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ABSTRACT

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Abstract

Most of the organizational information is stored in documents. Along with digitalization and global networks, the amount of information and electronic documents has increased massively. Electronic document management systems (EDMS) make it possible to manage the whole life cycle of a document, enhance document compliance, improve document visibility as well as to control and streamline processes electronically. This research investigated how implementation of the electronic document management system succeeded from an end user perspective in the case company. Success was defined to be the system users' intention to use the system.

Based on the previous literature, a new research model was developed to evaluate the user intention to use the newly implemented system and to figure out how different factors were related the intention. Data of the quantitative case study was used as an input for the research model. The data was collected with structured questionnaire from end users of the system in the industrial company. The questionnaire was generated on the basis of the research model which consisted of six research constructs: training, system characteristics, communication, ease of use, usefulness and intention to use. As a result, training and system characteristics were positively associated with perceived ease of use and perceived usefulness of the system. However, communication was not significantly related to perceived usefulness. Similarly, perceived ease of use was not positively associated with the intention to use the system. However, perceived ease of use was positively associated with the usefulness of the system. A useful system increased the intention to use the system which was defined to be the success in this research.

All the research constructs had high mean value from respondents. Mean of 4.4/5 referred to as high commitment of the user's intention to use the system and thus, it can be considered that the implementation was successful from the end user perspective. As a conclusion from the research, it is useful to put effort on training and system characteristics in the future implementations because those had the strongest impact on perceived ease of use and perceived usefulness of the system. If users feel that the system is easy to use it will increase the perceived usefulness of the system which will finally increase the intention to use the system.

Key words	Electronic document management system, EDMS, system implementation
Further information	

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Tiivistelmä

Dokumentit sisältävät suurimman osan organisatorisesta tiedosta. Digitalisaation ja globaalien verkkojen myötä tiedon ja elektronisten dokumenttien määrä on kasvanut runsaasti. Elektroniset dokumenttien hallintajärjestelmät (electronic document management systems) mahdollistavat dokumenttien koko elinkaaren hallinnan, prosessien tehostamisen sekä sopimusten näkyvyyden parantamisen. Samalla varmistetaan, että sopimukset noudattavat lakeja ja määräyksiä. Tämän tutkimuksen tavoitteena oli selvittää, kuinka elektronisen dokumenttien hallintajärjestelemän käyttöönotto on onnistunut case-yrityksessä loppukäyttäjän näkökulmasta. Onnistuminen määritettiin käyttäjän aikomukseksi käyttää uutta järjestelmää dokumenttien hallinnassa.

Kirjallisuustutkimuksen pohjalta luotiin uusi tutkimusmalli arvioimaan loppukäyttäjän aikomusta käyttää uutta järjestelmää ja selvittämään kuinka eri tekijät vaikuttavat järjestelmän käyttöhalukkuuteen. Tutkimusmalliin syötettiin kvantitatiivinen tapaustutkimusaineisto, joka kerättiin kohdeyrityksen dokumenttien hallintajärjestelmän loppukäyttäjiltä strukturoidun kyselyn avulla. Kysely muodostettiin luodun tutkimusmallin pohjalta, joka sisälsi kuusi osatekijää: koulutus, järjestelmän ominaisuudet, viestintä, helppokäyttöisyys, hyödyllisyys ja käyttöaikomus. Tuloksiksi saatiin, että koulutus ja järjestelmän ominaisuudet vaikuttivat positiivisesti järjestelmän koettuun helppokäyttöisyyteen ja hyödyllisyyteen. Viestintä ei kuitenkaan vaikuttanut positiivisesti järjestelmän koettuun hyödyllisyyteen. Myöskään helppokäyttöisyydellä ei ollut merkittävää vaikutusta käyttäjän halukkuuteen käyttää järjestelmää. Helppokäyttöisyys kuitenkin vaikutti positiivisesti koettuun hyödyllisyyteen. Hyödyllinen järjestelmä puolestaan kasvatti käyttäjän aikomusta käyttää järjestelmää, mikä oli tutkimuksen onnistumisen mittari.

Kaikki tutkimusmallin osatekijät saivat kyselyssä hyvän keskiarvon vastaajilta. Keskiarvovastaus käyttäjien aikomukselle käyttää järjestelmää oli 4.4/5, mikä tarkoitti, että käyttäjät halusivat jatkaa järjestelmän käyttöä. Järjestelmän käyttöönotto siis onnistui käyttäjän näkökulmasta. Tulevaisuuden vastaavissa käyttöönottotilanteissa huomio tulee kiinnittää koulutukseen ja järjestelmän ominaisuuksiin, sillä niillä oli suurin vaikutus siihen, että järjestelmä koettiin helppokäyttöiseksi ja hyödylliseksi.

Asiasanat	Elektroninen dokumenttien hallintajärjestelmä, EDMS, järjestelmän käyttöönotto
Muita tietoja	

UNIVERSITY OF TURKU
Turku School of Economics

EVALUATION OF AN ELECTRONIC DOCUMENT MANAGEMENT SYSTEM IMPLEMENTATION SUCCESS FROM AN END USER PERSPECTIVE IN AN INDUSTRIAL COMPANY

Master´s Thesis
in Operations and Supply Chain Management

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The originality of this thesis has been checked in accordance with the University of Turku quality assurance system using the Turnitin OriginalityCheck service.

Table of contents

List of figures

List of tables

List of abbreviations

BPR	Business Process Re-engineering
COG	Cognitive Model
CSF	Critical Success Factor
DF	Degree of Freedom
DOI	Diffusion on Innovation
ECM	Enterprise Contract Management
EDM	Electronic Document Management
EDMS	Electronic Document Management System
ELM	Elaboration Likelihood Model
IS	Information System
IT	Information technology
MM	Motivational Model
MPCU	Model of PC Utilization
OCM	Organizational Change Management
OCR	Optical Character Recognition
PEU	Perceived Ease of Use
PU	Perceived Usefulness
SCT	Social Cognitive Theory
TAM	Technology Acceptance Model
TOE	Technology, Organization and Environment
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
UTAUT	Theory of Acceptance and Use of Technology
VIF	Variance inflation factor

1 INTRODUCTION

1.1 Background

Sprague (1995) states that 80-90% of organizational information is stored in documents. By tradition, paper has been used in document management (Konishi et al. 2007). Along with digitalization and global networks, the amount of information and electronic documents and has increased enormously (Konishi et al. 2007; Bondarenko et al. 2010). Documents are more often created in personal computers which enables easy distributing and sharing them in an electronic format (Konishi et al. 2007). In electronic document management (EDM) paper documents are managed by using information technology (Sprague 1995).

Electronic document management systems (EDMS) are rather new and came in the markets on the 21st century (Saxena 2008, 272). Electronic document management systems make it possible for organizations to manage the whole life cycle of documents from the point of creation until disposal (Jones 2012; Alshibly et al. 2016). EDMS offers improved contract visibility and control, enhances company's compliance, streamlines processes and has positive impact on profit by increasing revenue and cutting costs (Saxena 2008, 261–262).

Certainly, electronic document management systems are costly and may cause risks, but those are still possible to mitigate. However, the long-lasting benefits of full EDMS integration will outweigh the risks. Companies benefit from implementing EDMS by ensuring the flow of information and by maximizing the benefits received from the contract relationships. (Saxena 2008, 147, 261–262.) Success of EDMS like any other information system implementation is based on the system usage and acceptance by the end users. Organization can achieve the real benefits of the system only if users accept and use the system. (Venkatesh & Davis 2000.)

1.2 Research question

This research was made as an assignment for an industrial company which implemented a document management system. This research focused on the procurement contract management functionalities of the system. The background was that the case company did not know how the implementation of document management system has succeeded. Previous research about EDMS implementation is narrow and there has not been sufficient research about the factors that lead to successful electronic document management system implementation (Alshibly et al. 2016). According to Saxena (2008,

263) the most critical aspect in implementing an EDM solution is to make sure that the targeted results are achieved and maintained. Purpose of the research was to create a model to evaluate the user intention to use the newly implemented system and to figure out the factors affecting the technology acceptance.

This research investigated the success of implementing a new EDMS and the factors related to it. Also, improvement ideas for the future implementations were proposed. The research questions were:

- How has the implementation of procurement document management functionalities of the electronic document management system succeeded from an end user perspective in the case company?
- What are the factors associated with successful implementation in the case company?

State of the art was investigated in the literature review. Empirical research was done in the company and it included a questionnaire which was made to the case company's system users. This research focused on the contract management functionalities even though the system included also wide variety of other document management functionalities.

1.3 Structure of the study

This study consists of six chapters. Chapters 2 and 3 consist of the literature review including document management and information system implementation. Chapter 4 presents the methodology used in the empirical part of the study and chapter 5 introduces the analysis of the quantitative data and results. Last, chapter 6 includes conclusion and discussion by connecting the literature and empirical findings.

2 DOCUMENT MANAGEMENT

Sprague (1995) determine document to be "relatively structured and formal information (primarily text) printed on paper". Björk (2002) defines document to be either written or drawn information carrier. The purpose of document is that it can be transferred, stored and used as a unit with ease (Björk 2002).

2.1 Introduction to document management

By tradition, information workers have used paper in their document management (Konishi et al. 2007). Along with digitalization and global networks, information workers have gone through significant changes in their workflow as the amount of information and electronic documents has increased enormously (Konishi et al. 2007; Bondarenko et al. 2010). Documents are more often created in personal computers which enables easy distributing and sharing them in an electronic format. Nonetheless, all the offices are not yet paperless. (Konishi et al. 2007.)

However, Whittaker and Hirschberg (2001) have investigated that paper have no role in the modern way of working but people still store hard copies of documents. Under half of people's document archives are unique, rest are available in public or unread. People store irrelevant paper documents either because they do not have time to go through them or because they cannot estimate if the documents need to be utilized in future. (Whittaker and Hirschberg 2001.) In electronic document management (EDM) paper documents are managed by the use of information technology. Electronic document management improves information management and organizational performance. (Sprague 199.)

Sprague (1995) states that documents contain 80-90% of organizational information and rest of the information is stored in organizational databases. Likewise, Tseng and Chou (2005) state that organizational 80% of information is stored in documents and other information is located in the data warehouses as numeric data. They point out that text is the most common tool for conveying knowledge and information. For example, e-mails, project reports, market surveys and meeting records are all in a format of document. However, documents may also contain graphics or multimedia data in addition to text. (Tseng & Chou 2005.)

Document management can be seen as the most reliable tool for managing information both in public and private organizations (Alshibly et al. 2016). Document management has a significant impact on business value in all organizations operating in different industries. The value of document management can be divided into three categories. (Sprague 1995.)

1. Organizational communication tool
2. Business process
3. Organizational memory

In the first category business value come from improved communication. Ideas and concepts are stored and communicated in the format of documents internally and externally in organizations. The second category emphasizes upgraded business processes. (Sprague 1995.) Re-engineered business processes are an opportunity for electronic document management (Meier & Sprague 1996). Automating document management requires rethinking and reengineering of business processes. The third value comes from utilizing the organizational memory by storing documents in a digital format and therefore ability to analyze and enhance performance. (Sprague 1995.)

Three main challenges can be found in EDM: System design, organizational support and implementation. The first challenge relates mostly to the database architecture. EDMS should be modular and able to count on document components. Understanding the meaning of document components i.e. meta-structure is crucial. Organizational support is the second challenge in EDM. Documents are everywhere in the organization and support is needed from all departments. Documents should be standardized in format as well as between departments and cross-organizations. Implementation challenge is the third challenge and chapter 3 will dive deeper into the implementation of an information system. Meeting these three challenges help organization to get benefits out of EDM. (Meier & Sprague 1996.)

2.2 Electronic document management system

The most mature way to handle contract management is via electronic document management systems (Björk 2002). Electronic document management system is a system that has been made to manage documents (Adam 2008). According to Alshibly et al. (2016) the main object of EDMS is to enable flow of records in organization and to provide the availability of document information. Electronic document management systems make it possible for organization to manage the whole life cycle of document from the point of creation and use to distribution and disposal (Jones 2012; Alshibly et al. 2016).

Technology improvements enable document management to be more efficient, better quality and faster (Meier & Sprague 1996). EDMS is a vital tool for organizations to gain savings as offices will be more and more paperless and people work also outside the office (Jones 2012). Electronic tools for managing documents are essential. For constructing document management systems, understanding the needs of an end user is very important.

(Bondarenko et al. 2010.) It has been proposed that electronic document management tools should be very similar than the physical environment and meet the requirements of physical document management (Whittaker and Hirschberg 2001).

In business world employees need to read hundreds of electronic documents in their work. There is an enormous number of documents in organizations, and document management systems are needed to process the data. (Tseng & Chou 2005.) The cost of implementing a new document management tool is usually high but organizations can achieve clear benefits out of EDMS (Alshibly et al. 2016). Among other things EDMS automates operations, lowers transaction costs, minimize errors, reduce the workload of employees, enhance decision making and facilitate executing the company strategy (Tseng & Chou 2005; Alshibly et al. 2016).

Document management systems are usually webserver based where documents are stored in a repository (Björk 2002) or server based systems (Dourish et al. 2000). When internet is used as a platform for EDMS users can access the document repository by using web browsers. Therefore, acquiring EDMS is easy as there is no need to install a software. Organization may build their own EDMS or buy it from external Application Service Provider. (Björk 2002.)

Also, cloud computing has become a popular way for services to be delivered in internet and it enables enormous opportunities for IT industry. Benefits of cloud computing is that it does not require huge investments from users and it lowers operating costs as operational costs accumulate according to the demand. Cloud computing enables easily scalable and easily accessible services in web. It also reduces maintenance expenses and business risk when infrastructure provider takes the responsibility of those. (Zhang et al. 2010.)

2.2.1 EDMS functionalities

Most of the commercial EDMSs have common functionalities including integration with desktop applications, document repository, check-in and check-out, versioning, auditing, classification and indexing, search and retrieval and security as described in the table 1 (Adam 2008, 12).

Table 1 Basic functionalities of EDMS (adapted from Adam 2008, 11–15)

Functionality	**Definition**
Integration with desktop applications	Possibility for users to save documents from the desktop applications, such as Microsoft office, to EDMS.
Document repository	Must have feature. Place for storing and searching for documents.
Check-in and check-out	Ensures that only one person can edit a document at one time. Shows a record who has been editing the document and when.
Versioning	A mechanism that keeps a track of the document changes by numbering document versions.
Auditing	Tracks what changes has been made, when and by whom.
Classification and indexing	Classification by document metadata which allows easy searching for a document.
Search and retrieval	Commonly used search and retrieval mechanisms: folder structure browse, basic search and advanced search.
Security	Security needs to be integrated with the system, allowing the setup of different access permissions.

