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Critical factors in information system implementation success

A case study of how to increase the usage of a SaaS based HR system

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ABSTRACT:
While the importance of technology has increased in our daily lives, it has also increased with the number of different industries and their external and internal processes. There is a lot of positive evidence of modern technology solutions, for example, to help human resources management, and more companies end up digitizing and updating their HR tools. When procuring information system solutions, companies are increasingly choosing a system from companies that offer their products with agile and cost-effective solutions based on cloud services instead of systems using traditional local installation. The purpose of the study is to find out what are the critical success factors in the implementation of an information system or in the successful introduction of a system to a new employee in the case of a personnel system based on the SaaS model. A successful implementation project is viewed from the perspective of a system service provider and with continuous or increasing usage as the measure of success. Another motivation for the study is to find out what factors influence the end user's desire to increase or begin to avoid using the system.

The study consists of an integrative literature review, in which theory and previous research are used to find out what factors are involved in a successful information system implementation process, and an empirical interview section. The theory focuses on the system implementation process, usability, and user experience in SaaS-based information systems, as well as their challenges from an end-user perspective. Based on the literature review, the critical success factors in successful implementation are the information system as a ready-to-use procurement, the information system implementation process, the implementation from the organisation's point of view, and the implementation from the end-user's perspective. Based on these factors specified in the literature review analysis, the idea of potential critical factors for successful information system implementation was translated into practice in focused end-user interviews in the study, and thus clarified how these were realised in the success of the case-client company implementation process.

The study shows that although no direct previous research on the successful implementation of SaaS systems can be found, the theory of critical success factors in traditional system implementations can be applied from the actual implementation phase and its planning onwards. Companies that make acquisitions of ready-to-use systems easily forget that, despite their apparent ease of implementation, they are essentially ordinary systems, where the most critical step to success in implementation, is where end-users are informed and oriented about it. The results of the study also suggest that increasing communication with end-users is associated with successful deployment, as is receiving feedback from end-users on continuing to actively use it, as end-users want to both understand and influence the tools they use in their work.

KEYWORDS: information system, system implementation, critical success factors, SaaS

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TIIVISTELMÄ:
Samalla kun teknologian merkitys on lisääntynyt päivittäisessä elämässämme, se on lisääntynyt myös kasvavalla skaalalla eri toimialoja ja niiden ulkoisia ja sisäisiä prosesseja. Nykyteknologian ratkaisuista esimerkiksi henkilöstöhallinnon apuna löytyy runsaasti positiivista näyttöä, ja moni yritys päätyykin digitalisoimaan ja päivittämään juuri HR-työkalujaan. Tietojärjestelmäratkaisuja hankkiessaan yritykset valitsevat yhä useammin perinteisen lokaalin asennuksen sijaan järjestelmän yrityksiltä, jotka tarjoavat tuotteitaan pilvipalveluihin perustuvin ketterin ja kustannustehokkain ratkaisuin. Tutkielman tarkoituksena on selvittää, mitä ovat kriittiset menestystekijät tietojärjestelmän käyttöönotossa tai uudelle työntekijälle esittelyssä silloin, kun kyseessä on SaaS-malliin perustuva henkilöstöjärjestelmä. Onnistunutta käyttöönottoprojektia tarkastellaan järjestelmäpalvelun tarjoajan näkökulmasta ja siten, että onnistumisen mittarina pidetään tasaisena jatkuvaa tai lisääntyvää käyttöä. Tutkimuksen toisena motivaationa on selvittää, mitkä tekijät vaikuttavat loppukäyttäjän haluun lisätä tai alkaa välttää järjestelmän käyttöään.

Tutkimus koostuu integroivasta kirjallisuuskatsauksesta, jossa teorian ja aiemman tutkimuksen avulla selvitetään millaisia vaikuttimia onnistuneeseen tietojärjestelmän käyttöönottoprosessiin sisältyy, sekä empiirisestä haastatteluosiosta. Teoria painottuu käyttöönottoprosessiin, käytettävyyteen ja käyttökokemukseen SaaS-pohjaisissa tietojärjestelmissä, sekä niiden haasteisiin loppukäyttäjän näkökulmasta. Kirjallisuustutkimuksen perusteella on määritelty kriittisiksi menestystekijöiksi käyttöönotossa näkökulmat, joiksi nousivat tietojärjestelmä käyttövalmiina hankintana, tietojärjestelmän käyttöönottoprosessi, käyttöönotto organisaation näkökulmasta, sekä käyttöönotto loppukäyttäjien näkökulmasta. Kirjallisuuskatsauksessa eriteltyjen tekijöiden pohjalta syntynyt malli potentiaalisista kriittisistä tekijöistä käyttöönoton onnistumiselle siirrettiin tutkimuksessa käytäntöön loppukäyttäjien haastatteluissa, ja näin selvittämällä miten nämä case-asiakasyrityksen käyttöönottoprosessin onnistumisessa toteutuivat.

Tutkimustulokset osoittavat, että vaikka suoraa aiempaa tutkimusta SaaS-järjestelmien käyttöönotosta ei löydykään, voidaan perinteisten järjestelmäkäyttöönottojen onnistumisen kriittisille menestystekijöille tehtyä teoriaa soveltaa varsinaisesta käyttöönottovaiheesta ja sen suunnittelusta eteenpäin. Heti valmiita järjestelmähankintoja tekevät yritykset helposti unohtavat, että näennäisestä helppoudesta huolimatta kyseessä on kuitenkin pohjimmiltaan tavallinen järjestelmähankinta, jossa onnistumisen kannalta kriittisin vaihe on se, missä järjestelmän käyttöönotosta tiedotetaan ja orientoidaan loppukäyttäjiä. Tutkimuksen tuloksista voidaan päätellä myös, että kommunikaation lisääminen loppukäyttäjien suuntaan on sidoksissa onnistuneen käyttöönoton kanssa, ja loppukäyttäjiltä kerättävän palautteen vastaanottaminen sen aktiivisen käytön jatkamisen kanssa, koska loppukäyttäjät haluavat sekä ymmärtää käyttämiään työkaluja, että voida vaikuttaa niiden käyttöön työssään.

AVAINSANAT: tietojärjestelmä, käyttöönotto, kriittiset menestystekijät, SaaS

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1 Introduction

The importance of technology is increasing in variable working fields, and different kinds of information systems and applications are being used in daily bases by a constantly broader range of professions. At the same pace with this increase, has the need for both, technological knowledge, and technical equipment, also grown. Information systems are being offered to companies more and more often with the so-called ready-to-use software systems, like cloud computing-based SaaS, PaaS, and IaaS models, because they can offer adaptive and easy to try platforms for multiple kinds of organisational needs.

Even though new technologies are being transferred from offices to altered workplaces, and a constantly larger part of the functions in everyday working life are being mechanized, the need for labor workforce is still going to remain high for a long time (Teknologia15.com, 2018). Employees in these fields are usually scattered in various locations or worksteads, and often there are no common communication channels or stabilized information sharing solutions available across the organisation, which can lead to usage of diverse ways for reaching the employees. This can easily lead to company's internal communication being unclear and ineffective, and that is the reason many of these companies are now looking for a solution that functions like a conventional human resources information system but works fluently in non-office environment.

The manufacturing and service sector industries are the fields of business which have the major turnover in workforce. The biggest reason for that is in the structure of these companies' human resources and work descriptions, for example a job in retail is very often the first job for a young individual, or a short-term job while looking for other occupation (Elinkeinoelämän keskusliitto, 2018). This large workforce turnover commits employer companies' resources constantly to recruiting, orientating, and training, and that ties time and input of supervisors and other employees. The great turnover in workforce and fixed-term jobs are one the biggest disadvantages and expenditure for organizations (Miettinen 2007: 20), and that is why companies in these business fields are

starting to use technical human resources and training tools to cut these costs and guide these unnecessarily tied resources elsewhere.

1.1 Focus and aim of the study

The aim of the study is to find out which are the critical factors for the success or failure when implementing or presenting a new, SaaS-modeled human resources information system in enterprises. The main problem of this study is to look for the reasons for the lack of active use of the SaaS system under study, which has formed sub-problems, i.e., the actual research questions:

1. *What are the critical success factors in implementing a SaaS-based information system in an organisation?*
2. *How can the service provider increase success in the implementation process of a SaaS-based information systems?*

The study is done in co-operation with a company that provides its customers a SaaS-based human resources information system service for onboarding, training, and communication: a platform that can be used as an intranet-like tool apart from the desktops. The subject of the study is the implementation and introduction process and the usage of the platform in the system providers selected customer company.

The purpose of the study is to be able to determine concrete factors in the success or failure of the commissioned information system implementation and introduction process from the end user's point of view and seek answers on how a SaaS provider can effect on the implementation experience. The study seeks to describe and understand end-user expectations of the phenomenon under study within the surrounding context. The individual views are formed into an entity that allows for better consideration of the end-user and thereby contributes to the success of the implementation.

1.2 Delimitation of the study

Information systems can be divided into static traditional information systems and so-called ready-to-use solutions based on their sales and distribution method. Ready-to-use solutions are a common and ever-increasing way to acquire information systems for organisations, but still less researched in relation to static systems. However, older theories for the design, acquisition, and implementation of information systems for static information systems are broadly valid for ready-to-use solutions as well and theories behind them have been used to consider as the possible answers for the research questions. Clear exceptions to this way of segmenting the systems have been specified, and the reasons related to the specific features of cloud service solutions have been highlighted in the theory part of the study.

The theoretical framework for the study is an integrative descriptive literature review, which introduces the probable or possible factors that contribute to the success or failure of an integration process such as the case studied. The literature review is supplemented with the methods of qualitative research by determining, through interviews, whether the critical factors found and specified in the literature review are realized in practice. For this reason, these found possible critical factors are then reflected to the themes on which the interview path is based. The implementation experience is studied via focused, half-structured interviews in a selected consumer company of the studied SaaS platform provider. The studied target group of the software users contains people who are not required to have wider before-hand experience with computers than the regular internet browsing, or to have more knowledge in computer technology than the basic usage of a smartphone or a tablet computer.

Because the nature of SaaS deployment is, from the technical perspective, so different from the implementation of a traditional software implementation, the following theoretical background is focusing more on the users' view of the implementation process instead of the initial installing and other possible operations when deploying new software. Similarly, because of the nature of retail business being often in workforce sense

quite changeable, and because one of the main purposes of the studied software is to onboard and train staff, the literature review about the implementation process of the information system is presented from the perspective of introducing new users to the system that is already in use in the company.

1.3 Structure of the study

This study is structured into six chapters as follows: chapter 2 discusses the theoretical background of the research and presents the previous research, chapter 3 presents the research plan, introduces the methods that were chosen to use in both the theoretical and empirical parts of the study and the intended use of the research and analysis methods. Chapter 4 presents how the literature review was implemented, and the key results with their analysis. Chapters 5 presents the implementation of the interviews, as well as findings and their analysis. Chapter 6 presents the discussion of the theoretical and empirical parts of the study and the comparison of them from the perspective of research questions. The discussion part also includes the discussion about the chosen methods and their usage.

2 Theoretical background

This chapter presents the theoretical background of the research through a study of the organisational information system procurements, reasons behind information system procurements and the acquisition of information systems as a service. It also sifts through the information system implementation process and specifies a success or failure of information system implementation through earlier research.

2.1 Information system as an organisational procurement

An information system as a concept, can be discussed as an entity created to serve a specific activity (Paananen, 2005, p. 364), and this entity can be defined as combinations of hardware, software, and telecommunications networks that are built to collect, create, and distribute information (Valacich & Schneider, 2017). The information system consists of data, operating instructions, programs, data processing and data transmission equipment, and the people who use the equipment and programs (Paananen, 2005, p. 364), which have usually the purpose of helping organisations to be more profitable and productive, gain competitive advantage, reach customers, or improve customer service (Valacich & Schneider, 2017). From the sociotechnical perspective, information systems are combinations of certain basic components which include a task, people, their roles and used technology, where every organisation may be thought of as a collection of interrelated parts that are working together toward a common goal (O'Hara, Watson & Kavan, 1999, p. 64).

Given the nature of information systems, it is reasonable to argue that they are a nuisance for every organisation, even though not all organisations' information systems are necessarily automatic, formally defined, or even conscious (Pohjonen, 2002, p. 8). An information system can be viewed from various perspectives, like the technical and human resource components that make up the system, and the role these components play in an organisation. To understand this entity, it is important to understand all these

views. As discussed by research, information systems' definitions can be divided into different views of how to describe them: the components that make up the information system, and the roles those components play in the organisation. However, what organisation's information systems and their operations have in common, is that they are designed to serve the organisation to accomplish its strategy and to achieve its goals (Paananen, 2005, p. 364).

According to Pohjonen (2001, pp. 8–10), when looking at the role and significance of information systems in organisation, it is practical to consider companies as functional units that can be delimited from their environment. These functional units have their own goals, and as an outcome of their activities, the inputs (raw material, information) given to them will generate the wanted result (product). The reasons for an organisation's use of information systems can be roughly divided into three categories: support for core operations, business and operational functions, support for management decision-making, and achieving strategic competitive advantage. Organisation's information system projects are usually business development projects that accomplish organisation's strategy, and the trend has been to align the company's information technology strategy with its business strategy (Myllymäki, Hinkka, Hirvensalo & Hämäläinen, 2011, p. 21). Advanced information systems give companies new ways to streamline their business, and information technology offers several new opportunities in organisations to increase and enhance their operations (Pohjonen, 2002, p. 11), for example staff interaction and co-operation, training and other on-the-job learning, and work performance.

2.1.1 Information system solution as a service procurement

Companies have increasingly begun to focus more narrowly on their own core competencies, outsource operations and procure the necessary goods and services from other organisations. This means changes in the business strategy of these companies, and a transform in procurement from being an operational support function to becoming a strategic function of the company. In addition to the role of procurement in business,

have also the procurement practises grown significantly. The development of information and communication technologies has enabled completely new ways of operating in and between organisations, and effective information management has become a significant competitive factor for many companies, especially in industry, but also increasingly in services (Huuhka, 2017, pp. 11, 17).

The number of resources from outside the organisation (services, materials, goods) accounts for more than a half of the company's total costs on average (Iloranta & Pajunen-Muhonen, 2018, p. 21), so it is no wonder that procurement is crucial when planning and creating conditions for future business and competitiveness. The key role of procurement is to bring value to the organisation and its customers, and procurement is seen as a strategic function that ensures that the organisation has the most suitable external resources for its own operations (Huuhka, 2017, pp. 24, 28). Depending on the characteristics of the procurement, it is possible to divide organisation’s procurements into five main groups: recurrent production procurement, project-type production procurement, investment, indirect procurement, and intermediate goods, which differ in terms of their objectives and practical approaches. The division into main groups helps in procurement process, because the procurements included in different groups require different internal treatment (Iloranta & Pajunen-Muhonen, 2018, p. 59).

Indirect procurement refers to all those procurements made by an organisation that are not related to the organisation's end-product or service but are needed to carry out the organisation's own activities. For example, machinery and equipment, Information technology systems and software licenses, support services, information services and human resources related procurements like recruiting and staff training, are indirect procurements (Iloranta & Pajunen-Muhonen, 2018, pp. 62–63). Therefore, indirect procurements can be described as typically being goods and services related to the organisation’s administration, sales, and marketing, as well as personnel (Huuhka, 2017, p. 42).

Whether the object of the procurement is a good, a material or a service, the procurement process is essentially similar. The most important matter is to define the need and goals precisely, to find out the supplier market, and to find the most optimal alternative (Iloranta & Pajunen-Muhonen, 2018, p. 215). The procurement of an information system is always part of a larger data processing development entity, which includes many different projects including design, investment preparation, operations, and IT development. Every software acquisition is an investment for the organisation, involving costs and an assessment of the benefits and side effects – no matter if the organisation is developing the software itself or buying software products from an external supplier (Forselius, 2013, pp. 19). Forselius (2013) has presented information system procurement process as a model presented in Figure 1. The process starts from organisation's strategic planning, annual planning, or a change in its operations, and is then followed by investment preparations. From procurement preparation phase to monitoring phase in information system procurement is like most procurement processes, and it follows the steps presented in figure: Purchase transaction, where the definition of (information system) requirements is followed by the selection, contracting, ordering, monitoring and finally the evaluation of the (software solution and its) vendor.

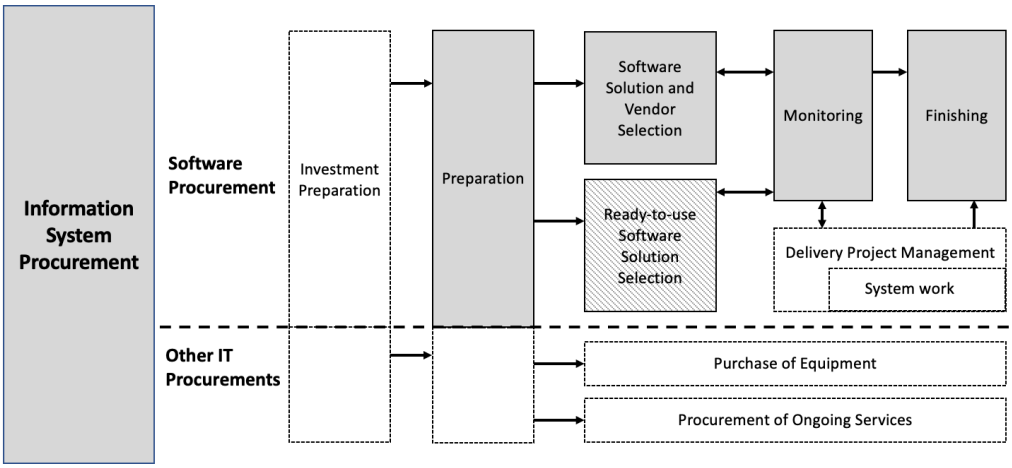

Figure 1. General view of information system procurement process (Forselius, 2013, p. 20), adapted.

The development of technology has influenced the development of procurement, and in particular the development of technological procurement. Therefore, instead of choosing a software solution and software vendor, organisations increasingly end up choosing a ready-to-use software or information system. One form of ready-to-use software is SaaS, which is becoming increasingly popular today, where the customer leases the software and hardware capacity they need and uses it over the network, most often on a cloud server of the SaaS provider (Forselius, 2013, p. 23).

The procurement process is influenced by whether the service is procured by a private sector or a public sector organisation. The processes for procurement in these two different sectors are broadly similar except for differences that are affected by legal requirements, guidelines, recommendations and directives, and knowledge of procurement law is important both in an organisation operating in the public sector, but also for a service provider (Forselius, 2013, pp. 19, 21). At best, procurement can become a catalyst for a company's business and a strategic driver of change, enabling it to rise to a whole new level (Huuhka, 2017, p. 11), and for this reason the procurement manager must know much more than just purchasing. In particular, the acquisition of an information system is a demanding task, and the person responsible for it must be able to consider a wide range of factors, including technical, legal, organisational, and psychological, and assess their impact on the outcome (Forselius, 2013, p. 14).

2.1.2 Ready-to-use systems and SaaS

Cloud computing refers to the applications delivered as services over the Internet and the hardware and systems software in the data centers that provide those services (Armbrust., Fox, Griffith, Joseph, Katz, Konwiski, Lee, Patterson, Rabkin, Stoica & Zaharia, 2010). Youseff, Butrico & Da Silva (2008, p. 4) define cloud computing as an information technology service that enables the user to use the information technology infrastructure on-demand via a data network. These information technologies services can be called cloud services, which is the base for the variety of different kinds of ready-

to-use information systems and applications. In this study the focus is on SaaS, which means a software or a complete application that is delivered as a service to the consumer via web, and where the consumer is at the most required to configure the application-specific parameters consumer finds essential for the usage, and manage application users (Kavis, 2014, pp. 17–18). The SaaS product is usually leased from a service provider, and the services that are the subject of the application lease are located on the service provider's cloud server so that they are as widely available as possible and easily scalable according to the size of the user base (Forselius, 2013, p. 23).

Rönkkö, Ylitalo, Peltonen, Koivisto, Mutanen, Autere, Valtakoski, & Pentikäinen (2009, p. 62) have defined five characteristics of Software as a Service and SaaS companies, which can be expanded and clarified by the SaaS definition made by Mell & Grance (2011) for National Institute of Standards and Technology, to sum up in seven typical features that describe SaaS. This expanded list of characteristics is:

- Product is located on a provider’s cloud infrastructure.
- Product is accessible from various client devices and used through a web browser or a program interface.
- Product is not tailor made for each customer.
- The product does not include software that needs to be installed at the customer’s location.
- The product does not require special integration and installation work.
- The product does not require any management or controlling of the underlying cloud infrastructure by the consumer, except for possible limited user-specific application configuration settings.
- The pricing of the product is based on actual usage of the software.

