Influence of contextual factors on the adoption process of Robotic process automation (RPA)

Case study at Stora Enso Finance Delivery

Katriina Juntunen
Abstract

Influence of contextual factors on the adoption process of Robotic process automation (RPA)

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This study investigates the intra-organisational adoption of technological innovation and focuses specifically on the perceived influence of innovation, organizational, individual and managerial facilitation factors on the adoption process of Robotic process automation (RPA) technology. Based on an exploration and integration of eight adoption related frameworks from Innovation diffusion, User acceptance and Change management fields, a conceptual model linking the system level change to individual level commitment process was created. The model integrates concepts from Diffusion of Innovation, Theory of Reasoned Action, Theory of Planned Behaviour, Technology Acceptance Model, Unified Theory of Acceptance and Use, Lewin’s 3 stage-model, Kotter’s 8-step model and Change Institutionalization framework. A qualitative case study at Stora Enso’s Finance delivery function was conducted utilizing semi-structured interviews to contribute to better understanding about the adoption process of RPA. The empirical data was then analysed against the created conceptual model. The findings from the case study suggest that contextual factors related to innovation, organizational, individual and managerial facilitation attributes are perceived to influence the adoption of RPA. In relation to innovation attributes the key themes identified were RPA advantages, risks and threats, ease of understanding and use, development effort and RPA-process fit. Under the category of organizational attributes, the main factors identified were RPA-organization fit, previous RPA experience, RPA capabilities and organizational support. Key individual attribute related factors were personality, time resources, previous success with RPA and personal motivation, and main managerial facilitation attributes were management support, communication, knowledge and experience sharing, training and skill development and employee involvement.
Popular science summary

This paper is focused on exploring the process of innovation adoption, more specifically in the context of deployment of Robotic process automation (RPA) technology. RPA is one of the most recent developments and innovations in the field of business process automation. The technology is able to automate rule based, routine processes or process tasks previously performed by humans, and hence enables the process workers to turn their focus to more cognitive tasks. While RPA is not intelligent technology in itself and suitable only for specific type of work, together with more intelligent technologies the use of RPA is expected to advance the automation of knowledge work.

In full-scale use, RPA is able to provide significant organizational benefits varying from cost savings to increased employee satisfaction, however to reach these advantages the adoption process needs to be managed effectively. To be able to spread the use of a technological innovation within the organization, it is relevant to develop comprehensive understanding about the factors that influence the adoption process, either negatively or positively, and also about the tactics management should use in the facilitation of the adoption process. Hence also this study aimed to increase the understanding about the adoption process of RPA by focusing specifically to the influence of contextual factors. By identifying deficiencies and best practices based on employee perceptions, the organization can adjust their strategies and tactics in relation to the initiated change and increase the organizational commitment.

The study started with exploration of eight well-established theoretical models derived from the Innovation diffusion, User acceptance and Change management fields, and summarised the key concepts into an integrative conceptual model. The model was then used as a tool to analyse the results gained from qualitative semi-structured interviews and explain the findings with existing theory.

The results show that both innovation, organizational, individual and management facilitation related factors are perceived to influence the adoption process and hence the change process is concluded to be dependent on numerous of situational variables reflecting for example the content, context and process of change. Within these four categories, in total 15 key factors were identified to influence the adoption process based on the perceptions of organizational members and these findings were also aligned with the previous research conducted within the area. The identified factors formed the categories for the more detail level findings, which then explained more closely how the participants perceived these factors to influence the adoption process. Both inhibiting, accelerating and facilitating associations were identified.
Acknowledgement

I would like to express my appreciation to all those who have been supporting me in carrying out this thesis project. First, I would like to thank Stora Enso and especially my supervisor Charlotte Sperling for initiating the project, giving the opportunity to be part of this interesting development initiative and providing the access to the organization. Further, I would like to express my gratitude to Toni Paunonen for taking the time to support me with practical matters throughout the research process, as well as to my subject reader Thomas Lennerfors, who has provided me guidance in relation to the academic aspects of the work. Lastly, I want to thank the whole Finance delivery organization and especially all the respondents who were kind enough to share their time and thoughts to contribute to this study.

I hope that the thesis will provide valuable insights and practical help both to the Finance delivery organization and the centralized RPA set-up to lead the deployments of RPA successfully also in future.

Uppsala, 4th of June 2018

Katriina Juntunen
**Abbreviations**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>BPM</td>
<td>Business Process Management</td>
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<tr>
<td>CoE</td>
<td>Center of Excellence</td>
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<tr>
<td>DOI</td>
<td>Diffusion of Innovation</td>
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<tr>
<td>FTE</td>
<td>Full-time Equivalent</td>
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<tr>
<td>HR</td>
<td>Human Resources</td>
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<tr>
<td>IS</td>
<td>Information System</td>
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<tr>
<td>IT</td>
<td>Information Technology</td>
</tr>
<tr>
<td>PBC</td>
<td>Perceived Behavioural Control</td>
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<tr>
<td>POC</td>
<td>Proof of Concept</td>
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<tr>
<td>RPA</td>
<td>Robotic Process Automation</td>
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<tr>
<td>TAM</td>
<td>Technology Acceptance Model</td>
</tr>
<tr>
<td>TPB</td>
<td>Theory of Planned Behaviour</td>
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<tr>
<td>TRA</td>
<td>Theory of Reasoned Action</td>
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<tr>
<td>UTAUT</td>
<td>Unified Theory of Acceptance and Use of Technology</td>
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1. Introduction

The introduction will first describe the theoretical background for the research, followed by origin of the study and problematizing. These considerations are used to define the purpose statement and research questions. The chapter concludes with limitations and outline for the paper.

1.1 Background

According to Taylor and Todd (1995) there has been two key approaches to study adoption and usage of Information technology (IT) systems; intention-based acceptance theories and diffusion of innovation perspective. Straub (2009) describes that adoption theories view adoption as a decision to accept or reject innovation, whereas diffusion theories focus on the spread of an innovation within the social system. Rogers (2003) defines innovation as an idea, product or process perceived as a new by the adopting social system or its members, whereas innovation adoption is defined as the process of reaching “full use of an innovation as the best course of action available” (p. 177). During the last decades IT has been at the focus of innovation adoption studies and as new IT can be considered as technological innovation, also innovation theories are seen to be applicable in empirical IT adoption research. (Hameed, Counsel & Swift, 2012)

According to Hameed, Counsel and Swift (2012), for successful adoption and implementation of IT, it is necessary to examine collectively the processes related both to adoption and user acceptance. Also the critics of the technology acceptance frameworks have concluded that user acceptance models don’t sufficiently acknowledge the influence of social and organizational factors. (Bagozzi, 2007; Legris, 2003) Legris (2003) for example points out that both in innovation and organizational change research implementation of new technology is related to the organizational dynamics and there is strong interdependence between technology, organizational context and the model used to manage the change, which together eventually determine the effectiveness of a change process.