Electronic document management systems handle the document file management, life cycle management and storing different versions of documents (Björk 2002). Versioning is used to track changes in the numerous document versions (Adam 2008, 12).

Metadata is normally used for classifying documents with the document information. Metadata can contain for example document title, document subject, author and department information. To specify the search and retrieval mechanisms, good EDMS allows user to search with many mechanisms at the same time. A basic search allows user to search with words and the system will find the words from metadata or the document content. Advanced search allows user to search with metadata fields using AND and OR statements. Advanced search can also search with the metadata combined to certain word and phrases at the same time, for example to search by author “William Wood” and containing word “information system”. (Adam 2008, 11–15.)

Documents are mostly organized in hierarchies. Hierarchical structure is used for example in e-mails. Bookmarks in web browsers are also grouped hierarchically. Also, many people store their personal documents in hierarchical folder in their desktop. Hierarchical document structure is a logical way to store documents, but it may not meet user's needs as one document may belong to many folders at the same time. (Dourish et al. 2000.)

In addition to functionalities represented in table 1, Optical Character Recognition (OCR) is a feature of modern EDM systems. OCR is part of a software that recognize characters in printed text and images and change those into a digitalized format. Challenges for OCR are the diversity and complexity of languages as well as different text styles and font in the document. (Islam et al. 2016.)

2.2.2 Benefits of EDMS

EDMS benefits can be divided based on their effect level (individual user, organization, society) or physical type (tangible, intangible). Table 2 lists the EDMS benefits and divides those by their effect level and physical type.

Tangible benefits save money and are entered in the organization's account. Tangible benefits are hard gains such as cost savings, saving floor space from storing paper documents, improved productivity and competitive advantages by increased efficiency and customer satisfaction. (Adam 2008, 151–153.) According to Adam (2008, 153–156) intangible benefits are:

- Centralized storage of information
- Management of information
- Improved staff morale
- Improved customer service
- More efficient business processes
- Encouraging team working
- Compliance with record keeping laws and standards
- Full disaster recovery

All tangible and intangible benefits are interlinked and complement to each other (Adam 2008, 153–156).

Table 2 Benefits of EDMS (adapted from Johnston & Bowen 2005; Adam 2008)

<table>
<tr><th>Benefit</th><th>Effect level</th><th>Type of benefit</th></tr>
<tr><td>Centralized storage of information</td><td rowspan="2">Individual user</td><td rowspan="8">Intangible</td></tr>
<tr><td>Improved document search</td></tr>
<tr><td>Better quality</td><td rowspan="3">Individual user / Organization</td></tr>
<tr><td>More efficient business processes</td></tr>
<tr><td>Improved staff morale and team working</td></tr>
<tr><td>Compliance with laws and regulations</td><td>Organization</td></tr>
<tr><td>Transparent organizational processes</td><td rowspan="2">Society</td></tr>
<tr><td>Accessible historical records</td></tr>
<tr><td>Cost savings</td><td rowspan="2">Organization</td><td rowspan="2">Tangible</td></tr>
<tr><td>Saving floor space from document storing</td></tr>
<tr><td>Improved productivity and competitive advantages</td><td>Organization</td><td>Tangible / Intangible</td></tr>
</table>

In addition to tangible and intangible classification, another way to divide EDMS implementation benefits is in the level of individual user, organization and society. Some of the benefits of the EDMS system are recognized in many of these three levels. For individual user EDMS enables better information availability, better quality, easier and faster processes at work as well as better possibility to find documents afterwards. (Johnston & Bowen 2005.) Centralized storage of information enables organization to store documents in a central location accessible from anywhere which improves the management of information. It also saves time from employees searching for documents which improves staff's morale. (Adam 2008, 153–156.) Centralized storage also improves document sharing and reporting as documents are in the same place. When documents are in the same place, all users can view those if no restrictions exist. (Downing 2006.)

For the organization the benefits are better quality, easier and faster processes as well as improved cash flow and compliance with laws and regulations (Johnston & Bowen

2005). Also, the mentioned increased efficiency in the organization improves customer service. Most of the company's business processes use documents and EDMS can therefore lead to more efficient business processes. Improved staff morale as well as the more efficient business processes encourages team working in an organization. (Adam 2008, 153–156.)

More regulations are set by governments around the globe, so another benefit is the compliance with record keeping laws and standards which can be reached by implementing a compliant EDMS (Adam 2008, 156; Nguyen et al. 2009). Last, when documents are stored safely in EDMS instead of physical archives it prevents organization from losing the documents in case of emergency, for example fire (Adam 2008, 156; Nguyen et al. 2009). In addition to the prevention of disasters, EDMS also reduce the need for storages and equipment. EDMS improves overall security of documents. (Downing 2006.) Along with EDMS project, new guidelines may be set to organization for example related to document retention and destruction (Downing 2006).

For society EDMS enables transparent organizational processes, better law and regulation compliance of companies as well as accessible historical records. (Johnston & Bowen 2005). Possibility to access historical records enables better organizational accountability (Downing 2006).

Benefits of EDMS are seldom properly measured, especially lack occurs in reporting both benefits and costs (Johnston & Bowen 2005). Information technology (IT) benefits may not always be possible to measure with monetary terms and business initiatives needs to be taken into consideration. Value can be created through business processes and practices. Measuring IT benefits has been challenging many years. It needs to be noticed that IT investment does not create benefits itself. IT investment has possibility to create derived value to organization. (Remenyj et al 2007, 2, 9.) Gaining benefits of EDMS is not guaranteed and requires a good project plan and execution. Paying attention to the human aspect is crucial, actual benefits are achieved by focusing on user acceptance, user training and continuous user support. (Johnston & Bowen 2005.)

When talking about the benefits, it is useful to understand that the immediate effect of the implementation may be the decrease in productivity. But once users learn to use the system the productivity should improve to be better than before the implementation (Downing 2006). The benefits do not appear in one day after the system is implemented and in use. EDMS implementation requires time before the full benefits are obtained. (Saxena 2008.)

2.3 Contract management

Contract is one form of a document (Saxena 2008, 5). The difference between a contract and an agreement is that contract is always legally binding. Contract can be made without writing as an oral or implied contract. Contract contains rights and responsibilities of the contracting parties as well as the administration procedures. An agreement defines the terms for exchange of services or goods between at least two parties. (Uher & Davenport 2009, 1–2, 6–7.) Saxena (2008, 5) crystallizes the same thoughts by defining that contract is "a set of documents, governed and restricted by law, that clearly establish the boundaries, extent, and intent of the executing parties' relationship, along with the rights and responsibilities of the entities involved".

Contracts matter only in a legal system (Uher & Davenport 2009, 7). Contract law system needs to have designated norms. It needs to allow and encourage in exchange and reinforce exchange relations, enhance complementarity, enable freedom in exercise of choice and institute planning among other things. (Law review 1997.)

In their book "Fundamentals of building contract management" Uher and Davenport (2009, 8) point out that seven following characteristics are fundamental for a document to be contract:

1. Aim for creating legal relationship
2. Offer and acceptance
3. Consideration of value
4. Parties' legal capability to make a contract
5. Parties' honest consent
6. The object of the contract must be legal
7. Contract terms need to be adequate certain

The first characteristic is about the aim for creating legally binding commitments. Document must be enforceable by law to be a contract. The second fundamental characteristic is the offer and acceptance which means that in a contract one party's offer needs to be accepted by other party. Offer can be made by writing, speaking or by execution. The third fundamental is about the consideration. Consideration is a value or promise of value which is delivered when making a contract. Contract can be legally binding only when there is consideration given from one party to another. Fourthly parties need to be capable of doing a contract according to the country's law. Fifth characteristic states the contract needs to be made under the voluntarily willingness. If an agreement is made under compulsion, it cannot be considered as a contract. The sixth fundamental states that contract object need to be legal. Illegal objects are for example crime commitment, tort and justice hindering. Last characteristic is certainty. There need to be

certain and complete terms in the contract. Not only the promise or purpose need to be included but also how to deliver the promise. (Uher & Davenport 2009, 8–18.)

In today's business word success depends very highly on company's ability to manage its contracts proactively and effectively. It is normal that a large company has tens of thousands of contracts to drive its enterprise. At the same time the complexity and importance has risen. (Saxena 2008, 1.) Contract management is a key activity to manage risk in an organization which has many contracts in its business processes (Gallagher 2017).

Park and Kim (2018) defines that "contract management is the implementation of contractual items set out in the contract documents". Anyway, they consider important to expand the scope to cover pre-contract stage because contract preparation takes lots of money and time. According to Park and Kim (2018) the contract process can be divided into three phases: bid preparation, signing of the contract and implementation of the contract. By executing good contract management an organization can result in good visibility of contracts, better contract compliance and monitoring as well as investigation of contract performance (Saxena 2008, 5). In Saxena's (2008, 12) study he investigates Enterprise Contract Management (ECM) which emphasize the enterprise point of view to contract management. ECM solutions are defined as information solutions with best methods and technology used to effectively manage contracts in and outside the enterprise. ECM aims to manage contracts through its life cycle. (Saxena 2008, 12.) Saxena (2008) represents five steps contract life cycle model which is represented in figure 1 below.

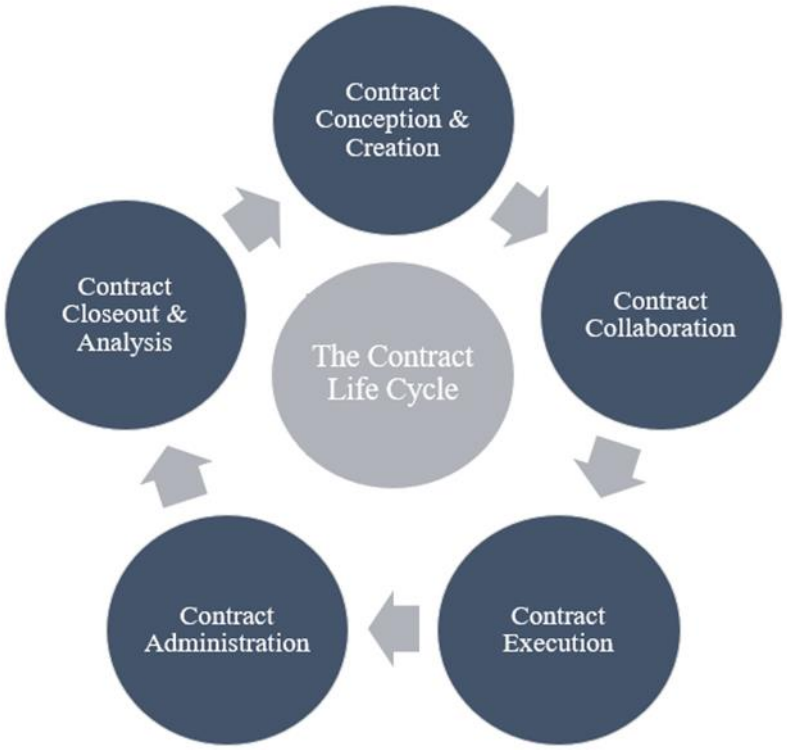

Figure 1 Contract life cycle (adapted from Saxena 2008, 13)

Contract life cycle starts from the establishment of contract conception for example as a letter of intent. After defining conception, it is time for contract creation which can be seen as the most important step in contract life cycle. When creating contract, the contracting parties determine clearly their relationship, the nature of products and services they promise to deliver and all other activities and consequences. After these issues have been discussed, the contract will be sent to internal or external review. This phase is called contract collaboration phase. Contract will be approved internally by different company functions and possible senior management. Contract negotiation cycles will be arranged with customers, suppliers or business partners by web applications for example document management systems, e-mail of fax. The aim is to mutually agree terms and conditions of the contract. (Saxena 2008, 13–14.)

After the contract content has been agreed and reviewed by all the necessary organizations the contract is ready for execution. Contract execution includes defining effective and expiration dates as well as signing the contract. In the contract administration phase the purpose is to achieve the objectives and benefits that were originally negotiated in the contract. Parties need to ensure compliance in the contract procedures and regulatory for example monitoring the contract terms. The last phase, contract closeout and analysis, focus on analyzing the contract performance and characteristics to enhance future contract related activities. Analyzing is also made on

spend budgeting and contract usage. After analyzing, decision of contract termination or renewal is made. (Saxena 2008, 14–15.)

The main challenge in contract management is the interest conflicts between supplier and client. This problem can be recognized as a problem of opportunism in the literature. Problem of opportunism means that when parties are closing a deal, each party has interest to serve their own interests. To avoid this conflict organizations could do more efficient communication to make sure all parties have decent information to act. If communication is good parties have better understanding of each other's interests. If effective communication can support the change management strategy, user's perception and adoption will be enhanced. (Nguyen et al. 2009.)

Another way is to set common goals with the supplier related to health, safety or environment for example. It has been investigated that collaborative relationship between parties lead to better outcomes in contract management. If parties want to have collaborative relationship, they should agree how the goods and cash flow as well as build relationships with parties and stakeholders. (Puil van der & van Weele 2014.)

Puil van der and van Weele (2014) have divided the contract life cycle into three parts: pre-contractual stage, contractual stage and post-contractual stage. Pre-contractual stage starts with the contractor's (supplier) sales and marketing. Contractor needs to make their company known and try to influence customer's (employer) decision makers. Customer then makes invitation to tender when the project is communicated to public market, freedom of this varies between companies and governmental organizations. Contractors need to react to the customer's request of information and bids. (Puil van der & van Weele 2014.)

The contractual stage is about the landing of a contract which is usually led by directors or lawyers. Employer select one or two contractors based on their bids who will continue to the negotiation phase. Contract negotiations will end when contract is negotiated with the supplier. In post-contractual stage the work is left to the project team and this phase consists of engineering and design, subcontracting and procurement, realization of the scope of work, testing and delivery, maintenance and guarantee period and claims. All the steps in the contract life cycle are in a relation to the next step and cannot be isolated. (Puil van der & van Weele 2014.)

Similarly, Rendon (2016) sees the following three contract activities important in assess the best practices in organization: pre-award, award and post award which are applicable for both sellers and buyers. Rendon (2016) considers the measuring of the maturity of contract management process important even though the metrics can be hard to develop. Five life cycle phases can be seen as a tool to measure the contract process management maturity. The five life cycle phases include developing satisfaction, developing offer, forming contract, performing contract and closing contract. (Rendon 2016.)

Implemented system in the case company is a document management system which is used to manage contracts. Understanding document management and document management systems were represented in previous chapters and next chapter will focus on information system implementation from document management perspective.

3 INFORMATION SYSTEM IMPLEMENTATION

The Stanford Electronic Health Information Security Committee determines that information system (IS) is "an interconnected set of information resources under the same direct management control that shares common functionality. A system normally includes hardware, software, information, data, applications, communications, and people" (Johnston & Bowen 2005).

