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INFORMATION SYSTEM ACCEPTANCE AND ITS RELATED FACTORS

Case Study – Invalidiliitto Ry

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ABSTRACT

Information technology is used in a wide variety of different ways in the current highly competitive business environment, and because of this it is highly important for companies to utilize their information systems to the fullest extent in order to remain relevant.

The end users of these systems within companies are therefore critical for the success of the organizations as a whole, and their attitudes towards the information systems in use can largely determine their effectiveness. Users that are not satisfied with a system, or lack the proper training for using it will inevitably make the system less efficient and waste most of its potential benefits.

Because of the aforementioned reasons it is essential to find out what information system development and implementation practices have positive impact on end user satisfaction. Additionally, it is important to investigate the causes of negative user responses towards information systems, and possible methods for mitigating their effects.

The objective of this research is to find out what the causes of poor system successfulness of a document management system that is currently in use at Invalidiliitto Ry are by comparing two models (TAM and IS success model) to interview responses from users of the system.

Key words: Information system, end user, usability, user satisfaction and acceptance, information system successfulness.

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Tietoteknologiaa hyödynnetään monin eri tavoin nykyaikaisessa kilpailukykyä vaativassa liiketoimintaympäristössä, jonka seurauksena on erittäin tärkeää että yritykset pyrkisivät saamaan kaiken mahdollisen hyödyn irti tietojärjestelmistään pysyäkseen kilpailukykyisinä.

Eryityisesti kyseisten tietojärjestelmien käyttäjät ovat avainasemassa yritysten menestykselle, sillä heidän suhtautumisensa järjestelmiin määrittää suurelta osin niistä saatavan hyödyn. Puutteellisen käyttökoulutuksen saaneet tai jostakin muusta syystä tyytymättömät käyttäjät aiheuttavat sen että kaikki tietojärjestelmien potentiaaliset hyödyt eivät realisoidu.

Edellämämainituista syistä johtuen on siis erittäin tärkeää saada selville millä tietojärjestelmien kehittämis- ja käyttöönotto käytännöllä on myönteinen vaikutus järjestelmien käyttäjien tyytyväisyyteen. On kuitenkin myös yhtä lailla tärkeää selvittää mitkä tekijät aiheuttavat negatiivista suhtautumista järjestelmiä kohtaan, sekä miten niiden vaikutuksia voidaan vähentää.

Tämän tutkimuksen tarkoituksena on selvittää mitkä ovat Invalidiliitto Ry:llä tällä hetkellä käytössä olevan toimintajärjestelmän huonon onnistuneisuuden taustatekijät vertaamalla järjestelmän käyttäjiltä kerättyä haastatteluaineistoa kahteen malliin (TAM ja IS success model).

Asiasanat: Tietojärjestelmä, käyttäjä, käytettävyys, käyttäjien tyytyväisyys ja hyväksyntä, tietojärjestelmän onnistuneisuus

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1 INTRODUCTION

1.1 Overview

Information systems provide processes and useful information to the members and clients of organizations, and as a result their aim is to make them operate more effectively. These systems are usually created or acquired with a specific purpose in mind, and their functionalities reflect that - because of this, most of the time the information that is processed by this kind of system concerns the organization's customers, operations, procedures or products. This type of information can then be used to make better managerial decisions. Because of the aforementioned points, the information system of a company should be considered as an important organizational resource, as companies without it are at a considerable competitive disadvantage (Fitzgerald, Avison 2002.).

Usability in general can be defined as the extent to which a system can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use. A usable system is therefore one that is designed to have specified users with concrete goals, and it is used in a particular context.

System usability is extremely important because it allows the users to achieve their tasks easily and efficiently, which in turn provides maximum benefits to the organization (Spencer 2004).

User satisfaction and acceptance determine the way in which end users perceive the system, which in turn has an effect on their use patterns. Therefore it is important that they are satisfied with how the system works and how they are expected to use it. End user involvement in the development process in combination with continued support to keep the users up to date with any changes are generally considered to improve user satisfaction and acceptance.