Due to this complementarity between innovation diffusion and user acceptance theories, countless of models and frameworks have been created to integrate the key concepts from these two approaches (Moore & Benpasat 1996; Venkatesh, Morris, Davis & Davis 2003; Zhou 2008; Weigel, Hazen, Cegielski & Hall 2014). However, both of these theoretical streams have rational perspective to the adoption. For example, the origin of technology acceptance frameworks is based on the assumption that individuals tend to take advantage of available information in a rational systematic manner (Ajzen & Fishbein, 1975) and also diffusion theory is focused on explaining the process of innovation decision making with a rational approach to the behaviour change of individuals. (Kim, 2015) In comparison according to Kim (2015), change management models focus more on the normative-reeducative approach, where individuals are brought to change often without sufficient acknowledgement of the fact that they are rational and driven by self-interest. Due to these differences in the approaches Kim suggests that also diffusion of innovation and change
management frameworks are complementary to each other. Also Hameed, Counsel and Swift (2012) point out that IT adoption studies rarely consider what it takes to institutionalize the IT system within a social system, hence incorporating change management models, which recognize the institutionalization of change (Lewis 1947; Kotter 1995; Armenakis, Harris & Feild 1999) is justified.

While innovation and new IT adoption is widely researched subject, the research related to adoption processes is usually focused only to one research stream or alternatively integrating frameworks from two of these theoretical streams. But simultaneously as described above, these three theoretical streams of innovation diffusion, acceptance and change management are perceived to complement each other. Hence integration of their frameworks and concepts is expected to give more comprehensive understanding on the diverse contextual factors influencing the dynamic adoption process of technological innovation.

1.2 Origin of the study & Problem description

The recent development of computers and other digital devices harnessed with human-like cognition is suggested to lead the way toward the second machine age, where new innovative technologies will complement and eventually even substitute humans in knowledge work. (Brynjolfsson & McAfee, 2014) Robotic process automation (RPA) technology is one of the first steps organizations are taking in this digitalisation journey toward more cognitive technologies. RPA is the latest development related to business process and service automation and while using software to automate organizational work has been existing for a long time, the rapid development of related technologies has increased the interest toward service automation and the deployment of them in organizational contexts. (Lacity, Willcocks & Graig, 2015a)

RPA is a software-based robot that mimics the actions taken by a human colleague to perform a specific process or process part by accessing the user interface layer of different Information systems (IS) and tools. And if compared to the other automating business process management (BPM) solutions, RPA is perceived to be easier to configure and considered as a lightweight technology in that sense that it doesn’t disrupt the other systems it is connected to. RPA tools can be easily implemented to simple business-owned processes by the business units themselves without advanced organizational programming skills or extensive system changes, which lowers the threshold to automate business processes. (Lacity, Willcocks & Craig 2015c) Shared services are described to be suitable application area for RPA as there tends to be so called swivel chair processes. The term refers to the rule-based processing between different IT systems and this type of work has traditionally required manual human effort but can now be automated with the help of RPA. (Lacity & Wilcocks, 2016a) RPA enables organizations to reach lower costs, improve service quality, increase compliance and minimize delivery time but to reach these gains organizations need to learn how the adoption of RPA can be managed effectively. (Lacity, Wilcocks & Graig, 2015a)
The company in focus of this thesis is Stora Enso, one of the leading companies in forest industry, which is currently undergoing a transformational journey from a traditional paper producer into a sustainable renewable materials company. (Stora Enso, 2018). According to the megatrend mentioned earlier, also they have identified digitalization as one of the key enablers for the transformation and hence their IT and Digitalisation unit is focused on identifying and accelerating the use of new technology within Stora Enso for example to increase efficiencies in the internal business processes. RPA is one of these technological innovations, which is perceived to provide great scaling opportunities and together with other cognitive technologies is expected to eventually transform the traditional paradigm of knowledge work. To stay on top of this digital development and create competitive edge in the marketplace, Stora Enso has decided to start providing RPA technology as a service for their group functions and drive implementations of this technology company-wide. The first function undergoing RPA implementations is Finance delivery.

Early 2017 Stora Enso initiated a Proof of Concept (POC) in Finance delivery to pilot the RPA technology in practice and the results were promising. However, based on this early experimentation Stora Enso concluded that to succeed in future implementations strong commitment from organizational members is required as the RPA implementations are driven by the business units themselves, even if the IT department is responsible for the RPA projects in a centralised manner. According to the assignment specified by the IT and Digitalisation and Finance delivery functions, Stora Enso wished to utilize the early implementations of RPA in Finance delivery as a case study to collect the first organizational learnings from the adoption process of RPA. Gathering employee experiences and perceptions and identifying for example deficiencies and best-practices from the adoption process was perceived to support the effective management of RPA adoption, help in the planning of further implementations and reaching the full gains RPA is able to deliver.

1.3 Purpose statement & Research questions

The purpose of this paper is to increase the understanding about the intra-organizational adoption process of RPA from the perspective of the organizational members and focus on describing the key contextual factors perceived to influence the adoption process. The study will aim to contribute to the limited existing RPA research by explaining empirical data with well-established theories and help the client organization to develop and refine their strategies and tactics related to deployment of RPA with the empirical findings. The following research questions are set for the study:

1) What are the main innovation, organizational and individual factors that influence the adoption process of RPA, based on the perceptions of organizational members?
   - How are these factors perceived to influence the adoption process of RPA?

2) What are the managerial tactics used to facilitate the adoption process of RPA, based on the perceptions of organizational members?
   - How are these tactics perceived to influence the adoption process of RPA?
The two main questions are focused on identifying the contextual factors that influence the adoption process and will be answered both with theoretical frameworks and empirical data. From theory perspective, the factors will be reflected under the four categories of the integrative conceptual model and summarising tables in section 4.4. And from empirical perspective the influencing factors are reflected in the themes introduced in Results & Analysis chapter and further summarised in the tables of Conclusions & Discussion chapter.

However, to contribute to the practical aim of the study, and to get more elaborated data about the factors influencing the adoption, also sub-questions were set. Answers to the complementing questions, which focus on how the identified factors influence the adoption process in the empirical case study, are provided in the detailed descriptions of empirical data in chapter 6, Results & Analysis, under each theme separately. Additionally, this aspect is also considered in the Conclusions & Discussion chapter, in the tables summarising the key findings from the empirical data.