When choosing the EDMS, technology itself in the software is important but less important than the people who are going to use it and the business that it supports. Assumption that the technology will change the organizational culture is not true. But if the technology is combined with skilled employees who understand how the system improves their everyday work EDMS implementation can lead to better processes and improved productivity. 80-20 rule applies to the EDMS implementation, to get the most success, 20 percent of the focus should be put to the technology and 80 percent to the cultural matters. (Downing 2006.) Models need to be used to facilitate the IS use analysis (Legris et al. 2003). Information technology adoption models are introduced in the next sub-chapter.

3.1 Information technology acceptance

How and why individuals accept and adopt newly implemented information technologies have been studied a long time in information system research (Venkatesh & Davis 2000; Venkatesh et al. 2003). EDMS may be a threat as well as a hard and difficult system to some people. Therefore, user acceptance is an essential part of successful EDMS implementation. User acceptance include training people to use the system and telling the benefits for them and to the organization for using the system. Usually it is a necessity that people do not have to make remarkable change in their working habits when starting to use new system. Also, ensuring that the system is easy to use regardless of person's IT skills is important. (Johnston & Bowen 2005.)

Information technology productivity can only be realized when the information technology is widely accepted and used in a company (Venkatesh et al. 2003; Oliveira & Oliveira Martins 2011). Successful EDMS implementation requires users to accept and use the system (Venkatesh & Davis 2000). Therefore, it is very important to understand the determinants of information technology acceptance and theoretical models (Oliveira & Oliveira Martins 2011). Many different and competing models have been investigated in the IT acceptance literature and each of them has their own acceptance determinants (Venkatesh et al. 2003). Managers can use these models for example to motivate employees to information acceptance (Bhattacherjee & Sanford 2006).

Technology Acceptance Model (TAM) is widely studied theory among the researchers. TAM focuses especially on the behavioral intention of IT system usage. In TAM the determinants of system usage intention are perceived usefulness (PU) and perceived ease of use (PEU) as presented in the figure 2. (Venkatesh & Davis 2000; Amoako-Gyampah & Salam 2004.)

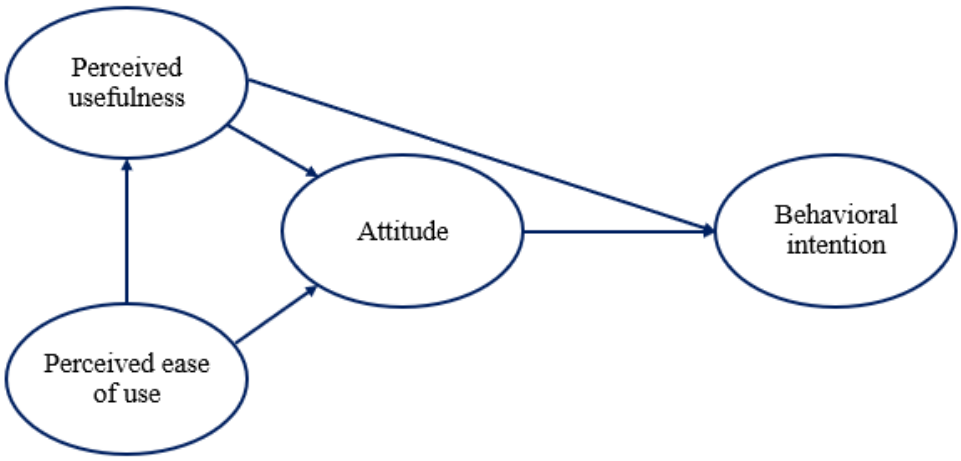

Figure 2 The technology Acceptance Model (adapted from Amoako-Gyampah & Salam 2004)

PU indicates how much individuals believe that using system enhances their job performance and PEU how free of effort the system usage will be (Venkatesh & Davis 2000). In TAM, individual's attitude and perceived usefulness are significant factors influencing user behavior. (Liao et al. 2009). PEU and PU affect individual attitude and therefore intention to use the system (Adapted from Amoako-Gyampah & Salam 2004; Liao et al. 2009). Also, some TAM models leave the attitude out. Then PEU and PU directly affects behavioral intention to use the system and PEU affects PU. (Venkatesh & Davis 2000.) In their research Venkatesh and Davis (2000) created TAM2 model where social improvement processes, such as subjective norms, result quality, self-imposing and cognitive instrumental processes affected PEU and therefore technology acceptance.

A couple years later in 2003, Venkatesh et al. (2003) and Legris et al. (2003) also investigated TAM-model. Amoako-Gyampah and Salam (2004) extended the TAM investigation and they found out that project communication and training affected believes about system benefits. Then again, shared believes positively affect PU and PEU and therefore the technology acceptance. Information technology acceptance determinants may vary along the life cycle which can be divided in to initial adoption, short-term users and long-term users. (Liao et al. 2009.)

In addition to TAM, Venkatesh et al. (2003) also investigated seven other models, Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), Motivational

Model (MM), Model of PC Utilization (MPCU), the Innovation Diffusion Theory (IDT) and the Social Cognitive Theory (SCT) which will be briefly introduced next.

Theory of Reasoned Action (TRA) is an essential theory of human behavior (Venkatesh et al. 2003). It is based on subjective norm and the thought that individual's open behavior is specified by the intention of individual to behave that way. TAM and Theory of Planned Behavior (TPB) are based on TRA. (Moore & Benbasat 1996.) In addition to TRA, TPB also covers perceived behavioral control which means how easy it is to perform the behavior (Venkatesh et al. 2003). TAM, TRA and TPB are three theories in the literature which try to explain system user's relations between attitudes understanding, beliefs and system usage (Amoako-Gyampah & Salam 2004).

The Social Cognitive Theory (SCT) focuses on behavioral aspect as well being one of the most dominant theory of human behavior (Venkatesh et al. 2003). Model of PC Utilization (MPCU) also highlights behavior aspect of technology acceptance, considering perceived complexity, job-fit, long-term consequences, social factors and facilitating conditions as core constructs. Motivational Model (MM) emphasizes motivational aspect for behavior. Motivation can be external (e.g. promotion) or internal (e.g. no incentive). (Venkatesh et al. 2003.)

Based on these 8 models, in their research Venkatesh et al. (2003) created new model, Unified Theory of Acceptance and Use of Technology (UTAUT), where three direct determinants where found to explain intention to use (performance expectancy, effort expectancy and social influence) and two direct determinants for usage behavior (intention and facilitating conditions).

Diffusion on Innovation (DOI) also called Innovation Diffusion Theory (IDT) focuses also on the company level of information adoption in addition to individual level. The main idea in the theory is to describe how, why and what speed technology spread across cultures. (Oliveira & Oliveira Martins 2011.) DOI focus on individual user's attitude towards new systems and the different level of diffusion among systems (Moore & Benbasat 1996).

Bhattacherjee and Sanford (2006) researched an Elaboration Likelihood Model (ELM) which focuses on external influence in technology acceptance. They had two ways to affect user attitude, central route and peripheral route. Central route guided the user to think critically about system related information and peripheral route less cognitively relied on cues regarding the desired behavior. Both routes can be used to influence users to adopt IT, but the central route is more stable and persist longer and users have higher elaboration motivation. (Bhattacherjee & Sanford 2006.)

Liao et al. (2009) compared TAM, Expectation Confirmation Model (ECM) and Cognitive Model (COG) to investigate the user behavior in accepting IT. ECM considers user satisfaction as the most important determinant for long-lasting usage. In ECM, satisfaction is closely tied to disconfirmation which consists of the difference between

user expectation and perceived performance. COG model was created before ECM to investigate satisfaction decisions. In that model, satisfaction is defined as "a function of expectations and disconfirmation and acts as an antecedent to attitude". (Liao et al. 2009.)

Based on these three theories, Liao et al. created a new theory, the Technology Continuance Theory (TCT) which combine attitude and satisfaction into same more applicable model. Satisfaction is a short-term factor which is based on the user experience. Attitude is more long-lasting evaluation of the system. The factors which influence satisfaction and attitude, for example system design and training, must be managed well to achieve success in information system implementation. TCT considers the whole life cycle of IT adoption: initial adoption, short-term users and long-term users. (Liao et al. 2009.)

In Oliveira and Oliveira Martins' (2011) literature review, they add Unified Theory of Acceptance and Use of Technology (UTAUT) as the most used theory of information technology acceptance in individual level. In addition to individual level, Oliveira and Oliveira Martins (2011) consider company level adoption important and review two theories DOI and Technology, Organization and Environment (TOE) in their research.

TOE is a theory for company level information adoption. It introduces three factors that affect the adoption of technological innovation in an organization: technological, organizational and environmental context. Internal and external technologies available for a company belong to the technological context. (Oliveira & Oliveira Martins 2011.) Organizational context focuses on qualitative measures of company's size, slack, scope, communication and organizational hierarchy (Oliveira & Oliveira Martins 2011) as well as the financial readiness and technological knowledge (Kuan & Chau 2000). Environmental context relates to the pressure perceived from industry, for example business partners, competitors and government. Company may have a pressure to acquire new technologies to be competitive in the market. (Kuan & Chau 2000.)

To conclude, many different technology acceptance models have been created in the previous research. TAM is popular and the most accepted theory for information technology acceptance and many other theories are based on TAM. Therefore, TAM is used in the theoretical model for evaluating the implementation success of the document management system in the case company. In addition, TAM focuses on initial adoption of technology (Liao et al. 2009) which is the scope of this research. According to Liao et al. (2009) initial adopters have used the system less than 6 months, short-term users have used the system 6-12 months and long-term users over 1 year. The research model is presented in chapter 3.4. TAM consist of PEU and PU which explain how useful and easy to use the implemented system is from the user perspective. Attitude is left out from the theoretical model to make it simpler. Recent technology acceptance studies show that attitude is a full mediator from PEU and PU to behavioral intention to use the system.

3.2 Mitigating information system implementation risk

Information system implementation (IS) is typically costly and has a poor success rate. From 70's, information researchers have investigated information system implementation process and outcomes of it. (Legris et al. 2003.) Electronic document management systems are normally expensive and complicated to implement too (Alshibly et al. 2016). Changing working practices, sharing information and developing processes in the EDMS implementation may be challenging (Jones 2012). As discussed in more detail in chapter 3.1, ensuring user requirements and gaining user acceptance should be ensured when implementing a new technology. This has not been easy in the history. (Remenyi et al. 2007.)

According to Sumner (1999) technical issues lead to project failure more seldom than larger issues like poor communication and leadership effort. Also, Irani (2010) states EDMS is more a social than technical innovation and successful implementation is potentially hard. Whereas Avison and Fitzgerald (2006, 11) state that human and organizational aspect is as important as the technical side of the information system development. Many information system development projects failure concern human and organizational factors, for example lack of planning, insufficient training and exceeded costs. All in all, poor project and change management lead to failure in most cases. (Avison & Fitzgerald 2006, 11, 74.)

Many information system implementations face challenges in change management, project management and risk management (Saxena 2008, 272). Project management, change management and risk management are important in EDMS implementation (Adam 2008, 127) and those will be covered in the next subchapters.

3.2.1 Project management

Effective project management is significant in EDMS implementation (Irani 2010). The aim of project management is to stay on schedule and deliver high-quality and complete project on a budget. Project management includes for example defining scope, setting times and deadlines, allocating resources, reporting of achievements and controlling quality. (Avison and Fitzgerald 2006, 74–75.)

IT project can be managed successfully almost like any other project. Project management is a cycle of planning, resourcing, execution and controlling activities. Focusing on the continuous evaluation is especially important. Most of the evaluation happens in the control phase when the evaluation supports next planning activities. Project management need to focus not only to the technical management issues but also

to wider issues like business processes, partnerships in system building and communication towards stakeholders. (Remenyj et al. 2010.)

As information system implementation is often a long and complex process, top management should consider project management and project delivery success as a main importance (Irani 2010). Also, a sponsor is needed from the senior management to promote the project in the organization. Senior management's support is very important for the project to succeed. (Adam 2008, 127.)

First when starting the project, project methodology or framework need to be defined. Two famous project management methods are PRINCE2 (Projects IN Controlled Environments) which focus on control of organizational projects and PMBOK (Project Management Body of Knowledge) offering best practices and processes for project management. (Adam 2008 149–150.)

In a project, scope should be set which to follow in the implementation (Alshibly et al. 2016). It is important to keep the big picture of the project in mind for example relating to different departments' needs about the system. Project manager needs to compare each department's requirement to the organization wide project plan. This will help avoiding the system not to be too fragmented. (Downing 2006.) Project manager together with the project team should create a cascade of positive attitudes and changes in every part of the organization (Saxena 2008).

In addition to the project methodology and scope it is crucial to have enough and right people in the project. Good relationships in the project group is necessary. (Adam 2008 149–150.) In a project it is important to define roles and responsibilities of project group members (Alshibly et al. 2016). Saxena (2008) defines that EDMS project has a change champion, a person in the company who has vision of all the benefits the organization can achieve by implementing an EDMS, who's primary task is to form a team and consensus to be able to success in the project. The project champion can also be the project manager who needs good leadership, communication and management skills. It is beneficial that the project manager is senior enough to command respect. Most projects have a project manager who reports to steering committee and senior management.

Project group may consist of project managers, business analysts, IT developers, IT supports and key users of departments where EDMS will be implemented. From IT department, IT trainers are needed to train employees to use the system. IT support should also be available during the implementation to ensure technical excellence of the system. (Adam 2008 149–150.) Involving right people in giving feedback about the pilot version of the system is important. This pilot group should consist of users who can provide feedback weekly about the system and evaluate how well the system supports their business processes. This feedback should be then used to refine the system. (Downing 2006.)

Project management is related to management of people and change. Good project management goes hand in hand with effective change management which will be covered in the next subchapter. (Avison and Fitzgerald 2006, 77.) In addition, Boehm (1991) found out that successful project managers have one common feature, they are good risk managers. Risk management is covered in this chapter as well.

3.2.2 Change management

Information system implementation is fundamentally a change management process (Moore & Benbasat 1996). Implementation of EDMS is a change process as well. Change occurs in document management culture and in the user's way of working. Having the system in place is relatively easy but getting people to use the system efficiently is much more difficult. (Nguyen et al. 2009.) Well led change management reduces the chance for conflicts at the stage of implementation (Alshibly et al. 2016).

The decision to implement a corporate wide EDMS is often made at corporate level in corporations and mandated to the business units. It is important to ensure that each business unit get good support systems especially if the units are geographically scattered. (Saxena 2008.) The bigger the company is the more valuable a sufficient change management strategy is. In small companies with less than 20 employees, a change management strategy is not that important. (Nguyen 2009.)

Training is an important part of the EDMS implementation and should be a part of the change management strategy. Users may have fears which can be confronted in the training. In addition to the classroom training, one-on-one training should be used to provide information according to the user's needs. Questions are more likely asked in one-on-one training than in a classroom training. Using a demo system similar to the production one is one tip for the training. Demo system allow users to test the system in a risk-free environment. (Johnston & Bowen 2005.)