For information systems or applications using the SaaS solutions, the service provider handles all the systems’ required infrastructure, all the system logic, all deployments, and everything pertaining to the delivery of the service or product. SaaS models are extremely common for non-core-competency functionality, which provides consumers

that are using them the freedom from not having to do the support for application infrastructure, provide maintenance, or hire stuff to manage it (Kavis, 2014, p. 18).
All users share the same codebase and instances of the software, which enables large economies to scale, and by this lets service consumers to quickly change the presentation, logic, and database layers of the application through on-screen clicks and without any code modification, compilation, or deployment. Moreover, this allows SaaS providers to release frequent software updates and upgrades and give their customers a seamless access to the latest version of the service bundled with their unique customizations (Hai & Sakoda, 2009, p. 258). Application leasing and cloud services usually involve some security threats that prevent all organisations from taking the opportunity to take advantage of these services. On the other hand, even organisation's own, enclosed data centres are not completely unbreakable, as some ports must be kept open anyway due to communication and data transfers. In SaaS services, customer-specific adjustments are usually non-existent or at least significantly smaller than when purchasing a software or an information system, which also reduces these risks (Forselius, 2013, p. 23).

Right after the first smartphones came along, revolutionized the idea of work not being bound to a certain place or office anymore. The increase of consumer mobile devices, tablet computers and low-cost-computers gave rise to the trend of using own devices at work, which generated the expectations for companies to provide the latest consumer technology for use in workplaces (White, 2019). SaaS offerings let companies of all sizes test and take in use new applications a lot more quickly than they could with legacy software (Kaplan, 2007, p. 53), and answered to organisations' needs of keeping up with rapid technological development in cost-effective way.

2.2 Implementation of information system

The implementation of a computer-based information system can be used as describing the very different stages of the lifecycle of the system (Nurminen, Reijonen & Vuorenheimo, 2002, p. 2), and the implementation process of it involves more than just

installing the software or hardware. When a new information system is brought into an organisation, it usually means a major change in it. Some operations for example may completely change, when a new way of working supported by this exact new system is being introduced (Lehtimäki, 2006, p. 175) to the users. The term implementation can also refer to the extent to which the system is used and how satisfied the users are (Pinto & Millet, 1999). The deployment of an information system is therefore a process that will result in the implementation of a new or improved system (Hyötyläinen & Kalliokoski, 2001, p. 25). So, implementation specifications may differ a lot, depending on the perspective. From a technical point of view, the implementation of an information system means the implementation, parameterization, and possible computer conversions of the selected information system from the old system to the new one (Hyötyläinen & Kalliokoski, 2001, p. 25), and as an example for another viewing point, Lucas., Ginzberg & Schultz. (1990, p. 1) have defined information system implementation as a change and improvement in information handling and sharing. In a good case, the introduction of a new information system into a company is organized into a project, where the building of the system is its own project, and the implementation is its own, whereby the synchronization of these two takes place at the project level (Lehtimäki, 2006, p. 175).

There is a great difference between SaaS based information systems' and the traditional information systems' implementation because SaaS has significant divergences in its software providing and sharing methods. According to Hai & Sakoda (2009), SaaS systems have driven a completely new deployment methodology. With no infrastructure to be purchased, set up, or maintained, a SaaS application is immediately available for customization, and a declarative development model enables all changes to be quickly designed, implemented, and shown to users for possible feedback (Hai & Sakoda, 2009, pp. 258–259; Kaplan, 2007, p. 53). From other perspective, SaaS model may offer organisation less variability or less tailored solutions than building an information system for their specific usage from scratch (Kaplan, 2007, p. 51). This chapter discusses the implementation of an information system in general, but from a perspective that can be used to reflect on the implementation of a ready-to-use software like SaaS as well. The

next sections describe the information system implementation process and information system implementation success in general, as well as the most common measures and models used to indicate the system implementation success.

2.2.1 Implementation process

As noted earlier, the life cycle of an information system can be described and divided in various ways, perhaps the simplest of which is the waterfall model that Alter (2002) that roughly divides it into five phases. The starting point of building or improving an information system is always a risen problem or an opportunity, for which the solution will be the new or improved system. The identification of a problem or opportunity is followed by the design phase of the information system, during which the idea generated is refined to provide a clear idea of what is expected of the new information system. The design is followed by an implementation in which a new system is developed based on the defined needs. The new system will be available to users during the deployment phase (Alter, 2002, p. 474).

According to Turban, McLean and Werthebe (2002, p. 368), implementation can be accomplished in four different approaches: plunge, parallel, pilot, and phased, each of which can be used as a stand-alone operation or in combinations of some of these with another approach. In plunge, the old system is simply shut down and the new one is started. In this approach, the costs are low, but the risks are high, and problems can arise if, for example, not all errors are found in the testing. In parallel approach, the old and new systems operate simultaneously for a period, allowing the biggest problems to be solved before the old system is completely shut down. Of course, using the two systems together will increase costs and cause additional work. The pilot approach can be used if the organization has multiple units. Initially, the system will be put into trial operation in one unit and, once the functionality has been verified, it can be introduced in other units as well. In this way, employees of other units can learn from the experiences of pilot users. The last approach is phased, where deployment can be done, for example,

by site or time-separate installations, in which case the main modules are installed first and later the modules related to the support functions.

Alter's (2002) division of the implementation phase is shown in Figure 2. In traditional project lifecycle thinking, the implementation phase follows the development phase that results in the system to be deployed. The implementation process begins with the preparation of a implementation plan, which includes plans for three phases of the implementation: a training plan that explains the methods of how and to who in the organisation will be trained (Alter, 2002, p. 485), which should cover the minimum requirement of an appropriate instructions for use (Pohjonen, 2002, p. 37), conversion plan that includes measures to transition to the new system, and an acceptance testing plan that describes the processes and criteria for validating the system. After successful acceptance testing, the new system can be implemented. Once implemented, the necessary checks can still be performed to ensure the functionality, correctness, and integrity of the system (Alter, 2002, p. 485).

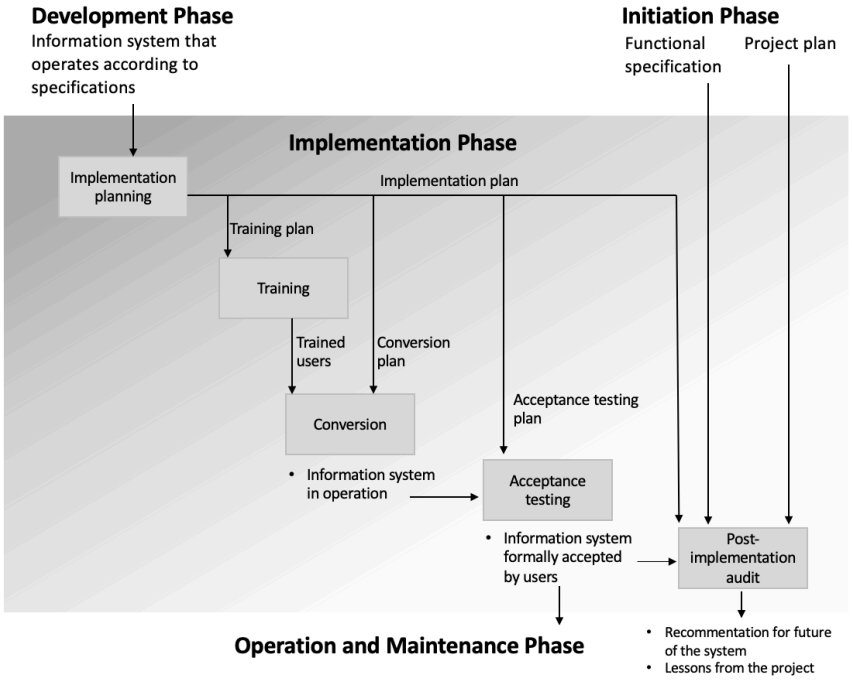

Figure 2. Steps in the implementation of the traditional system life cycle (Alter, 2002, p. 485), adapted.

Another alternative way to classify the implementation process is Waldorf's (1999) eight-step process implementation methodology, which differs most from Alter's in that it emphasises the importance of documentation and training early in implementation process, but the actual training phase occurs only after the system has been installed and tested. The main difference between the implementation process of a traditional information system and a ready-to-use information system is that the development phase, the initiation phase and the operation and maintenance phase are largely managed and controlled outside the internal processes of the organisation implementing the system. As a result, information system implementation processes in organisations are shorter in duration, but the systems do not necessarily evolve and scale to meet the growing or evolving needs of the organisation (Hai & Sakoda, 2009, p. 258). This may also lead to difficulties in evaluating the implementation success, as sometimes the problems in preparation and planning phase can be found outside of the project: lacking in organisational and project management, or overall project culture (Myllymäki et al., 2011, p. 13), which can be hard to identify when implementation process is scattered to different organisations.

2.2.2 Successful implementation of information system

Building an information system is a business process, and as with other business processes, design affects its internal operations and the resulting end product. The performance of the final product can be evaluated in terms of cost, quality, reliability, and regularity. For internal operations, evaluation can focus on utilization, integrity, productivity, downtime, or safety (Alter, 2002, p. 473). Different stakeholders often have different views on what defines a successful information system implementation. From a developer’s perspective, a successful information system has been completed and deployed on schedule, costs have remained within budget, and the system includes all the planned features and functions. From the point of view of a system designer, a successful system attracts a large, loyal and growing user base. From the perspective of a company’s management, a measure of a successful information system is reduced costs and lowered

risks, and end-users evaluate the success of the system from its effects on their work performance (Briggs, De Vreede, Nunamaker & Sprague, 2003, pp. 5–6).

Studies on the success of an information system implementation have generally focused on the characteristics of the different phases of the system and the characteristics of the different information systems, and most studies have focused on a specific area (Larsen, 2003, p. 170). For example, according to Hamilton and Chervany (1981, p. 55), there are two perspectives on the evaluation of information systems, a goal-centered perspective and a resource perspective. From a goal-centered perspective, information system goals serve as metrics for measuring success. The resource perspective refers to how well the resources have been utilized, i.e., how effectively the units and users who use the information system achieve the goals set for them. The goal-centered perspective emphasizes the results and the resource perspective the processes that achieve the desired results. In addition to these, however, user satisfaction is today being considered an acceptable and most commonly used measure of information system success (Mahmood et al., 2000, p. 751).

Some studies measure multiple dimensions and relationships between these perspectives of success, but the measurements have been implemented in very different ways in different studies. Some have measured all the different dimensions, while others have measured all the dimensions from the perspective of a particular application area (Larsen, 2003, pp. 170–171).

3 Research plan and research methods

The study is conducted in two parts and separate techniques, an integrative literature review and in-depth interviews with the selected client organisation of the case company. The aim of this study is to identify the most critical factors of the successful implementation for new workers and overall usage of the system by provider. Since the pricing of the SaaS models are generally leaning on its end-user activity, successful implementation or introduction is defined in this case as a situation in which the usage of the information system continues actively in the client company, or the platform is engaging its users. According to Davis et al. (1989) factors affecting this success can include time taken in the implementation, bugs in the system, pass experience or inexperience with similar software, access to the required information, general attitudes towards the system, and factors related to product usability, such as the ease of use and its efficiency (Ovaska et al., 2005, p. 4). The final goal of the research is to find out the concrete points from this information system implementation experience, that positively effects on the usage of the platform. By that these critical factors can be taken into consider on the implementation phase, and that can help case company and alike SaaS providers to better engage the end-users on their software or platform.

Despite the fact that the main research question and the topic of this study is a platform's implementation process for a new employee, as well as the factors influencing in the further use of it, in essence the problem to be solved is the success of a business plan of a SaaS company. This study follows interpretivism because it is trying to create a richer understanding of how individuals in the workforce interpret experiences and situations. There are many forms of interpretivism but common to all of them is a concern with subjective and shared meanings (Eriksson & Kovalainen, 2008, p. 19). Interpretivism emphasises that humans are different from physical phenomena because they create meanings, and in interpretivism these meanings are studied. As individual people of different cultural backgrounds, under a variety of circumstances and at different times make alternative meanings, and in that way create and experience diverse social realities, these rich insights into humanity create an excellent base for understanding and interpreting

the social worlds and contexts. If research focuses on the experiences that are always common to everyone, much of the richness of the differences between individuals and their unique circumstances will be lost, and the understanding of what the research delivers will reflect to this (Saunders et. al., 2019, pp. 148–149).

This study is qualitative and explanatory in nature. The study attempts to find out the users' opinions and the reasons for their actions in practical situations. The purpose is to clarify the factors behind the problems with the use of the information system and to find out how the implementation and presentation of the information system can be improved in the future. Critical factors in experiencing the information system implement can be viewed from at least three different angles:

- The characteristics of the information system, the cloud services used, and the interfaces between the service provider and the supplier.
- The platform's user interface factors and their impact in usability experience and overall user satisfaction.
- Attitudes related to information system implement and presentation, and other factors related to its adoption and the willingness to use it.

In this study, theory provides a basis for understanding the research phenomenon and is applied both in literature review and in the definition of hypotheses for the creation of interview questions. Therefore, the research approach is deductive, i.e., theory-based, and seeks to verify an existing theory, and thereby find answers to research questions. This chapter describes how the data collection for literature and interview section of the study will be carried out and how their analysis will be carried out.

3.1 Literature review

A literature review is a research method that examines previous research, compiles their results, and thus generates new research results. The aim of the literature review can

either be to develop an existing theory, to build a new theory, or to obtain the most comprehensive picture possible of the topic under study (Salminen, 2011, pp. 3-4). The literature review is used to outline the totality of the research topic. It provides information on how much research data exists, from what perspective the topic has been studied and by what methods it has been studied so far (Hirsjärvi, Remes & Sajavaara, 2009, p. 121).

An integrative literature review is considered to be the most comprehensive type of the literature reviews. When using the integrative literature review as a research method, the aim is to obtain comprehensive information about the research subject by combining previous research and making a general summary of the obtained material (Flinkman & Salanterä, 2007, p. 85). The source material is used in a great variety of ways, and the material used is not limited to only empirical research, but also theoretical and conceptual materials are considered important. The material used in the integrative review is collected from several different sources, and the research material is not screened as accurately as in other literature reviews. Therefore, a larger sample of the research subject can be obtained in integrative review (Salminen, 2011, pp. 8, 31). An integrative literature review was chosen as the type of literature review to this study, because the aim f was to get the widest possible picture of the phenomenon covered by the research question, without unnecessarily delimiting the material to be covered with very precise criteria.

The stages of an integrative literature review (Figure 3.) are the preparation of research questions, the collection of data, the evaluation of data, the analysis and interpretation of data, and the presentation of results (Salminen, 2011, p. 8). The research is started by defining the research task, research questions and key concepts. All possible methods are used in the data collection in order to obtain as much potential material as possible. When evaluating the data, several different methods can be used to find out the weight of the conclusions of the data (Flinkman & Salanterä, 2007, pp. 91-97). A descriptive integrative literature review was chosen as the research method of the study because of

the desire to gain a wide and comprehensive view of the research topic, and how the research on it has developed during the time, in order to be able to clarify which are and have been the core factors affecting to the research questions under study. The initial idea of the research question was based on the need for a case company, but the sub-questions were slightly modified to better suit more general research. The research questions partly determined the choice of the research method, because since a lot of previous research had already been done in the field, it was found that the literature review is very suitable as a preliminary research method. The aim was to collect and summarize the previous theory related to the research topic, using the widest possible and most diverse sources of information, and to clearly identify the probable answers to the research questions that have remained and established over the earlier studies.

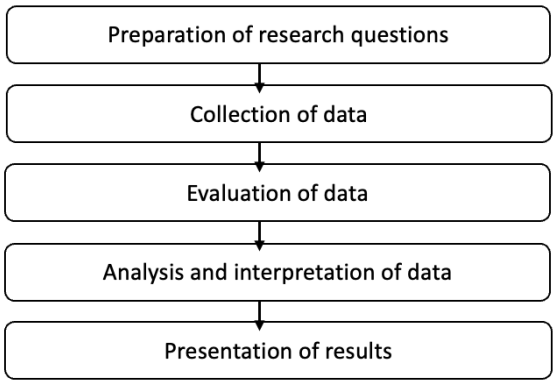

Figure 3. The stages of integrative literature review according to Salminen (2011).

3.1.1 Search and selection of research materials for literature review

A well-prepared plan is the basis for conducting a literature review (Stolt, Axelin & Suhonen, 2016, p. 111). When building a literature review, it is important that only relevant literature directly related to the research topic is screened for the review, and the well-limited collection of material and its appropriate review can be considered a sign of a successful literature review (Hirsjärvi et al., 2009, pp. 258–259). For this reason, keywords need to be developed and exclusion and acceptance criteria selected for the

collection of material (Stolt et al., 2016, 111), but since a highly permissive descriptive integrative literature study is chosen as the literature search method, no very precise definitions are necessary to set for the databases, keywords, and other factors used as search criteria. Instead, the selected materials sought to emphasize non-fiction literature related to the topic of the research questions, peer-reviewed studies, and summary reviews of previous related studies, as suggested by Hirsjärvi et al. (2009, p. 259).

Despite the fact that the selection of the material to be studied is scaled up very widely, source criticality is still a necessary and important part of the data collection process. According to Vilkka (2002, Lähdekritiikki), source criticism is all the processes of conducting research, according to which the source of information to be used is selected, how relevant information is extracted from it, and how information is structured in the research. Hirsjärvi et al. (2009, pp. 113–114) list the following factors to help evaluate the source:

- The author and publisher of the material must be known, and the author should be a known expert on the field.
- The information should be reliable and accurate:
    - A list of sources must be found in the publication, and the publishers must be credible and responsible.
    - The source material should be as new and up to date as possible, considering the research problem and the rate of change of research data on the topic.
- The source material must be objective and truthful: the material should be treated objectively, considering any biases that may be observed in the emphasis of the text or the use of language.

The database research will be limited to Google Scholar, Scopus ja Finna.fi. Google Scholar provides a way to broadly search for academic and scholarly literature across many sources like articles, theses, books and abstracts from academic publishers,

professional societies, universities and other websites. It aims to rank the documents in a way that researchers do, weighing the full text or document, where it was published, who wrote it, and how recently it has been cited in other scholarly literature (Google Scholar, 2021). Finna.fi is a search service that compiles a wide range of materials available online from hundreds of Finnish actors, as well as information on material in libraries and archives that has not been digitized or access to which has been restricted (Finna.fi, 2021)**.** Scopus is the largest abstract and citation database of peer-reviewed literature: scientific journals, books and conference proceedings, and is widely used among academia, business and government (Scopus, 2021).

Only Finnish and English are selected as search languages because of the scheduling and resources reasons. The inclusion criteria for the selection of material loosely follows Hirsjärvi et al. (2009) list above, but the search will include publications of different levels, textbooks and other literature in the material, as well as sources of selected materials, which will be evaluated according to the same criteria. The initial selection of the material will be done on the basis of the title and the abstract, and as the selection criteria is loose and the aim is to create as diverse and comprehensive description as possible, the selected materials will be critically reviewed to ensure suitability and relevance throughout the process.

3.1.2 Method of data analysis and the construction of the literature review

It is important to plan the analysis phase of a literature review at an early stage of the study, as the analysis phase has the greatest potential for error in the research (Stolt et al., 2016, p. 112). In the integrative literature review, a readable and clear summary of the extensive material is made in the analysis phase of the material, in which general conclusions are drawn from the research results (Flinkman & Salanterä, 2007, p. 95). Salminen (2011) describes that an integrative literature review can be though as a link between a narrative and a systematic review, and that according to Birmingham (2000) it can be placed as a part of a systematic review with some narrative spices. An

integrative review differs most clearly from a narrative review in that a critical review can be considered essentially as a part of it. It is also a methodological requirement, as critical evaluation allows the main research material to be summarized as a basis for the review. The structuring of the content into a text can also be examined with the help of thinking about what kind of analysis the aim of the research is to create. A pragmatic analysis looks for differences and regularity, based on which material is grouped, how these groups are categorized, and how the categories are named, but a narrative analysis creates a synthesis based on data without looking for differences (Vilkka, 2020, Reasoning and text structure).