### 1.4 Delimitations

This paper focuses specifically on the adoption process of RPA in the Finance delivery function at Stora Enso. Even though the RPA implementations were started also in other units at Stora Enso, Finance delivery was chosen to be investigated as it was the first function to deploy RPA and hence had the most experience and had progressed furthest within the area by the time the study was initiated. The majority of the respondents participating to the qualitative interviews were Finance delivery employees, however two respondents from IT and Digitalisation unit were interviewed as the centralized project management related to RPA was located in this unit and hence these individuals were closely related to the early adoption and implementations of RPA.

Additionally, due to the time and scope restrictions of the research the studied factors related to innovation, organizational, individual attributes and management facilitation were decided to be limited to the variables introduced in the specific theoretical frameworks, which were chosen for closer exploration. Hence from determinant point of view this study limits itself to the concepts of the chosen frameworks and it should be acknowledged that the paper doesn’t consider all the possible factors influencing the innovation adoption. For example, detail level organizational characteristics or individual attributes external to the chosen theoretical frameworks, might in reality influence the adoption process, but aren’t considered in this study. A limiting consideration is also that the aim of the research was to collect qualitative data about the perceptions of individuals in the context of RPA adoption, hence the empirical data and the results don’t describe the actual experiences, attributes and conditions, but the individuals’ perceptions about their influence.
1.5 Outline

This paper consists of seven main chapters. The introduction is followed by a methodology chapter, which introduces the methodological selections made for the study. The chapter describes the chosen research approach, design, level of analysis, strategy, data collection methods and considerations related to sampling, chosen theoretical frameworks, validity, reliability, generalizability and ethics. The methodology chapter is followed by a brief RPA research review, which is divided into three sections. First RPA as a technology is introduced shortly, followed by sections describing the existing commercial and academic RPA research separately.

The theory chapter is divided into three theoretical sections followed by the integration of the chosen frameworks with the help of a conceptual model created. The introduction of the chosen theoretical frameworks is started with four acceptance frameworks, followed by the framework of diffusion of innovation theory and finished with three change management frameworks. The empirical part of the research starts by brief introduction of the case study, followed by the integrated results and analysis chapter. The themes identified from the empirical data is organized under the four key constructs introduced in the conceptual model and described to influence the adoption; innovation, organizational, individual and managerial facilitation attributes.

Lastly, combined discussion and conclusion chapter summarises the results under the research questions and describes the concluding considerations related the research process, incorporating topics such as contribution, limitations, suggestions for future research, managerial implications and ethics.

2. Methodology

This chapter describes methodological selections made for the study, describing the research approach, design, level of analysis, strategy, data collection methods and considerations related to sampling, chosen theoretical frameworks, validity, reliability, generalizability and ethics.

2.1 Research approach & Design

To explore the perceptions about the adoption process of RPA, the focus needs to be on the individuals involved in the change process. Because deployment of RPA is an emerging phenomenon in the organization, only a limited quantity of individuals had been involved in the deployment of RPA. Qualitative research is described to focus on and increase understanding about the social world by investigating the interpretations and perceptions of the participants. It is a suitable approach for gathering rich, detailed and descriptive data and fits well to situations when research is conducted with a smaller sample. If the two main research approaches are compared, qualitative is focused on words whereas the quantitative approach is focused on quantification of data. (Bryman & Bell, 2011) As the aim is to collect
rich descriptive data about the adoption process of RPA from client organization’s own environment, a qualitative approach makes the best fit for the study and was chosen to set the basis for the research. However, the qualitative approach was complemented with some quantification of empirical data to be able to point out to the repeating findings in the interviews. There are multiple options for study design when conducting qualitative research, but when the intention is to gather detailed and rich data from a single organization at one point of time, a case study is the most suitable approach. (Bryman & Bell, 2011) In regard to this paper, the request to conduct a case study came from the client organization.

2.2 Level of analysis

The level of analysis is usually stated to vary between society, organization, group and individual level. It is often recommended to choose only one level of analysis to avoid cross-level misattribution. (Bryman & Bell, 2011) However organizations tend to operate in multiple interacting levels with interdependence between them. For example, teams and organizations are context for individual level beliefs, attitudes and behaviours, but also vice versa; individual’s characteristics can influence the organization. (Costa, Graca, Marques-Quinteiro, Santos, Caetano & Passos, 2013) Because the purpose of this study is to explore the intra-organizational adoption process, it is necessary to apply a multi-level approach for the study and consider both individual, organizational, innovation and process level factors impacting the adoption process.

2.3 Research strategy

Qualitative research is often linked to an inductive strategy, which means that the data, referring to observations and findings, will guide the generation of theory, whereas a deductive strategy aims to test existing theories against the hypothesis and data set. (Bryman & Bell, 2011) However, as the aim of this research was to use existing theory and literature to guide the collection and analysis of data instead of generating new theory or testing the existing ones, an abductive strategy was chosen. The abductive approach allows the interaction and iteration between the theory and the empirical data, whereas the two other strategies are more linear in character. Also, in this study the development of the final theoretical framework was influenced by the empirical study and the empirical data collection guided by the existing theories as the theoretical and empirical part were conducted simultaneously. As a result, the research questions were refined during the research process based on the changes in the theoretical frameworks and focus of the data.

2.4 Method

2.4.1 Interview & Document data

Traditional research methods for qualitative research are observation, interviewing, focus groups and document data. (Bryman & Bell, 2011) The main method used for this qualitative research was semi-structured interviews, however they were complemented with an
exploration of RPA related documents provided by the client organization. As the organizational members were distributed between three different countries (Finland, Estonia, Sweden), observation and focus group methods weren’t sensible options, while interviewing was enabled by Skype and document data could be sent through email. A form of semi-structured interview was chosen as a main data collection method, as it suited the abductive research strategy and allowed to refine the focus of the study through the insights gained from the earlier interviews. The semi-structured interview method also allows follow-up questions and gives the interviewees opportunity to freely answer the questions. (Bryman & Bell, 2011)

For the semi-structured interviews an interview guide with comprehensive list of questions categorized under themes was designed beforehand, however due to the abductive nature of the study the interview guide was adjusted and complemented with additional questions during the research process. Also the chosen questions and wording differed between interviews. The drawback of this approach is the complexity of the data, leading to a situation where the analysis of the data isn’t as straightforward as with structured interviews. (Bryman & Bell, 2011) All interviews were done through Skype and conducted starting from mid-February to early April. The interviews took 30-60 minutes each and were recorded. While 17 of the interviews were transcribed, four recordings were only summarised due to time restrictions. The documents provided by the client organization were focused on the structures and strategies of Finance Delivery organization and timeline descriptions in relation to the adoption process. They were used only to gain background information about the adoption of RPA for the Case introduction chapter. They weren’t used as a data source for the actual empirical material and hence the chapter of empirical Results & Analysis uses only data gained from the semi-structured interviews. The analysis of the results was done utilizing thematic analysis.