When project has gone live, change requests are common. Each change request needs to be handled and managed systematically to keep the project going on original way. (Adam 2008, 138.) Regardless of change management is one of the most cited EDMS success factor there is still confusion what the construct precisely includes and what change management tactics would be useful. Content and definitions of change management vary a lot. Change management is necessary but further exploration is needed to figure out how it should be dealt with. (Finney and Corbett 2007.)

Figure 3 represents 8 organizational change management (OCM) elements which are all needed for successful EDMS implementation (Kotter 1996). The first four steps aim to change the status quo. Phases from five to seven present new practices. Phase 8 aim to make the change last in corporate culture. (Kotter 1996.)

Figure 3 Organizational change management elements (adapted from Kotter 1996)

Starting from the top bullet in figure 3, establishing a sense of urgency is one OCM element. EDMS project needs to be in priority for users. Also, the project team "a guiding coalition" has a vital role as putting their effort to support the project. The change champion and the team should create a clear vision to inspire people. Vision needs then to be communicated regularly including short-term wins that the project has achieved. Short-term victories which are part of the bigger goal of the project create confidence to people along the implementation. In addition to the vision, the change champion should enable and empower the team to work effectively to accomplish the goals set. (Kotter 1996.)

Consolidating gains and producing more change means that the change champion needs to measure the effectiveness and efficiency of the EDMS and focus on the areas where true gains are obtained as well as to focus on areas which need to be addressed. The last OCM element is to anchor the change in corporate culture which ensures that the benefits got in the implementation will continue and flourish in the future when the company faces new challenges and opportunities. Focus on the long-term goals and benefits as well as top-down-up flow of communication and feedback will ensure that the positive impacts of the change are realized, and negative impacts minimized. (Kotter 1996.)

It is the project manager's or "change champion's" role to start the change process by communicating the team and the most important stakeholders about the change so that they engage their own commitment to the change (Saxena 2008).

3.2.3 Risk management

Information system implementation may be risky for an organization and can cause disadvantages instead of benefits (Remenyj et al 2007, 2). Project risk management covers identifying, analyzing and responding to any risk the project faces. EDMS implementation consists of many variables and there is always risk regarding to the outcomes. (Adam 2008, 146.) According to Saxena (2008, 203) there are six types of risk in EDMS implementation:

- Program risk
- Project risk
- Functional risk
- Resource risk
- Business risk
- Technical risk

Program risk occurs when project is lacking broad-based support and commitment which prevents the project from succeeding. Project risk focuses directly on internal project risks such as risk related to project leading, project planning and architectural fit to organization's operations. Functional risk represents risk relating to functional elements such as operational and administrative support, business processes controlling, reliable system and connections between other systems in a company. Resource risk highlights the importance of correct timing and sufficiency of human, capital and operational resources. Key resources should be available when needed. Risk related to ongoing activities and different divisions in a company is called business risk. Many business processes may be affected by EDMS solution which forms a risk for continuity of business processes. Last, technical risk covers technical risk from the start of project until it is finished. Technical risk can relate to for example inappropriate, malfunctioning system, bad networking in and outside the company, performance speed, data security and file structure. (Saxena 2008, 204-2016.)

However, there are ways to manage the risk. In PRINCE2 project management method, risk can be managed by controlling it. First risk needs to be identified, evaluated, monitored and reported. Project may have a risk owner for each risk, usually they are project board members. In PMBOK method, risk management includes four processes: risk identification, qualification, response development and response control. These processes form a cycle that will be repeated in the project. Risk identification is about identifying and documenting both internal in project and external risk. Risk qualification process evaluates risk and evaluates the risk implications. Risk response development includes response to the faced risk by avoiding, mitigating or accepting the risk. Last, the

risk response control process deals with implementing risk management plan which will be executed to the identified risks. (Adam 2008, 138, 147–148.)

Close to previous methods, Boehm (1991) presents four risk management techniques: risk identification, risk prioritization, risk management planning and risk monitoring. Risk identification includes a list of most serious risk items and techniques to manage those. Risk items includes for example personnel shortfalls, unrealistic schedules and budgets and development of wrong user interface, properties or functions. As the project may identify a lot of risk items, risk prioritization helps to identify the most important risks and actions needed. Risk management planning relates to controlling risk items by creating risk control functions and risk management plans. Risk monitoring phase takes care of the risk resolution process by implementing risk reduction techniques. (Boehm 1991.)

The earlier risk is identified in the information system development, the more it will reduce long-term costs and prevent from huge failures. (Boehm 1991.) Risk management is important because when user perceives increased risk, trust is reduced. User's trust influences remarkably and positively the attitude of accepting EDMS. (Hung et al. 2009.)

3.3 Project success

Definitions of success in IS projects vary. According to Irani (2010) failure of the project means that is has not met users' or sponsors' expectations. Expectations are usually converted into metrics and targets, for example costs, delivery deadlines or functionality requirements. (Irani 2010.)

Project success measuring cannot take into consideration only the costs, but also the degree which stakeholders have met their expectations and adequately managed project itself. Project performance can be evaluated before, during and after the project. The purpose of "after" phase is to define whether the project objectives and targets have been achieved as well as the performance have met the measures. Cost, benefit and risk analysis is also made, and client feedback collected. However, only few researchers have evaluated after implementation success mostly because there is not enough budget left to fix the mistakes made. Organizations could use the post-implementation phase as a possibility to go through good and bad which can bring beneficial learnings for the future implementations. (Irani 2010.) To crystallize, successful projects remain on schedule and budget, are reliable and have maintainability as well as meet the user requirements (Sumner 1999).

Success in IT projects can be divided into four sections; correspondence success, process success, interaction success and expectation success. Correspondence success occurs when planned targets and IT system meets. In process success the IT project is

executed according to time and budget. Interaction success focus more on the end users and whether users have positive attitudes towards IT. Expectation success also focus on users and the degree which the IT system meet user's expectations. (Al-Mashari et al. 2003, according to Lyytinen and Hirschheim 1987.) In this research the empirical part will mainly focus on interaction and expectation success, correspondence and process success will be left out of scope in the empirical research.

Downing (2006) states that EDMS implementation has succeeded if the system captures company's official documents, manages the documents through their life cycle and is integrated to the culture so that employees would feel they couldn't work without the system.

In the short term focusing on the system quality and receptiveness is critical to meet user expectations. In the long term, ensuring qualitative after-adoption service, for example continuous improvement programs, is needed to meet users' post-expectation and satisfaction as well as to achieve success in the implementation. (Liao et al. 2009.)

For organization to succeed in IS project it is useful to consider training internal IT workforce and utilize the expertise of external consults when necessary. It is also advisable to re-engineer business processes to fit the system instead of modifying the system to fit the business processes. (Sumner 1999.)

3.3.1 Metrics

A metric is used to measure process or activity over a defined period. Commonly metrics measure progress and success. Typical metrics are possible to verify and audit. Metrics can be either specialized or standard. Specialized metrics are organization, function, or group specific which external people can't copy. Whereas standard metrics can be benchmarked and copied across organization. (Saxena 2008, 255, 264.) When selecting metrics, quality is more important than the quantity. A few high-quality metrics should be picked rather than many insignificant ones (Saxena 2008, 264).

When implementing an EDMS, it is crucial to ensure that targeted results are achieved. Development of the system and integrating it with other systems is almost impossible without measuring system success. Both metrics and subjective surveys should be used to measure the EDMS implementation results. Metrics play a key role when defining the EDM solution processes implementation success. Metrics are used to measure value added to the contracting group, organization functions, for example procurement, and to the whole organization. Subjective surveys provide information of the human impact of EDMS as users hold the core of value EDMS in their daily work. (Saxena 2008, 255, 266.)

It is not easy to decide what and how to measure and how to report on it. Many kinds of metrics exist, for example qualitative, quantitative, diagnostic, forecasted or related to finance or human behavior. “SMART” describes the characters of a good metric - Specific, Measurable, Achievable, Relevant and Timed. (Saxena 2008, 264.)

Objective measures are most important metrics in the work of contracting professionals. A few metrics of EDMS implementation results are listed:

- Average number of contracts by contract responsible
- Average time for authoring a new contract
- Average time for negotiating a new contract
- Perception of contracts that are made on standard accepted templates
- Perception of contracts that have clauses of auto-renewal

Objective metrics for procurement functions are listed (Saxena 2008, 267.):

- Spend under contracts in relation to the total spend, possibly divided into e.g. supplier, region, purchased product.
- Number of suppliers where one or many contracts exist
- Average time from the start of contract negotiation to contract execution with a supplier

In addition to objective metrics, subjective metrics are also beneficial. Subjective metrics can contain user evaluation of efficiency, user friendliness and how easy it is to find and access contracts in the implemented system. (Saxena 2008, 267.)

3.3.2 Critical success factors

Critical success factors include significant areas of performance crucial for achieving goals and mission. Critical success factor method is used for identifying the critical elements of success. CSF can be used for different purposes including identifying project failure causes and estimate the information system reliability. (Caralli 2004.) Usually CSF’s should be measurable and actionable. CSF’s are used to measure that the information system project supports the business strategy. Typically, first the business goals are evaluated and then four to six CFS’s are set to achieve those goals. (Avison and Fitzgerald 2006, 297–298.) Critical success factors can also be used to evaluate the success of EDMS implementation. Awareness of CSF’s can help to aim successful implementation. (Alshibly et al. 2016.) In this research CSFs reflects to elements which are necessary to achieve successful EDMS implementation. According to Alshibly et al. (2016) there are six critical factors for EDMS success:

1. System-related factors
2. Top management support
3. Resource availability
4. Training and involvement
5. Technological readiness
6. Work environment and culture

In their findings factors are listed in a descending order starting from the most important factor which are system related factors. System related factors cover for example document management system performance, capabilities, user satisfactory and integration to other technologies and tools. The second most important factor is top management support which is crucial for implementation to succeed. (Alshibly et al. 2016.) In many information system implementation journal, top management support and commitment is seen as first or second most important factor concerning information system development success (Al-Mashari et al. 2003; Avison and Fitzgerald 2006, 79; Nguyen et al. 2009). If top management is not interested about the project or information system, employees will not trust the information system (Alshibly et al. 2016). Top management support improves users' understanding of the project importance and guarantee the project funding (Nguyen et al. 2009). Top management support should cover the full implementation starting from the initiation (Al-Mashari et al. 2003).

Resource availability is also considered as a critical success factor for EDMS implementation. Especially technical resources are important but also adequate financial, human and procurement resources are needed. Technological readiness has also been mentioned as a fifth critical factor. This includes technical know-how and assets such as software, hardware and IT infrastructure. (Alshibly et al. 2016.)

Training and involvement are defined as the fourth critical factor for the EDMS implementation success. Users, both managers and employees, need information about the system and how to use it in their own work. (Alshibly et al. 2016.) Training is often the first time for contacting the end users. Training is a good possibility to communicate why the EDMS is implemented and what are the impacts in working practices. (Johnston & Bowen 2005.) Training affects the system user's PEU and technology acceptance. In training, user gets to experience the system by exploring the technical and functional sides of the system. (Amoako-Gyampah & Salam 2004.) User experience is an important factor when planning trainings. In the initial phase of information system implementation critical success factors (CSF) are to understand actual user needs and implement a system that meets user expectations. (Liao et al. 2009.) Work environment and working culture like change management, project specific system guidelines and policies, good communication, teamwork and co-operation are the last critical factors to the EDMS implementation success. (Alshibly et al. 2016.)

As said, project communication is a critical success factor in EDMS implementation. Communication provides information of the project and creates understanding among the system users and stakeholders. (Amoako-Gyampah & Salam 2004.) Amoako-Gyampah and Salam (2004) found out in their research that if managers put communication mechanisms in place, communication tends to achieve positive believes of the system benefits which will lead to increased technology acceptance. Also, limitations and system capacities need to be communicated to avoid unrealistic expectations among the users (Liao et al. 2009). According to Downing (2006) it is not possible to over-communicate during the implementation as people are curious to know how the change will affect them.

As included in Alshibly et al's. (2016) sixth CSF, change management plays a key role as an EDMS implementation critical success factor (Nguyen et al. 2009). EDMS implementation CSFs can be compared to any other information system implementation. In EPR system implementation, Finney and Corbett (2007) state that change management is the most cited CSF with top management commitment and support. Change management is processed in more detail in chapter 3.2.2. The third most cited CSF according to Finney and Corbett (2007) is business process re-engineering (BPR) and software configuration. They found BPR and software configuration as the third most usually cited CSF.

3.4 Developed theoretical model for evaluating document management system implementation success

Based on the previous literature, a new research model was developed for evaluating document management system implementation success. A new research model was developed because there were no extensive models in the literature to investigate EDMS implementation success. The factors related to technology acceptance wanted to be included in the research model and hence, critical success factors and technology acceptance model were combined to the developed research model.

The model consisted of one success construct, two behavioral factors and three external variables. The success construct and two behavioral factors was incorporated to the research model from technology acceptance literature stated in chapter 3.1. The three external variables are derived from the critical success factor literature specified in more detail in chapter 3.2.2. Figure 4 represents the developed research model for measuring implementation success from an end user perspective in the case company.