As the research questions of the study are used for searching information on a qualitative research problem, for which, however, no exact previous research could be found, a partly descriptive, but mostly data-driven and inductive content analysis is chosen as the method of data analysis. In this way, the aim of the literature search is to provide a scientific background for the research questions, to position the possible connections with previous research, and to refer to how the research of the factors influencing the research question have developed over time. The purpose of the analysis of qualitative data is to increase the value of information, because the aim is to create clarity about the phenomenon under study from fragmented data. Analysis can be used to create clear and comprehensible data from any material, as well as to draw conclusions and present hypotheses. The qualitative processing of the material is based on logical reasoning and interpretation, in which the material is first broken into parts, then the concepts are created, and finally everything is reassembled. Data-driven content analysis is a three-step process in which the material is reduced in the first stage, clustered in the second stage, and abstracted in the last stage (Tuomi & Sarajärvi, 2018, p. 188).

3.2 Focused interviews

When considering the selection and collection method of research material, it is necessary to consider how it is possible to describe the research problem as accurately as

possible. The research method and what it wants to achieve guides the choice of research material very strongly (Eriksson & Kovalainen, 2016, p. 82). In the selected case, the survey sample of the empirical part of the study is quite small, and the research population is deliberately homogeneous, so the chosen research type is qualitative. On the other hand, there are some wider similar features in the research group, for example in the professional field, and the impact of these on the introduction experience is also sought (Hirsjärvi & Hurme, 2009, pp. 38–39).

The focused, semi-structured interview, or a so-called themed interview method was chosen as the second type of research because of the desire to obtain insight data for the research problem of a very specific case study. The interview required persons who work in a specific customer organisation of the company as interviewees, as a result of which they have, by default, become acquainted with the software under study. In addition, the aim was to choose the type of interview that would allow the analysis of the interview material to start already during the interviewing phase, as the themes and script of the interview could be made well supportive of the research question.

3.2.1 Methods of data collection and making of the frame for interviews

Following the thematic structure of the theoretical part of the study, a frame for the interviews will be formed. In order to ensure the smooth running of the interview, more specific and individual questions should be prepared according to the themes. Questions are generated according to the framework created for each theme. The reliability of the study is affected by conceptual and content validity, and the concepts of the phenomenon under study must be clearly defined in order to be able to make a reliable study of the research problem, as the interview framework is based on the key concepts. The interview questions should therefore reach the selected thematic area comprehensively. Sufficient additional questions from the thematic area ensure the validity of the content (Hirsijärvi & Hurme, 1991, pp. 128–129). To ensure the best possible flow of the interviewing frame, it will be tested with a test interviewee.

3.2.2 Method of data analysis

The first planned conduct of the interviews differed in part from the final method used. This also changed the way the interview results obtained are analyzed in the final study. An observation is a basic method necessary for all branches of science, and it can even be argued that all scientific information is based on observations made about reality. In a face-to-face interview, the interviewer is able to interpret the interviewee's non-linguistic messages (Hirsjärvi & Hurme, 2009, p. 35, 37) and original plan was to do a light observation from the interviewees body-language and gestures during the interviews. Because some of the interviews were in the end not done face-to-face, the detection of non-linguistic messages was abandoned, and observations from only the linguistic messages, i.e., usage of certain phrases or descriptive words, were made.

The general analysis method for the so-called thematic interview, thematising, as well as often a direct derivate for this, typing, were selected as the analysis methods for the material in the empirical part of the research. Thematising refers to when the analysis phase examines features that emerge from the material that are common to several of the interviewees. These features may be based on the themes of the interview, but it is common for other themes to emerge in addition to these, which are often more interesting than the starting themes for the outcome of the analysis. Typing, on the other hand, means analyzing the cases in the material in order to determine how it could be grouped on the basis of certain common features. The aim of the typing is to classify all the interviewed cases into two or more types on the basis of some key emerging factors (Hirsjärvi & Hurme, 2009, pp. 173–175).

4 Key results of the literature review

This chapter discusses the emerged key results from the analysis of the research data of the literature review. The first part of the chapter introduces the implementation of the literature review, and the following parts present the findings. The study concluded with a literature review on what factors have been found in previous studies to provide answers to the research problem, and how found research on the involved subjects have evolved over time. The literature review of the study includes carefully selected excerpts from studies related to the success and failure of information system implementation, as well as observations on the critical success factors established in research in information system implementation and presentation to new users.

4.1 Implementation of the literature review

This literature review has been carried out on the principles of a narrative review, following a systematic approach to research search. The literature review process thus proceeded according to the model of the narrative literature review. The information search was based on a mind map composed of the main concepts of the research questions and their causal relationships, presented in Figure 4. The mind map was used to compile keywords and keyword combinations, and it was later also used to create a literature review structure for the theoretical framework of the study.

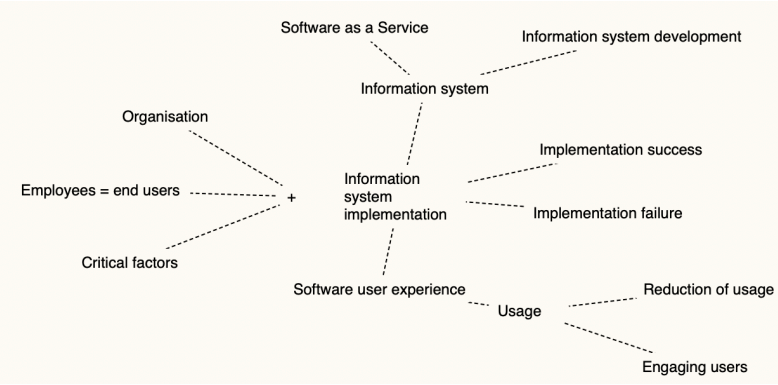

Figure 4. Data search for the literature review, mind map of the main keywords and terms.

“Information system”, “information system implementation” and “software user experience” were the three main terms used in information retrieval, as they are the most important terms related to the topic of the research. Among other things, “SaaS” was added as their sub-terminology, as it is a term that defines the research question and the case under study in various ways. From SaaS onwards, keywords such as “information system procurement” were derived. Similarly, the search for information system implementation was expanded to better address the topic by searching for “successful implementation of an information system” and, in addition, the “and” Boolean for more information on the critical drivers of the successful implementation process. Incidentally, different keyword derivatives, different forms of the keywords used, and the use of different Boolean logics by search engines played a major role in information retrieval because the theoretical framework of the study was sought to be as descriptive and comprehensive as possible (Ridley, 2012, pp. 41-42). It was decided to address the implementation and usage of the information system from the perspective of both the company acquiring the system and its end-users at the initial stage of the research design, and this way of thinking guided the search for information through the literature review.

Database searches were performed on electronic databases in Finnish and English, as it would not have been possible to translate material in other languages due to schedule and resource reasons. Therefore, when examining the collected material, it is necessary to consider the so-called language bias, why it has been possible to lose valid material in non-selected languages (Kääriäinen & Lahtinen, 2006). When searching for information in Finnish and English on materials with a lot of established terminology, it was necessary to consider that both languages search for information on the exact subject, so database searches were prepared by making a list of correct concepts and terms in advance. The main databases for data retrieval were Google Scholar, Finna.fi and Scopus. Finna.fi was mostly used to study the archives of libraries, especially university libraries.

The preliminary suitability of the database search materials was justified on the basis of their title, a method that can cause a so-called selection bias (Kääriäinen & Lahtinen,

2006), which was tried to prevent, if possible, by looking at the contents and abstracts of the materials as well. In addition to the database search, some literature was also selected by searching the material from the source lists of the material already found in the databases, which helped both to expand the valid material to be processed and to tackle the above-mentioned bias. In addition, various electronic databases were mainly used to search for non-electronic sources such as research literature and other materials. The chosen type of literature research allows for the extensive and looser use of the materials, so some so-called gray literature was also selected as the material. The gray literature refers to, for example, various non-peer-reviewed reports, thesis and other dissertations, conference literature, popular media, work-in-process papers and specialist literature (Ridley, 2012, p. 46).

Precise definition of inclusion and exclusion criteria for a literature review increases the reliability of the review and reduces the potential for skewed results. Criteria can be determined according to the research question, including a review of several starting points such as target group, intervention, control and outcome, research design, or timing (Stolt et al., 2016, p. 57). This study sought to adapt to the results of the earlier represented list of Hirsjärvi et al. (2009) as well as possible, i.e., the selected materials had to meet the criteria of reliability, credibility and be relevant to the extent possible for the selected materials. The selected articles were evaluated as they were read through. Evaluation serves as a tool to ensure reliability, as it can prevent potential errors at an early stage and prevent biases in research results (Stolt et al., 2016, pp. 25–28). The following table (Table 1.) presents the inclusion and exclusion criteria used in the selection for review:

Inclusion criteria	Exclusion criteria
- original scientific research, peer-reviewed article, textbook or other proven source - original study or official translation available in Finnish or English - source full available online or in paper - discusses the implementation of the information system and the factors	- author, year of publication or otherwise the reliability of the source cannot be guaranteed - the publication or official translation is not available in Finnish or English - source not full available online - discusses information system development or other technical aspects

affecting it from the point of view of the service provider, implementing organisation or end-user	not suitable to answer research questions - perspect cannot be reflected to answering research questions

Table 1. Inclusion and exclusion criterias used in the literature review.

The collected material was read through from the parts that were relevant to the study: appropriate chapters were read from the books, articles were read in their entirety, and at least abstracts, conclusions, and summaries were read from the larger studies, as well as all the sections that were discussing the topic in accordance with the table of contents. The terminology and concepts related to the research questions were extracted from the collected source material, which were tentatively classified at a very early stage in order to create an overall picture of the research material. The entire research material was selected as the unit of analysis because it is about the same phenomenon under study.

For the theory-based content analysis, theories selected for the classification of the material were 1. Success of the procurement, 2. Success of the information system project, 3. Success of the implementation, 4. Success of the implementation from the perspective of the implementing organisation, and 5. Success of the implementation from the end-user's perspective. Initially, publications were included at a rather low threshold because of the desire to describe the information found in as diverse a manner as possible. However, when processing the literature, the materials and their parts were eliminated, for example, because their content was ultimately not relevant for the research questions. 72 publications were ultimately selected for the literature review, of which 22 were excluded by further delimiting the content, resulting in a final sample of the literature review of 50 publications. Selected publications and how they divided in classification are presented in Appendix 1.

During the reduction of the material, all additional sources were removed from it, and efforts were made to find answers to the research questions, and to find similarities and differences in the material under study. After that the material was clustered,

whereupon the actual classification of the material began with the grouping and combining the reduced expressions. At this stage, the focus was on exploring the similarities and differences in the data, which resulted in the creation of subcategories. The upper classification was formed based on the topics of the subcategories, and the main categories were formed after this classification was made. It is noteworthy that the material to be studied is very extensive and partly overlaps in its topics, so the same materials ended up in many categories. Based on this classification, a draft of the theoretical framework of the study was constructed, which was later restructured a couple of times due to the inexperience and human error of the researcher.

4.2 Critical factors in the success of implementation of an information system

Both information system developers and end-users often have very unrealistic picture of how easily a new information system can be implemented in an organisation (Hertzum, 2002, p. 199), as the process of implementing a new information system is influenced by many factors related to individuals, organisation and technology. Multiple lists of factors influencing the success or failure of information system implementation can be found in the research literature. One of the most comprehensive of these is the critical factors list from Pinto and Slevin (1987), which consists of ten major factors that have an impact on the success of deployment. These ten factors include project mission, top management support, project plan and schedule, end-user consulting, project team, technical tasks, customer acceptance, monitoring and feedback, communication and troubleshooting.

The mission of the project describes the whole purpose of the implementation. Several studies have found that a clear and precise definition of goals is important, and that these goals should be clear not only in the project team but also throughout the organisation. The people in charge of the project work under the authority of the management, but at the same time the project team acts as a mediator of the plans and goals of the senior management to the rest of the organisation, and with the help of management,

the necessary resources are allocated to the project. Detailed plans must be created for each phase. The plan must consider the scope of the project and the division of labor into different task, it must be measurable, thereby identifying potential risks (Pinto & Slevin, 1987, p. 24).

Implementation concerns end-users to the greatest extent possible, because end-users are the people who come into contact with the new system in one way or another. The expectations and wishes of end-users should always be considered when developing, deploying and implementing a system. In several studies, end-user consulting has been identified as one of the most important factors in improving success in system implementation. People in the project team are important and often overlooked factor in the success of implementation. Technical tasks refer to the technical skills of the people in the team but also to the technology of the system to be implemented: the project team must consist of people with the necessary skills, and the system must have the necessary technology and technical environment. Customer approval is required at the final stage of the implementation process, where the overall impact of the project is assessed. System developers may make the mistake of believing that if they complete all the previous stages of the project well, the end product will automatically gain customer approval. However, the customer's assessment focuses on the entire system and its operation (Pinto & Slevin, 1987, p. 24–25).

At each stage of implementation, feedback should be received or, if necessary, checks should be made on the progress of the project. Progress should be compared to the plan and any anomalies noted. The monitoring and feedback system allow the project manager to anticipate problems, monitor corrective action, and ensure that all errors and omissions are addressed. Communication is important throughout the project to create the atmosphere needed for a successful system implementation. Communication is important not only within the project team, but also between the group and the entire organisation, and where necessary, communication should be extended to customers. Communication is not limited to gathering feedback but two-way sharing of information

between all groups. The tenth and final factor to emerge from classification of the model is trouble-shooting. Problem areas exist in almost every implementation process regardless of how carefully the project was initially planned. As a result, it is important that the project manager makes adequate initial arrangements for troubleshooting mechanisms to be included in the implementation plan (Pinto & Slevin, 1987, p. 25).

At the same time, Rockart (1982) introduced the whole initial idea and concept of critical success factors in the implementation of an information system and defined the main or most typical four of them. Rockart's critical success factors include service, communication, human resources, and repositioning of the information system function. Service as a critical success factor refers not only to the effective and efficient performance of necessary operations but also to the perception of that service by user and corporate management. Communication indicates with a strongly felt need to thoroughly understand the world of key users and top line managers, as well as to have them understand the information system environment. This refers to the responsibility to educate top management and key users about the potential impact of information technology on their industry and their company, as well as to the communication of user needs and priorities to the information system function. Human resources as a critical success factor means the human resource in the information systems function, and how they need to adapt and change with the changing systems. Finally, repositioning of the information system function contributes to the changing role of the information system in the organisation and is quite attached to the third critical success factor as in this change involves a lot of changes in human resources as well (Rockart, 1982, pp. 17–20).

Subsequently, the critical success factors for the implementation of information systems have been studied from many different perspectives, but the basic ideas and discoveries have remained very similar despite the fact that technology and systems and the ways in which they are distributed have evolved by great leaps. Many researchers conducted in the 21st century find that these definitions, created by the pioneers of the background idea of critical success factors, remain largely relevant, which is why they are presented

instead of more subsequent studies. From a SaaS perspective, the implementation of an information system in a system procuring company is more about the implementation of a project than the implementation of a technical system itself, so the focus on determining critical success factors is therefore more focused on project deployment.

4.2.1 The success of information system procurement

In most organisations, procurement metrics are limited to monitor immediate supplier service level and have traditionally used negative metrics to highlight failures. As procurement is often the most significant total cost for a company, controlling its efficient use has a strong impact on its profitability and competitiveness. For this reason, the cost savings achieved in procurement and the impact of development on results are being monitored with positive indicators in more and more companies, but the tools for this are not yet very developed. Organisation's strategic goals are often set at the board or management team level to be very general, and for such strategies to be useful, goals and objectives should be more precisely defined, i.e., concretised. Organisational goals must be aligned at different levels throughout the organisation, and the ultimate objective must be to meet the needs of the end-user. Critical success factors are derived from these goals, and the critical success factor must absolutely succeed in achieving the vision. In procurement, it is very important to note that critical success factors must be considered both as a whole and for each product and service group to be procured separately (Iloranta & Pajunen-Muhonen, 2018, pp. 360, 370–372). The perspectives and main areas of evaluating the success of the organisational procurement are presented in Figure 5.

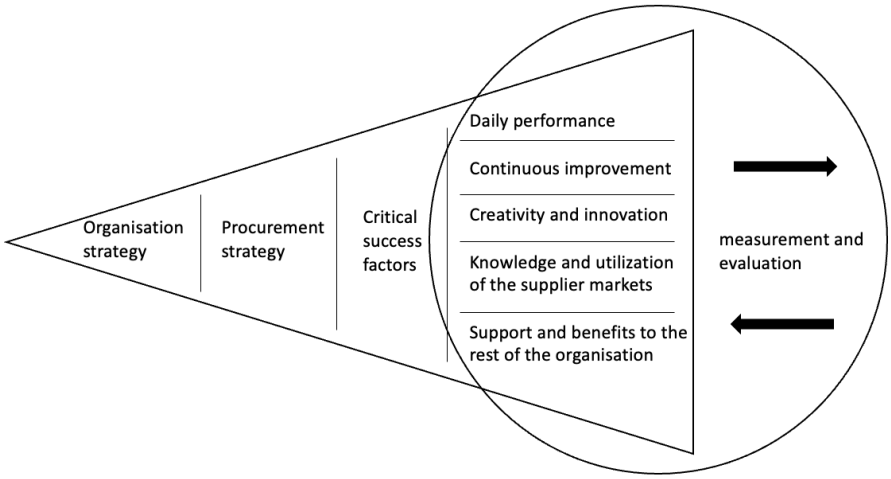

Figure 5. The perspectives and main areas of evaluating the success of the procurement (Iloranta & Pajunen-Muhonen, 2018, p. 372), adapted.

According to Forselius (2013, pp. 18–19), the success factors of an information system project, i.e., the factors to increase the probability of its success, are:

- management support, clear ownership and adequate software understanding
- customer and end-user commitment, participation, and feedback
- clear definition of requirements
- a pricing model appropriate to the requirements
- skilled and motivated employees
- fair remuneration practices
- successful division of labor at all levels
- realistic targets
- measuring results
- adequate monitoring and guidance.

Successful procurement of an information system is quite a rarity, and more than half of the projects are late, exceed their budgets, or produce a system of poor quality and functionality (Forselius, 2013, p. 14). If the need for procurement and the desired service level requirements have not been determined with sufficient precision and rationality, there is a risk that the procurement will also be perceived as failed, even if the process

is otherwise successful according to used indicators. A requirement for a successful procurement process is thorough preparation and planning (Iloranta & Pajunen-Muhonen, 2018, p. 82), but the difficulties can be found even outside of the process. Although the above list of success factors is not absolute, it is important to keep the factors in mind and to pursue to ensure that they are taken care of at all stages of the procurement.

4.2.2 Measuring the success of implementation of information systems

The success and efficiency of the implementation of information systems are critical metrics for measuring the value and impact of information technology decisions and investments (DeLone & McLean, 2002, p. 1), and measuring the success and efficiency has long been considered as a challenge in the field of information systems science. The ideal measure of implementation success would be an objective set of indicators, such as a cost-benefit analysis (Nurminen et al., 2002, p. 3). Information technology is an investment, as are all other investments in a company, so it competes for resources with other investments and should be compared in the same way. However, the difference between an information technology investment is its impact on the whole company, so the benefits should be assessed in other than financial terms (Briggs et al., 2003, p. 5).

Several researchers have attempted to develop a useful, generally accepted, and comprehensive model for evaluating the success of information system projects. The model should consider all the functions and aspects of the information system, so problems in creating the model have been caused by disagreements about which factors should be considered when measuring success, and how these factors can be measured (Pinto & Millet, 1999). All stakeholders have their own views on what is meant by success, and how it should be measured (Briggs et al., 2003, p. 6). The correspondence between the results of the activities under the new system and the set operational objectives can be considered as the primary criteria for evaluating the success of the implementation. Performance can be defined not only in terms of speed, costs, or savings, but also in terms of user or customer satisfaction (Nurminen et al. 2002, p. 3). Schultz and Slevin have

over the years studied the success of the project implementation process from a behavioral perspective and created a quite known model for explaining the three prerequisites that a successful implementation meets: technical validity, organisational validity, and organisational effectiveness. Technical validity means that the implemented system works correctly and logically. Organisational validity refers to the system being suitable for its users, as the system can be thought of being valid if it is accepted and used by the users. Successful implementation also has a positive impact on organisational efficiency. This model has been used as a basis for measuring the success of information system implementation (Pinto & Millet, 1999).