DeLone & McLean state that EUS (End user satisfaction), or lack of it, is often the reason for IS failure. There has to be willingness and ability from employees to operate the system effectively. Many organisations neglect to ask the end users their needs or aspirations for the system. This involvement is needed from the

beginning of implementation to ensure there are no issues regarding the system's ability to fulfil its purpose (Au, Ngai & Cheng, 2008.).

The impetus for conducting this research came from the IT department of the case company Invalidilitto Ry as a result of them getting complaints about the poor usage and effectiveness of a document management system currently in use.

1.2 Structure of the thesis

This thesis consists of seven main parts: introduction, research framework, research methods, literature review, research methodology, data analysis and the resulting conclusions, and finally discussion.

The first section consists of an overview of the thesis as well as this explanation of its contents. The purpose is to give a clear picture of the context of the study, and to explain and define the important keywords related to it.

In the second section the research question and framework are presented, and the data collection and analysis methods are explained along with the reasons for choosing them.

In the third section the topics of qualitative research and research approach of this thesis in are expanded upon and a reason for choosing a specific approach is also given.

Section four is the literature review part, which is meant to provide insight into previous studies on information system successfulness and acceptance, and it specifically focuses on models that have been developed to explain these phenomena. Key words associated with this study are also expanded on in this chapter.

Fifth section includes an explanation of the case study research method, and also provides a short overview of the case company to give some insight into the context of this study.

Sixth section contains the actual data analysis part of this thesis, and it is followed up by a presentation of the drawn conclusions in a following chapter.

The seventh and final section contains the discussions part, in which questions about the limitations, validity and reliability of this study are answered. Finally, suggestions for further research on this subject are presented.