2.4.2 Literature review

At the beginning of the research process theory related to IS implementation, technology adoption and organizational change were reviewed, additionally existing RPA related research was scanned through. This early literature review was conducted to guide the early interviews. Later on, as the study progressed, the frames of references were specified to cover innovation diffusion, user acceptance and change management in addition to the RPA focused research. Research articles were found through the databases Uppsala University provided access to and Google Scholar. Literature review was conducted simultaneously with empirical research, hence there was interaction between the development of analytical framework and collection of empirical data. According to Bryman and Bell (2011) for interpretative researchers who aim to generate understanding rather than accumulate knowledge and use iteration between theory and empirical data, choosing narrative review approach is a sensible option. This approach focuses on giving initial impression of the topic and is often more wide-ranging in its scope compared to systematic literature review. As the purpose of this study was to generate understanding with an abductive strategy, a narrative review approach was chosen for the literature review and theory section.
2.5 Sampling

The sample size for the research was 21 individuals. 19 respondents were working in the Finance delivery and two in the IT function. Employees from five hierarchical levels were chosen for the sample and a non-probability sample was used, meaning that the participants weren’t selected randomly. According to Bryman and Bell (2011) this increases the possibility that human judgement affects the selection in such way that some individuals within the population might get chosen more likely than others. Additionally, the sampling method used in the study was purposive sampling. This was necessary as two individuals provided the access to the organization and thus the final sample was based mainly on their judgement and recommendations. A list of interviewees was formed with their help and complemented later during the process with a few additional individuals. All individuals were contacted by e-mail for voluntary participation and all of them, except one, also participated the interview.

2.6 Choice of theoretical frameworks

In an exhaustive study conducted by Hameed, Counsel & Swift (2012) about innovation adoption research, it was concluded that the most commonly used theoretical models among all innovation adoption theories were Diffusion of Innovation Theory (Rogers, 2003), Perceived Characteristics of Innovation (Moore & Benbasat, 1991), Theory of Reasoned Action (Fishbein & Ajzen, 1975), Theory of Planned Behaviour (Ajzen, 1991), Technology Acceptance Model (Davis, 1989), Technology Acceptance Model 2 (Venkatesh & Davis, 2000), Technology Acceptance Model 3 (Venkatesh and Bala, 2008), Technology, Organization and Environment Model (TOE) (Tornatzky and Fleischer, 1990) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris, Davis & Davis, 2003).

From this list of frameworks TOE model was left outside from this paper as it is focused on the organization-environment relationship, whereas the focus of this study is in the intra-organizational adoption of technological innovation. Additionally, the framework for Perceived characteristics of innovation by Moore and Benbasat will be described as part of the DOI, in the section of Innovation characteristics as it is perceived to be complementing the original innovation characteristics introduced by Rogers. However, the characteristics introduced by Moore and Benbasat are not included in the conceptual model created. Also, TAM 2 and TAM 3 frameworks will be introduced in the context of original TAM, however they are not incorporated to the conceptual model, as the core constructs are the same as in TAM.

While acceptance frameworks and innovation diffusion frameworks are able to provide insights to the variables related to the individual level adoption decision and acceptance, to be able to cover the research question focused on the management facilitation as an influencing factor, it was necessary to integrate also change management aspect to these traditional innovation adoption frameworks. To incorporate this more normative-reeducative approach to
the conceptual model to complement the rational individual interest approach of DOI and acceptance models, three change models were integrated to the theoretical framework and conceptual model.

Lewin’s (1947) 3-stage model was chosen as it is perceived to form the foundation for many of the existing planned and emergent organizational change models (Rosenbaum, More & Steane, 2018) and Kotter’s (1995) 8-step model was included as it is one of the most referred models that offers practical guidance for the management of organizational change. (By, 2005) Thirdly, a model for Institutionalizing change interventions (Armenakis, Harris, Feild, 1999) was chosen to complement the two stage-models, as it is described to interweave the change institutionalization on organizational level to the process of building commitment toward the change on individual level. It creates the foundation for combining the individual level rational acceptance and commitment process to the process of organizational institutionalization of RPA by recognizing the impact of management influence and setting the individual level beliefs to mediate the institutionalization process.

2.7 Reliability, Validity & Generalizability

Qualitative research has been criticized for the lack of agreement what comes to assessing its quality, however Leung (2015) identifies validity, reliability and generalizability of the research as the main factors determining the quality of the study. According to Leung, reliability refers to the replicability of the study but in qualitative case-study research this is challenging as the investigation focuses on single organizational unit affected by situational variables. It is impossible to freeze this social setting for research purposes to make it replicable for future researchers. Additionally, the respondents might for example alter their answers based on the characteristics of interviewer, and the unstructured data rich in quantity forces researcher to make selections related to what to include and what to disregard, hence the analysis is always influenced by subjectivity of the researcher. Similarly, Bryman and Bell (2011) describes that qualitative research tends to give free hands for the researcher to choose what to concentrate on, hence there are no standard procedures to follow. Suggested by Leung (2015) instead aiming for replicability, in qualitative context focusing on the concept of consistency is more relevant. This means that a certain degree of variability in results is tolerated in qualitative research. However, she describes that the reliability of the study can be improved for example with comprehensive data use and with analysis that refers to the empirical data with quantification. Hence, rich data descriptions and incorporating quantification has also been used in this study.

In qualitative research, validity refers to the appropriateness of the tool, data and process selections made for the research. The concept of validity incorporates considerations related to whether the research question is suitable for the targeted outcome, the methodology chosen for the study is suitable for the research question, conclusions are valid in relation to the sample and context, and sampling and data analysis are conducted in an appropriate way. (Leung, 2015) Bryman and Bell (2011) refers to this match between observations and theoretical ideas as internal validity. In this research the validity and fit between research
question and the methodology and targeted outcome was ensured through flexibility and iteration. Based on the interaction between the chosen theoretical frameworks and collected empirical data, the research questions were adjusted for a better fit during the course of research. Even if the sampling opportunities were limited due to the time restrictions for the research and organizational access considerations, the validity was increased with thick data analysis and description.