The evaluation of the effectiveness or success of information systems has always been important aspect of the information system research and practice. However, the way the evaluation has been done has changed over time as the context, purpose, and impact of information technology has evolved. As information technology has developed, information has become more voluminous, appearing, and accessible by all, and the measurement of information system success has become more complex. The complexity even arises because the usage and users of information systems are even expanding, and yet the measurement of information systems success at its core is still simple because there are consistent key elements in the measurement of success, such as information quality, system quality, use, and outcomes (DeLone & McLean, 2016, pp. 3–4). The goal of a new system is always to improve the organisation in terms of either productivity, efficiency, or performance, and these changes can be used to look at the organisational effectiveness and success of implementation (Pinto & Millet, 1999).

4.2.3 Information system success model

The core idea that a successful information system implementation experience is determined by various internal and external factors from the perspective of all the service provider, the deployment organisation, and the end users is also the base of the success model of information system by DeLone and McLean. The model was developed as early

as 1992 and was based on several theoretical and empirical studies conducted in the 1970s and 1980s. The success model has been widely used in various studies, based on which it was finally updated in 2003. The model of DeLone and McLean's is considered the standard for information system implementation research (DeLone & McLean, 2003, p. 10). The updated information system success model (Figure 6.) consists of six measurable characteristics; information quality, system quality, service quality, use or intended use, user satisfaction, and net benefits. Service quality and intention to use were added to the updated version of the model, as well as were individual and organisational impacts transformed first into net benefits (DeLone & McLean, 2003, p. 23), and later into net impacts for clarifying the meaning of it (DeLone & McLean, 2016, p.8).

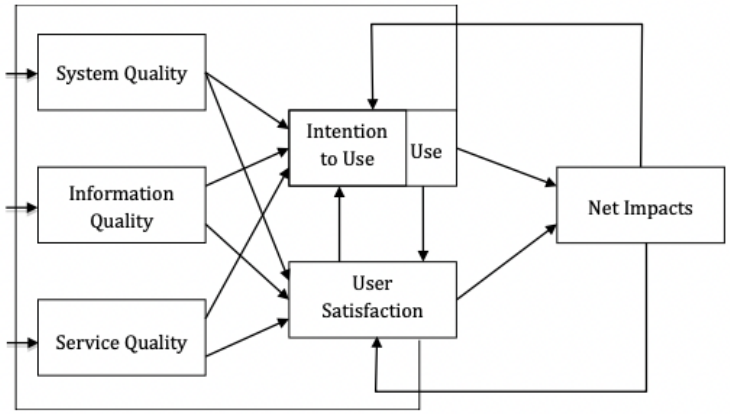

Figure 6. Updated DeLone & McLean Information System Success Model (modified) (DeLone & McLean, 2016, p. 10).

System quality refers to the functionality and processing capability of an information system, the response times and stability of hardware and software. The quality of information is formed based on the information produced by the information system, i.e., how updated, and accurate the information produced by the system is (DeLone & McLean, 1992, p.64). Service quality covers all the support provided by a service provider in the implementation and operation of the system (DeLone & McLean, 2003, p. 25). Use refers to the extent to which an information system is used and how well the information it produces can be used. User satisfaction is one of the most widely used indicators of information system success, covering the user experience of the system, its usability, and

the usefulness of the content generated by the system to the end-user (DeLone & McLean 1992, p.66).

Figure 6. shows how a perimeter relationship is created between net impacts, usage, and user satisfaction. Net impacts refer to the extent to which information systems are contributing to the success of individual users, groups, organisations, industries, and nations (DeLone & McLean, 2016, p. 11). As users feel the benefits of the system, the desire to use the system increases. This increases usage and its increase is reflected in user satisfaction. Of course, there are also systems that are difficult to use. However, this does not rule out the fact that adequate net benefits increase user satisfaction (DeLone & McLean, 2003, pp. 23–24). The DeLone and McLean success model has been widely used in studies that have focused on measuring the success of an information system and finding the factors that contribute to its success. (Petter, DeLone & McLean, 2008, p. 238). DeLone and McLean (1992) do not provide a direct set of metrics by which the components of success should be measured, but they suggest that an overall measure of success should be constructed by combining individual metrics specific to different components. The overall measure should include all the essential aspects of success of the information system, but at the same time be simple enough.

4.2.4 User satisfaction

User satisfaction in information system implementation and end-user computing refers to how satisfied a user is with a particular information system, and of the individual factors contributing to the success of an information system, it is the most widely used measure in research (Petter et al., 2008, p. 239). That is why the importance of developing standardized instruments for measuring user satisfaction has been stressed by several researchers (Doll, Xia & Torkzadeh, 1994, p. 453). The most widely used metrics used to assess user satisfaction are End User Computing Support (EUCS) and User Information Satisfaction (UIS), which are described later in this section. They both include factors related to system quality, data quality, and service quality. There are several

methods to measure net benefits at both the organizational and individual levels. At the individual level, the most common measure is the estimated benefit or impact on work. At the organisational level, the most used indicators are those related to profitability (Petter et al., 2008, p. 242).

One of the oldest and best-known indicators of user satisfaction is the model developed from the user information satisfaction instrument by Bailey and Pearson (1983), which was then expanded by Ives, Olson & Baroundi (1983), and later again by DeLone and McLean (Bouaissa & Chalal, 2017, pp. 108–109). According to the DeLone and McLean model, user satisfaction consists of the quality of the system, system acceptance, system usage, system impact on user behavior, and information satisfaction, and a high-quality system leads to greater user satisfaction, with a consequent positive impact on the efficiency of the individual and the work community (DeLone & McLean, 1992, p. 62). This model applies primarily in traditional data processing environment, where users interact with the computer only indirectly through programmers or operations (Doll & Torkzadeh, 1988, p. 260).

End-user computer environment is however very different from the traditional data processing environment, and the satisfactory of end-users lies on wider variety of affecting factors. That is why Doll and Torkzadeh (1988) developed their EUCS model, a satisfactory model to measure specifically end-user's satisfaction towards a particular software or application. The model consisted of five factors that were measured with 12 defining questions. Doll et al. (1994) later re-analyzed their model, found out it is still competent to validate user satisfactory in many contexts, and later in 2004 Doll et. al. developed the original model into improved and more accurate one (presented in Figure 7.). The basic idea, structure and the defining questions remained the same as in the first attempt, but in the improved model relationships between variables in the model were defined more precisely. The EUCS instrument is well-known and widely used in research, and it has been found to be capable of relevantly measuring end-user satisfaction, and

that the user-satisfaction factors used in it are also valid across cultures (Deng, Doll, Al-Gahtani, Larsen, Pearson & Raghunathan, 2008, pp. 211, 218).

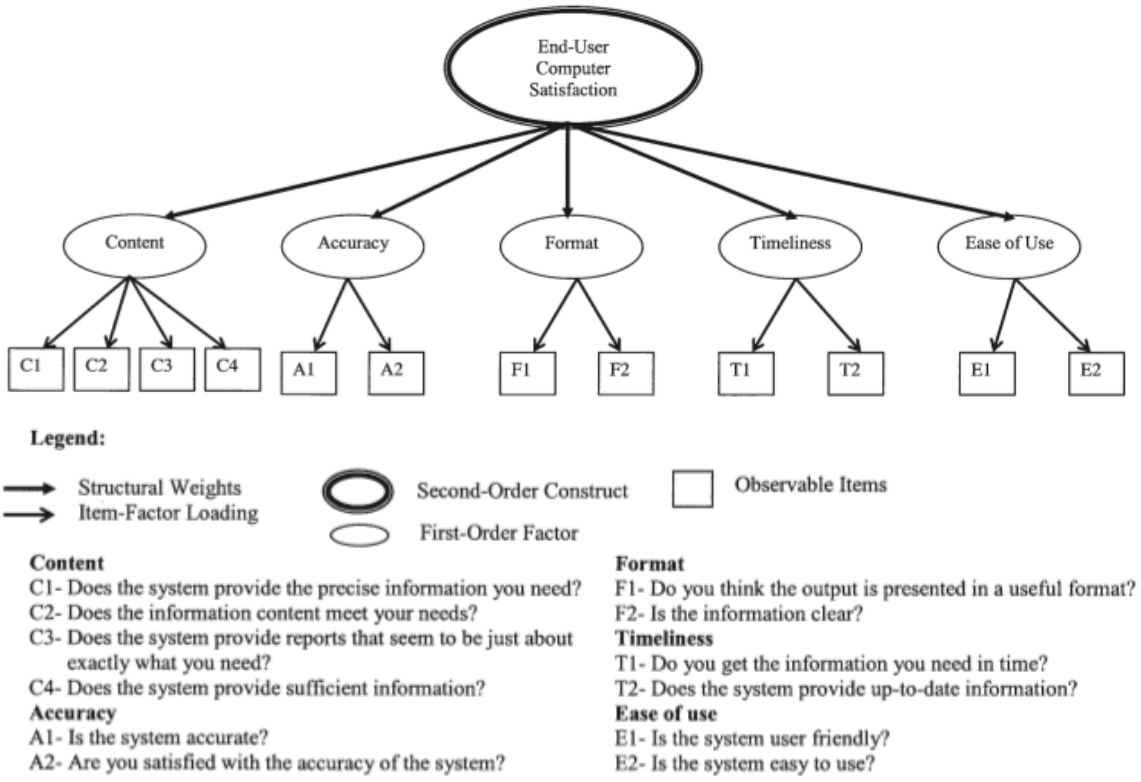

Figure 7. A second-order measurement model of the end-user computing satisfaction in-strument by Doll et al. 2004 (Deng et al. 2008).

Alongside with Doll et al. developing their model the variety of research studies of the determinants of satisfaction continued as researchers attempted to list the determining factors on the subject. One of the most important research works mentioned in the literature is the model made by Mahmood, Burn, Gemoets & Jacquez in 2000, presented in the Figure 8., when the authors conducted a synthesis and validation of the studies related to measure the user satisfaction between 1986–1998 (Bouaissa & Chalal, 2017, p. 109). Factors influencing user satisfaction can be in the model divided into three main categories: perceived benefits, user background and participation, and organisational attitude and support. In addition to these, nine variables can be observed that can be broken down into main categories.

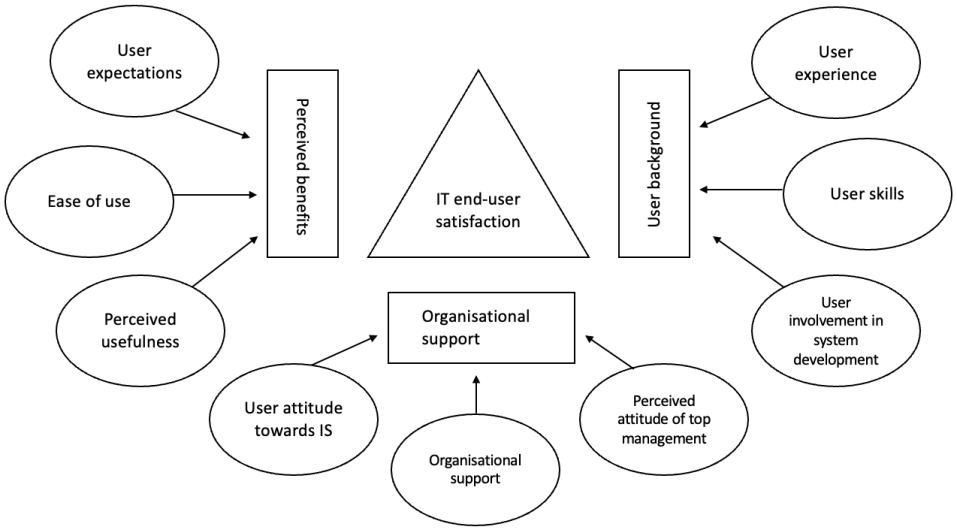

Figure 8. Factors Affecting User Satisfaction (Mahmood et al., 2000, p. 753).

Perceived benefits include job-related benefits that the user perceives as a result of using the system. The perceived utility is the main incentive to use the system. The added value achieved from use depends on how well the information system supports the user's decision-making. Based on the research results, ease of use reduces the user's effort and at the same time frees up the user's resources for other work tasks. Utility and ease of use are the most important factors in predicting system usage based on research results. Adequate user support must be provided to realize the benefits of the system. User training has been found to have a direct effect on user satisfaction, and colleagues and manuals are widely used forms of user support. The management must create an environment suitable for the change and provide adequate resources for the use of the information system to show employees their interest in the success of the information system (Mahmood et al., 2000, pp. 753-756).

4.3 Critical success factors of information system implementation from the organisational view

Studies have shown that the role of an organisation in implementing its information systems is multifaceted and significant. This chapter discusses the critical factors that

contribute to the success of an information system implementation in the organisation in terms of how the organisation's own input and actions affect it.

4.3.1 Implementation of information system from the organisational view

In the literature about development of information systems, the system deployment and implementation are usually viewed exclusively from the perspective of the system vendor. In other words, a documented workable program is the entity, for which the system vendor is responsible and does not need to be involved or knowledgeable about the software's steps after it has been operationally tested. Again, implementation can be thought starting with the design or customization of the system, since at this stage, it is largely necessary to define the boundary conditions to be later operated with. In this broader perspective, implementation does not end with the installation of a system operating according to the technical specifications, but it continues at least until the objectives set for the operation are also achieved (Lucas et al., 1990, p. 5). Viewed this way, implementation process is a joint project of the system supplier and the user organisation, although the primary responsibility for the success of the deployment remains with the user organisation (Nurminen et al., 2002, p. 2). Organisational implementation comprises all the activities that prepare an organisation and system end-users for a transition phase when a new system is deployed or gradually replaces an existing system solution (Hertzum, 2002, p. 202). The way which the implementation process in an organisation is managed strongly influences how well new technology is received by the end-users. Implementation management method selection in turn, is affected by the characteristics of the technology to be implemented (Leonard-Barton, 1988, p. 603).

The implementation of new information system can be seen as a gradual, ongoing organisational process that begins with the original suggestion for the application, continuing when new users are introduced to the system (Lucas et al., 1990, p. 5). The stages of implementation in an organisation are the creation of an information plan, the conversion of existing data into a new system, and the development of a system release

strategy. In addition to the actual implementation date, the information plan defines the dates for informing and training users and other stakeholders. The information plan also defines the hardware required by the new system, as well as how and when existing data will be transferred from the old system to the new one. The information plan must be flexible enough to accommodate, for example, possible delays in the technical implementation of the system (Hertzum, 2002, p. 200).The learning and renewal steps taken by the applying organization and its different actors play a crucial role for the success in the implementation process (Hyötyläinen, 2013, p. 3), even when the deployment process only involves the presentation of the system for new members in the workplace (Lucas et al., 1990, p. 5).

Before the implementation can begin, the organisation must make a variety of preparations, such as installing production equipment and software, deploying necessary infrastructure, setting up databases and conversions from other systems, developing guidelines and informing about the new system implementation in the company (Forselius, 2013, p. 13). In addition to these it is important to transfer the existing information from the old system to the new one, train users and considerate the premises and the technical environment in which the system is to be installed (Pohjonen, 2002, p. 37). Depending on the amount of existing data, it may take a long time to convert and transfer it to a new system. Today's information systems almost always replace an existing system solution, so the successful conversion of data to a new system is a very important step in the implementation process. The publishing strategy refers to the way in which the new information system is implemented in the organisation. The strategy may be to publish the system to all end-users simultaneously, on a case-by-case basis, or regionally. Simultaneous publishing is technically easy to implement, but very risky, as potential initial usage issues occur to all users at the same time. A case-by-case publishing strategy means that initially only part of the organisation's functions will be transferred to the new system. This strategy is very flexible, but parallel use of the old and new system can be confusing for end-users. A regional publishing strategy means that initially

only part of the organisation will deploy the system. If problems are experienced in the initial phase, they do not affect all end-users at once (Hertzum, 2002, p. 199, 201–202).

The ready-to-use information system implementation process does not include a phase in which the customer's needs are defined for product design and implementation, but the project focuses on the design and deployment phase of the system. However, at the beginning of the deployment project, a deployment plan should be prepared in the same way, describing how the deployment will be carried out in the organisation. The deployment plan should at least indicate how future users of the system will be trained, how new practices will be approved, whether information from previous systems will be converted, whether there is a need for parallel use of the old and new systems, and how the organisation will participate in acceptance tests during the process (Lehtimäki, 2006, p. 176).

4.3.2 The affection of stakeholders in the implementation process

The implementation and deployment process of information system in the organisation has stakeholders with whom it interacts, and who are affected by the software implementation. These stakeholders can exist both within the organisation and outside of it. The people involved in the information system development process can be divided into developers, users, and management, of which users can be considered the most important group for its success. Users will use the information system in their work tasks, which is why they are usually familiar with the target area and related tasks and are therefore a key source of information when defining and analysing the requirements of the systems. Within an organisation, users differ based on their job roles and accumulated experience and can be divided on this basis into operational users, supervisors, managerial users, amateurs, and professionals. Different user groups have different goals and expectations for the information system. For the end user, the system is a tool for performing routine tasks, while management may see the system as a tool for control and monitoring (Pohjonen, 2002, pp. 46–49).

Once the production version of the new system has been tested and is being introduced, end-user training must be started, as well as how the training will be organized, who will perform it, to whom the training will be directed, whether different user groups need different training, and training schedule (Pohjonen, 2002, p. 37). In addition to end-user training, training is also needed by those responsible for the functionality of the software. These are usually the future administrators of the software and the people responsible for the technical environment (Hyötyläinen & Kalliokoski, 2001). An important factor in the success of deployment is the end-users 'perceptions of the usability of the system, and negative opinions are usually due to users' lack of knowledge and ambiguities regarding the system. Training cannot compensate for poor software design or the impracticality of a new approach, but training can make a significant contribution to successful deployment (Waldorf, 1999, p. 557–559, 561). Training reduces frustration and minimizes the decline in productivity during the transition period. In addition to technical training, training should also aim to motivate users, for example by emphasizing the benefits of the system for the entire organization, and in addition to guidance only on use, the training should show why the implementation is carried out (Hyötyläinen & Kalliokoski, 2001). Research shows that the importance of conceptual training in addition to procedural training in overcoming the knowledge barriers associated with the assimilation of new work processes (Robey, Ross & Boudreau, 2002, p. 39).

4.3.3 Organisational challenges in the implementation process of information system

Bringing a new information system into an organisation usually leads to a major change in its operating methods or processes (Lehtimäki, 2006, p. 175), and therefore the changes require careful planning and caution to succeed. Problems usually arise during the implementation phase but should already be identified and considered when planning the implementation (Alter, 2002, p. 477). Change management in the company is also an important part of procurement activities. By investing in change management from the outset, new practices are put in place more effectively and resistance to change is avoided, which slows down the achievement of the benefits of acquisition (Huuhka,

2017, p. 129). For this change to be positive, it needs to be planned and managed. The relationship between organisational change and technological reform varies between organisations (Robey et al., 2002, p. 39), and according to Hyötyläinen (2002, p. 175) it is a good way to divide the introduction of a new information system into projects where the deployment, or acquisition in this case, and implementation are completely their own projects which are later synchronised together. Some organisations first implement the information system and only later focus on changes in the organisation, its processes, and operations, while others tie the organisational change and the implementation of the information system tightly together. In practice, however, the distinction between organisational change and information system implementation has proven to be very difficult (Robey et al., 2002, pp. 39–40).

When looking at the implementation process of an organisation, a distinction must be made between the concepts of adoption decision and response. Adoption decision refers to the decision made by individuals to adopt a new technology for their own or the organisation they represent, while the response to deployment refers to the attitudes or behaviour of end-users towards the technology being deployed. The response to the introduction of new technology in an organisation is influenced not only by the characteristics of the technology being deployed, but also the way in which the deployment and implementation processes are managed in the organisation. The characteristics of the technology to be deployed include the transferability of the technology, the complexity of its implementation, and its divisibility. Transferability refers to how strongly a new technology is seen to be ready for deployment in terms of its technical and operational features, and the level of communicability of the technology to be deployed, i.e., how easily the basic principles and the knowledge and skills can be adopted and learned by also the non-developers of the system. The complexity of implementing a new technology in an organisation is particularly affected by the extent to which its effects extend. The extent of the area of influence can be assessed by determining the number of individuals around influence of the technology or the number of functional units affected by the changes caused by the technology. Divisibility refers to how easily a new technology

can be divided into functional parts, allowing its deployment to be done in stages and thus reducing potential deployment issues (Leonard-Barton, 1988, p. 604–607, 611–613).