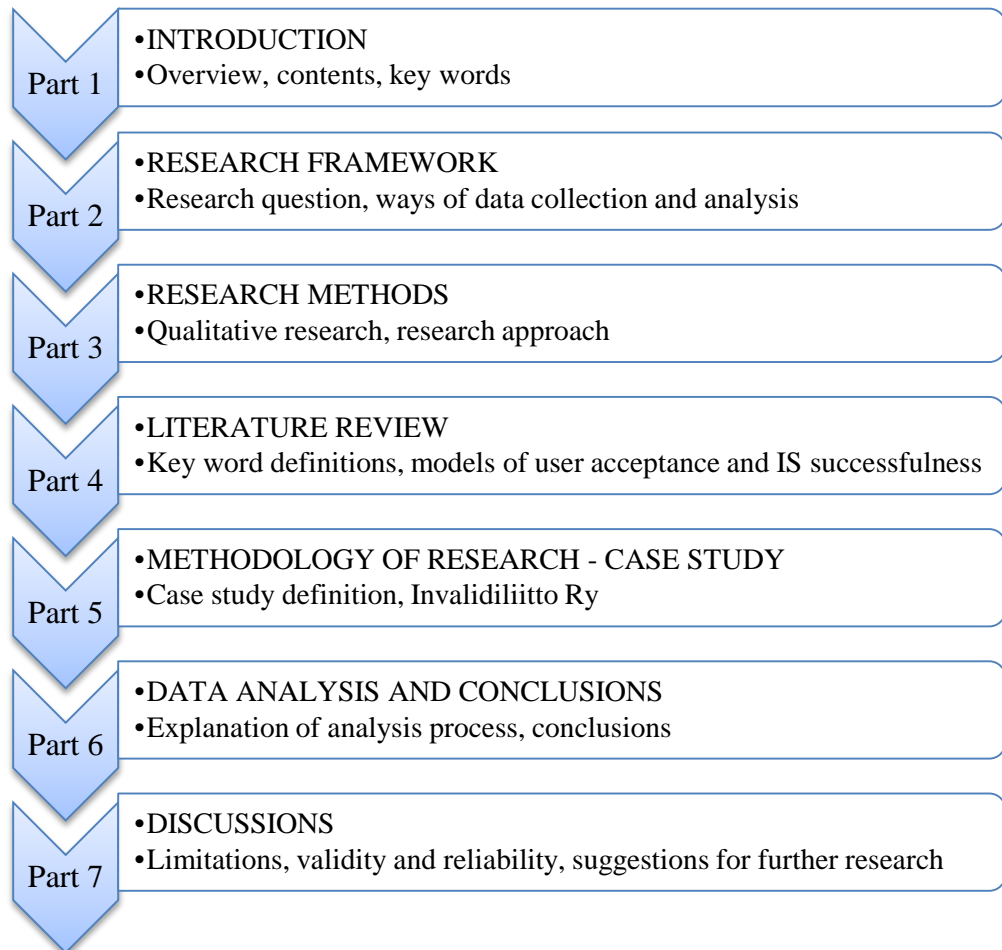


Figure 1: Thesis structure

2 RESEARCH FRAMEWORK

2.1 Research question

The main research question of this study is the following: What things need to be taken into account regarding end users for a successful implementation and use of an information system?

Because the main purpose of this research question is to understand the reasons behind individual user opinions about an information system and its perceived usability, the nature of it is explanative.

2.2 Research data collection and analysis

The data for this study was collected by interviewing a diverse sample of the user base of the current document management system. The chosen interview type in this case was structured and the aim was to gain a good understanding of the underlying thoughts and opinions of the interviewees. (Easterby-Smith, Thorpe & Lowe, 2002, according to Grange & Scott, 2010)(James, 2012) The interview questions were created with predetermined themes in mind, which were based on the data gathered for the literature review.

Data from these interviews was recorded in the form of written notes to a laptop computer. Interview sessions were performed in the premises of Invalidiliitto Ry headquarters and its Validia-services subunit located in Lahti within a period of four weeks during the months of September and October in 2014. All sessions aside from one were one-on-one, and their durations generally ranged from 10 to 15 minutes.

The results of these structured interviews were then analysed by comparing them with each other in order to find possible similarities as well as to identify general problem areas in the use of the system at the time of the study. Earlier research material was also taken into consideration throughout this analysis process to form a hypothesis.

Two different analysis methods were used to find out the most prominent causes of user dissatisfaction, as well as positive aspects in the current system based on the interviews that were conducted on the system users. These methods were qualitative analysis and cross-tabulation, which is a tool generally used for quantitative research. The results of this full analysis was then compared to the hypothesis that was based on the literature review of earlier studies on the topic.

Qualitative analysis was used to review all the information gathered from the interview sessions by first reading the gathered material, followed by separating the relevant points of information from the irrelevant ones. After this some common themes within the relevant data gathered from different people were combined in order to discover any general areas of dissatisfaction or other problems.

Cross-tabulation on the other hand was only used as an extra tool to find out general trends from the gathered data more easily, and to find out the differences in opinions and experiences between employees of management level and lower levels of the organization.

3 RESEARCH METHODS

3.1 Qualitative research

“Qualitative research is designed to reveal a target audience’s range of behavior and the perceptions that drive it with reference to specific topics or issues. It uses in-depth studies of small groups of people to guide and support the construction of hypotheses. The results of qualitative research are descriptive rather than predictive.”(<http://www.qrca.org/>, 2015).

In comparison to quantitative research, qualitative research utilizes only semi-structured data gathering methods such as open ended interviews, whereas the former uses highly structured methods like surveys and questionnaires. The aim is also to describe and explain variation and relationships, as opposed to quantifying and predicting them as in quantitative methodology.

3.2 Research approach

This study focuses on the current practices of information system development, implementation and management at Invalidiliitto ry, and specifically the perceptions that the document management system users have on these practices. The research strategy is qualitative, and the actual method of research is case study.

Research approach is deductive in nature because the main objective is to attain a better understanding of a certain phenomenon by interpreting the gathered data, and comparing it to earlier theories and studies made on this subject. Generally, studies using deductive approach consist of the following stages: theory, hypothesis, observation and confirmation, which is also the case with this specific study. (Woodwell, 2014)

Case study was chosen to be the method for conducting this research, because it is well suited for gaining experience about individual user experiences, and it also allows for in-depth analysis of precise details that are sometimes unobserved by

other research designs. (Kumar, 2005, Benbasat, Goldstein & Mead, 1987, according to Grange & Scott, 2010.).