Generalizability refers to whether the findings and conclusions can be generalized to other contexts. However, it is not usually an expectation for qualitative research as qualitative research is focused on studying a specific phenomenon in a specific social setting. (Leung, 2015) Bryman and Bell (2011) refers to this concept of generalizability as external validity, meaning whether the results can be generalised into other contexts or to the whole population. Also they describe that external validity is often low with qualitative case studies. Based on these ideas also the conclusions drawn from this case study focused on single function and specific organizational conditions with small sample size, shouldn’t be generalised into other contexts. However, according to Bryman and Bell (2011) case study can generate a hypothesis for later testing. In this study, the generalizability of the results to the whole population was improved by interviewing individuals from four different organizational streams undergoing their own RPA implementations instead of focusing on one stream and one development team. Hence also the findings and conclusions represent better the Finance delivery organization as a whole. Techniques to improve generalizability are for example multi-dimensional theory and proper documentation. (Leung, 2015) Also this study focused on this multi-dimensional theory aspect and acknowledged multiple dimensions that influence the adoption process by considering multiple theoretical streams.

2.8 Ethical implications

Bryman and Bell (2011) explain ethical issues around business research to revolve around how the stakeholders involved in the research are treated and to what type of activities the stakeholders should be involved in. (Bryman & Bell, 2011) Based on their categorization ethical principles cover four main areas; harm to participants, lack of informed consent and invasion of privacy and deception. (p.128) The thesis partly deals with sensitive data about employees’ perceptions, hence to decrease the possibility of any harm to participants, the interviews were conducted as anonymous. The interviewees might feel uncomfortable sharing their opinions about the technological change if in fear of organizational consequences and with anonymity the comments can’t be traced back to the participants. To protect the anonymity and avoid causing any harm to the participants, all information and details that could refer to the positioning of the individuals within the organization was also left out. This was necessary as the sample size was rather small and hence individuals could be identified more easily.

Interviewees were also asked to participate to the research in voluntary basis, however they might have felt pressured to be involved against their own will, because the inquiry was coming from the management. If participants don’t feel comfortable with and positive about
the situation, there is a risk that they won’t reveal their true perceptions in the interview, which leads to biased conclusions. From ethical perspective participants should also be offered adequate information about the content of the interview before they are deciding whether they want to participate to the research or not. (Bryman & Bell, 2011) However providing detailed information about the content of the interviews while contacting the respondents was not possible as the scope and focus of the research developed during the process. Thus, the scope the respondents originally agreed on might have differed from the actual content of the interview. However, all respondents had the possibility not to answer a question if they wished so.

Before starting the project, also a confidentiality agreement was signed by the researcher, which influenced the decisions made in regard to the paper. This factor was considered for example when the topic and scope of the study were chosen and also when the empirical data was analysed, because some details that were brought up during the interviews were covered in the non-disclosure agreement and hence left out from the results descriptions. An ethical dilemma is that even the aim was to conduct as objective research as possible, the client organization had the opportunity to influence the chosen methodology and even the outcome to some degree.

3. RPA research

To gain a comprehensive outlook on the current state of research related to RPA, a literature review considering both academic and commercial research was conducted. This chapter introduces briefly RPA as a technology and then describes the commercial and academic research separately.

3.1 Robotic process automation

RPA is the latest development related to business process and service automation and while using software to automate organizational work has been existing for a long time, the rapid development of related technologies has increased the interest toward service automation and its application in organizational context. (Lacity, Willcocks & Craig, 2015a) RPA is a software-based robot that mimics the actions taken by a human colleague to perform a specific process or process task through accessing the user interface layer of different IT systems and tools. And if compared to other automating BPM solutions, RPA is perceived to be easier to configure and it is a lightweight technology in that sense that it doesn’t disrupt the systems it is connected to. RPA tools can be easily implemented to simple business-owned processes by the business units themselves without advanced organizational programming skills or extensive system changes, which lowers the threshold to automate business processes. (Lacity, Willcocks & Craig 2015c)

Shared services are described to be suitable application area for RPA, as there is so called swivel chair processes, meaning rule-based processing between different IT systems. In these routine processes inputs are taken from one system and processed into an output to be utilized
in another system. This type of work has traditionally required manual human effort but now can be automated with the help of RPA. (Lacity and Willcocks, 2016a) RPA can for example open and attach e-mails, log into enterprise/web applications, move files and folders, copy and paste content, fill forms, scrape data from the web, extract structured data from documents and make calculations. (Deloitte, 2017) It is described to free the knowledge workers from dull, routine, structured work, allowing them to focus more on the analytical thinking tasks. The RPA robots are not physical, but they are offered for organizational use as software licences and on average one robot can perform work that equals to the work of two to five humans. (Lacity & Willcocks, 2015) RPA enables organizations for example to reach lower costs, improve service quality, increase compliance and minimize delivery time. RPA is also reported to lead to increased employee satisfaction as after the deployment these individuals can focus on more interesting work, perform tasks which need for example human judgement, empathy and allow social interaction. However, to reach these gains organizations need to be able to manage and govern the adoption RPA effectively. (Lacity & Willcocks, 2016a)

### 3.2 Commercial RPA research

The sample for the commercial research review consisted of four research reports by different global consulting companies (Pwc 2017; Deloitte 2017; Accenture 2016; EY 2016) and one report from an analyst company HfS Research (Fersht & Slaby, 2012). HfS’s report shared best-practices to increase the RPA acceptance within the organization, Accenture’s and EY’s reports focused on the most common pitfalls and issues related to RPA adoption and implementation, Deloitte’s report summarised recommendations for successful scaling and Pwc’s report was focused on explaining the reasons why the adoption of RPA is often more complicated than initially expected.

#### 3.2.1 Piloting & Process selection

It is suggested that RPA projects are often started with POC or a pilot project and later on expanded when the acceptance toward the technology has developed and good results achieved. (Pwc, 2017) POC’s are conducted to make sure that RPA delivers its promise. (EY, 2016) However the piloting of RPA was explained to take often longer than initially expected as in many cases too comprehensive or complicated processes have been chosen for the first round of implementations. (Pwc, 2017) Targeting wrong processes with RPA was mentioned also by EY as one of the most common issues occurring in RPA adoption. Choosing too complex processes for RPA leads for example to increased automation cost and effort. It was also described as an issue that the process is not optimized for RPA, meaning that targeting only part of the process instead of end-to-end view might be beneficial to be able to minimize the cost and effort and to maximize the benefits of RPA. (EY, 2016) Deloitte (2017) described that “process complexity drives robot complexity” (p.14) and suggested that lack of process standardization increases the difficulty to implement RPA.
It is suggested that only few processes can be easily automated using only RPA, but for the end-to-end view RPA needs to be combined with other solutions and tools, such as cognitive technologies. The mistake is to think that robots are the whole solution. (Accenture, 2016) Additionally proving the technology’s value in the process in question was perceived as an important factor to gain organizational acceptance. There needs to be business case behind the implementation and ability to measure the advantages aimed for. (Hfs, 2012)

3.2.2 Management & Governance

It was also emphasized that having one robot in place is different from having the capabilities to manage full-scale adoption of hundreds of robots. Moving from the piloting project to RPA program consisting of parallel smaller projects and aiming for full-scale automation requires formal structure, operating model, governance and long-term road map. As RPA is easy to deploy and suitable for various contexts, it is important to develop centralised control for all the RPA projects from early on. (Accenture, 2016) To be able to eventually reach the full-time equivalent (FTE) reductions aimed for, an end-to-end change programme is needed instead of having multiple single automations. (EY, 2016) Pwc’s (2017) report suggested that organizations tend to use more time than initially expected to this stage of designing the RPA governance, including for example Center of Excellence (CoE) and RPA staff considerations.