The problem with implementing a new information system may be that users do not want to cooperate with system developers or may refuse to use the system. Such a situation is called user resistance, for which there can be many reasons, one of the most common being a completely human way of alienating new things as well as the uncertainty associated with change. This is called resistance to change (Pohjonen, 2002, p. 50). Healthy change resistance is a good and useful, completely natural thing, but at the same time, resistance to change can also be a negative and difficult issue, which in some cases paralyzes the entire company. Properly utilized, constructive criticism and questioning of change can improve an organisation. Change must be seen as a process in which the task of resistance to change is to enrich and refine it better (Erämetsä, 2003, pp. 98–99).

Stress is easily caused by changes, which in turn increases resistance. Resistance to change is a natural reaction that can contribute to the failure of projects, which is why influencing it is an important goal in change management (Huuhka, 2017, p. 130). Resistance is also caused by a lack of knowledge, a lack of understanding and a disturbance of the sense of security. If change is not justified and precisely implemented, it is unlikely that people will understand its significance (Erämetsä, 2003, pp. 193–194). Change management anticipates measures to smooth out the change experienced by people and speed up the adoption of new ways of working (Huuhka, 2017, p. 130), because to get the most out of the positive effects of resistance to change, it is important to speed up the transition from resistance to change to acceptance of it (Erämetsä, 2003, p. 99). According to Erämetsä's positive process for change (Figure 16), the new way of working is internalized through certain stages. First, resistance to change arises. Doubtful thoughts about change can be dispelled through reasoning and understanding. When the change is well-founded, the belief in the rationality of the change and the will to carry out it are also strengthened. Through this, a new delivery method will eventually be adopted. The most important thing in change management is to define change. It can be used to

communicate why it is needed and at what it is aimed. It is more difficult for people to commit to change if they do not know the rationale for it, and therefore information, engaging and educating people are effective ways to reduce the resistance (Huuhka, 2017, p. 129).

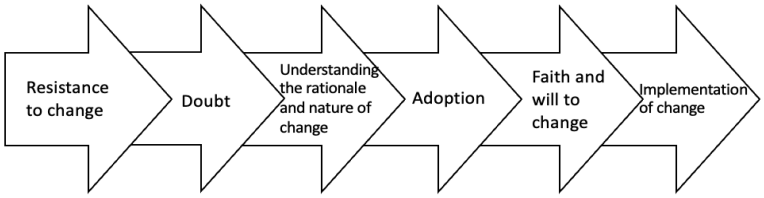

Figure 9. A positive process for change (Erämetsä, 2003, p. 100, adapted).

Conducting an organisational change in a company requires strong and visible commitment and support from the management. Communication and cooperation of different stakeholders involve people in the change process, which in turn gives them a sense that they have been able to influence it (Huuhka, 2017, p. 130). Several different models have been developed to support change management, perhaps the most famous being the Stairs of change shown in Figure 10. (Kotter, 1996), of which numerous other models are adaptations of (Erämetsä, 2003, p. 153). According to Kotter (1996, p. 4), change is a process consisting of several steps which usually takes quite a long time. Failure to go through all the steps will cause the imagination to change faster, but usually the result will not be satisfactory.

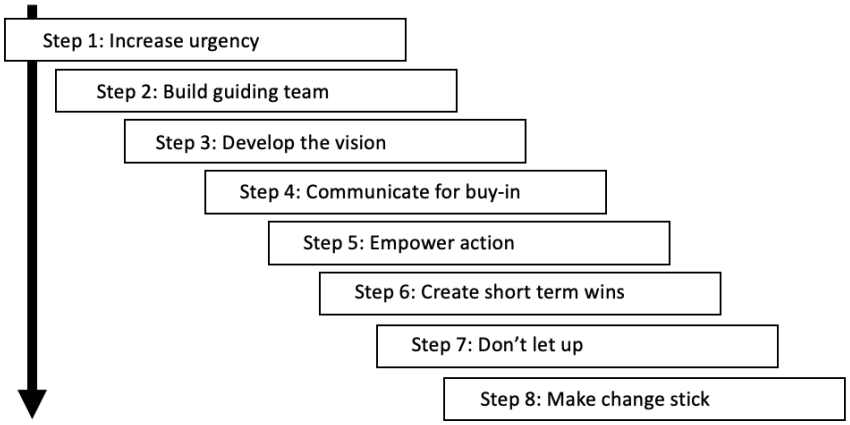

Figure 10. Kotter's eight-stage process of creating change, adapted (Kotter, 1996, p. 21).

Kotter's eight-step model is based on his observations of the most common errors in the change process. When initiating change, sufficient energy for change must be created in the organisation, and its members must be made to understand the necessity of the change, which is why the first step consists in emphasizing the urgency and necessity of it. Management must be constantly open to the demands of change and, if necessary, create a crisis or a sense of necessity for change to become important (Kotter, 1996, pp. 16, 21). Management must also provide sufficient resources to implement the change, as limiting resources may, in the worst case, cause the project to fail (Huuhka, 2017, p. 130). It should be noted that it is not self-evident that new ways of working are accepted in an organisation (Lehtimäki, 2006, p. 176), and for this reason it is important that people feel that future changes are necessary, which weakens the resistance to change (Huuhka, 2017, p. 131). Therefore, the next step in successfully leading organisational change is to establish a steering team. To ensure that change takes place, a change management team must be set up to take it forward and gain a critical mass of change. The outcome of the change process must be made worth pursuing, thus creating an inspiring vision (Kotter 1996, p. 21) that specifies why the change is necessary and what it is intended to pursue (Huuhka, 2017, p. 131).

The third step is to formulate a clear picture of where you want to go and how to get there. Once the vision and strategy are in place, it should communicate effectively to all personnel. All channels must be used for communication. The fourth step, communication, is the critical sales process of change (Kotter, 1996, p. 21). Often, special modifying agents may be required at this stage. They can be the first to be introduced to new processes, and their task is to function as advocates for the change in the organisation (Lehtimäki, 2006, p. 176). The fifth step is to remove obstacles to change, empower staff and encourage visionary action. Even in the short term, there must be successes that build faith in the success of change. Once the change has been communicated and the correctness and necessity of the change have been identified, the new approach must be implemented and consolidated. In the seventh phase, change will be given more

impetus and will be considered permanently important. In the last, eighth stage, the task is to instill a new way of operating in the organisation (Kotter, 1996, p. 21).

4.4 Critical success factors of information system implementation from the end-user perspective

The implementation process of a carefully selected and well-prepared information system on the part of the organisation can fail in many ways that are significant from the end-user's point. These can be influenced by the individual physiological, psychological, and social factors of end users, and in this chapter, we delve deeper into the critical factors influencing the implementation of an information system from these perspectives.

4.4.1 Information system implementation from end-user perspective

The life cycle of an information system is usually seen as consisting of an analysis phase, a design phase, a technical implementation, and a testing phase, when the introduction of a new information system is often viewed mainly from a technical point of view. However, information systems projects can face several serious problems if organisational and personnel factors are not considered when doing the introduction. According to the change theories presented in the previous chapter, change projects should focus more on the members of the organisation affected by the change than on the technological impact of it. From this perspective, technology is only another concern when trying to influence user attitudes towards new technology. Organisations often experience problems where the new information system to be deployed is technically successful but which, from the organisation’s point of view, does not meet its requirements within its users (Keen, 1981, pp. 31–32). Implementation research can be separated into two types of system use: voluntary and mandatory. Implementation considerations are strongly important for both types, but the impact of undesirable implementation outcomes in involuntary use can be highly risky in work environment (Lucas et al., 1990, vii, 4). It is

good to remember, that in some cases the technology is simply made available in the organisation, but there is no requirement for it to be used (Hodgson & Aiken, 1998, p. 206), and especially in these cases the recommendation and support in the working environment makes a significant difference in implementation success.

Usually, the focus in implementation process is simply on system integrator (Nurminen et al., 2002, p. 2.) when technology and user factors are often overlooked (Hodgson & Aiken, 1998, p. 205). Implementation process is a joint project of an information system supplier and user organisation, although the primary responsibility for the success of the deployment remains with the user organisation (Nurminen et al., 2002, p. 3), and that is why the change should be understood as a whole and not just the factors related to the information system itself. Attitudes to change will vary according to situations and individuals, their respond to change in general, and to each change they encounter. The strength of the response to an individual change depends on the personnel's personal characteristics and beliefs in organisational factors such as adequate training and support. Understanding and considering the changes brought about by the new information system is important for the success of it (Hodgson & Aiken, 1998, p. 206).

4.4.2 User acceptance

Instead of just installing a software or hardware, the term implement also refers to the extent to which a system is used and how satisfied users are with its use (Pinto & Millet, 1999). For a new system to be successful, it is important to understand the user acceptance process, which is used to understand how users adopt systems. Davis (1989) identifies two factors that have an impact on how well an end-user accept a new information system. Perceived usefulness refers to the extent to which individual believes that the use of a new information system is beneficial to them. Perceived ease of use, in turn, refers to the extent to which an individual believes that the introduction and use of a new system will not cause them any additional inconvenience. Perceived usability has a significantly greater impact on an individual’s deployment decision than perceived

ease of use. The implementation decision is therefore primarily influenced by the functionality of the new system and its impact on one's own work tasks. If the new system is useful in terms of its features, the employee is prepared to learn the skills required by a slightly more difficult system (Davis, 1989, p. 320).

The technology acceptance research is widely based on Ajzen and Fishbein's (1975) Theory of Reasoned Action (Figure 11.), which is developed to describe and predict individual behavior, thus, much of the study of adoption is based on psychology and this theory (Venkatesh, Morris, Davis, & Davis, 2003). The model was originally developed for use in social psychology research but is also used in marketing and information systems science research (Davis et al., 1989), and Venkatesh et al. (2003) state that reasoned action theory is one of the most important and fundamental theories of consumer behavior. According to theory of reasoned action, to understand attitudes and their relationship to intentions, it is important to understand person's subjective norms and their impact on the decision-making. This intention measures how strongly someone wants to behave in the way they choose to, which leads to the use of the individual being always preceded by the intention to engage in that particular behaviour. The intention to behave tells how strongly people believe they are behaving in the way they have chosen. It is a combination of attitudes and subjective norms. Attitudes towards behaviour, on the other hand, are built on user's positive and negative feelings about the behaviour, i.e., whether the implementation of the behaviour is a positive or negative thing for them. Attitudes towards behaviour are influenced by user's beliefs about the consequences of the behaviour, as well as the probability of their realisation (Fishbein & Ajzen, 1975).

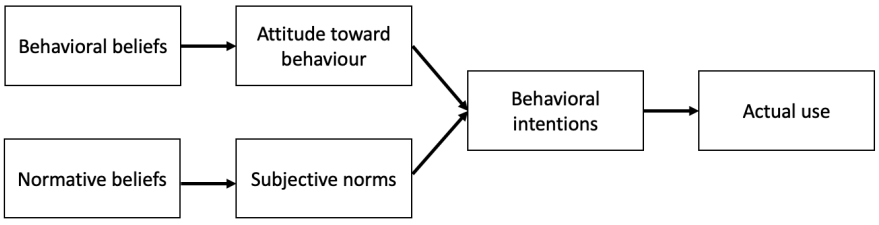

Figure 11. Theory of Reasoned Action (TRA) model (Fishbein & Ajzen, 1975), adapted.

The other side of the whole is the subjective norm, which describes the impact of other people's expectations and opinions on user behaviour and its consequences, or how the social environment reacts to whether the situation should be implemented or not. According to the theory of reasoned action, it can be generalised that the user implements the chosen behaviour model if both variables are positive, i.e., if the users themself evaluate their action as positive and the reference effect is also positive (Fishbein & Ajzen, 1975). Ajzen (1991) has later supplemented and expanded the theory of reasoned action to the theory of planned behaviour with behavioral control (Figure 12.), and according to it, perceived control can affect intentions and therefore also perceived behaviour. Behaviour control can be defined as user's beliefs and expectations about how difficult or easy the intended behaviour is and can be considered primarily as a motivating factor. In addition to the intention, the management of behaviour in the theory of planned behaviour model also directly becomes an important influencing factor. Central to behaviour management are the user's previous experiences, as well as whether the consumer experiences the behaviour as easy or difficult for themselves. These factors directly affect the self-confidence experienced by the user, which is highly likely to lead to better success of the behaviour (Ajzen, 1991, pp. 185–186).

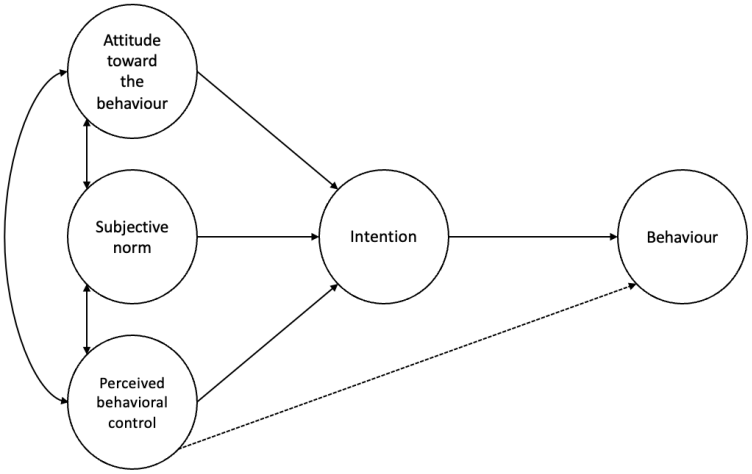

Figure 12. Theory of Planned behaviour (Ajzen 1991, p. 182), adapted.

4.4.3 Technology acceptance

Technology acceptance means that a user finds the technology in question usable and starts to use it, and it is one of the key factors in the successful implementation of a new information system. A system can only make the organisation more efficient if it is accepted and used by its users, therefore, technology validation has been the subject for a variety of research and many different models have been developed to explain and predict it (Venkatesh et al., 2003, pp. 425–426). Human-technology interaction research is interested not only in usability but also in the usefulness and acceptability of technology. According to Nielsen (1993, p. 24) usability is part of a larger entity, the actual acceptability of the system, which refers to whether the system is good enough to meet all user needs and requirements.

The implementation of new software involves the psychological and social factors of users, which can be studied for example through a technology acceptance model (TAM) (Davis, Bagozzi & Warshaw, 1989, p. 985). Technology acceptance models aim to predict people's willingness to adopt technology, and the theories for introduction of new technologies are based on the technology acceptance model published by Davis in 1985, presented in Figure 13. Since then, research has resulted several theoretical models, with roots for example in information systems, psychology, and sociology (Venkatesh et al., 2003, pp. 425–426). According to TAM, a number of factors influence to the decision on when and how the system is used. The attitudes towards technology are formed based on the usefulness and ease of use perceived, which are again influenced by external factors. The experienced ease of use refers to the amount of inconvenience experienced by an individual using the system. Meaningful utility refers to the experience users have of the benefits of an application in relation to their work. The ease-of-use experience is related to the perceived utility, such that the ease-of-use experience enhances the user experience of the utility of the system. However, the experience of ease of use of a system does not increase the attitude towards the use if the system is not considered useful (Davis et al., 1989, pp. 985–986).

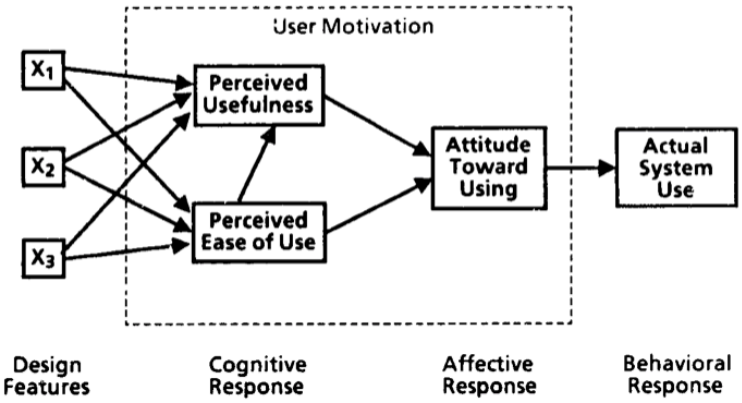

Figure 13. The first Technology Acceptance Model by Davis (1985: 24).

The goal of TAM is to provide an explanation of the determinants of technology acceptance that is general, capable of explaining user behavior across a broad range of end-user information technologies and user populations, while being both parsimonious and theoretically justified at the same time. In the original TAM model, the attitude towards use was a major factor in explaining the intention to use the technology. However, in their studies, Davis et al. (1989) found out that perceived usefulness and ease of use alone do not explain attitudes towards the usage, but that perceived usefulness has been seen to influence the intention to use, which in turn predicts the actual use (Davis et al., 1989, pp. 985–986). Based on these observations Davis et al. (1989) defined a renewed TAM model, presented in Figure 14.

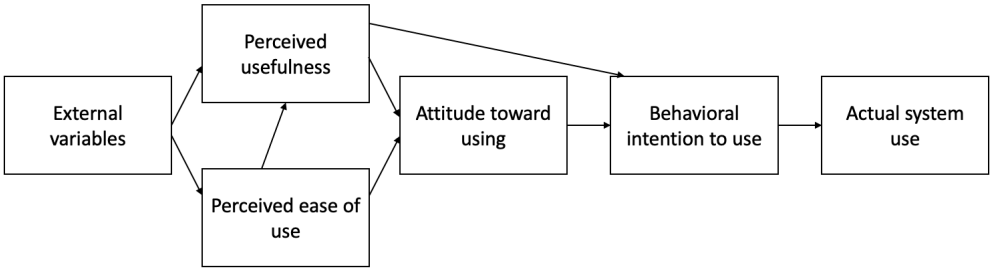

Figure 14. Renewed Technology Acceptance Model by Davis et al. (1989, p. 985).

In addition to TAM, Venkatesh et al. have developed the unified theory of acceptance and use of technology (UTAUT) model, presented in Figure 15.

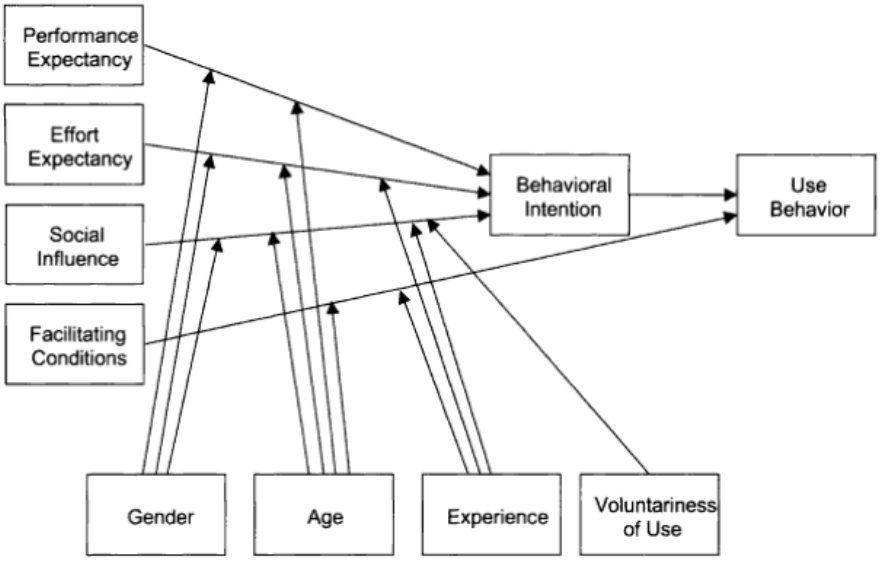

Figure 15. UTAUT model by Venkatesh et al. (2003, p. 447).

UTAUT overlaps with six similar theories and models for technology acceptance and usage, and it explains more about the intention of use than any of the previously created models alone. The UTAUT model has four determinants: operational expectations, usage expectations, social impacts and facilitating conditions that affect the intent, use and acceptance of new technology. Performance expectations refer to the level where a person believes that technology could improve their performance at work which is included in the technology adoption model as a perceived utility, theoretically influenced by gender and age. Effortlessness refers to the user experience of the ease of use of technology, which is again influenced by gender, age, and experience. Social influence refers to the level at which a user believes that people important to them think they should use the system. The social impact experience is influenced by gender, age, experience, and voluntary use. Facilitating conditions mean that the user believes that the conditions are sufficient to operate the system effectively. Supporting conditions include, but are not limited to, the resources available and the support provided by the organisation. They are influenced by age and experience, as well as the conditions that support not only the intention to use, but the use directly. These factors influence behavioral intention, which in turn predicts the actual use of technology Venkatesh et al. (2003, pp. 427, 447–454).