4 LITERATURE REVIEW

4.1 User and end user

Generally “user” in the context of information systems can be defined as a person who uses an information system and makes use of its output, whether it be from within an organization or from outside of it. Furthermore, a system can have multiple different types of users, and each one of these user types can be divided further into subtypes. Out of these user types, the most relevant for this study are “end users”, which can be defined as the personnel within an organization that directly interact with the system. Even within this subgroup of users there are some distinctions between them that can and should be made clear when studying their experiences of interacting with an information system. Some of these include their level of expertise and training, frequency of use and the types of tasks that they are required to perform (Fitzgerald, Avison 2002.).

4.2 Information system successfulness

Success of an information system implementation should be measured by the extent of the actual benefits that it brings to the organization as a whole. In this specific case the expected benefits of the system include increased productivity, profitability, time saving and work safety. As a necessary prerequisite for successfulness, the system has to be well accepted by its users, and therefore it is important to find out how well they can utilize its functionalities, and how willing they are to use it in general.

4.3 Information system acceptance

The acceptance of information technology is mainly influenced by two factors: perceived usefulness and perceived ease of use. Citing the research done by Fred Davis, Abdekhoda et al. define these two in the following way: perceived usefulness is considered to be the degree to which an individual believes that using a particular system will enhance his or her job performance, while perceived ease of use is the degree to which an individual believes that using a particular

system is free of effort, which includes mental and physical efforts as well as ease of learning (Abdekhoda et al., 2013). External variables such as the user's level of education, gender and organizational features such as on the job training may also have an influence on perceived usefulness and perceived ease of use.

Ensuring the compatibility of an information system with current work practices of an organization could also be considered as a necessary component for the acceptance of information technology. If the technology in use is perceived to, for example slow down procedures or increase workloads of the employees, then patterns of resistance that lead to a poor user acceptance may emerge (Moore, 2012).

4.4 Models for successful systems

Multiple studies have been conducted and models created in order to find out an easily generalizable set of factors to explain what makes a great information system. Specifically, two of the more well-known models for this purpose are the Technology Acceptance Model (TAM) by Fred Davis, and the DeLone & McLean information system success model.

Fred Davis developed the technology acceptance model in order to explain the reasons behind user acceptance of information systems, and according to his theory the two main factors that determine user acceptance are perceived ease of use and perceived usefulness of the system. End user's attitude towards the use of a specific information system consists of at least these two factors, and this attitude in turn affects behavioural intentions, however, according to the model there is also a direct link between perceived usefulness and intentions of use, which suggests that perceived usefulness has a bigger impact on a person's use patterns than perceived ease of use. Actual system usage behavior is ultimately defined by the intentions of the user. (<http://edutechwiki.unige.ch>; "Technology Acceptance Models", 2012.).

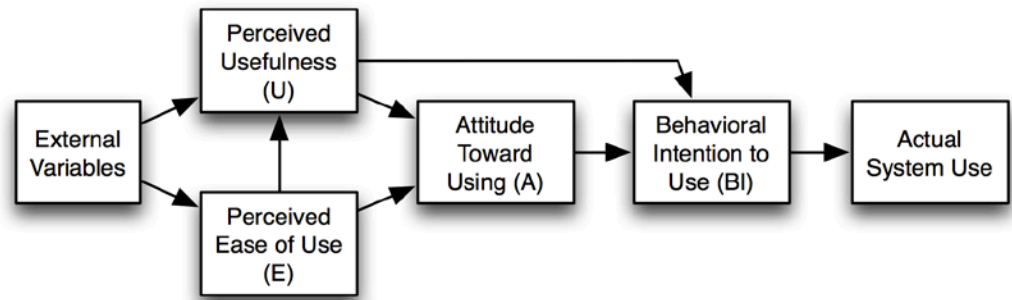


Figure 2: Technology Acceptance Model – TAM (Davis, F., 1989)

