisest osast. Esmalt (1) viidi läbi küsitlus, et saada ülevaade tehnoloogia kasutuselevõtust. Teiseks (2) koostati süsteemi kasutajakogemuse hinnang, et leida suuremaid kasutusmugavuses probleemseid kohti. Kolmandaks (3) viidi läbi kasutajaintervjuud, mille abil otsiti konkreetsemaid vastuseid eelmiste sammude käigus esile kerkinud kitsaskohtadele. Saavutatud tulemused kinnitasid, et Tehnoloogia Aktsepteerimise Mudel suudab aidata leida ja tõlgendada infosüsteemide kasutuselevõtul tekkivaid kitsaskohti. Uuringu käigus leidis kinnitust, et uuritav keskkond on lihtne kasutada ja lihtsasti õpitav. Kasutajate üldine hoiak keskkonna suhtes oli samuti positiivne. Uuringu tulemused aitasid üles leida konkreetsed kitsaskohad, miks Online Abi keskkond ei ole Telia Eesti tehnilise toe peamiseks töövahendiks kujunenud. Ühtlasi koostati uuringu tulemuste põhjal esialgsed arendusettepanekud tulevikuks. Nende ettepanekute seas oli ka näiteks süsteemi väljastatava informatsiooni hulga suurendamine. Lisaks leiti, et uue töövahendi juurutamine 1600-inimeselises organisatsioonis vajab väga põhjalikku lähenemist. Üldine juhtimine peab olema järjekindel ja selgete eesmärkidega, kui uusi töövahendeid ja infosüsteeme juurutatakse. Kokkuvõttes tuleb suurt rõhku panna planeerimisele ja pidevale kasutuselevõtu toetamisele. Fookuses peab sealjuures hoidma nii organisatsiooni juhtimist kui ka teisi toetavaid meetodeid.

Appendix

A Online Help Environment questionnaire

Online Help Environment survey

1. Keel / Language

Mark only one oval.

- Eesti keel Skip to question 4.
- English Skip to question 2.

Online Help Environment survey

This questionnaire is a part of the survey, which aims to better understand the usage of Online Help environment.

Results gathered here are to be used as a source for recommending future developments of Online Help environment.

There are 13 questions in this survey. It shouldn't take more than 3 minutes to complete.

Please, answer these questions based on your personal experience in using Online Help environment.

All collected information is 100% anonymous and will be used only for the purpose of the study!

Thank you for your help!

Respondent information

2. Occupancy length in current position (years) * Mark only one oval.

- less than 1 year
- 1-3 years
- 3-5 years
- over 5 years

3. Age

Skip to question 6.

Online Help Environment survey

The answers are on a scale of 1-5, where 1 = Strongly disagree and 5 = Strongly agree.

6. I find the Online Help environment easy to use * Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

7. Learning how to use the Online Help environment is easy for me * Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

8. It is easy to become skillful at using the Online Help environment * Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

9. Online Help environment would improve my work performance * Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

10 Online Help environment would increase work productivity * Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

11 Online Help environment could make it easier to study work related content * Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

12. Studying through Online Help environment is a good idea * Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

13. Studying through Online Help environment is a wise idea * Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

14. I am positive toward Online Help environment * Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

15. I intend to check technical information from Online Help environment frequently * Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

16. I intend to be a heavy user of Online Help environment system *

Mark only one oval.

	1	2	3	4	5	
Strongly disagree	◯	◯	◯	◯	◯	Strongly agree

Stop filling out this form.

Powered by
Google Forms

B SUS Study Script

Online abi keskkonna kasutajakogemuse hindamine

Uuringu läbiviimise protseduuri juhis:

Esmalt loen ma sulle ette nõusolekuvormi. Sa võid vabalt igal hetkel vahele segada ja küsimusi esitada.

Tere! Olen Reimo ja viin täna selle kasutajakogemuse hinnangu läbi.
Jagan sinuga natuke infot ja loen selle ette, et kõik oleks selge, enne kui me alustame.
Esmalt tahan ma rõhutada, et me hindame selle protseduuri käigus keskkonda, mitte selle kasutajaid. Protsessi käigus ei ole valesid samme ja siin ei saa eksida.
Kui sa keskkonda kasutad, siis ma palun sul kirjeldada oma mõtteid võimalikult häälekalt ja ütle välja, milliseid küsimusi üks või teine tegevus tõstatab. Võid kirjeldada seda, mida sa vaatad, või mida sa parasjagu otsid jne. Sellest kirjeldusest on minule hilisemalt väga palju kasu.
Ühtlasi palun ära muretse, et sa kellegi tundeid riivaks või midagi valesti ütleks. Selle tegevuse eesmärk ongi adekvaatse ja ausa hinnangu saamine keskkonnale.
Kui sa soovid korraks peatuda, või on sul küsimusi, siis ütle julgelt!
Sinu nõusolekul soovin ma lindistada tegevusi, mida sa teed arvutiekraanil.
Ma kasutan seda lindistust vaid konkreetse lõputöö raames ning seda ei näe keegi peale lõputööga seotud isikute. Lisaks aitab see mind ja ma ei pea nii palju märkmeid tegema.
Kui sa oled nõus siis ma palun sul allkirjastada selle nõusolekuvormi, mis lihtsustatult ütleb, et sa andsid nõusoleku lindistada seda sessiooni, ning keegi väljaspool seda lõputööd ja selle hindamist ei näe konkreetset lindistatud materjali.