4.4.4 Usability evaluation methods

When looking at any technical product or service, it is noticed that many of the users of these are human, but only a few people are actually the users of these products or services (Sinkkonen, Kuoppala, Parkkinen, Vastamäki, 2006, p. 15). Usability is a system quality factor of the product from the user's perspective. Product usability determines whether the product solves the right problems for its user, and does it solve them in a meaningful way (Technology Research Centre of Finland VTT 2015). Usability consists of several components that are defined by ISO, International Organization for Standardization (2018) as accuracy, efficiency, and satisfaction. In this context accuracy and efficiency refers if the system has the right user characteristics and features, and satisfaction if the use of the system is pleasant, is the user satisfied with using the product, and does the user like the product in the first place (Rubin & Chisnell, 2008, p. 4).

In consumer and entertainment applications, the definition often extends to technology such as learning, experience, or user confidence. Usability cannot be defined in absolute terms, but availability depends not only on the product, but also on the users, their goals and the using environment (Technology Research Centre of Finland VTT, 2015). Often for large part of users, what makes something usable, is in fact the absence of frustration when using it (Rubin & Chisnell, 2008, p. 4). In usability studies, is not only usability, but also the usefulness of the product and user’s acceptability for new technology studied (Sinkkonen et al., 2006, p. 15). When designing usability, it is important to get to know the users and their wishes and needs for a product, so that the user perspective can be considered in planning (Technology Research Centre of Finland VTT, 2015). Usability is a field of methods and theory that aims to make the interaction between the user and the device more efficient and more user-friendly. Usability utilizes tools from both cognitive psychology and human-machine interaction research (Sinkkonen et al., 2006, p. 17). Nielsen (1993) defines usability as a part of the product usefulness, and has developed a model for usability, which is still used as the basis for most usability studies and usability definitions. The elements recognized by Nielsen include how easy and logical

something is to use, the efficiency and flawlessness of its usage, the reliability of action, the legibility of it, and how effortless the use is (Ovaska, Aula & Majaranta, 2005, p. 4).

The term usability evaluation is often used to refer to any technique used to evaluate a product or system, even though it is a very classical experimental research tool (Rubin & Chisnell, 2008, p. 21). Usability can be evaluated to various categories of methods that vary widely, but often it is divided into two main groups, peer reviews and empirical user tests. The allocation is determined by whether users participate in the usability evaluation process or not (Riihiaho, 2000, p. 223). According to Rubin & Chisnell (2008, p. 21) usability can be evaluated to three categories: user-based methods, expert evaluation methods, and model-based or theory-based methods. Nielsen (1993) on the other hand has presented a model of grouping the methods into four categories: automatic, empirical, formal, and informal evaluation methods, but has later criticized automatic and formal methods and does not consider them to be viable for assessing usability. The most used methods for usability evaluation are heuristic evaluations, which are usually done by a small group of usability experts. They are often just testing for prototypes done for the test group in test labs but with the correct user situations, questionnaires or interviews, or variations of idea groups (Immonen, 2003).

Choosing the right method can be sometimes problematic because there are various evaluation methods, each of having a slightly different purpose, and the choice of the method can be influenced by several separated factors (Rubin & Chisnell, 1994, pp. 26–30). According to Nielsen (1993), most usability issues are best addressed by asking the user. Surveys and interviews are useful methods for exploring how users use the system and what features they like or dislike. Interviews provide qualitative information, like user satisfaction, fears and enthusiasm, which otherwise would be difficult to objectively investigate. Asking is also best to find out what users would want from the system. The usefulness of the answers is influenced by the last time the user has used the system to which the questions relate. Answers tend to be more useful the less time has elapsed since last use (Nielsen, 1993; Ovaska et al., 2005, p. 37). If the primary purpose of the

evaluation is to assess how easy it is to start using the product, the method should be different from that of assessing the effectiveness of it. The choice of method is also influenced by the purpose of the evaluation: whether the purpose of the evaluation is to make an existing product more usable or whether a new product is being evaluated. The resources available also influence to choosing the right method. Usually, the most significant resources are time, money, and accuracy, which can also lead to using heuristic or expert evaluations instead of product testing (Rubin & Chisnell, 1994, p. 26).

Human-machine interaction (HCI, CHI) and usability are largely seen the same. In theory, HCI does not think of a person as part of an organisation, an employee, or even a willing actor. Usability, in turn, considers these interactions between the device and the human being (Sinkkonen et al., 2006, p. 18). When designing usability and usability testing, it is important to profile potential user groups that will be evaluated and take to account their potentially varying characteristics as users. These characteristics may include psychological features, knowledge and experience, and physical or cultural characteristics. User experience is influenced not only by the user's characteristics, but also by the nature and cause of each use (Immonen, 2003). Graphical user interface usability studies are designed to determine how well the application suits for certain users to perform a specific set of tasks in the particular environment, and what mental and physical efforts it requires. The most common user testing method for graphical user interfaces is the usability test where user performs the given tasks with the system being evaluated (Riihiaho, 2000, p. 223).

4.4.5 User experience metrics

The user experience, i.e. UX, is not about inner workings of a product or service, but about how it functions on the outside, at the interface where a person encounters it. User experience answers to the question of how a certain product or a service is to use, and it is often overlooked side in the designing or in acquisition decision-making processes that can make the difference between a success or failure in them (Garrett, 2011,

p. 6). Sometimes the terms usability and user experience are used as synonyms but according to Albert & Tullis (2013, p. 5), usability is usually considered as the ability of the user to actually use the product to carry out a task successfully, whereas UX includes individual's entire interaction with the product, as well as the thoughts, feelings and perceptions that result from that interaction. Albert & Tullis (2013, p. 4) state, that UX includes these main defining characteristics: a user is involved, interacting with the system in discussion, and the interest is in the felt experience of this particular interaction.

The user experience metrics reveal something about the personal experience of the human being using a product or system. UX metrics can be divided into three categories or aspects of what they reveal from this human – product interaction: effectiveness, efficiency and satisfaction (Albert & Tullis, 2013, p. 7). Väänänen-Vainio-Mattila, Kaasinen and Roto (2011) have defined these categories into themes from research perspective. The first theme is the access to user data, which means that because internet service providers are monitoring user behavior and collecting a lot of different kind of data without users even being aware what is actually monitored, it can often cause a fear for security issues with users' sensitive and personal information. The second theme is the multi-device access, which means the possibility and desire to have information and service available and accessible anywhere and with any device. Social UX is the third category in the research, and it means the way that cloud services are often communication or social media services where users interact with each other either directly (e-mail, messaging) or through media content, and how does these communication channels work out for users' needs.

The fourth theme defined by Väänänen-Vainio-Mattila et al. (2011) is reliability, security, and trust, which are based on the functionality of the service when the internet connection is bad or off, and the feel of security and trustworthy of the service. The fifth theme is the pricing principles of the service: what is the optimal, clearest pricing principle for customer to evaluate what is the fair price for the service. Finally, the last theme in their report is the service discovery and life cycle, which stands for the potentially very large

set of similar services for users to choose, and how easily they can be clear of which services are going to be discontinued, which ones are new, and how natural it is to take new services in use and integrate them to the already existing set of services. Unlike with the typical metrics, measuring individual's personal experience about using a product or a system needs this kind of different approach to it. It is easier to measure user experience by thinking them through a variety of themes like Väänänen-Mainio-Mattila et al. (2011) or by finding answers to questions outside of the actual usage situation of the product or system. Hence instead of discussing whether did a test task got done or not, when talking about user experience, should the interest be in how it got done, or would another way of doing it be considered more suitable (Albert & Tullis, 2013, pp. 7–8).

SaaS being a software or an application that is installed and used via internet connection and through the provider's web-based graphical user interface, can be discussed as the perspective of a website user experience. Garrett (2011) makes a statement that in the web, user experience is even more important than it is for other kinds of products, because websites and applications are self-service products that lean onto user's own ability to figure out how to use them. Cloud computing is a relatively new interaction, development, and delivery paradigm where services and data are stored in servers managed by external parties, and from the user point of view, the cloud concept may lead to better user experience, but the concept may also raise new challenges and concerns (Väänänen-Vainio-Mattila et al., 2011, p. 1). Cloud servers are making applications very light and cost-effective choice for consumers, but even though the providing and usage of cloud-based software systems are rapidly growing, and therefore more familiar form of service, they raise more uncertainty and concerns about security issues among its users than its locally installed competitors do (Kulkarni, Gambhir & Rajnikant, 2012, pp. 1–3), and these concerns may effect on the thoughts and feelings of using the product.

Miller (2008, pp. 28–30) lists as most significant threats on cloud computing from user-perspective that it relies on continuous, fast Internet connections that are not self-evident, that in web-based applications features may be limited compared to local

applications, and that security issues may arise when the user does not know where the data is or who has access on it, with the fear of data-loss or not having physical backups. These factors combined with UX indicators as emotions, beliefs, preferences, perceptions, physical and psychological responses, behaviors, and accomplishments that occur before, during and after use (International Organization for Standardization 2019), composes a frame for SaaS user experience. Bad user experience can be crucial for the provided service, because when people have difficulties while using complicated pieces of technology, they tend to blame themselves and feel stupid or that they are doing something wrong. If users have unpleasant experience on a website, they will not come back (Garrett, 2011, pp. 10, 13), and if a SaaS system is difficult to use, users start to avoid using it. Any user experience effort aims to improve efficiency, which means they help people to work faster and make fewer mistakes, and when talking about tools used in an organisation, that effects straight to improvement of the business in whole. People like their jobs more when their tools are logical and easy to use, not frustrating or needlessly complex, so improving the user experience in working tools improves the job satisfactory of the workforce (Garrett, 2011, pp. 15–17).

5 Findings from the empirical part of the study

This chapter discusses the key findings that emerged from the analysis of the data gathered from the interviews of the end-users of the studied information system. The first part of the chapter introduces the actual implementation of the interviews, and the following parts present the findings.

5.1 Implementation of the interviews

As described in the methods chapter, following the thematic structure of the theoretical part of the study, a loose frame for the interviews (Appendix 2.) was formed. Created frame was then tested and evaluated with a test interviewee, after which it was slightly modified. The frame of the interview was not felt to need much editing, as the free-form face-to-face interview method allows the interviewer to reformulate the questions and ask additional questions on the subject or reasons for the interviewee's opinions (Hirsjärvi&Hurme, 2009, s. 34–35) as long as the interviewer is able to keep focus on the topic, i.e. which part of the question frame or the themes is being discussed. This interview method therefore relies heavily on how good the interviewer is, which is according to Hirsjärvi & Hurme (2009, p. 36) anyway one of the most sensitive issues in the success of interview as a method of collecting data for the research.

The interviewees were selected from the employees of different workplaces of the client company of the SaaS provider company under study, using a method in which one interviewee was first recruited by random sampling, and through this selected interviewee was the next interviewee recruited. The aim was to take advantage of the impartiality offered by random sampling in the study and to avoid the collection of incomplete data related to the research problem alone, due to the relatively low individual usage of the platform under study. The research sample consists of employees from the same customer company between different worksteads, and their user rights within the platform vary slightly, as does the experience of using the software. Within a

client company, the use of the application is, and should be, quite logical and consistent across separate locations and worksteads, so the comparison itself is fairly comprehensive in-country in this sense.

The interviews were placed during summer and fall of 2020. The interviews were designed to be conducted as normal face-to-face, conversational-like situations that would be recorded. However, a global pandemic during the interview period forced some of the interviews to be conducted using a video calling services, as well as a variety of text-based communication tools and phone call combinations. The interviews were still aimed at implementing, as far as possible, the same practices. For example, before the interview, the interviewees had a change to browse through the frame of the interview, and thus get oriented for it, because according to Ovaska et al. (2005, p. 41) it has been found that filling out for example a small form before the actual interview, it reassures the interviewee and leads to more accurate answers. Most of the interviews were recorded and transcribed, some were done due to the prevailing pandemic conditions in sections via interactive text-based discussion software. Prior to the interview, each interviewee was allowed to see the thematic script of the interview to be better able to orientate themselves to the themes covered in the interview. The lengths of the interviews were approximately 10–25 minutes, depending on the interview method and the interviewee's basic knowledge and usage of the application under study.

In the empirical part of the study, a thematic compilation was made based on the literature review, which limited the research topic to different themes. These themes are: background information of the interviewees, information system acceptance and user satisfactory, usability and user experience of the software, and finally interweaves feedback and ideas about the software and its usage in their work. The interviews generally proceeded according to the themes, but I also had to jump over some of the topics when the interviewee answered a question in connection with another theme. Similarly, in the analysis phase, due to this, the interview responses were combined and divided thematically. In the following subsections, the issues raised in the interviews are

discussed in more detail and are then examined in the sections following the thematic script of the interviews. Due to the free and debatable form of the interviews, the possible issues of another topic that emerged under the questions of other themes have been grouped to the themes they belong but are also mentioned separately in the compilation of the interviews for the critical examination of the script. Data analysis was initiated by transcribing the interviews and reading them through to ensure accuracy. The transcribed material was coded according to the interviewees into interviews A–F, and in addition, the responses of the interviews were divided into assorted color codes according to the rising themes. The aim was to highlight clearly recurring and emerging similarities or differences in the answers and the vocabulary used in the printed material from the very beginning, and to find clear cause and effect relationships between them. The findings and analysis of the interviews are presented in the next chapters.

5.2 Background information of the interviewees

Half of the interviewees are women and half are men, and their age at the time of the interviews has been between 25 and under 45, with a slight emphasis on the upper and middle stages of the axis. The gender and age distribution between the interviewees are presented in Figure 16.

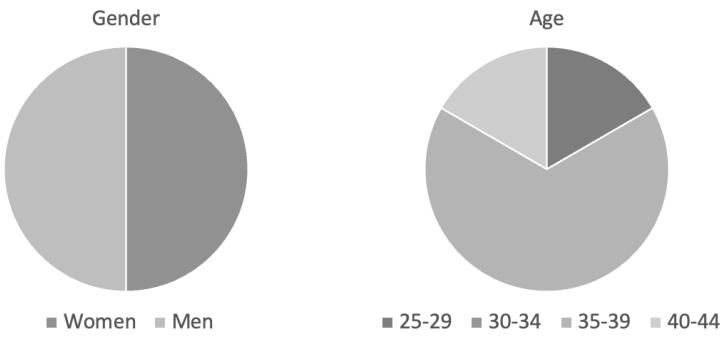

Figure 16. Gender and age of the interviewees.

Each of the interviewees works in the same organisation, but their position and tasks are slightly different from each other. In the main, the work tasks of the interviewees belong

entirely or partly to the so-called practical work, and they do not have a fixed workstation, for example. To maintain the anonymity of the organisation under investigation, the tasks are described only at the top level, presented in Figure 17.

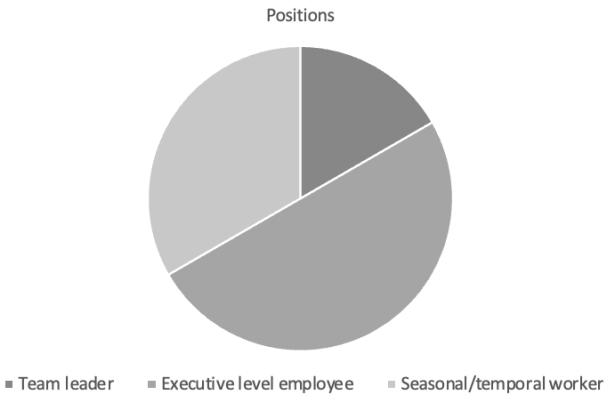

Figure 17. Positions of the interviewees.

The out-of-work activity on smart devices (specified in the interview questions were computer, tablet, mobile phone, smartwatch) of the interviewees varies significantly from about two hours a day to closer to ten hours a day. Each of the interviewee's state that their basic knowledge is on a level that it is easy for them to use and learn to use different applications, i.e. they meet the minimum technical competence requirement for the use of the application or platform under study. The daily use of smart devices by the interviewees is illustrated in Figure 18.

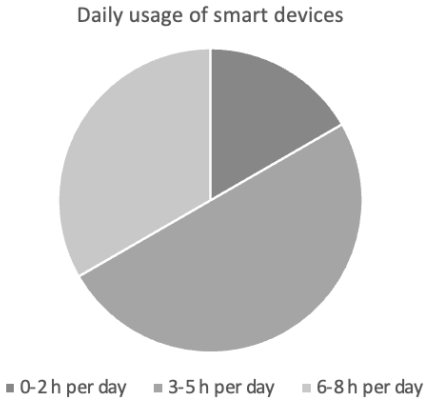

Figure 18. Daily usage of smart devices of the interviewees.

Two of the six interviewees said they use other applications alike the one studied to perform work tasks, such as telephone communication tools for communicating work matters. Four out of six also stated that their job did not require the use of duplicate technical applications. At a later stage of the interview, one interviewee stated that he/she had used other onboarding material instead of the application's onboarding at his own work, because in the customer organisation it is, by his/her knowledge, not possible to get technical devices (e.g., work phone or shared work phone) for everyone to use the platform. Applications that provide overlapping features with the platform under study and their usage between the interviewees at their work are presented in Figure 19.

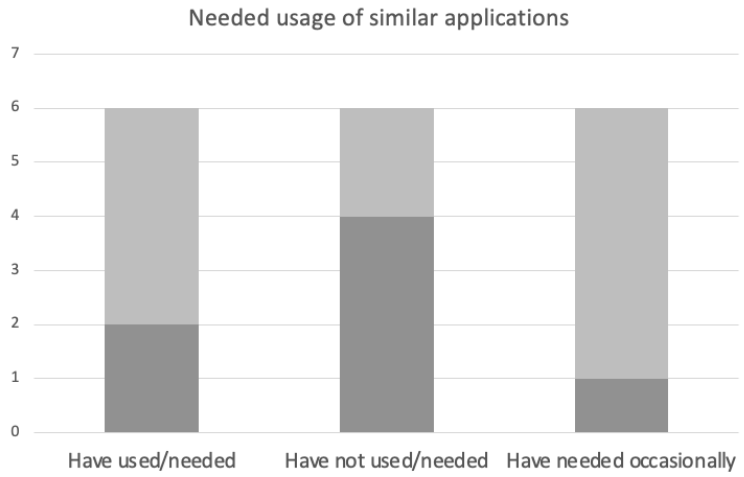

Figure 19. The needed usage for similar applications or software in their work.

5.3 Information system acceptance and user satisfactory

The utilization rate of the interviewees for the studied platforms varied, so that some had not used it at all at their work, some had used a total of hours, and some used the platform several hours per week. Two out of six interviewees used the app in their work on a weekly basis, and less frequently, but still regularly, one of the interviewees. The three respondents who used the application most actively had used it in their work for 1–3 years, while the rest talked about using it for hours in total. The overall and regular usage of the platform via interviewees is presented in Figure 20.

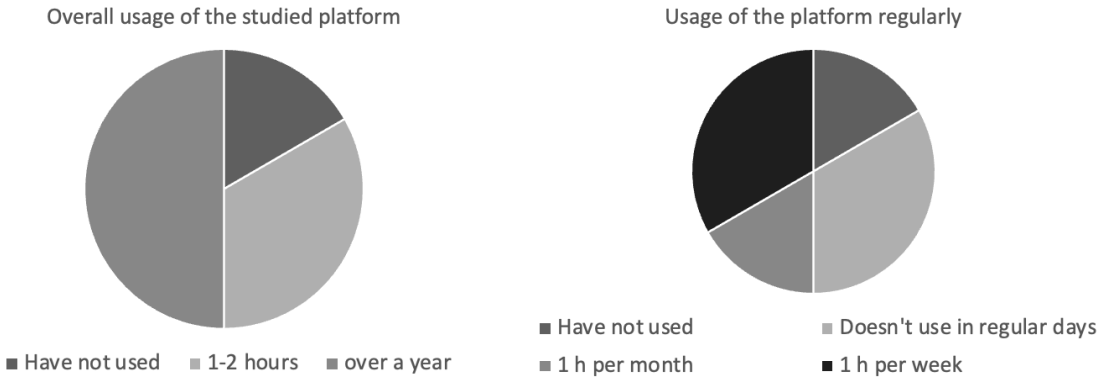

Figure 20. Usage of the platform overall and during a regular workweek.

Four out of six interviewees found the platform as a useful tool in their work, especially in onboarding and work-related training. It is also noteworthy that among the interviewees, those who had used more of the platform in their work found it or similar applications more useful more often than the other interviewees, the correlation of which is shown in Figure 21.