Also, investments in change management and stakeholder management are needed to implement RPA as uncertainty and ignorance might occur at the early stages of adoption. Communication and gaining approval, support and acceptance of the organizational members, both from employee and management side, is crucial for successful RPA implementation. For example, lack of top management support might significantly inhibit the adoption. (Pwc, 2017) Hence, it is suggested that to gain the acceptance of organizational members the executive level buy-in should be ensured and created first. POC is perceived as a practical way to demonstrate the advantages of RPA with minimal resources. (Fersht & Slaby, 2012) Employee acceptance was described to be needed especially for successful scaling and engaging them to the design and implementation of the RPA and offering them ability to influence how RPA alters the new roles was perceived to influence positively the employees. (Deloitte, 2017)

3.2.3 Resources & Capabilities

It is suggested that utilization of external capabilities and partners will speed up the implementation, whereas handling the early implementations only with internal resources tend to delay the implementation, as it takes time to develop the needed capabilities. However, for scaling RPA in the organization, development of internal resources is perceived as crucial. Without internal capabilities and comprehensive understanding about the technology and how it can be used in the best way possible, the organization won’t be able to reach the full benefits of it. (Pwc, 2017) For example utilizing traditional delivery methodologies might not work that well in RPA context but instead, with RPA, agile delivery
approach should be used. Challenging the existing ways and avoiding no-value
documentation is crucial to deliver RPA in fast pace. (EY, 2016)

Developing and hiring new skills was perceived as mandatory, because with RPA there will
be emerging new tasks related to software development. (Fersht & Slaby, 2012) EY’s (2016)
report describes that organizations shouldn’t be economical what comes to training and skill
transfer as the skills needed to build scalable, robust RPA processes are much more extensive
than skills needed to create successful pilot case. One of the typical mistakes in relation to
RPA adoption is that the need for maintenance is not considered sufficiently. (Accenture,
2016) The capabilities built into the business led CoE are perceived to be crucial to be able to
maintain the robotic workforce in a sustainable manner. (EY, 2016)

Additional capability aspect is the cooperation of IT and business unit needed to adopt RPA
successfully. This is mentioned by all reports. One of the basic mistakes is to think that
business units can adopt RPA without involving IT as it is usually a business led initiative.
The most fundamental reason to involve IT as early as possible is to ensure sufficient security
and reliability and to have strategies in relation to scalability and continuity. (Accenture,
2016) It is suggested that a successful RPA initiative is business led with a strong support
from IT. IT is having a crucial role in providing for example the infrastructure, software
support, governance and change management from IT perspective. (EY, 2016) This IT-
business unit cooperation was perceived as important also from acceptance perspective as
there will occur technical challenges during implementation, which can’t be solved by the
business people without IT support. (Fersht & Slaby, 2012) Also unclear division of work and
responsibilities between business and IT units are perceived to lead to delays in the
implementation, IT might for example have differentiating perspectives what comes to the
selection of RPA tool and if IT is involved too late this might develop into a problem. (Pwc,
2017) Early IT involvement is also proven to improve the speed and cost to deliver RPA.
(Deloitte, 2017)

3.3. Academic RPA research

In addition to the exploration of commercial research, also empirical academic research was
investigated and summary of the found studies compiled. In Appendix 1 the type, focus and
key findings are summarised, but the key findings will be described also in this section. So
far, only limited amount of academic research has been conducted in RPA context and
eventually only eight studies were found and included to the review. The requirement for the
studies chosen were that they needed to be directly related to RPA adoption or
implementation. Two of the studies were conducted in pre-adoption setting and focused on
the factors influencing the evaluation of RPA and six studies to post-adoption considerations
focusing on best-practices related to the adoption of RPA.

The empirical research about RPA is mainly conducted by the research team in the
Outsourcing Unit of London School of Economics, Willcocks, Lacity and Craig being the
main contributors to exploring the RPA topic. They have focused on identifying the best
practices related to RPA implementation and deriving lessons learned based on the case studies of early adopters of RPA. The main focus of exploration has been in RPA attributes (Lacity, Willcocks & Craig, 2015a), factors that facilitate and accelerate adoption and implementation (Lacity & Willcocks 2016a; Lacity & Wilcocks 2016b; Lacity, Willcocks & Craig 2015b), the role of IT in RPA adoption (Lacity, Willcocks & Craig, 2015c) and the task criteria, use cases and implementation effects. (Fung, 2014)

Lacity, Willcocks and Craig (2015a) described that RPA is characterized by the need for explicit, detailed instructions and process documentation. They also emphasized that RPA is only one complementary automation alternative for organizations, utilizing for example BPM solutions in specialized higher value processes where IT investment is justified is recommended. Whereas RPA should be utilized in lower value and generalized processes where business units themselves can deploy it. Fung (2014) described that RPA is suitable for example to processes and tasks with limited exception handling and stable environment.

However, even RPA can be deployed by the business units themselves, RPA requires adjustments also to the IT infrastructure to reach the advantages related to the speed of RPA. RPA also offers multiple sourcing alternatives such as insourcing, combined consultancy and insourcing, outsourcing with Business process outsourcing or RPA provider or cloud-sourcing. Additionally, even it is recommended to involve IT early in the process, it is emphasized that to be able to pioneer a new technology and gain quick benefits, it is better to proceed quickly rather than end up waiting the governance to react for years. (Lacity, Willcocks & Craig, 2015a) In their case study Lacity and Willcocks (2016a) identified that RPA is able to provide multifaceted business results and due to the opportunities RPA is able to provide, organizations seem to be committed to RPA also in long-term. However, despite its great benefits RPA adoption has also its downsides, Fung (2014) pointed out to for example the potential job-loss, reskilling, deployment costs and diminishing human touch.