DeLone & McLean (1992) based their initial information system success model on six variables that they were able to identify by reviewing a number of preceding studies on the topic. These interdependent variables were system quality, information quality, system use, user satisfaction, individual impact and organizational impact. Following the publication of their model other researchers started to make suggestions on how to improve it, and recognizing some of these proposed modifications, D&M reviewed empirical studies that had been performed during the years after publication and revised the original model accordingly in a follow-up work. In their reviewed model the variables were updated to be system quality, information quality, service quality, system use, user satisfaction and net benefits. Service quality was added to the list based on propositions made by other researchers, and organizational impact and individual impact have been condensed into one unit as net benefits. (DeLone & McLean, 2002, 2003)

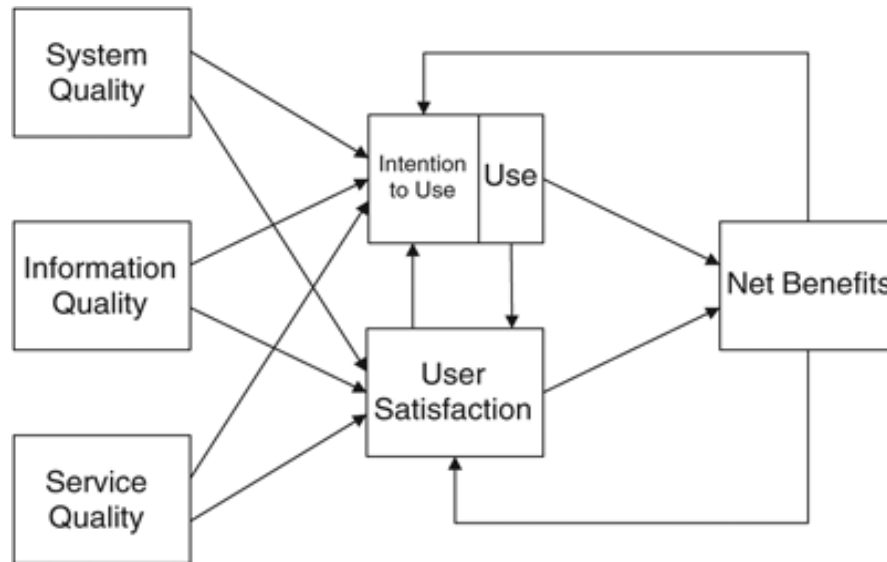


Figure 3: Revised IS success model (DeLone & McLean, 2003)

According to Somers and Gorla there have also been several other empirical studies related to IS success models, including among others Wang and Liao's application of the IS success model to citizen (G2C), the results of which showed that the relationships are valid in the eGovernment context in Taiwan, Lee et al.'s validation of the information system successfulness models within open source software environment in which they were able to find out the determinants of open software success, and Gorla's own validation of the positive impact of the information, system, and service quality on organizational performance in 2011 (Gorla & Somers, 2014).

This research shows that IS service quality is one of the most influential variables and that the link between information system quality and information quality is legitimate in information system success models, additionally, the validity of these success models in various business and government contexts through empirical studies shows that information system success models are well accepted by scholars and are useful for practitioners. (Gorla & Somers, 2014).

5 METHODOLOGY OF RESEARCH – CASE STUDY

5.1 Case study

Case study is a form of qualitative, descriptive research that could be defined as follows:

“A case study is an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident.” (Yin 2009).

There are numerous other definitions by other researchers however, and for example according to Creswell a case study consists of one or more bounded systems, in-depth data collection and multiple information sources that are rich in context. (Creswell 2007).

According to Eriksson and Kovalainen, a central feature to all case studies is the construction of either one or multiple “cases”, which are actors such as individual people or companies, around which research questions are built with the goal of gaining a better understanding. Case studies also provide room for diversity and complexity through empirical sources that are rich in context, and therefore produce more complex research designs, however, the boundaries of the case should also be clearly defined to not stray away from the focus of the study. (Eriksson, P & Kovalainen, A. 2008).