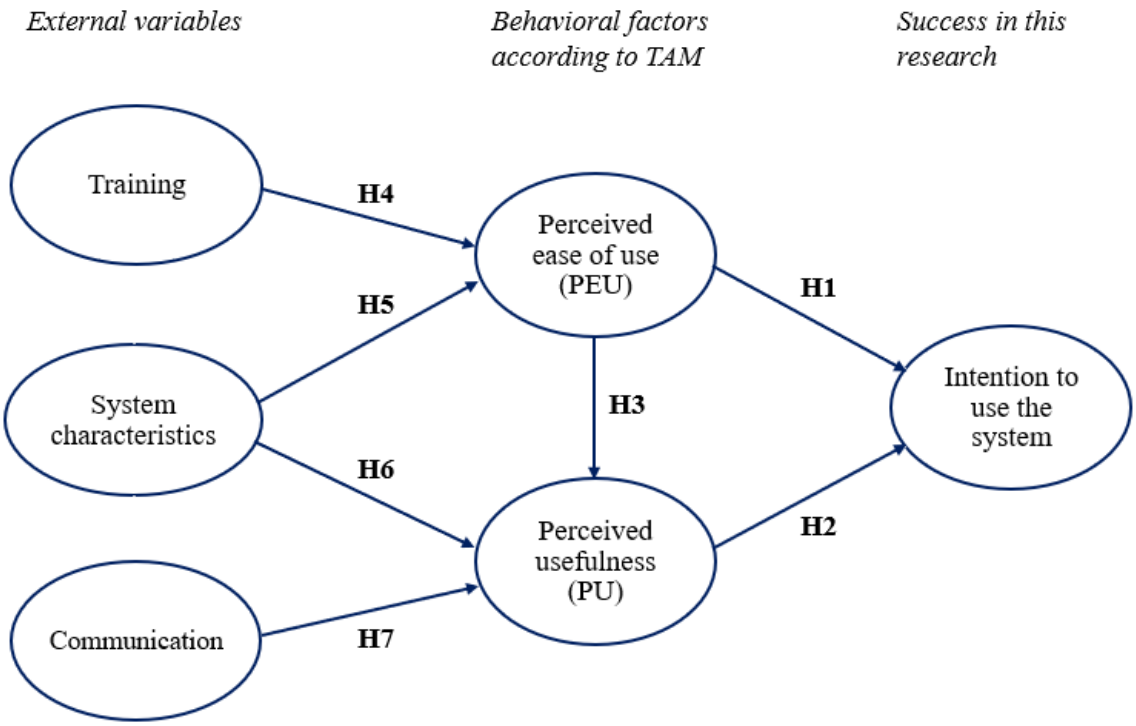

Figure 4 The research model for evaluating document management system implementation success

As stated in chapter 3.1 TAM is widely used theory for user technology acceptance. It focuses mainly on initial adoption of technology (Liao et al. 2009) and is therefore suitable to be used in the theoretical model. According to Liao et al. (2009) initial adopters have used the system less than 6 months. The research sample have used the implemented system 1 to 6 months and investigating the initiate variables instead of long-term variables of user acceptance is reasonable.

The core of TAM is the intention to use the system which is also the success construct in this research because information technology productivity can only be realized when the information technology is widely accepted and used in a company (Venkatesh et al. 2003; Oliveira & Oliveira Martins 2011). In TAM the determinants of system usage intention are perceived usefulness and perceived ease of use (Venkatesh & Davis 2000; Amoako-Gyampah & Salam 2004). PEU and PU does not fully explain the intention to use and thus additional factors are needed which affect PEU and PU (Alshibly 2014). TAM has a mediating role between external variables and intention to use the system because external variables affect the intention to use through mediators PU and PEU (Venkatesh & Davis 2000; Legris et al. 2003).

According to the literature, three external variables can be seen to influence PEU and PU and hence the behavioral intention to use the new system. The three external variables used in the research model are communication, training and system characteristics. These external variables are derived from critical success factor theory. Because not too many

factors can be critical, the focus has been put on three most important success factors which are most critical for the project to success (Avison and Fitzgerald 2006, 296–298).

The research model was used to answer to the research questions. Success was defined to be users' intention to use the newly implemented system. The model was used to figure out the correlations and directions between research constructs. The purpose of the model was to find out how research constructs influence the intention to use the system. The research model is used as a framework in the empirical part of the study.

Hypotheses were created to test the research model and those are listed in table 3. Hypotheses are also marked to the research model in figure 4.

Table 3 Research hypotheses

Hypotheses	**Literature**
H1: PEU is positively associated with intention to use the system	Venkatesh & Davis 2000; Alshibly 2014
H2: PU is positively associated with intention to use the system	Venkatesh & Davis 2000; Alshibly 2014; Liao et al. 2009
H3: PEU is positively associated with PU	Liao et al. 2009; Venkatesh & Davis 2000; Alshibly 2014
H4: Training is positively associated with PEU	Amoako-Gyampah & Salam 2004
H5: System characteristics is positively associated with PEU	Wixom & Todd 2005; Alshibly 2014
H6: System characteristics is positively associated with PU	Wixom & Todd 2005; Alshibly 2014
H7: Communication is positively associated with PU	Amoako-Gyampah & Salam 2004

Hypotheses H1, H2 and H3 in table 3 above were created based on the technology acceptance model (TAM). PEU and PU are positively associated with intention to use the system. However, PU has more influence on user acceptance than PEU. It is also widely investigated that PEU positively relates to PU. PU increases when the system is easier to use as users expect their job performance to increase. If two systems have same functionalities, users feel that system which is easier to use is more useful. (Liao et al. 2009; Venkatesh & Davis 2000; Alshibly 2014.)

Training affects users perceived of ease of use in the beginning of their learning and hence the training is investigated to have positive association with PEU (H4). Training provides possibility for employees to explore the system from technical and functional perspective. Training is a way for users to get information and experience the system and the perceived ease of use at first hand. However, the effect that training has on PEU may be dependent on its character and source. (Amoako-Gyampah & Salam 2004.)

System characteristics are positively associated with both PEU and PU (H5 & H6). System characteristics measure technical perspectives of the system from the user point of view. (Alshibly 2014.) Alshibly (2014) states that system characteristics are the most important determinant which affects EDMS acceptance. System characteristics consist of system and information quality. System quality means reliable and flexible system which can be integrated to other systems and where information is easily and timely accessible. Information quality refers to accurate, up to date and complete information that the system should provide preferably in a good format. (Wixom & Todd 2005.)

The last hypothesis (H7) is that communication is positively associated with PU. Communication provide information that have an effect on the users' shared beliefs of the technology benefits and that way influence the perceived usefulness of the system. Communication has a key role in providing information and understanding for employees about the new system. PU is dependent on the frequency and quality of the communicated information. (Amoako-Gyampah & Salam 2004.)

4 METHODS

4.1 Data collection

A survey was used to collect information of the system from end users. If a survey is done well it can produce detailed information about the effectiveness of the system. Every survey is unique, and the questionnaire needs to be specified to meet the needs of the study. Questionnaire was sent to employees by e-mail. Collecting survey information electronically through e-mail allows for a quick data collection, elimination of bias and instant sum up. On the other hand, argument against this method is the amount of time and money spent in the preparation and that the respondents can only be people using e-mail. (Remenyj et al. 2007, 231–235.) In this research all the system users had e-mail so collecting data through e-mail is the most effective, quick and inexpensive way to reach all the respondents.

According to Irani (2010) client feedback is one component of post-implementation success measurement. Document management system users at case company are identified as clients in this research. By collecting the user data evaluating the best practices and improvement areas for future implementation of the system is possible. Survey participants were located all around the world working in different businesses. All of them were invited to system training and they were communicated about the project. Users were trained starting from September 2018 to January 2019. A couple of key users participated the system configuration and testing phase before the trainings on July and August. Users will more likely adopt the new information system if they are involved in the design, analysis, decision making and implementation of the system (Avison & Fitzgerald 2006, 79).

Online survey tool Webropol was used to execute the questionnaire. The questionnaire data was collected between February and March with two weeks response time. Two reminders where sent to people who had not answered the questionnaire at each point. Only users who had used the system at least once were selected to the sample because system usage was important for answering the questions. Questionnaire was sent to 77 employees and 65 responses were received. The total questionnaire response rate was 84%. As known the more responses the better. A common rule is that for each predictor there should be 10 or 15 cases of data. (Field 2013, 313.) In this research the research model included all together 5 predictors, so there were 13 data cases per predictor. Thus, the sample size was considered to be large enough.

Questionnaire was created on the basis of the created research model. The questionnaire was conducted as structured closed-ended questionnaire which meant that

the answer options were given to the respondents. The idea of structured questions is to simplify the data analysis and to avoid certain mistakes (Heikkilä 2008, 50-51).

The questionnaire consisted of 6 control questions and 16 questions related to the constructs of the research model. In control questions, closed-ended questions were used which means that the response options were given to them. This was possible because the response values could be estimated. As Heikkilä (2008, 59) states, if the age scale of the respondents is known, the given answer options eases the analysis. Risk in that method is that if the scaling turns out to be incorrect, all the answers are in one or two classes. Closed-ended questions were used because the response alternatives were known beforehand. 3 or 4 questions were asked per each construct of the research model and five-point scale were used from strongly disagree to strongly agree for answering. Arithmetic means were used as single-indicator constructs. Possibility to choose "do not know" was also available. In regression analysis made in SPSS (Statistical Package for the Social Sciences) the "do not know" responses were removed from the analysis.

The complete questionnaire form can be found in appendix 1. The questionnaire included one open-ended question to figure out the reason if respondent had not uploaded any contracts to the system. Open-ended questions are meaningful when answer options are not known in advance (Heikkilä 2008, 49). Mostly closed-ended questions were used to make it easy and quick for the user to fill the form.

4.2 Data analysis

The data analysis was done in SPSS statistical analysis tool. Analysis started with analyzing the control factors and then making regression analyses.

Statistical models consist of variables and parameters. There are two kinds of statistical variables, dependent and independent (synonyms to predictor and outcome). Linear regression model is used to anticipate outcome variable values by using one or more predictor variables. When one predictor variable is used, the model is called simple regression and when there are multiple predictors, the model is called multiple regression. (Field 2013, 44-45, 298.)

Linear model is a multipurpose model for explaining relationships between one or more predictor variables and an outcome variable (Field 2013, 297-298). The linear regression model equation is written as:

$$y_1 = (b_0 + b_1X_1 + b_2X_2) + e_1$$

where,
y_1 = outcome variable
b_0 = constant
b = regression coefficient
X = predictor variable
e_1 = error

Predictor variables X_1 and X_2 are measured constructs that varies in the sample. B parameters are usually constants and estimated from the data. Every predictor variable X has a parameter b which explains the relationship with predictor and outcome. Adding as many variables as wanted to the model is possible. e_1 illustrates the error that always occurs to some extent. (Field 2013, 44–45.) e_1 is part of the y value that estimates of the model cannot predict (Heikkilä 2008, 238).

The research model was divided into three models where the linear regression analysis was done. The three models are shown in figure 5 below.

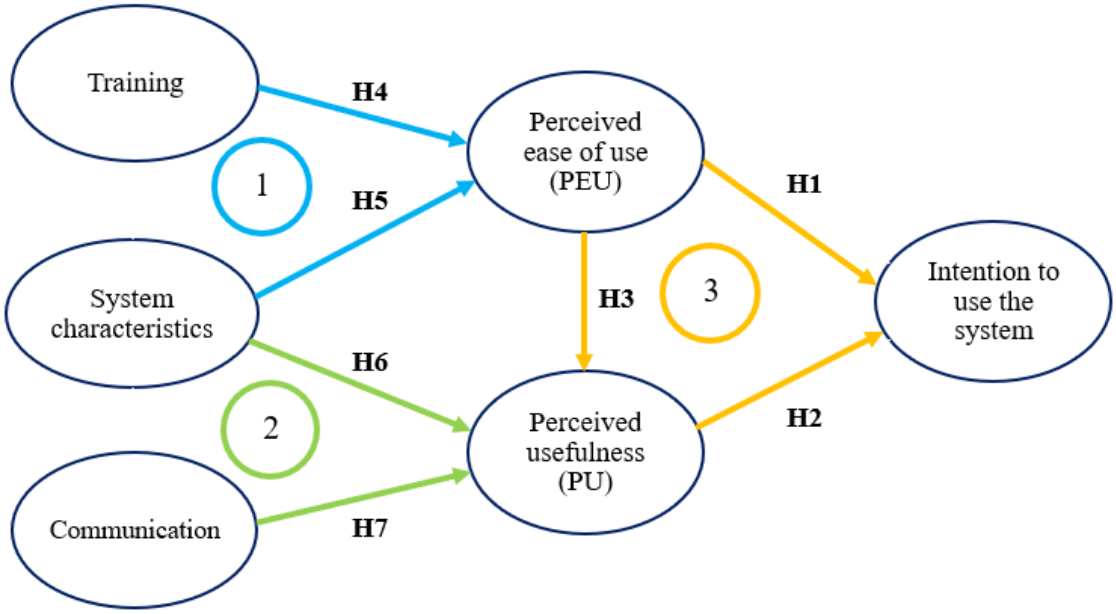

Figure 5 Research model divided in to three models for data analysis

First and second models were analyzed with linear multiple regression model. In the first (blue) model PEU was the dependent variable, training and system characteristics independent variables. In the second (green) model PU was dependent variable, system characteristics and communication the independent ones. The purpose was to investigate how the independent variables are related to the dependent variable to investigate the validity of set hypotheses in each model. Simple regression analysis was made in the third (orange) model. Intention to use the system was dependent variable while PEU and PU

were independent variables. In the relationship between PEU and PU, PEU was independent and PU dependent variable.

For generalizing the model, following assumption need to be met; additivity and linearity, homoscedasticity, multicollinearity and normality. (Field 2013, 309). *Additivity and linearity* assumption concern the linear relationship between the outcome variable and predictors. A linear model should describe the developed models. A scatter plot analysis was made to all predictor and outcome variable relationships separately to test the linearity (arrows in figure 5). All the scatter plot figures showed uphill pattern from left to right in the figure which meant that the variables had reasonably positive linear relationships between them. When x axis values increased, also Y axis values increased.

Homoscedasticity is used for testing the accuracy of estimated parameters in the model and in significance tests. Homoscedasticity is the homogeneity of variance meaning that variance of outcome variable should be the same in all levels of predictors' residuals. (Field 2013, 174, 309.) Homoscedasticity were tested from looking at the seven scatter plot tests. The variations were relatively equally distributed in all levels of the predictor and therefore the research model can be said to be almost optimal.

Multicollinearity occurs when two or more predictors have a strong correlation. In perfect collinearity predictors have the same regression coefficients. One possibility to assess multicollinearity is the variance inflation factor (VIF). VIF shows if the relationship between predictors are highly linear. (Field 2013, 324.) The VIF test were executed to all of the three models derived from the research model. For the first model, training and system characteristics both got VIF value of 1.069. For the second model, system characteristics and communication both got VIF value of 1.396. The last model showed VIF value of 1.241 to PEU and PU. If VIF value is more than 10 it is considered to be problematic. Also values under 0.1 may cause serious problems. (Field 2013, 325.) Therefore, VIF values got were suitable for the analysis and predictors had strong linear relationships with each other.

When data has been collected, it is meaningful to make a histogram, a graph of how many times each score occurred. In the horizontal axis there are the values of observations and in the vertical axis the times each value occurred. Assumption of *normality* refers to normal distribution of the data. This means that data would be symmetrically distributed in both sides of the center value. If the data is not distributed normally, it may have lack of symmetry (skew) or pointiness (kurtosis). In skewed distributions most of the values are accumulated to the ends of the scale. Kurtosis refers to how much the scores accumulate to the end of the distribution which shows how pointy the distribution looks like. (Field 2013, 19–20.) Normality were tested for each research construct separately. All of the constructs were relatively normally distributed with a few outliers. Normality is important when making significance tests is small samples but in larger samples the normality does not matter. Sample size of 73 in this research can be considered large

enough where normality and a few outliers did not really matter. Because all the four assumptions were met in the models, it can be said that the research model met the assumptions and it can be generalized (Field 2013, 309).