In relation to the factors facilitating and accelerating adoption in a case study conducted at Xchanging, it was concluded that project sponsorship, supporting organizational culture, organizational fit, harmonized processes, internal RPA capability, RPA communication and multi-skilled robots are facilitating factors for adoption. (Lacity, Willcocks & Craig, 2015b) Whereas another study suggested the importance of embedding RPA into the enterprise strategy, increasing the understanding and communication about the attractiveness of the RPA benefits, distributed RPA capabilities, management support, business led RPA implementations, early IT involvement and preparedness for employee resistance. (Lacity & Willcocks, 2016b) In a paper focused on best practices and effective governance of RPA Lacity and Wilcocks (2016a) suggest that to succeed in RPA implementation C-suite should show high support for adoption, the capabilities should be located in the business units and talent management considerations incorporated to rethink the new focus for work. Additionally, they identified that business led RPA initiatives have better control over the automation and POC’s are a great way to increase the buy-in within the organization. However, it is acknowledged that also IT has its role in RPA deployments, the IT function should support the business units and be involved in issues related to business-RPA
alignment, organizational structure, delivery methodology, technical environment, RPA governance and plan for scaling. (Lacity, Willcocks & Craig, 2015c)

In addition to the best practice focused stream two of the studies were focusing on the factors influencing pre-adoPTION decisions and considerations. With a focus on indirect procurement context Lintukangas (2017) investigated the tasks RPA could be applied to and the benefits, risks and challenges related to RPA. In addition to a list of suitable processes, it was concluded that incentives for adoption consisted of the perceived RPA benefits, new opportunities and personal motives. Whereas the disincentives were the expected deployment challenges, restricting factors and perceived risks. And Jalonen (2017) emphasized the cost, ease of implementation and benefit factors in selecting the processes to be automated.

4. Theoretical frameworks

This chapter will introduce theoretical frameworks, which can be applied to intra-organizational adoption of technological innovation. These frameworks are derived from the user acceptance, diffusion of innovation and change management fields. In the Acceptance frameworks section four models will be introduced; Theory of reasoned action, Theory of planned behaviour, Technology acceptance model and Unified theory of technology acceptance and use. This section will be followed by the section introducing Diffusion of innovation framework and lastly, the concepts from three change management frameworks are described; in more specific Lewin’s 3-stage change model, Kotter’s 8-step model and a model for institutionalizing change.

4.1 User acceptance frameworks

Intention-based user acceptance frameworks are one of the most commonly used theoretical models to explore the technological innovation adoption on individual level. These frameworks aim to explain and predict the individual’s intentions to use and the actual use behaviour through the underlying beliefs and attitudes as determinants for user acceptance.

4.1.1 Theory of reasoned action

Ajzen and Fishbein (1975) are the originators of the Theory of reasoned action (TRA). The theory was based on the assumptions that individuals tend to take advantage of available information in a rational systematic manner and it aims to explain and predict human behaviour and attitudes with a strong focus on the influence of behavioural intention on acceptance. (Marangunic & Granic, 2015) In TRA the main determinant for actual behaviour is in an individual’s intention to engage in a behaviour and these intentions are influenced by the individual’s attitudes and subjective norms. These attitudes and subjective norms are two core elements of TRA and determined by the beliefs of the individual. According to Ajzen and Fishbein the concept of Attitude towards behaviour can be defined as the individual’s feelings toward performing the behaviour and can be either negative or positive. The attitude is formed based on the beliefs about the consequences of performing the behaviour and
evaluation of these consequences. Whereas the concept of Subjective norm is defined as the individual’s perceptions about whether the people significant to him/her think that performing the behaviour is important or not. The subjective norm is also influenced by the motivation to comply with these perceived expectations coming from the social environment. (Chuttur, 2009) The influence of these beliefs to the acceptance are visualized in Figure 1.

Figure 1. The model for the Theory of reasoned action. (Ajzen & Fishbein, 1975)

TRA framework acknowledges also the influence of external variables but claiming that they can influence the behavioural intention only indirectly, through the constructs of attitude towards behaviour or subjective norm. This is stated to improve TRA’s applicability also in IS implementation and adoption context. The external variables previous research has proven to influence user acceptance, for example user attributes, task and system design characteristics, organizational structure, implementation process and political influence, can be integrated to TRA framework through these two psychological core variables. (Davis, Bagozzi, Warshaw, 1989)

4.1.2 Theory of planned behaviour

The main limitation for the TRA framework is that it should be applied only to volitional behaviours. Thus, behaviours that require skills, resources or opportunities that are not available for the individual falls outside of TRA’s applicability. (Conner & Armitage, 1998) The concept of non-volitional behaviour refers to individuals who have or perceive to have little control over their own behaviour and attitudes. (Marangunic & Granic, 2015) Theory of Planned behaviour (TPB) (Ajzen, 1985) is an extension to the original TRA theory to be able to explain also these non-volitional behaviours. TPB was created by adding a construct of Perceived Behavioural Control (PBC) to TRA framework. Otherwise these two frameworks remained the same and both of them aim to explain the motivational and informational influences for behaviour and steps taken in the individual’s decision process. (Conner & Armitage, 1998) The purpose of the theory can be described to be to identify these non-motivational influences and then to create suitable strategies to target them and change the behaviour. (Marangunic & Granic, 2015) Figure 2 describes the model for TPB.
According to TRA, control beliefs that determine the Perceived behavioural control are individual’s beliefs about whether individual has access to the resources and opportunities to achieve behavioural success. (Madden, Ellen & Ajzen, 1992) Lai (2017) described that PBC reflects the individual’s perceptions about the limitations to perform the behaviour. Ajzen (1991) described that while some behaviours can fit to the volitional intention-based framework of TRA well, in some cases behavioural success depends also on non-motivational ability-based resource factors such as money, time, skills and cooperation of others. Ajzen also perceived the concept of PBC to be compatible with the concept of perceived self-efficacy by Bandura (1982), which reflects the judgements about how well individual can perform the required behaviour. He explained the role of PBC in the TPB with the earlier self-efficacy research that has systematically shown that behaviour is influenced by individual’s confidence to her/his ability to perform the behaviour in question. Earlier research had for example recognized self-efficacy beliefs to influence choice of activities, emotional reactions, thought patterns and expended effort. According to Madden, Ellen & Ajzen (1992) individuals will have low intentions to perform even they would have a positive attitude and favourable subjective norm, if they believe that due to lack of resources they have only little control over the behaviour.