Case study research is particularly suitable for answering questions concerned with who, how and why, and as opposed to quantitative research methods such as surveys, the aim is to thoroughly understand, explain and describe a particular phenomenon in a contemporary context (Farquhar 2012), and for the aforementioned reasons this research approach was specifically chosen for this study.

Experiment	Case study	Survey
Small number of units	Small number of units (sometimes one)	Larger number of units
Data collected and analysed about small number of predetermined features of each unit	Data collected and analysed about large and often not predetermined features of each unit	Data collected and analysed about a small number of features of each case
Study of units organized in such a way as to control variables of interest	Interest in naturally occurring features or the variables in context	Units selected to represent characteristics of the study's population
Data usually quantified	Data can be quantitative, qualitative or both	Data usually quantified
Aim is of testing theory or evaluation of an intervention	Aim is to understand and theorize through enfoldng the literature	Aim is to generalize findings from sample to population

Adapted from Gomm et al. (2000)

Figure 4: Comparison of different research approaches (Farquhar 2012)

5.2 Overview of the case company

The case company of this study is Invalidiliitto Ry (Finnish association of people with disabilities), which is one of the largest providers of supported living and rehabilitation services in Finland. There are thousands of people working in the company's operational units, which consist of housing areas, rehabilitation centres and regional offices.

The company has taken multiple different types of information systems into use to improve the quality and safety of the services it provides to its clients and to increase productivity and make every day work of its employees more convenient. These systems range from document management systems that are used to track for example internal information exchange, provided services (and any possible deviations in them) and client medical records among other things to electronic service request systems.

This study focuses on the usability and acceptance of information systems that are currently in use in the regional offices of the company as well as in its headquarters, specifically a system that is used for document management on all levels of the organization.

6 DATA ANALYSIS

The aim of this study is to find out the underlying causes of poor information system acceptance, and to this end 4 to 5 open questions were asked from a sample of 15 people, of which 4 belonged to management level in different areas of the company, and 11 were regular employees working with clients in the Validia housing subunit in Lahti. The vast majority of the interviewed personnel were female (~86%), with only two of the management employees being male (~14%). Age distribution within the interviewee group was also varied, with people ranging from 20 to 55 years of age.

The questions that were given to employees and managers from different levels of the organization were generally the same, however, an additional question was given to the management level people in order to gain a better understanding of how they perceive the concrete benefits of the document management system for the organization, and how well those benefits are currently realized.

The hypothesis that information system successfulness is dependent upon the following main factors: system quality, information quality, service quality, user satisfaction, net benefits, and the development practices concerning them is tested through these questions.

Following list of question tables contains the questions themselves as well as a generalizing overview of the important points from the answers that were given to them:

- 1. Do you feel like the document management system is useful in your everyday work? Why?**
- 2. How useful do you think the system is for your company and what would you base your opinion on?**

Management:

The system is useful in everyday work because it allows easy access to documents and sharing of information. It also makes workflow within the

company more cohesive and helps with management of different areas in general.

It is beneficial for the company because it makes work processes faster and easier to track, which increases productivity and profitability. Though right now all possible benefits from the system are not realized.

Employee:

The system does feel somewhat useful for them, but it does also feel lacking since there is no access to report summaries for example, it is as if the system does not have a direct effect on everyday work.

The first question had two parts, of which the second one was only presented to the management level employees. The vast majority of regular employees felt like the system was not really useful in their everyday work, while everyone at the management felt like it was beneficial for their own everyday work as well as for the organization as a whole.

In both groups people expressed some dissatisfaction with the user interface of the system and it being difficult to use at times.

3. In what ways were you involved in the development process of the system?

Management:

Some of the managers were asked for their opinions on features and they were able to give feedback to developers. Others were not involved.

Employee:

No involvement in the development process at all.

In the second question it became apparent that end user involvement had been almost completely neglected in many cases, as only the management level people had been asked to give their input on the system, and even then not all of them were involved.

4. What kind of training did you receive for system use if it was offered to you in some form?

Management:

People from IT department did give general training to managers but it was not sufficient enough according to some of them.

Employee:

No training was offered officially to most employees, some of them were trained by others who received rudimentary training and were more comfortable with using information systems.