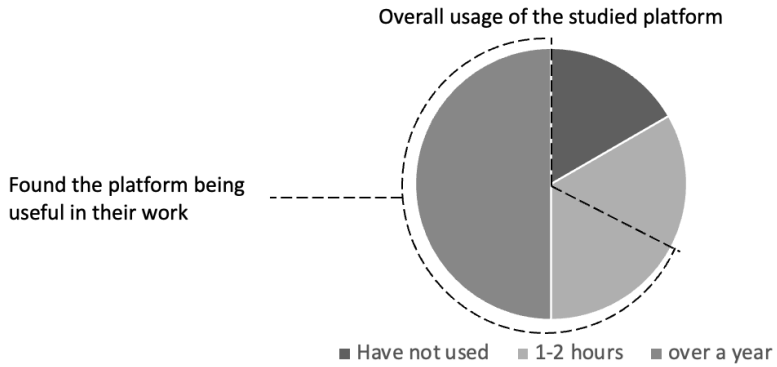

Figure 21. How the usage of the platform effects on the found usefulness of it.

Three of the six interviewees in total, three of the five who actually used the application, had encountered some problems with its use, mostly related to the interviewees' own limited use and general usability of the platform, as well as some occasional technical bugging. One of the interviewees who encountered problems felt that they had raised concerns about his/her use of the application, the said concern being a problem related to the registration of the courses, i.e., the problem of data storage and transfer. A

breakdown of how problem encounters, and concerns were distributed among interviewees is presented in Figure 22.

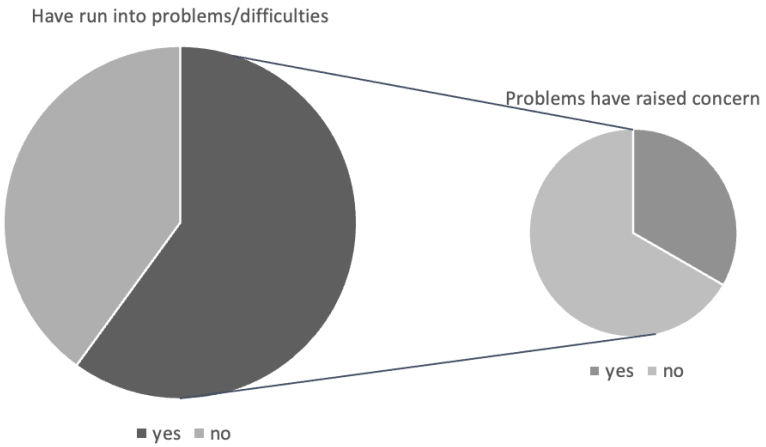

Figure 22. Have running into technical problems or bugs during the use effect on having concerns about the platform.

5.4 Usability and user experience

When asked for their opinion, half of the interviewed found the platform in case as a useful addition to their work. The other half of the interviewees could not say any opinion about the platform in the interview because they did not consider it familiar enough for them to form any special opinion.

Each of the interviewees who regularly used the platform used it either for their own training or to assign similar trainings or courses to other employees. Those who used less of the platform had used it for onboarding or to perform individual, not training-related in-app tasks.

Everyone who considered the platform to be a useful addition to their work also considered it the most appropriate platform for employee e-learning or as a tool for onboarding, even those who had not used it in either or had used it for only one of these.

Separation between the overall feeling of the usefulness and where interviewees found the studied platform most useful in their work is presented in Figure 23.

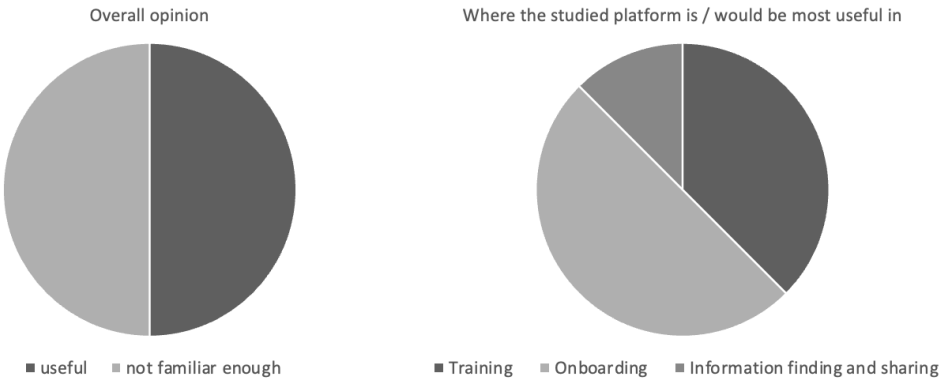

Figure 23. Overall feeling of the usefulness and where interviewed end-users find the plat-form most suitable in their work.

”The platform is a great tool for onboarding new employees, and also for introducing new tasks to old employees.”

“Alusta toimii hyvin apuvälineenä uusien työntekijöiden perehdytyksessä, ja myös uusien työtehtävien esittelyssä vanhoille työntekijöille.”

”The platform facilitates my work as a trainer in particular, and there are also good work instructions for my own use.”

”Alusta helpottaa erityisesti kouluttajan työtäni, ja sieltä löytyy myös hyvin työohjeita omaankin käyttöön.”

”…it had a positive effect on onboarding, I would rather handle it this way than with a stack of papers or studying on my own time as in some of my previous jobs.”

”…vaikutti positiivisesti perehtymiseen, mieluummin näin kuin paperinipulla tai perehtyen omalla ajalla (kuten joissain aiemmissa töissäni).”

”Various compulsory courses can be taken conveniently when you have the best time to do so yourself.”

”Erilaiset pakolliset kurssit voi suorittaa kätevästi silloin, kun siihen itsellä on parhaiten aikaa.”

Three of the five interviewees who had used the application under study had advised a more inexperienced colleague on how to use it, and one in five interviewed had needed help to use it themselves. The separation between given and needed help with the use of the platform is shown in Figure 24.

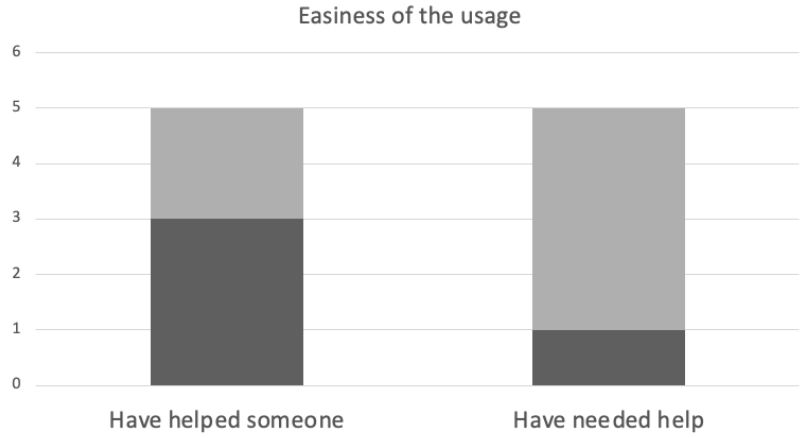

Figure 24. How many of the interviewees have run into a need of assistance according to the usage of the platform.

5.5 Feedback and ideas

Three of the six interviewees had concrete development ideas both for the use of the system in their own employer organization and for feedback and development targets for the system itself. The development ideas for the system were mainly related to improving its usability and bugging.

The content of the feedback is not further specified in this section, as it contains information that is irrelevant to this study, and this is only considered as a significant amount of feedback during the interviews witch clearly indicates the need of end-users to be able to give feedback about the system.

6 Discussion and conclusions

While the importance of technology has increased in our daily lives, it has done the same on an ever-increasing scale across different industries and their external and internal processes. There can be found a lot of positive evidence of modern technology solutions to help human resource management, which is probably why many companies end up digitizing and updating their human resources tools. When upgrading information system solutions, companies often choose the system from companies that offer their software with cloud-based, agile, and cost-effective solutions instead of the traditional local installation. The purpose of the study was to find out what are the critical success factors in implementation of a human resources system focusing on staff training and onboarding to be distributed as a SaaS model, or in the introduction of it to a new employee. A successful information system implementation project was examined from the perspective of a software service provider and a continuous or incremental usage was the measure of successful implementation by them. Another motivation for the study was to find out what influences the end user's desire to actively continue using the application, or on the other hand to start avoiding using it.

As discovered from the earlier studies and research literature, there are various things effecting on the failure or success of the information system implementation in an organisation. With various effective matters comes multiple perspectives to approach the subject, and for this study have been chosen quite a tricky one: how a software supplier can effect on the usage of their product by their end-users. The study found out that largely the responsibility for the success of the information system implementation process, as well as the introduction of the information system to a new user, is depending on the top level of the implementing organisation. This ranges from successful and organisational procurement to continuing to ensure that they are well justified, not only to those who decide to use the resources, but through the organisational structures and all the way to the end-users of the system. Unfortunately, this is something that SaaS system providers cannot really influence directly through their product or the way it is

distributed, even though the animated paper clips have been used to explain a convenience and usability of a software since the 1990s.

The majority of the critical success factors for the successful implementation of an information system focus on end-user user satisfaction and their attitudes towards the new system. In SaaS systems, the importance of this factor is further emphasized, but it is difficult to directly influence it as a system service provider, as the interaction with end-users is easily eliminated due to the distribution method. Because ready-to-use systems are easy to procure and quite inexpensive, and often have technical deployment processes that are lighter than traditional systems or in-house system development, there is a risk that even the actual implementation and end-user involving part of the implementation process will be left halfway. Indeed, the empirical part of the study shows that some of the end-users interviewed felt that this part of the process had remained inadequate; some were unaware of the existence of the studied system in their organisation, some thought that although they had been assigned in various tasks on the system, it did not actually concern them.

In the end, all the themes presented in the literature review seem to make the proper communication as the most important critical success factor for the success of any system implementation processes. In information system projects and information system implementation, this is shown as in communication about the rationale and impact of information system procurement throughout the organisation, the need for change management planning from an organisational perspective, and as anticipation and preparedness of the end-user’s possible resistance to change. From the end-user's point of view, the meaningfulness of communication is the most important, and is also the most important aspect to consider in terms of research questions. However, end-users are also ultimately responsible for how much they use work-related software and applications, and whether they seek other ways to perform certain tasks instead of using them. End-users are also often full of development and other ideas regarding the systems they

use and providing a channel for them to share this information can offer two-way benefits to both the customer company and the service provider.

The importance of communication as a key critical factor in the success of the implementation of an information system, as well as its regular and active continuation, was also emphasized in the empirical part of the study and would seem to validate the theory presented in the literature. Indeed, the dilemma stems from the delusion caused by the apparent ease of obtaining, installing, and deploying an information system distributed as a ready-to-use service from the procuring organisation not having to plan and put in use the implementation process stages that affect straightly the implementing organisation, and in that way they may fail engaging the end-users from a very early stage in the implementation process. The problem is not solely on the side of the service provider, because while a little-used system may be beneficial to the procuring company paying the costs by use, it is still a wasted resource. From the point of view of SaaS providers, it is crucial to note this correlation between easy implementation and poor implementation process planning and seek to contribute to this by either enhancing communication between the company and the customer company, or by for example including a mandatory but informative intro for each new user in the application. Other ways to promote end-user's commitment to using the system as a service provider could be to increase the collection of customer feedback from end-users, as they are the largest and even the most important customer group in addition to the actual customer organisations.

The literature section reviewed organisations' information system implementation's critical success factors from the system procurement process, information system implementation process and from both the implementing organisation and the end-user side. These were also the thematic areas according to which the interviewees were sought to obtain confirmation or objections as to whether the theoretical statements for critical success factors are fulfilled in the case system and its implementation, as well as how it can engage its end-users better. In the following chapters the arise observations about these

subjects from the literature review will be reflected to data from interviews as they are discussed by the perspective of answering the research questions.

6.1 What are the critical success factors in implementing a SaaS-based information system in an organisation?

More than half of information system projects are completed late, budgets get exceeded, or their quality or functionality does not meet the expectations. In addition, the success of information system projects is usually also measured through failure. As the procurement of an information system is in principle assumed to have a positive effect on the area of business or process for which it is acquired, the lack of use of the end-product in the company or other failures may be borne by the acquirer, although the fault may lie at different stages of the deployment process or even in the entire corporate culture. From the point of view of procurement, it is critical that it operates in practice as defined in the justification for making it. Capital and other resources are always committed to the procurement, which is then to be realized, for example in the acquisition of an information system, as a justification for achieving the goal set for the system. The goals of the organisation, as well as the goals and benefits to be achieved through procurement, must be clearly articulated throughout the organisation, and therefore the reasons behind, for example, information system procurement must be communicated to end-users so that they understand and want to commit to the change it brings. The interviewees' opinions on the system under study varied, but there was no clear difference, for example, by location, so the attitudes may be related to the interviewees' personalities and general attitudes towards technology and / or new technology.

> *”It [the case-platform] is dynamic and inspiring.”*
>
> *”Se [tutkittava alusta] on dynaaminen ja innostava.”*
>
> *”I experienced it [onboarding via platform under study] mainly as a fill of working hours when there was no actual job to do.”*

> *”Koin sen [tutkittavalla alustalla perehtymisen] lähinnä työtuntien täyttönä, kun ei ollut varsinaista hommaa.”*

In the literature review, system acquisitions in the form of cloud services were mentioned as more risky than traditional systems in terms of information security in several sources, and one of the most prominent issues for information security when making system acquisitions. However, at least in the end-user group interviewed, security concerns did not raise any concerns about the system under investigation, even though the platform under investigation was used for at least some users on devices shared with a co-worker, such as work phones. Based on the interviews, it can be thought that in Finland, employers are so knowledgeable about information security issues that an employee does not have to worry about them.

> *”I have not thought that these things should be worried about, here [in Finland] everything is so regulated and supervised.”*

> *”En ole ajatellut, että näistä asioista pitäisi olla huolissaan, täällä [Suomessa] kaikki on niin säänneltyä ja valvottua.”*

Renewal of an information system is often a large and multifaceted event in an organisation, which can be reflected not only in the change in the technical use of the system, but also in the organisation's internal processes and workflow. In the previous studies, the process of implementing an information system has been divided into multiple different ways, which seem to have in common that they are based on the way the system is implemented in the organisation: at once, in stages, or a combination of these. SaaS systems allow companies to test new information systems in practice with ease, on a quick schedule, and with little resources, but the apparent ease and uncomplicatedness can bring problems to the success of the implementation process. There is also a risk that the ease of making a system procurement will make the organisation to forget about the careful planning of important steps in the implementation process, leaving, for example, the necessary training and end-user acceptance steps of the system undone. Applying the steps of Alter's implementation process to the platform under study, it seems that in the case organisation there has happened exactly what the theory suggested as

one of the critical failure points, i.e., the scalability of the ready-to-use system does not fully meet the needs of the end-users of the customer organisation.

> *"The lack of performance records makes it difficult to monitor the performance of the courses, as I cannot be sure whether the course is in progress or has been fully completed by the employee. "*

> *"Suoritusmerkintöjen puuttuminen vaikeuttaa kurssien suoritusten seuraamista, sillä en voi olla varma onko kurssi työntekijällä kesken vai suoritettu kokonaan. "*

Because the procurement of an information system always responds to an existing problem or opportunity in the organisation making it, the success of the implementation can be measured by how well it achieves its goals, how well it utilizes the resources allocated to it, and how well it serves the needs of the end-users. Measuring the success of an information system implementation process is difficult, and there are no established metrics for measuring success, as success is strictly defined by different stakeholders from their own perspectives. From the point of view of the SaaS provider, the deployment can be considered successful when the system is considered successful by its end-users, i.e., when it engages and activates its users. For this reason, the interviews of the empirical research section focused on finding out the opinions of end-users about the studied platform and its user experience.

The DeLone & McLean Information System Success Model and its development is considered a pioneering idea for measuring the success of an information system project, and it also works well for evaluating the success of a SaaS system. According to the model, the system itself, the information it provides, and the quality of the service it provides can be thought to directly affect the use, intent, and user satisfaction of the end-user, which factors then correlates with each other and the received impacts from the information system. Due to the varying payment methods of ready-to-use systems, often committed to the actual usage, these impacts can also be read as impacts received by the service provider. The success factors according to the model are those in which only a small part can be directly influenced by the organisation that is procuring the

information system, in which case the impact of these factors on the success of the implementation should be considered on the service provider's side. The problem in this case easily becomes how accurately and with what specs things are communicated between the service provider and its procurer.

Although research and the literature often present information system projects mainly from the perspective of the developer company, the role of the organisation implementing the system in its successful implementation is overly complex and significant. The company that procured the information system is ultimately responsible for how the actual implementation process of the system within the company takes place and how it is managed, which in turn directly affects how well the information system is accepted in the organisation. This is particularly important in ready-to-use systems, as they are often quick and easy to obtain for the company to use and require less interaction between the company making the procurement of the software and the one providing it.

> *"The employer should explain what that application is."*
>
> *"Työnantajan pitäisi selittää, mikä kyseinen sovellus on."*
>
> *"If they want employees to use these features, they should also let us know that there are such apps on the [work]phone. 'Take a look at them and use them'."*
>
> *"Jos he haluavat, että työntekijät käyttäisivät näitä toimintoja, heidän pitäisi myös kertoa, että hei täällä [työ]puhelimessa on tällaisia sovelluksia. 'Käyttäkää näitä ja käykää katsomassa sieltä'."*

The implementation of an information system can be thought of as an ongoing organisational process that begins as an aroused need for a system or change in the way it works and continues as long as it is introduced to new users. The upstream stages of this process involve more technical definitions and process design, and the downstream end involves how the management of the implementation project is done in practice and how it reflects in the use of the information system and user attitudes toward it throughout the organisation. Because the final phase is especially emphasized in ready-to-use systems, where the technical specification is often made within the scalability of the

software to be procured, the empirical part of this study has focused specifically on the downstream stages of the implementation process.

From the service provider's point of view, successful implementation, on the other hand, serves the needs of both extremes, but the pricing principles of the SaaS model in particular support the idea of the relevance of the end-user satisfactory as a measure of successful implementation. From the stages of the implementation process specified in the literature review, this is directly influenced by the resources allocated to end-user training or familiarization of new users to the information system in the implementing organisation, as well as how much it takes time for a new user to learn how to use the information system. The system under study, for example, has applications with similar usage patterns and a similar layout, which means that its implementation should be, and is marketed to be, relatively easy for users with a normal familiarity with smart device applications. Despite this, more than half of the interviewees had encountered the need for additional assistance in using it at work.

In addition to assessing and organizing the need for training, the introduction of a new information system often involves changes in the organisation's internal processes or working methods, which require preparing and planning for that future change. This is called change management, of which two approaches were presented in the literature review. The first of these was Leonard-Barton's innovation implementation-focused model, which describes the cross-cutting effects of, for example, the introduction of a new technology, depending on its own, and the characteristics of the implementation process. The second model presented was the change management model introduced by Kotter approximately ten years later, which is considered to be the starting point for several newer models. From each of these models, similarities can be identified for what are the most significant factors for change success from an organizational perspective. Such factors include the enthusiasm and involvement of end-users in the change process, the clear communication of the need for change throughout the organisation, and the coherence and persistence of change. In the empirical part of the study, these were also

clearly visible as issues that emerged in the responses to the interviews as perceived shortcomings in the implementation of the information system or in getting presented to the new system; the studied system was perceived as not being part of one's own job description, and more information was requested from the employer on its part.

> *"At the moment, I don't have my own work phone, so there's a feeling that the apps found on work phones don't apply to myself as an employee."*

> *"Tällä hetkellä minulla ei ole omaa työpuhelinta, niin on sellainen olo, etteivät työpuhelimista löytyvät sovellukset koske itseä työntekijänä."*

At an early stage in the development of information technology research, it has been found out that it is characteristic for human nature to respond in certain ways to change, such as new technology. Identifying these reactions in advance and managing them as part of the implementation process has become an issue that has been found to improve the success of the implementation process. Such reactions are referred to in research as resistance to change, and change management is something that specifically seeks to influence it. In the empirical part of the study, this type of change management seemed to vary greatly from location to location and otherwise, as did the utilization rate of the platform under study.