4.3 Research quality

According to Yin (2003, 33) four tests can be used to evaluate the research quality in any social sciences, also in case studies. The four tests are construct validity, internal validity, external validity and reliability. *Construct validity* addresses the correct measures towards research concepts. Subjective estimates should not affect the data collection. *Internal validity* refers to causal relationship where specific condition lead to another condition. Internal validity is competent in causal and explanatory case studies. Challenge is the incorrect interpretation of the items' causality. *External validity* represents the generalizability of research findings. Case studies deal with analytical generalization where researcher tries to generalize research findings into a broader theory. (Yin 2003, 33–35.)

In this research common models from literature were used to explain the intention to use the system. Questions related to the six constructs of the research model were commonly derived from the literature. The sample of employees to the research were scattered globally and had different experience background from assistants to directors. The research was executed and reported in detail, which makes it easier to repeat the research.

Reliability refers to the accuracy of the results as those cannot be random. Researcher need to be critical and precise with interpretation of the results. (Heikkilä 2008, 30.) The same results should be obtained if the research, for example the data collecting, were repeated (Yin 2003, 34). Inter-rater reliability refers to the fact that research tool should provide same results when different people repeat the research. Test-retest reliability emphasizes time dimension, the test should provide same information executed any time. (Roberts et al. 2006.)

Cronbach's alpha is commonly used estimate to measure reliability. Cronbach's alpha measures internal consistency of a test or a scale. Internal consistency explains that items in a test measure the same concept and describes the inter-relatedness of test items. Also, the amount of measurement errors is reported. Internal consistency should be measured before starting the actual data analysis. Cronbach's alpha values differentiate between 0 and 1. If the items are correlating with each other, the value of alpha increases. Low alpha value may be a cause of low amount of questions, low inter-relatedness or dissimilar concepts. There is differentiation in the literature about the accepted value of Cronbach's alpha, however most values range from 0.70 to 0.95. (Tavakol & Dennick 2011.)

Cronbach's alpha was calculated for each research construct and results are shown in table 4.

Table 4 Reliability test

Construct	Cronbach's alpha	Number of items
Intention to use	0.832	3
Perceived ease of use	0.879	3
Perceived usefulness	0.900	3
Training	0.820	3
System characteristics	0.889	4
Communication	0.891	3

As shown in the table 4, all alphas in the research exceeded the lower limit of 0.70. Alphas varied between 0.832 and 0.9. For example, perceived usefulness got alpha value 0.9 means that 90 per cent of the variability is true and 10 per cent some kind of error in the construct (Roberts et al. 2006). All the research constructs are internally consistent and reliable variables to be used in the data analysis in next chapter.

Bias may occur in different situations, but it means for example that something prevents oneself from evaluating evidence objectively (Field 2013, 164). Social desirability bias is a potential threat to research validity. Social desirability bias refers to situation where individual response is affected by social norms or mores. (King & Bruner 2000.) This research was conducted anonymously meaning that responses were anonymous and confidential. Results were analyzed on a group level and no individual responses could be identified.

One of the most popular techniques to measure common method variance is Harman's single factor test (Podsakoff et al. 2003). A common method variance test was made in SPSS and maximum variance that is explained by a single factor was 46,124%. This model did not suffer from the common method bias because the variance was below 50%.

5 ANALYSIS AND RESULTS

5.1 Case company and implementation description

This research was made as an assignment for an industrial company. Case company operates globally having operations in all continents: North America, South America, Europe, Africa, Eurasia and Australia. The company has around 10 000 employees and around 3 billion euros turnover in 2017. The case company implemented a document management system with aim to implement the system globally. The system enables using document management functionalities that meet different needs inside the company. Several functions participated in the project and several use cases were implemented in fall 2018, procurement use case being one of them. This research focused on the procurement use case. Documents are limited to contracts and contract related material.

The document management system is a cloud-based platform acquired from a third-party service provider. In their platform, advanced workflows can be created and integration to other systems inside the company is possible. However, in this use case no integration was made between other systems. Cooperation with the service provider started in the summer 2018 when system requirement specification and the configuration work was made. When the functionalities were ready and tested, implementation started in the fall 2018. The main functionalities of the system for procurement use case were contract upload, contract view, reminders and contract search. Target was that contracts could be transparently managed in a global system.

Implementation proceeded step by step and users were trained in small groups. Users were selected based on the needs for using document management system. The chosen employees were estimated to benefit from the system the most. Usually they had procurement contracts under their responsibility which would be beneficial to them or others to be stored in a shared global archive. Altogether around one hundred users were trained to use the system. First, employees from key functions and locations in Europe were trained to use the system. After that the financial heads of each legal entity in the company were trained.

First trainings started in September and last trainings were held in January. Trainings were held in Skype and included general project and system information as well as detailed introduction on how to use the new system. There was time for questions and answers in the training too. Approximately 10 trainings were held in total.

After the training access to the new document management system were given to the training group regardless whether they could attend the training or not. Everyone also got access to the training material. Training material included recorded training video and

PowerPoint instructions on how to use the system. During the fall and early spring help were offered to the users and change requests were listened. Individual help was given to the users if needed. To speed up the system usage, reminders were sent to users to remind them to start using the system. Deadline for uploading procurement contracts to the system were set to the end of the year for the users trained before that. There were around 500 contracts in the system when the questionnaire data was collected.

5.2 Sample characteristics

Table 5 illustrates the home country distribution in the sample. All the countries were the case company had operations were available in the questionnaire but only the ones selected are presented in the table.

Table 5 Home country of the sample (n=65)

Home country	n	%
Finland	17	26.15
Brazil	7	10.77
Chile	4	6.15
Sweden	4	6.15
Spain	3	4.61
China	2	3.07
Czech Republic	2	3.07
Germany	2	3.07
Peru	2	3.08
Russian Federation	2	3.08
UK	2	3.08
Australia	1	1.54
Austria	1	1.54
Denmark	1	1.54
France	1	1.54
India	1	1.54
Indonesia	1	1.54
Italy	1	1.54
Japan	1	1.54
Monaco	1	1.54
Norway	1	1.54
Poland	1	1.54
Portugal	1	1.54
Singapore	1	1.54
Korea, Republic of (South Korea)	1	1.54
Thailand	1	1.54
Turkey	1	1.54
United Arab Emirates	1	1.54
USA	1	1.54
Total	65	100

Majority of the sample were from Finland (n=17). 7 respondents were from Brazil, 4 from Chile and 4 from Sweden. Four continents were represented, 63% had home country in Europe, 22% in America, 14% in Asia and 2% in Australia. 29 different countries were represented in the sample so views from different perspectives were achieved in the research.

Table 6 represents results of control factor questions, in other words the characteristics of the sample. Table 6 illustrates the amount of answers for each option (n) and the percentage of total n.

Table 6 Characteristics of the sample (n=65)

		n	%
Age	Under 30	3	5
	30-40	19	29
	41-50	22	34
	51-60	20	30
	61-70	1	2
	Over 70	0	0
How long have you been working on document management in years?			
	Less than 1	8	12
	1-5	17	26
	6-10	14	22
	11-20	18	28
	More than 20	8	12
Did you attend to the Document Lifecycle Management (DLM) Procurement Skype training?			
	Yes	50	77
	No	15	23
How many times have you approximately used the system for procurement document management?			
	1	10	15
	2-5	32	49
	6-10	12	19
	More than 10 times	11	17
How many contracts have you uploaded into the system?			
	0	15	23
	1-5	24	37
	6-10	12	19
	11-20	6	9
	More than 20	8	12

The majority of the sample (n=61) were 30 to 60 years old. This age group were divided into three age categories where 93% of the sample belonged: 30-40 (n=19), 41-50 (n=22) and 51-60 (n=20). Mode is the highest frequency class in other words the most often chosen response alternative. Mode in the age was 41-50 (n=22).

The time respondents had worked in document management in general distributed evenly. The extremes with experience less than one year or more than 20 years accumulated 24% of the responses. Experience of 1-5 years got 26%, 6-10 years got 22% and 11-20 got 28% of the total sample. So, most of the respondents had experience in document management from 1 to 20 years.

A skype training were arranged to the respondents. In most cases the sample got two options to attend the same training in different dates to increase the attendance rate. 77% (n=50) of the sample attended the training. The questionnaire was conducted in early spring and until that they had possibility to use the system before answering to the questionnaire. Most of the people with percentage of 49 had used the system 2 to 5 times (n=32). Other results were divided evenly to 1 time (n=10), 6 to 10 times (n=12) and more than 10 times (n=11). 0 was left out of the questionnaire as only users who had used the system at least once were selected to the sample. System usage was important so that respondents could answer the questions related to the system functionalities.

Last control question sorted out the number of contracts uploaded in to the new system. The mode was 1-5 contracts with 37% of the sample (n=24). 19% chose option of 6-10 contracts. 77% of the sample had uploaded at least one contract to the system. 15 respondents had not uploaded any contract to the system. If “0” was selected, an open question “What is the reason why you have not uploaded contracts into the system?” arose. The question was intended to give deeper information of the reasons why no contracts were uploaded. The explanations why no contracts were uploaded were classified into six categories: 1) There were no contracts to upload (n=6) 2) Lack of time (n=3) 3) Not their responsibility to upload contracts (n=3) 4) System is too expensive and supplier management is difficult 5) There is something where help is needed before contract uploading (n=1) 6) Another system is replacing the tool at the moment (n=1). Most of the respondents who had not uploaded contracts said that they had no contracts to upload. A couple of tens of contracts were uploaded by the administrator at the beginning of the implementation so that may be a reason why some respondents did not have contracts to upload, at least one respondent mentioned that to be the reason. The classification of the response options was valid as responses distributed relatively evenly to the different classes. There is no need to further categorization with any of the control questions.

Figure 6 below presents how many times respondents had used the system. Orange (No) and blue (Yes) colors were set to the table due to the attendance of the training.

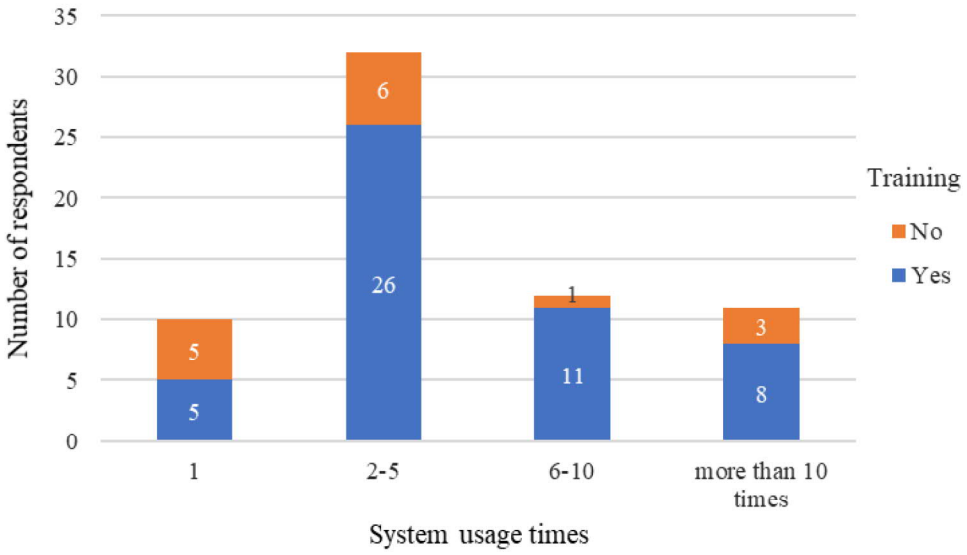

Figure 6 Respondents' system usage frequency (n=65)

From this data we can see that 79% (n=11) of the respondents who did not attend the training used the system only once or 2 to 5 times. However, in the highest category where the system was used "more than 10 times" the number of respondents that did not attend the training was higher (38%) than the original relation of non-attendants and attendants (23%). When observing the training attendance distribution in system usage frequency categories, relatively largest number of respondents who did not attend the training belonged to lowest category, 50% of the one-time users did not attend the training. Secondly the category where system was used 6-10 times got the highest percentage of respondents (91%) who did attend the training.

Cross tabulation analysis was made to figure out the relationship with system usage and uploaded number of contracts. The results of the cross tabulation analysis can be seen from the table 7.

Table 7 Cross tabulation: System usage * Contracts uploaded (n=65)

Count

		How many contracts have you uploaded into SpringCM?					
		0	1-5	6-10	11-20	more than 20	Total
How many times have you approximately used SpringCM for procurement document management? (signed in to upload, search or view contracts for example)	1	5	5	0	0	0	10
	2-5	9	13	4	3	3	32
	6-10	0	4	6	0	2	12
	more than 10 times	1	2	2	3	3	11
Total		15	24	12	6	8	65

From the table 7 we can see that the less system was used, the less contracts were uploaded and vice versa the more system were used the more contracts were uploaded in

to the system. In addition, what stood out in the table was that most of the respondents (58%) had used the system 1-5 times and uploaded 0-5 contract or used the system 6-10 times and uploaded 6-10 contracts. The highest score (n=13) was with usage of 2-5 times and 1-5 uploaded contracts. This indicates that the average user has used the system a few times and uploaded a couple of agreements to the system. In figure 7 crosstabulation was made also to figure out how document management experience was associated with the intention to use the system.

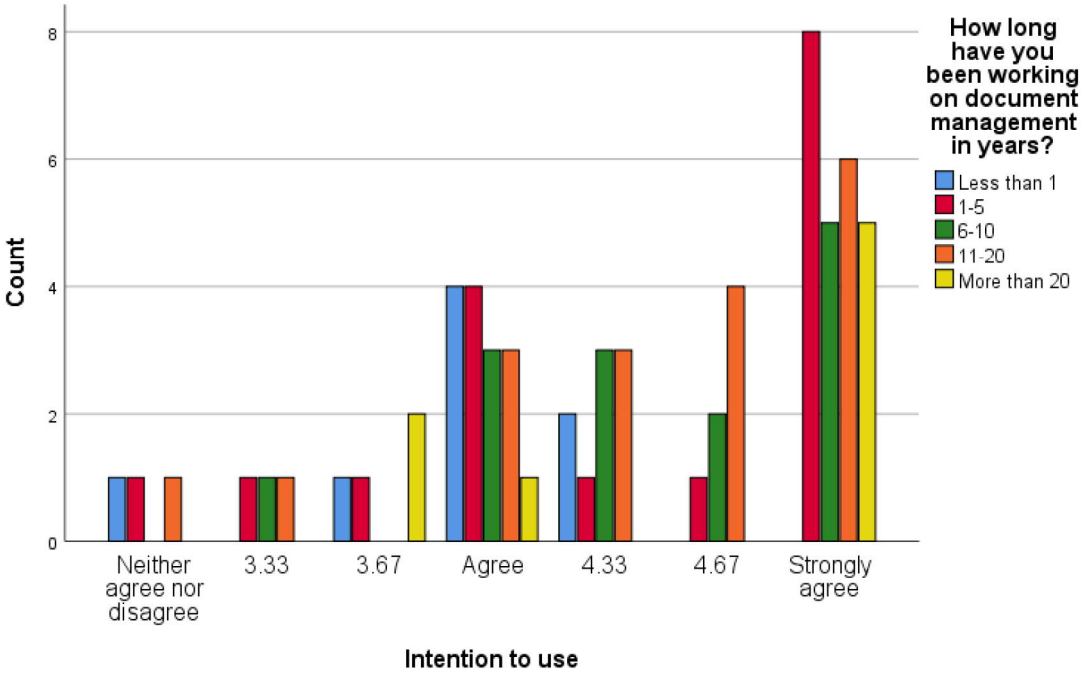

Figure 7 Crosstabulation: Intention to use * document management experience

Figure 7 shows that if document management experience was less than one year the score for intention to use ranged from 3 (neither agree nor disagree) to 4.33. In the other extreme were document management experience was more than 20 years, the intention to use the system got values from 3.67 to 5 (strongly agree). So, users with more experience in document management also intended to use the system more. In all experience groups except “less than one year” the highest individual response was 5 “strongly agree”.