The third question shows another major flaw in the development and deployment process when considering earlier research on the matter. Training should be given to all users who are expected to do something with the system in their everyday work, especially if they have not been involved in the development process in any way.

5. Is it possible to get support for system use in problem situations? In what way?

Management:

It is possible to contact IT department for assistance and most of the time they are helpful.

Employee:

The only way to get help for IT problems is by contacting the IT department, for which there is usually no time. Other fellow workers help sometimes if they have time.

The fourth question deals with issues that have arisen in the use of the system after it had already been taken into use, and based on the answers that were given during the interviews it would seem that continued support for system use is also lacking in this case.

7 CONCLUSIONS

The main purpose of this study is to provide some concrete examples of what Invalidiliitto ry, and by extension, any other organization should take into account when implementing information systems, as well as how to better manage the continuous use of such systems so that their users are satisfied. These improvements and better management methods are based on the deficiencies in the current practices that were discovered as a result of this study.

The data for this study was collected by interviewing a diverse sample of the user base of the current document management system at Invalidiliitto ry, which includes people from all levels of the organization.

The results show that the main problem areas at Invalidiliitto ry are related to user training and poor user interface which results in perception of uselessness particularly for regular employees. According to the interviews, most of the system users feel like the training that they received was very minimal or nonexistent, and that the IT support personnel do not listen to their feedback enough. In the case of development process involvement, some interviewees felt like they had been consulted at many points, while others felt like they had been completely left out from the process. This kind of divide in user participation suggests that priority may have been given to some types of users over others for some reason.

End User type:	Development process involvement	Training for system use	User interface	Perception of uselessness
Management:	2	2	3	0
Employee:	11	9	9	8

Figure 5: Cross-tabulation showing general areas of dissatisfaction (*With numbers representing the amount of interviewed personnel expressing dissatisfaction towards certain areas of information system development and continued use.*)

As a result it can be concluded that there is a correlation between the amount of interaction with system developers during the implementation stage and the happiness with the system. However, even the users that were happy with the system overall had some complaints about the quality of user interface, system support and the lack of training for using any new features.

Finally, in accordance with the results of this study and the earlier research that was reviewed for the purpose of forming a hypothesis, it is reasonable to conclude that it is possible for organizations to greatly increase the effectiveness of their systems if the people responsible for system development understand the importance of end user satisfaction as demonstrated within this body of research.

8 DISCUSSION

8.1 Limitations of the study

Since the nature of case studies is to provide deeper understanding of a specific subject instead of a large amount of generalizable data, the end result of this study is still quite limited and cannot always be applied directly in other similar situations, such as other companies because the employees working there are different.

Due to limited resources, willingness and time constraints the number of interviewees for this study was rather small, which means that the conclusions drawn from this study might not be conclusive. Furthermore, the observations of the interviewees are subjective, which should also be taken into account.

8.2 Validity and reliability

“The extent to which results are consistent over time and an accurate representation of the total population under study is referred to as reliability and if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable.” (Joppe 2000).

Nahid Golafshani on the other hand, citing previous research on the matter, defines reliability in qualitative research as either an irrelevant factor, or a consequence of the validity of the study. She also explains validity of qualitative research as “truthfulness” of the research results, which is also largely irrelevant in the case of qualitative studies, however, generalizability of the research results could be considered to increase its validity. (Golafshani 2003)

When taking into consideration these definitions of validity and reliability, it can be said that this study is both valid and reliable, as the results can be generalized.

8.3 Further research

Recommended further research would be to conduct identical case studies in other organisations allowing for the conclusions to be generalised with less scrutiny,

and an additional study could be conducted to establish what processes can be used to maximise the involvement of all end users with system development.

Even though the phenomena discussed in this study have been studied quite extensively for years at this point, there is still much left to be discovered and further investigation on the topics of information system development, user acceptance and by extension user experience is warranted. Taking into account the constant and rapid evolution of technology, and the increasing level of proficiency that people have in using said technology, many new models and methods of optimal information system development and end user involvement can be developed in the future.

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