User acceptance refers to how well the end-user accepts the system to be implemented. As presented in the literature review, according to Davis, this is influenced by the perceived usefulness and the perceived ease of use of the system to the end-user, but the literature review also presented a couple of broader perspectives to the subject: Fishbein & Ajzen's theory of reasoned action and Ajzen's later from that updated and completed theory of planned behaviour. Based on these, it can be concluded that the previous study identified the factors influencing user acceptance by the end-user to their individualistic basis and the impact of the environment. Research has pointed out that these influence end-user's intention to use the system, which in turn leads directly, at least in theory, to whether it will be used and how actively. In the case of work-related systems, of course, such a choice is usually not possible, but at least it is conceivable that one's own and the

attitude reflected by the environment will influence whether the use of the system is reluctant or enthusiastic. Most of the interviewees felt that the case system had a positive effect on their work, as well as facilitating some of their work tasks and performance. In addition, those interviewees who had negative previous experiences or general feelings about the system also saw that a change in certain things, either on the system's interface or on the employer organisation's side, would lead to their experience becoming more positive.

> *"It would be a good idea for [the set task] to go directly to the phone's main screen. Now employees will not notice a task if they're not browsing the task menu where the [case company brand] application platform can be found. It is likely that [the employer's organisation's] telephone platform will not allow this, as other messages will not appear on the screen either."*
>
> *"Olisi hyvä, että [asetetusta tehtävästä] menisi viesti suoraan puhelimen päänäytölle. Nyt työntekijät eivät huomaa tehtävää, jos hei eivät selaa tehtävävalikkoa, josta [case-] sovellusalusta löytyy. Todennäköisesti [työnantajaorganisaation] oma puhelinalusta ei tätä salli, koska muutkaan viestit eivät näytölle ilmaannu."*
>
> *"The onboarding material was aimed at the workers of another position, [the onboarding material] could be targeted at least according to the job description."*
>
> *"Perehdytysmateriaali oli suunnattu toisen työtehtävän tekijöille, [perehdytysmateriaalin] voisi kohdentaa ainakin oikeisiin tehtäviin."*
>
> *"In some companies, similar apps are downloaded to employees' own phones, but in this case, I used a supervisor's [work] phone, which was a bit awkward."*
>
> *"Joissain yrityksissä vastaavat sovellukset on ladattu omaan puhelimeen, mutta tässä tapauksessa käytin esimiehen [työ]puhelinta, mikä oli vähän kankeaa."*

Technology acceptance bypasses the same subjects as user acceptance, but from a technical standpoint. The literature review presented the development of technology acceptance and its research over the years. The pioneer in this study is Davis, whose first version of TAM was introduced as early as the 1980s and has been since updated and re-evaluated by various researchers. Technology acceptance also focuses on the usefulness of the technology experienced by the end-user and its perceived ease of use, and on how these experiences are reflected in attitudes and thus the actual use. Utility and ease

of use, on the other hand, are affected by, among other things, the design of the technological system, the learnability of its use and its effects on, for example, the tasks performed by the employee. The literature review finally presented the UTAUT model by Venkatesh et al. that brings together theories of user acceptance and technology acceptance. In this model, attributes of the individual's gender, age, and previous technical experience have been added to the utility and ease of use of the above-mentioned influencing factors. When thinking about the research questions, it was thought that the latest models in theory are the most processed and the most valid in view of the current situation, but the interviews showed very little connection between these factors and attitudes towards the system. Instead of this, the interviewees' actual experience in using the system was clearly reflected in the user experience, so that the users who used the platform more on a weekly basis found it clearly more useful in their work, i.e., increasing usage could be expected to increase usage satisfaction based on this sample.

Usability is a system quality factor from the user's point of view. It is essentially related to user satisfaction and correlates with willingness and activity to use, so it is no wonder that it is a particularly studied issue related to the success of information system projects. To define usability, many different models have been made to describe the factors of which it is composed. These, in turn, are widely related to whether the use of the system is efficient and trustful for the purpose it was made or acquired, but even more whether its use is pleasant or causes frustration. The literature review presented diverse ways to assess usability and metrics for assessing it, either using end-user participatory methods or the ones that rely on expert judgment. In the empirical part of the study, no actual usability testing or research was conducted in accordance with the principles presented in the theory, but because usability is so strongly related to the critical factors the study sought, it is presented in theory as a single key topic as well as discussed as one of the main themes in the interviews. The usability could also be said to be the theme that is easy for even a non-expert to understand, and from which it is also possible to move on to more abstract entities, such as attitudes. The literature review highlighted that interviewing for usability can provide information about one's own use, inactivity, or concerns

that would not be objectively obtainable by any other methods. The end-users may also like to answer certain types of questions more eagerly because of the clarity or felt personality of the subject, which was clearly shown in the interviews conducted for this study. For example, the interviewees responded to feedback questions more broadly than to other questions, and thus, the question of desired features provided a meandering answer from what does not work as desired in the current system or its use.

The concept of user experience goes hand in hand with usability, although there can be found differences in their definitions in the research. However, in seeking answers to the research questions in this study, they affect the same issue and, in a lot, the same way, which is why they are thematically bundled under the same upper category, and for this reason the interview also asked about usability and user experience side by side and in the same context. In the literature review, the topic was approached strongly from a SaaS perspective, as an information system distributed as a cloud service and application strongly stamps its own kind of end-user experience. It was also found that the user experience in this context was also affected by other technology used in the case-company's work or on the same equipment.

6.2 How can the service provider increase success in the implementation process of a SaaS-based information systems?

Looking at the process of implementing or introducing an information system to a new employee from the perspective of how a service provider could respond to this critical point of implementation process, it is difficult to find a direct answer from previous research. One of the research questions is based on the SaaS system procurement and distribution practices, which are often very favorable to the implementing organisation compared to traditional system procurement in the form of licenses and local installations, or how organisation resources are tied for internal system development. At the same time, this flexible and secure way for the buyer to make new system purchases drives the system service provider to easily develop, repair and renew the product

quickly and in response to wishes. This appears to the customer as a good service on the part of the service provider and certainly meets the customer's requirements but is not necessarily reflected as much revenue towards the service provider. Thus, the development and renewal of a system does not necessarily increase its use or commit end-users more than before, even if the acquirer and the decision-maker are satisfied.

Sufficiently careful preparation, monitoring and guidance, as well as the measurability of the results of the procurement, are considered important for its success. At this point, it is good to address how different the stakeholders consider a successful implementation. Organisational decision-makers want to digitize and automate processes, and procurement decision-makers want to do so cost-effectively. The service provider wants the active use of their product to increase the benefits obtained, and the end-users want a system that supports and helps them perform better and more efficiently in their work. Each of these perspectives would need its own metric, some are impossible to measure, and some of the conditions for success are met somewhat against each other. For example, the effectiveness of e-learning is difficult to measure in practice other than based on end-user feedback, as the rapid use of e-learning tools may indicate that they are effective or uncomfortable to use. In usage-based pricing, low-cost pricing is often an indicator of good procurement for the service acquirer, but vice versa for the service provider. One system may not meet everyone's expectations, but to answer the research question, it should provide enough benefits for decision-makers to encourage them for the procurement, and in addition, serve end-users in the most appropriate way to support and increase usage.

The importance of communication between system developers and end-users, as well as other organisational and process stakeholders, is emphasized in the success of information system development and implementation. The possibilities for this kind of communication are much lower in SaaS model than other information systems distribution systems, such as organisations' internal development. This is strongly an area that is difficult for the service provider to influence, as products distributed as applications often

do not have the ability to provide or receive feedback between end-users and developers at the service provider's end, which was mentioned as a bad thing in one of the interviews. Many applications collect user information from time to time, and at this point one might consider whether such an arrangement is possible in a system used in a work environment. The need to comment on and develop the system to better support one's own work that emerged from the interviews would communicate that, to improve the user experience, the experience of end-users being heard and being able to influence their technical tools would promote its active use.

The EUCS model and information system success model presented in the literature review, are very much in line with each other: a successful information system and a system that satisfies its end-users both provide high-quality, relevant, and necessary information, are distributed reliably and user friendly. As an alternative approach to these the literature review also presented the UTAUT model that shifts responsibility for the success of an implementation to a wider area than the benchmarks, and challenges to think about a successful information system project in terms of communicating the attitudes and support of the procuring organisation. This is a good perspective on how much the procuring and implementation of SaaS system, which is less participatory than the end-user model, relies on the transfer of attitudes from the acquirer all the way throughout the organisation and to the end-users in the procuring organisation.

> *"I don't really know what [this] app is, it has never been properly told. Once there was a prompt to go to respond to a query in it."*
>
> *"En oikein tiedä mikä [tämä] sovellus on, siitä ei ole koskaan oikein kerrottu mitään. Kerran tuli kehoitus mennä vastaamaan siinä olevaan kyselyyn. "*

This model also emphasizes the job-related benefits of the system at work as an crucial factor for successful implementation.

> *"I went to look at it [the query] and the answer options, but I left [to perform work tasks] and missed out. No questions were asked after [the missed query]."*

> *"Kävin katsomassa sen [kyselyn] ja vastausvaihtoehdot, mutta lähdin [suorittamaan työtehtäviä] ja jäi kesken. [Kesken jääneen kyselyn] vastausten perään ei kyselty."*

It is even conceivable that if a service provider wants to ensure the successful implementation of their information system, it would have to assure the upper level responsible for the actual implementation in addition to the procuring entity, so that the desired attitudes towards the new system would flow down the organisation and all the way to end-users. This ideal situation would also be influenced by the personal experience, attitudes, and the background of each individual throughout this flow of information, and in fact the interviews showed that the success on it had been very varied between different units. Some of the interviewees were extremely excited about the platform and what it can offer for their work, when some remained very sceptic about its usefulness.

The literature review addressed the theory and research of critical success factors from two different perspectives, information system success and user satisfaction, as well as their suitability to determine the success of the information system implementation process. Based on these, the support of the management and the entire organisation, the consideration of end-user feedback and other communication, as well as the consideration and response to problems emerged are critical success factors for the implementation process. More than half of the interviewees had received or given help in using the platform, of which one interviewee who needed help found it frustrating to ask for help. In each of the models discussed, as well as in the listings of critical success factors, the importance of communication is particularly important, as well as the user experience of end-users.

The literature review and the theoretical background of this study highlighted the importance of careful planning and monitoring of the implementation project for the successful implementation of the information system. It is difficult for the service provider to access what is happening in those parts of the implementation project that are taking place in the implement organisation. These phases are particularly sensitive to whether the implementation is perceived as successful for end-users, which has been found to be the main

criterion in practice for it to be successful from the service provider's point of view. The change management of the customer company and the progress of the implementation project cannot be accessed from the service provider's side, but some phases of the implementation process can. The systems offered as applications, like the case-system, are generally light and operate in such a way that the skills to use a smartphone provide the basis for the necessary technical expertise, and the implementation of the system does not necessarily require separate training or guidance to get started. However, interviews revealed that the system was perceived as foreign and unrelated by some of the end-users. When procuring systems, organisations consider the need for the acquisition, but information about the reasons and justifications for an acquisition does not always reach the group affected by the acquisition and the change it brings.

> *"It was unclear if the application had any functionality other than that query."*
>
> *"Jäi epäselväksi, onko sovelluksessa muita toimintoja kuin kyseinen kysely."*

At this point in the implementation process, the SaaS provider could be able to contribute to at least the attitudes of end users who actually encounter the system in their work. Because the solution offered is easy to use and does not require separate training, instead of training, a short mandatory pre-use tutorial could guide end-users to understand the needs for which the decision-makers have acquired the system.

The last section of the literature review, as well as almost the empirical interview section of the study as a whole, dealt with the success of the implementation from the end-user perspective. Factors influencing this include end-user attitudes towards the technology being implemented, the user experience it offers, and the factors that make it usable. The latter two are what the service provider might think would be easy, even mandatory, to influence to ensure successful deployment and continued use. The case information system is designed to be used in workplaces where not every employee has a work phone or other smart device in personal use. In several interviews were referred to the fact that using the system from a colleague's device is not considered pleasant. This raises the question of whether getting a system in the early stages of digitalization of a customer company's

internal processes is more important than getting directly to increase usage, for example by expanding the distribution of an application beyond work equipment. In the future, a digitalizing customer company may nevertheless invest in the acquisition of equipment for the workforce instead of another system purchases.

> *"Wider use of [our own] work phones would certainly increase the use of the platform in the company."*
>
> *”[Omien] työpuhelinten käyttö laajemmin lisäisi varmasti sovellusalustan käyttöä yrityksessä.”*

The user experience and the experienced meaningfulness of use, which has been pointed out in the literature review directly to influence the activity of the system usage of end - users, was strongly highlighted in the interviews also as a place to affect if wanting to increase the activity of use. Interviews stated that end-users want to be able to clearly influence the development and use of the tools they use at work. Communication between the developer and the end-user is often incomplete in external system purchases, and especially in low-cost application solutions no technical support or channel may not be available for bug location or development ideas from end-users. A way for a service provider to promote end-user’s commitment to using the system could be to increase the collection of customer feedback from end-users via for example, an internal feedback form.

6.3 Discussion about the chosen method, limitations of the research and opportunities for future research

The choice of a focused or so-called thematic interview as an empirical research method was justified in this study, but the impact of pandemic conditions on its implementation made it difficult both to find and recruit interviewees and to conduct the interviews themselves. The conduct of the interviews was also clearly influenced by the inexperience of the interviewer in conducting the interviews, and as the interview process progressed, it was found that the amount and quality of data extracted from the interviews

improved with experience. Similarly, although the body of the question was tested in advance by the test interviewee, it could have been a little more accurate in terms of what kind of answers were desired regarding the themes. This, too, is something that a more experienced interviewer or a researcher would certainly have tackled at the empiric phase of the study.

As it was challenging to find the interviewees for random picking due to the pandemic, it was finally decided to use the so-called snowball method to recruit the interviewees. It means that an employee was first selected from a randomly selected workstead, who then suggested a suitable colleague to be interviewed. This was also because it was known in advance that the studied system was used very differently in different locations of the customer organisation, and there was a desire to obtain possible answers from respondents with little prior knowledge, as well as the experts of the end-users. In retrospect, the mere random sampling, or the mere recruitment of experts directly for interviews could have provided more comparable data for the study. The interviewees were all quite of the same age group, and although their activity in using smart devices outside working hours varied quite widely, they can all be considered homogeneous in terms of their technical background, and perhaps a poor research group in this respect. The potential client companies of the software providing case company have a very variable age, education, and information technology skills in their workforce, so a more varied sample could have yielded better applicable results. On the other hand, it is conceivable that in the future, good technical skills will also be on the upswing among the younger generation of workers.

The involvement of the end user and their user experience became a significant factor in almost all the themes specified in the study, but in the interviews, for example, user and technology acceptance and resistance to change were discussed rather superficially. This was certainly due to the inexperienced researcher and interviewer at this point, as well as the fact that it was easier to highlight these more concrete issues in the layout of the questions, such as user experience from a technical point of view. In a future study

on the success of SaaS deployment, it could be important to examine this part of the implementation process, which is easily overlooked in the implementation of ready-to-use systems, because although the location, distribution and development of the information system is outsourced to the service provider, its implementation and management of the implementation process is not.

Theoretic background and literature review showed that a lot of research about the topics related to this research has been done during the decades. Nevertheless, the increasing amount of ready-to-use and other light and easy systems are acquired to organisations every day but for example SaaS implementation processes were nearly only mentioned in vendor websites and their advertising, so there seems to be a nice gap for future research to dive in to. In any future research on the topic of implementation success in SaaS systems or to this case company, I would not necessarily recommend the software provider's customers to use interviews as a data collection method, at least if the recruitment of interviewees is conducted on random sampling, as the information obtained may not be appropriate or may have to be applied. In the case of a technical application, of which one of the main purposes is e-learning, for the purpose of developing the application, it might make sense to set up diverse types of question sets to obtain information on the use of the application directly from its end-users. Carrying out own surveys or user queries is, of course, a research technical matter between the service provider and the client company, but in the light of the answers received and the answers sought to the research questions, I would consider such a model to be good and justified in the case of SaaS providers. Especially since, according to the information obtained in the interviews, at least the case application was already used in the customer company for similar data collection.

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Appendices

Appendix 1. Material selected for the literature research with their classifications

Classifications: 1. Success of the procurement, 2. Success of the information system project, 3. Success of the implementation, 4. Success of the implementation from the perspective of the implementing organisation, 5. Success of the implementation from the end-user's perspective

Publication (author, release year, name, publication information)	Classification number(s)
Ajzen I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes 50*, pp. 179-211.	4
Albert, W. & Tullis, T. (2013). *Measuring the User Experience: Collecting, Analyzing, and Presenting Usability Metrics.* Waltham, Massachusetts: Elsevier Inc.	4
Alter, S. (2002). *Information Systems: foundation of e-business*. 4th edition. Upper Saddle River, New Jersey: Pearson Education Ltd. ISBN 0-13-061773-3.	3
Bouaissa, D. & Chalal, R. (2017). Modelization of User Satisfaction in IS research. *Conference: Fifth International Conference on Advances in Computing, Communication and Information Technology - CCIT 2017*. USA: Institute of Research Engineers and Doctors. DOI: 10.15224/978-1-63248-131-3-46.	2
Briggs, O.R., De Vreede, G-J., Nunamaker, J.F & Sprague, R.H. (2003). Special Issue: Information Systems Success. *Journal of Management Information Systems*, 19(4), pp. 5–8.	2
Davis, F. (1985). *A technology acceptance model for empirically testing new end- user information systems: theory and results*. Doctoral dissertation. MIT Sloan School of Management, Cambridge, MA.	4
Davis F.D. 1989. Perceive Usefulness, Perceive Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly 13*(3), 319-340.	4
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DeLone, W. H. & McLean, E. R. (2003). The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. *Journal of Management Information Systems*, 19(4), pp. 9–30.	2

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Erämetsä, T. (2003). *Myönteinen Muutos*. 2. edition. Vammala: Vammalan kirjapaino. ISBN 951-26-4906-3.	3
Fishbein, M. & Ajzen, I. (1975). *Belief, Attitude, Intention and Behaviour: An Introduction to Theory and Research*. Reading, MA: Addison-Wesley.	4
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Garrett, J. J. (2011). *The Elements of User Experience: User-Centered Design for the Web and Beyond*. London: Pearson Education.	4
Hertzum, M. (2002). Organisational Implementation: A Complex but Underrecognised Aspect of Information-System Design. *NordiCHI 2002: Proceedings of the Second Nordic conference on Human- Computer Interaction* (Aarhus, Denmark, October 19-23, 2002). New York: ACM Press, pp. 199–202.	2, 3
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Huuhka, T. (2017). *Tehokkaan hankinnan työkalut.* 2. edition. Helsinki: BoD – Book On Demand. ISBN 978-952-339-300-4.	3
Hyötyläinen, R. (2013). Implementation of information systems as an organizational construction. *VTT Science 28.* Espoo: VTT.	3
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Lucas, H. C., Ginzberg, M. J. & Schultz, R. L. (1990). *Information Systems Implementation: Testing a Structural Model.* New Jersey: Alex Publishing Corporation.	3, 4
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Nielsen, J. (1993). *Usability Engineering*. San Francisco: Academic Press.	4
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Ovaska, S., Aula, A. & Majaranta, P. (2005). *Käytettävyystutkimuksen menetelmät*. Tampere: Tampereen yliopisto.	4
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Pinto, J. K. & Slevin, D. P. (1987). Critical Factors in Successful Project Implementation. IEEE Transactions on Engineering Management EM-34(1), pp. 22–27. DOI:10.1109/TEM.1987.6498856.	2
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Appendix 2. Interview questions script for focused interviews

Theme 1: Background information

1. Age
2. Gender
3. Occupation
4. How much do you use electronic equipment (computer, tablet computer, mobile phone, smart watch), or internet and social media applications on your spare time?
5. Do you use other alike tools aside in your daily work for similar cases?

Theme 2: Implementation and acceptance

1. How long have you been using the platform?
2. How much do you use it on a regular workday or workweek?
3. For what do you find the platform useful in your work?
4. Have you come up with any difficulties with the platform?
5. Have the usage of platform or the said difficulties raised any concerns about the platform?

Theme 3: Usability, user experience and user satisfactory

1. What is your overall feeling about the platform?
2. For which causes do you use the platform?
3. For which causes is the platform suitable for?
4. Have you required or given assistance in using the platform?
5. How does the platform effect in your work?

Theme 4: Feedback and ideas

1. How could the platform be developed in order for you and your co-workers to use it more?
2. What features or abilities would you like to see in it in the future?
3. Would the conduction and realization of these require changes on the part of your employer organization?