Table 8 represents the mean of sum constructs. All constructs included three to four questions and first individual respondent’s mean was calculated out of these three or four questions. Then the mean was calculated from the total population and results are shown in table 8 below.

Table 8 Mean response of research constructs (n=65)

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Mean	Amount of "Do not know"
	1	2	3	4	5		
Intention to use					★	4.4	0
Perceived ease of use				★		3.8	1
Perceived usefulness				★		4.1	1
Training (n=50)				★		4.1	0
System characteristics				★		3.8	2
Communication				★		3.8	1

The amount of “do not know” meant that all the questions in that sum variable were “do not know”. If one or two out of three questions were “no not know” the average were calculated from the remaining values. There were only couple of respondents answering “do not know” to all questions related to a construct and therefore left out from the mean calculation. Success in the research was defined to be the respondents’ intention to use the system. What is striking in this table 8 is that intention to use got highest mean score of 4.4. PEU, system characteristics and communication got the mean of 3.8 whereas PU and training got mean value of 4.1.

5.3 Regression analysis of research constructs

As previously explained the research model was divided into three models for the analysis. Models are analyzed in this chapter starting with the first model and continuing with the second and third model. Figure 8 shows the regression model number 1 where relationships between training and system characteristics were investigated towards perceived ease of use (PEU). According to the set hypotheses, training and system characteristics should have positive association to PEU.

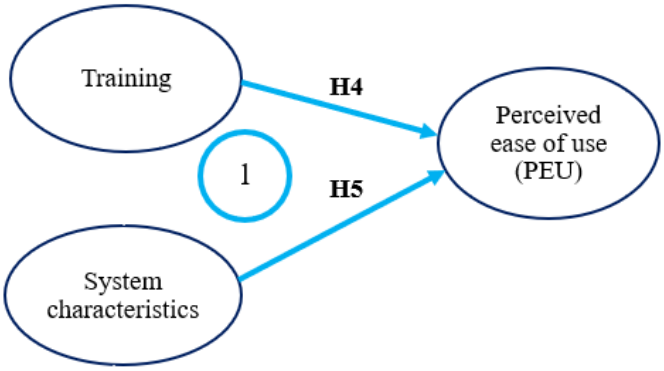

Figure 8 Regression model 1

Multiple regression analysis was made in SPSS and results are addressed in table 9. R square, total df (degree of freedom), F-test, coefficients, standard errors and significances are shown in the table.

Table 9 Regression analysis results of training and system characteristics on PEU

Std. error of the estimate	R square	Total df	F-test	Sig.
0.673	0.264	50	8.415	0.001[b]

Model 1	Coefficient	Std. error	Sig.
(Constant)	0.563	0.829	0.500
Training	0.366	0.178	0.046
System characteristics	0.453	0.155	0.005

R square tells us that 26.4% of the variation in PEU was explained by training and system characteristics. The bigger the R square is the more there is correlation between predictors and outcome variable (Field 2013, 318). So, there were also other variables in addition to training and system characteristics that would predict PEU.

Total df is the number of observations used in the analysis (Field 2013, 337). In model 1 the number of observations is 50 which can be explain with the fact that only people who attended the training (n=50) could estimate the training experience out of total sample (n=65).

F-test measures the suitability of the model. Significance (sig.) indicates statistical reliability of the made conclusion and how risky is that the difference or dependence is a result of chance. Sig. value is a key value in interpreting the results in SPSS. Value 0.000[b] in table 9 indicates that the model 1 is statistically highly significant. (Heikkilä 2008, 191, 194, 219, 241.) A conclusion can be made that the model 1 predicted PEU of the system better than calculation of the mean value of PEU alone (Field 2013, 318).

The constant (PEU) 0.563, which is the b_0 in the regression equation, tells us that if no effort is put to the training and system characteristics the model assumes that PEU got score of 0.563. This would mean that respondents strongly disagreed that the system is useful for them. In the regression equation b_1 and b_2 represented the regression coefficients. From the table 9 we can see that the coefficient for training was 0.366 and for system characteristics 0.453. Coefficients represent the change in the outcome when there is a unit change in the predictor (Field 2013, 319). If system characteristics' predictor increased by 1 then the model assumes that PEU would increase by 0.453 unit. If training response value increased one unit, PEU would increase 0.366 unit.

The significance (sig.) column tells the significance of each correlation. If the significance is less than 0.05 the result effect is genuine and makes a significant contribution to the predicted outcome. (Field 2013, 334.) Sig. can also be reported to be <0.01 or <0.001 when the contribution is highly significant. If the sig. is more than 0.05 coefficient does not statistically significantly deviate from zero (Heikkilä 2008, 194, 241.) Table 9 above shows that sig. for training was 0.046 which was enough significant to make contribution to PEU ($p < 0.05$) and the coefficient significantly deviated from zero. Abbreviation p (probability) is used to indicate significance (Heikkilä 2008, 194). Because $p < 0.05$ and the coefficient was positive, training was positively related to PEU. Sig. for system characteristics was 0.005 which is significant at $p < 0.05$ and therefore system characteristics were positively associated with PEU.

Standard error indicates how much variability there is in the population across samples. The larger values the more it indicates that the sample statistics does not accurately reflect the population. (Field 2013, 884.) Standard error of the estimate was 0.673 which is quite high when comparing to the range of variation in the responses of PEU (1-5). Even though the standard error was quite high, it was still smaller than the standard deviation of PEU (0.769) which also proves that the model presents a better estimate of PEU than the mean responses of PEU (Heikkilä 2008, 241).

However, when doing the regression analysis only with one predictor (training) the standard error estimate was 0.724. The error was 0.051 smaller with two predictors so we can come into a conclusion that by using both training and system characteristics as predictors we are able to predict the population of PEU better. With only system characteristics the standard error estimate was 0.681 so it is almost similar to the model where both predictors were used.

Regression model number 2 is shown in figure 9 below. According to the hypotheses, system characteristics and communication should positively associate with PU.

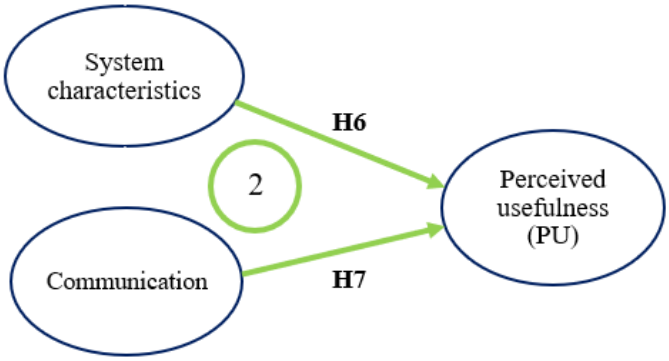

Figure 9 Regression model 2

Results of regression analysis are shown in table 10. Standard errors, R square, total df, F-test, coefficients and significances are shown in the table.

Table 10 Regression analysis results of communication and system characteristics on PU

Std. error of the estimate	R square	Total df	F-test	Sig.
0.617	0.336	63	15.165	0.000[b]

Model 2	Coefficient	Std. error	Sig.
(Constant)	1.666	0.447	0.000
Communication	0.114	0.108	0.294
System characteristics	0.520	0.130	0.000

From the R square it can be seen that 33.6% of the variation in PU were explained by communication and system characteristics. The number of observations used in the model is 63 (total df). Observations with only "do not know" in the response were removed from the analysis. F-test is highly significant ($p < 0.001$) and significantly differs from zero so the model is suitable for measuring PU.

The constant 1.666 indicates us that if no effort were put to the training and system characteristics the model assumes that PEU gets score 1.666. This score alone would mean that respondents would disagree that the system is useful for them. In the regression equation b_1 and b_2 represented the regression coefficients. From the table 10 it is seen that the coefficient for communication was 0.114 and 0.520 for system characteristics. Coefficients represent the change in the outcome when there is a unit change in the predictor. If communication predictor increased by 1 then the model would assume that PU increased 0.114 unit. Coefficient 0.520 means that half of the effort put in system characteristics will show in PU.

Table 10 shows that sig. for communication was 0.294 which was not enough significant to make contribution to PU ($p > 0.05$) and thus, communication was not positively related to PU. Sig. for system characteristics was 0.000 which was highly significant at $p < 0.001$ which means that system characteristics were positively associated with PU.

Standard error of the estimate was 0.617 which is quite high when comparing to the range of variation in the responses of PU (1-5). This means that communication and system characteristics are not able to accurately predict the population of PU.

Figure 10 shows the last regression model where PEU and PU are predicted to positively associate with intention to use the system and PEU to positively associate with PU. A mediation analysis is suitable to be done in that model. Mediation is a situation where third variable (the mediator) explain the relationship between a predictor variable and an outcome variable (Field 2013, 408). Model 3 in figure 10 illustrates the mediated causal relationship where PEU is predictor, PU mediator and intention to use is the outcome. It is said that mediation exists if the relationship between the predictor and outcome is reduced when mediator is included (Field 2013, 408).

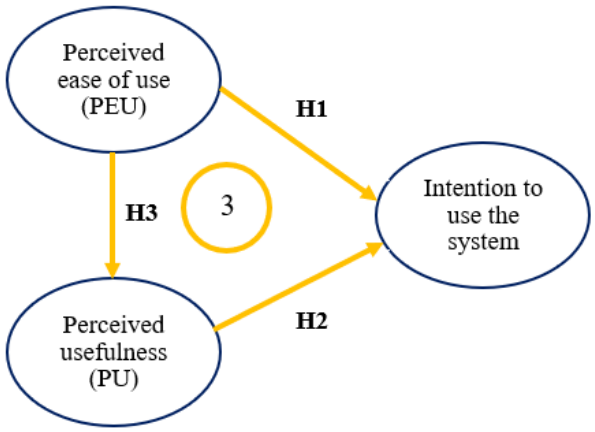

Figure 10 Regression model 3

In a mediation model which Baron and Kenny (1986) used in their research, the mediation is tested by executing three regression analysis 1) Regression analysis with predictor (PEU) and outcome variable (intention to use the system). 2) Regression analysis between predictor (PEU) and mediator (PU) 3) Multiple regression predicting the outcome of predictor (PEU) and mediator (PU) towards the outcome (intention to use). (Field 2013, 409–410.)

First the simple regression analysis was made to investigate the relationship between PEU and intention to use the system. For the mediation analysis to succeed PEU should significantly predict the outcome of intention to use (Baron & Kenny 1986; Field 2013, 410). When the regression analysis between PEU and intention was executed,

significance of the model was 0.266 which is not enough significant to make contribution to intention ($p < 0.05$). PEU did not positively associate with intention and therefore the mediation model could not be done either. Therefore, regressions were investigated separately. Simple regression analyses were made from PEU to intention, PU to intention and last the from PEU to PU. Results are shown in table 11.

Table 11 Regression model 3

Regression	Std. error of the estimate	R square	Total df	F-test	Sig.
PEU ⟶ Intention	0.600	0.024	64	1.496	0.226[b]
PU ⟶ Intention	0.483	0.366	64	35.809	0.000[b]
PEU ⟶ PU	0.669	0.194	64	14.949	0.000[b]

Regression	Coefficient	Std. error	Sig.
(Constant)	3.963	0.362	0.000
PEU	0.115	0.094	0.226
(Constant)	2.392	0.340	0.000
PU	0.493	0.082	0.000
(Constant)	2.538	0.403	0.000
PEU	0.407	0.105	0.000

When looking at the relationship between PEU and intention to use first, the F-test is not significant ($p > 0.05$). This means that the model is not suitable for the regression analysis. Also, sig. in the lower table indicates that PEU did not make significant contribution to intention ($sig > 0.05$).

Contrary to PEU, PU had significant contribution to intention. F-test is 35.809 and highly significant ($p < 0.001$). R square represented that PU explained 36.6% of the variation in intention. Standard error of the estimate was 0.483 which is smaller than standard deviation 0.602 of intention so the model presents better estimate of intention than the mean response of intention. PU's coefficient was 0.493 and it was highly significant ($p < 0.001$) so PU positively associated with intention. If PU predictor increased by 1 then intention would increase by 0.493 unit. So, almost double effort is needed to put into PU to get same effect in intention. Standard error in the coefficient was 0.082.

Similarly, PEU had significant contribution to PU with coefficient 0.407. F-test got value of 14.949 which is highly significant at $p < 0.001$. According to the t square, PEU explained 19.4% of the PU variation. Standard error of the estimate was 0.669 which is quite high when comparing to the response classification (1-5). All of the separate analyses had 64 observations (total df).

6 CONCLUSION AND DISCUSSION

The purpose of this research was to figure out how the implementation of the electronic document management system succeeded from an end user perspective in the case company. Success was defined as the end user's intention to use the newly implemented system because individual's open behavior is specified by the intention of individual to behave that way (Moore & Benbasat 1996).

6.1 Answering the research questions

The first research question was: How has the implementation of procurement document management functionalities of the electronic document management system succeeded from an end user perspective in the case company? When answering to the first research question, it can be seen that end users intended to use the system as the mean response value of the intention to use the system was 4.4/5. Mean of 4.4 referred to as high commitment for the user's intention to use the system. Consequently, the implementation of the electronic document management system can be seen to be successful from the end user perspective. The more users are accepting the new system the more they are willing to put time and effort to use the system and make changes in their working practices (Venkatesh et al. 2003).

Means of other constructs in the research model were relatively high as well, ranging from 3.8/5 to 4.1/5. These high numbers are important from the system implementation perspective. For example, Jones (2012) noted that insufficient training led to bad success and users felt they did not get enough consultation. In its entirety, respondents liked the system, the training and communication. They felt that it was easy to use and useful in their document management. They agreed to intend to use the system instead of using other systems. The factors that were associated with intention to use are analyzed in the next chapter.