Anna osalejale Nõusolekuavaldus ja pastapliiats [nousolekuavaldus.doc]
Kas sul on küsimusi tekkinud?
OK. Enne, kui jätkame, küsin ma sinult paar sissejuhatavat küsimust.
[Vastusteks kaustame exeli esimest lehte]

Q1 Mis ametis sa hetkel töötad? Q2 Kas sa oled Online Abi keskkonda varem kasutanud?

Tänan vastuste eest!

Käivitame salvestuse ja teavitame sellest osalejat.
Anna osalejale ülesannete loend [file Online Help Environment Usability Test Tasks**.**rtf**], ja loe need valjult ette.**

Käivitame brauseri (Google Chrome) Teenindusveebi avalehelt.
https://www.telia.ee/web/teenindus/avaleht.

Ülesanded [Vastused kirjutada exceli dokumendi teisele lehele Measuring_the_task_completion.xlsx]

Nüüd palun sul täita mõned konkreetsed ülesanded.
Mind aitab igakülgselt see, kui sa kirjeldad, mida sa parasjagu vaatad ja mõtled..

Task 1: Palun kontrolli kliendi teenuse toimimist: Reimo Känd; Address: Pärnu mnt 122. Kas kliendil on ühenduses tõrkeid?

Success criteria ...

Task 2: Mis ruuter kliendil on?

Success criteria ...

Task 3: Leia kliendi viimase 72 tunni võrguliikluse graafik.

Success criteria ...

Task 4: Kas kliendil on aktiveeritud teenused “vahetu suunamine” ja/või “kõnepostkast”?

Success criteria ...

Task 5: Leia vajalikud juhised, et aidata kliendil digiboksis HD pildikvaliteet aktiveerida.

Success criteria ...

Luba kasutajal ise jätkata seni, kuni tegevustest on kasu ja kasutaja pole frustreerunud.
Tänan, sellest oli väga palju kasu! Kas sul on mulle mõningaid küsimusi, enne kui me jätkame?

Nüüd palun anna viie palli skaalal hinnangud, milline su kogemus Online Abi keskkonnaga oli.

Anna osalejale küsimustik.

Jätkub lühiintervjuu - Küsimustiku leht (5 küsimust).
Intervjuu ajaks paneme telefoni salvestama.

C SUS study questionnaire

Online Help Usability Assessment Questions

I think that I would like to use Online Help frequently

Totally Disagree	1	2	3	4	5	Totally Agree

I found the Online Help unnecessarily complex

Totally Disagree	1	2	3	4	5	Totally Agree

I thought Online Help was easy to use

Totally Disagree	1	2	3	4	5	Totally Agree

I think that I would need the support of a technical person to be able to use Online Help

Totally Disagree	1	2	3	4	5	Totally Agree

I found the various functions in Online Help were well integrated

Totally Disagree	1	2	3	4	5	Totally Agree

I thought there was too much inconsistency in Online Help

Totally Disagree	1	2	3	4	5	Totally Agree

I would imagine that most people would learn to use Online Help very quickly

Totally Disagree	1	2	3	4	5	Totally Agree

I found Online Help very cumbersome to use

Totally Disagree	1	2	3	4	5	Totally Agree

I felt very confident using Online Help

Totally Disagree	1	2	3	4	5	Totally Agree

I needed to learn a lot of things before I could get going with Online Help

Totally Disagree	1	2	3	4	5	Totally Agree

D Interview Questions

1. How did you like using Online Help Environment?
2. What did you like about Online Help environment?
3. What did you dislike about Online Help environment?
4. What should be changed/different with Online Help?
    a. .. to make customer support more efficient?
    b. .. to improve quality of customer support?
    c. .. to make customer support more productive?
5. Do you have any other proposals for future development and usage of Online Help environment?