The second research question was: What are the factors associated with successful implementation in the case company? The factors were investigated to be training, system characteristics, perceived ease of use, perceived usefulness and intention to use the system. These factors are addressed more detailed in the next chapter.

6.2 Discussion

Factors that associated with intention to use the newly implemented system was investigated in the literature review of the study. Successful EDMS implementation

requires users to accept and use the system (Venkatesh & Davis 2000) and therefore, it was important to understand the determinants of intention to use the system (Oliveira & Oliveira Martins 2011). Technology acceptance model which consist of PEU and PU was seen as predictors of intention to use the system. The external factors relating to PEU were training and system characteristics. System characteristics together with communication were seen to relate to PU as external variables. These factors are also critical success factors which were investigated in more detail in chapter 3.3.2 Critical success factor method is used for identifying the critical elements of success (Caralli 2004) which was the EDMS implementation success in this research.

In chapter 3.4 a new research model was developed based on the literature and relationships between research constructs were stated. Figure 11 illustrates the results for the developed research model.

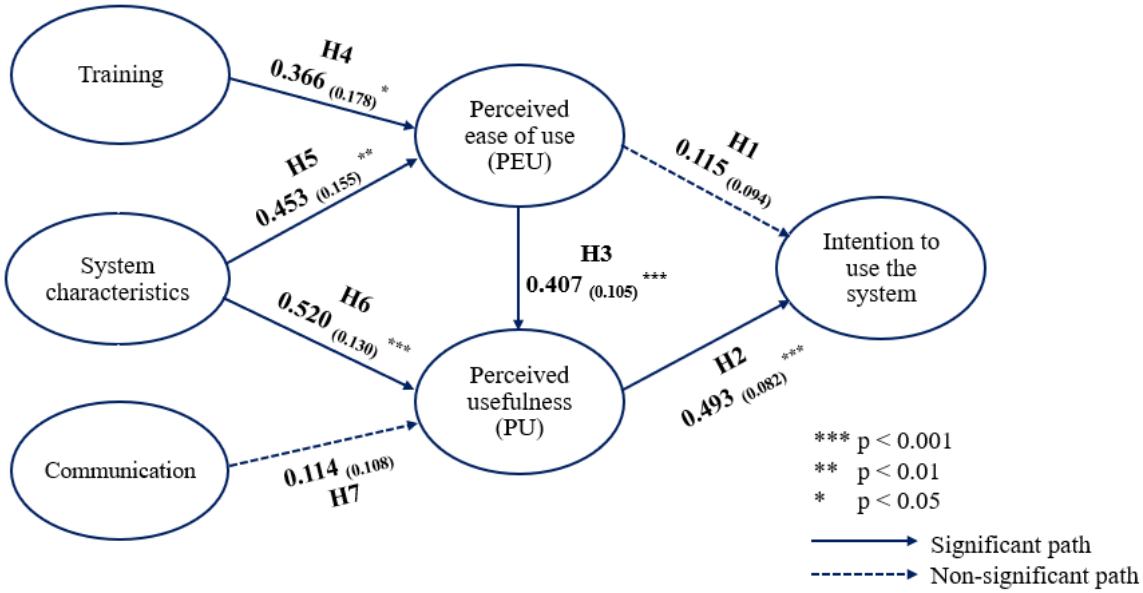

Figure 11 Results for the research model

In figure 11, regression and its direction is illustrated as an arrow (significant path) or dashed line arrow (non-significant path) with regression coefficient, R square value (sub-script) and significance (superscript) information.

6.2.1 Hypotheses H1, H2 and H3

Hypothesis H1 addressed that PEU was positively associated with intention to use the system. After doing the regression analysis, PEU was not a significant predictor to intention to use the system. Thus, hypothesis H1 of PEU having positive association with intention was not supported. Interestingly, in their research Venkatesh and Davis (2000)

found out that perceived ease of use were significantly related to intention to use. However, the regression coefficient was 0.17 being the lowest coefficient in their research. Similarly, Alshibly (2014) investigated significance relationship between PEU and intention with 0.207 coefficient. However, in this research the regression was not statistically significant. For the users it was not enough that the system was easy to use for them to intend to use it.

Hypothesis 2 stated that PU is positively associated with intention to use the system. PU was positively associated with intention and the hypothesis was supported. Only PU was significant predictor of intention to use the system. Similar to the research findings, PU has proven to have more influence on user acceptance than PEU in the literature (Venkatesh & Davis 2000; Alshibly 2014). As a conclusion, users need to feel that the system is useful for them so that they are willing to use the system.

Hypothesis 3 addressed that PEU is positively associated with PU. As a result, PEU had significant contribution to PU. This meant that if users felt that the system is easy to use it did not directly increase intention, but it increased the perceived usefulness of the system and that way finally increased the intention to use the system as well. PU increases the easier the system is to use as users expect their job performance to increase (Venkatesh & Davis 2000). So, if the system is easy to use, it will not itself increase the intention to use the system. Users need to feel that the system is useful for them in order to continue its use instead of using other systems. However, users feel the system to be useful for them the easier the system is to use.

H1: PEU is positively associated with intention to use the system.	**Not supported.**
H2: PU is positively associated with intention to use the system.	**Supported.**
H3: PEU is positively associated with PU.	**Supported.**

6.2.2 Hypotheses H4 and H5

As the hypothesis H4 stated, training was positively associated with PEU. Amoako-Gyampah and Salam (2004) got similar results of the regression with slightly smaller coefficient. However, training was the least significant factor among the significant external variables in this research.

Hypothesis H5 stated that system characteristics is positively associated with PEU. After making the regression analysis system characteristics were positively related to PEU. System characteristics associated with PEU more than training. The results followed Wixom and Todd's (2005) and Alshibly's (2014) researches and thus, the hypothesis 5 was supported.

As a conclusion training and system characteristics increased system's ease of use. So, focus in the implementation should be put on to comprehensive training and high-quality system characteristics as those increase users feeling that the system is easy to use. The better the training is, and the more high-quality system characteristics are the easier the system is to use. More focus should be put on to system characteristics than training as system characteristics have more significant effect on perceived ease of use.

H4: Training is positively associated with PEU.	**Supported.**
H5: System characteristics is positively associated with PEU.	**Supported.**

6.2.3 Hypotheses H6 and H7

H6 addressed that system characteristics is positively associated with PU. The results showed that system characteristics was a significant determinant of PU. Among the significant paths from external variables, system characteristics had the highest coefficient and highest significance towards PU. System characteristics was positively associated with PU like in previous literature (Wixom & Todd 2005; Alshibly 2014) and thus the hypothesis was supported. When users feel that the system characteristics are good, it will increase the perceived usefulness of the system as well.

H7 stated that communication is positively associated with PU. What stands out in the results of the research model is that communication was not statistically significant determinant of PU. Unlike in Amoako-Gyampah and Salam's (2004) research communication was not positively associated with PU and therefore the hypothesis was not supported. A good communication did not on one's own increase the perceived usefulness of the system and it does not fix the faults in the system characteristics. To increase the usefulness of the system, system characteristics should be improved instead of communicating more. Users feel that the system is useful only if the system characteristics are of high-quality. Despite the finding that communication was not related to PU, it cannot be fully ignored. Communication is still needed in some extent so that people get aware of the system.

As a conclusion, system characteristics was the most significant external variable predictor of PEU and PU. If system characteristics was seen good, it was positively related to the perceived ease of use and usefulness of the system. In EDMS implementation, the most focus should be put on system characteristics which consist of system quality and information quality. If the system is of high quality, it will make the system easier to use and users also feel it more useful.

H6: System characteristics is positively associated with PU. **Supported.**
H7: Communication is positively associated with PU. **Not supported.**

Results of all the hypotheses are collected together in table 12 below.

Table 12 Results of hypotheses

Hypotheses	**Results**
H1: PEU is positively associated with intention to use the system	Not supported
H2: PU is positively associated with intention to use the system.	Supported
H3: PEU is positively associated with PU.	Supported
H4: Training is positively associated with PEU	Supported
H5: System characteristics is positively associated with PEU	Supported
H6: System characteristics is positively associated with PU	Supported
H7: Communication is positively associated with PU	Not supported

H1 and H7 were not supported. Communication did not make significant contribution to PU and PEU was not positively associated with intention to use the system. Otherwise all the other hypotheses were supported.

6.3 Theoretical and managerial implications

This research investigated the implementation success of electronic document management system. When looking at the literature, previous information system research has mainly focused on ERP systems and their implementation. This research brought detailed analysis of document management systems and their implementation. The research provided information about the factors that are positively associated with intention to use the system and relationships between the factors. The developed research model can be used as it is in analyzing implementation success of other similar electronic document management systems. Research findings may be possible to apply to concern other systems than document management systems as well however, more investigation of that is needed.

When considering managerial implications, this research helps management to distinguish factors that affect the implementation of EDMS. Research findings help them to focus on the critical factors in order for the implementation to success. EDMS projects

are easier to manage and resources are easier to allocate if critical factors are known. The proposed research model offers a framework for estimating the influence that training, system characteristics and communication have on technology acceptance.

Managers should focus on system characteristics which includes system and information quality because those had the most impact on perceived ease of use and perceived usefulness of the system. Developing a good and informative system is therefore crucial for the EDMS implementation to succeed. Focus should be put for example on high-quality functionalities, easily accessible information, meaningful report and high-quality content in the system. When effort is put to the system characteristics, users feel that the system is easier to use and also more useful for them. Also, putting effort to training is worthwhile because it increases the experience that system is easy to use. When users feel that the system is easy to use it increases the perceived usefulness of the system as well. The more useful the system is, the more users intend to continue its use which means that the implementation has succeeded.

Management can utilize the research findings in future development of the system by focusing on arranging a good training and developing good characteristics to the system. Focusing on training and system characteristics will lead to successful implementation which gives value to the money that has been invested to the document management system and its implementation.

6.4 Limitations and opportunities for further research

There are some limitations in this research which need to be taken into consideration. Respondents were system users from the case company only. Findings of the research can be applied to similar organizations, but further research could be made to cover different companies implementing EDMS. Investigation of EDMS implementation compared to other information systems would be meaningful.

The research focused on initial adoption of the system (less than 6 months usage) and results cannot be generalized to short-term or long-term users. Further research is needed to investigate short-term and long-term adoption of EDMS. R squares were maximum 0.366 which means that there are also other factors explaining the outcome variable. So, it could be further investigated if there are other factors affecting intention to use or TAM variables PEU and PU.

6.5 Conclusion

Most of the organizational information is stored in documents. Along with digitalization and global networks, the amount of information and electronic documents and has increased massively. Electronic document management systems (EDMS) make it possible to manage the whole life cycle of a document, enhance its compliance, improve contract visibility as well as control and streamline processes electronically. This research investigated how implementation of the electronic document management system succeeded from an end user perspective in the case company. Success is defined to be the system users' intention to use the system. A research model was developed to evaluate the user intention to use the newly implemented system and to figure out the factors that positively associated with the intention.

This research was conducted as a quantitative case study. A questionnaire was used to collect data of the system from end users of an industrial company. Based on the previous literature, a new research model for evaluating document management system implementation success was created. The model consisted of six research constructs; one success construct, two behavioral factors and three external variables. Questionnaire was generated on the basis of the developed research model. As a result, training and system characteristics were positively associated with perceived ease of use and perceived usefulness of the system. Also, perceived ease of use increased the usefulness of the system. Useful system directly increased intention to use the system which was defined to be the success in this research.

All the research constructs had relatively high mean value from respondents ranging from 3.8/5 to 4.4/5. Mean response value for the intention to use the system was 4.4/5 which meant that overall users intended to use the system. Therefore, the implementation can also be said to be successful. The more users are accepting the new system the more they are willing to use the system and make changes in their working practices. As a conclusion from tested research model, in future implementation it is useful to put effort on training and system characteristics because those had the strongest impact on perceived ease of use and perceived usefulness of the system. If users feel that the system is easy to use it will increase the perceived usefulness of the system and that way finally increase the intention to use it as well.

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APPENDIX 1 QUESTIONNAIRE

1. Home country

Select

2. Age

- ○ Under 30
- ○ 30-40
- ○ 41-50
- ○ 51-60
- ○ 61-70
- ○ Over 70

3. How long have you been working on document management in years? (negotiating, making and handling agreements and maintaining contract archives) *

- ○ Less than 1
- ○ 1-5
- ○ 6-10
- ○ 11-20
- ○ More than 20

4. Did you attend to the Document Lifecycle Management (DLM) Procurement Skype training? *

- ○ Yes
- ○ No

5. How many times have you approximately used the electronic document management system (EDMS) for procurement document management? (signed in to upload, search or view contracts for example) *

- ○ 1
- ○ 2-5
- ○ 6-10
- ○ more than 10 times

6. How many contracts have you uploaded into the system? *

- ○ 0
- ○ 1-5
- ○ 6-10
- ○ 11-20
- ○ More than 20

8. Intention to use *

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	**I do not know**
I like the idea of using the EDMS *	○	○	○	○	○	○
I intend to continue using the EDMS rather than discontinue its use *	○	○	○	○	○	○
My intentions are to continue using the EDMS rather than use any alternative tools *	○	○	○	○	○	○

9. Perceived ease of use *

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	**I do not know**
Interaction with the EDMS is clear and understandable *	○	○	○	○	○	○
I find it easy to get the EDMS to do what I want it to do *	○	○	○	○	○	○
I find the EDMS to be easy to use *	○	○	○	○	○	○

10. Perceived usefulness *

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	**I do not know**
Using the EDMS enhances my document management performance (Easy loading, searching, sharing and utilization of contracts, contract transparency, contract reminders) *	○	○	○	○	○	○
I find the EDMS to be useful in my document management *	○	○	○	○	○	○
Using the EDMS improves my effectiveness in document management *	○	○	○	○	○	○

11. Training *

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	**I do not know**
My level of understanding was improved after going through the training *	○	○	○	○	○	○
The training was of adequate length and detail *	○	○	○	○	○	○
Training provided to me was comprehensive *	○	○	○	○	○	○

12. System characteristics *

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	**I do not know**
The EDMS functionalities are of high quality *	○	○	○	○	○	○
Information in the EDMS is easily accessible *	○	○	○	○	○	○
The EDMS provides reports that are relevant and meaningful for my work *	○	○	○	○	○	○
Information content in the EDMS is of high quality *	○	○	○	○	○	○

13. Communication *

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	**I do not know**
I was well-informed about the project through the company newsletters in company intranet platform *	○	○	○	○	○	○
Communication in the implementation has been sufficient *	○	○	○	○	○	○
I was well-informed about the project through e-mails, presentations or demonstrations *	○	○	○	○	○	○