According to Ajzen (1991) control beliefs can influence the behaviour either indirectly through the intention construct (motivation) or directly through resource-based actual control construct (ability) and that both constructs can be reflected in PBC. However, Marangunic and Granic (2015) point out that this is seen as problematic by some critics of TPB, as PBC can’t in all cases predict the actual control. TPB is also described to ignore the influence of demographic and personality factors and it is described to apply only if some part of the behaviour is not under volitional control. Marangunic and Granic also note that unconscious motives aren’t considered in the model as the theory is based on the assumption that individuals make rational systematic decisions. Additionally, either TRA or TPB couldn’t provide sufficient explanation to why individual rejected or accepted a technological system.
use and hence a new framework for this specific IS acceptance context was developed, Technology Acceptance Model by Davis. (Marangunic & Granic, 2015)

4.1.3 Technology acceptance model

Also technology Acceptance model introduced originally in the doctoral thesis of Davis (1986) has emerged from the theories introduced within the field of psychology. In the original TAM model, instead of intention to use, attitude towards using was mediating the actual system use and attitude towards using was determined by two factors, perceived usefulness and ease of use; ease of use having also a causal effect on perceived usefulness. Davis set system design characteristics as an external variable influencing both perceived usefulness and ease of use in the original model. (Marangunic & Granic, 2015) According to Davis (1989) Perceived usefulness reflects the individual’s beliefs about the degree that system use will enhance her job performance, whereas perceived ease of use is defined as the degree individual believes the use of system is free from effort.

Later on, the TAM model was altered based on emerged research findings by replacing the attitude toward using with the intention to use as a determinant for actual usage. (Marangunic & Granic, 2015) In the final version of TAM, introduced by Venkatesh and Davis (1996), the external variables influencing the beliefs were system characteristics, training, user involvement in design and the nature of implementation process. This final model is visualized in Figure 3. The strong explanatory relationship between perceived usefulness and intention to use encouraged the development of TAM2 by Venkatesh and Davis (2000), which was focused on introducing external variables influencing perceived usefulness. This model suggest that subjective norm, perceived usefulness and ease of use are direct determinants for intention to use and determinants for perceived usefulness included output quality, subjective norm, image, job relevance and result demonstrability. Also experience and voluntariness were moderating factors for subjective norm. Subjective norm describes the influence of social environment to the use decision, image describes the desire to maintain a favourable position within the system and result demonstrability describes the generated tangible and visible outcomes and results. Job relevance describes the degree of applicability of the technology to the job and output quality describes the extent the technology is capable to perform the tasks in a sufficient manner. (Marangunic & Granic, 2015) Further extension for TAM was TAM 3 by Venkatesh and Bala (2008), which complemented the original model with determinants for the ease of use construct and suggested computer self-efficacy, perceptions of external control, computer anxiety, computer playfulness, perceived enjoyment and objective usability as influencing variables.
In further research aiming to extend the TAM model, external variables construct has been covering various aspects originated from varying research streams, such as management support, prior experience, personal innovativeness, self-efficacy, complexity and perceived enjoyment, influencing the core TAM constructs. The most frequently referred variables has been identified to be system quality, training, compatibility, computer anxiety, self-efficacy, enjoyment, computing support and experience. (Lee, Kozar & Larsen 2003) Based on their research review Legris, Ingham and Collerette (2003) concluded that there is no clear pattern in the selection of the chosen variables but stated that exploring and integrating such variables into TAM, gives better understanding on what activities to take into consideration in organizational setting when aiming to increase the use of technology. Even the TAM models have been complemented with these numerous of variables, according to Bagozzi (2007) there is lack of research what comes to deepening the TAM model, for example reconceptualising the core variables.

From early on TAM has been cherished as a simple model, which can be applied to explain and predict any system use. (Davis, Bagozzi & Warshaw, 1989). Hence it has become one of the most applied acceptance frameworks within the IS field. However, this fact is also part of the criticism. Bagozzi (2007) describes that TAM is too simple to be able to explain the individual level decisions and behaviour across different technologies and adoption situations and it also ignores the potential differences with decision-making and decision makers. He also suggested that the intention-behaviour linkage is accepted uncritically in IS research. For example, use-to-goal-attainment gap reflects the fact that TAM sees the use behaviour as a final goal and doesn't acknowledge that the use behaviour can be the means for greater goals. Secondly, TAM doesn’t consider the various psychological steps that might occur between the intention formation and the actual behaviour. And thirdly, also the uncertainties occurring after the adoption decision might require the decision-makers to put forth dynamic effort to adopt the technology, hence influencing the process between the intention-behaviour linkage. Legris et. al. (2003) also claim that by integrating TAM to more comprehensive framework that include also social and organizational factors, the predictive and explanatory power is expected to be increased. Bagozzi (2007) also suggests the acknowledgement of both personal and collective intentions is needed. However, despite the criticism Bagozzi emphasised that TAM has repeatedly outperformed the TRA and TPB frameworks in relation to explained variance.
4.1.4 Unified theory of acceptance and use of technology

TAM has been criticised for its simplicity and inability to take a comprehensive view on intention formation, and Unified theory of acceptance and use of technology (UTAUT) by Venkatesh, Morris, Davis and Davis (2003) was created to integrate the key acceptance related theories. It consisted of eight theoretical frameworks and considered TRA, TPB, TAM, Motivation model, Combined TAM & TPB, Model of PC utilization, Innovation diffusion theory and Social cognitive theory. The final framework introduced performance expectancy, effort expectancy, facilitating conditions and social influence as antecedents to use behaviours through behavioural intentions. Additionally, gender, age, experience and voluntariness were identified as influencing variables. These concepts within the model are visualized in Figure 4.

Venkatesh, Morris, Davis and Davis (2003) incorporated to the performance expectancy the concepts of perceived usefulness, extrinsic motivation, job-fit, relative advantage and outcome expectations, and effort expectancy considers concepts of perceived ease of use, complexity and ease of use. Social influence construct is based on the concepts of image, subjective norm and social factors. This last concept refers to how much the other individuals in the social system are using or supporting the technology. And facilitating conditions incorporated concepts of perceived behavioural control, compatibility and facilitating conditions, which refers to the objective facilitating factors in the environment. With performance expectancy Venkatesh, Morris, Davis and Davis (2003) referred to the degree an individual believes that by using the system the individual would be able to gain job performance benefits whereas effort expectancy described the degree of ease use associated with the technology. As in TRA and TPB, the social influence construct covers the degree to which individual perceives that the social environment, people important to the individual, believes that the individual should use the technology. According to Bagozzi (2007) UTAUT has very comprehensive approach to the acceptance, incorporating in total 41 independent variables influencing the intentions. He criticises the model because even with this complexity and comprehensiveness, it can’t cover all aspects and some foundational variables are left out depending on the application context.
Venkatesh, Morris, Davis & Davis (2003) suggested that UTAUT would be a helpful tool for managers to understand the acceptance drivers and proactively design interventions to increase adoption and use of new systems. Additionally, it was stated to help acquiring information about both long and short-term effects of technology implementation on especially job-related outcomes, such as job satisfaction, commitment and productivity. These suggestions of Venkatesh, Morris, Davis and Davis are related to the continuance aspect of acceptance. Contemporary approach to IT adoption and acceptance is the IT continuance stream of research, aiming to increase understanding on how the intentions to use the system can be sustained. Models utilized in IT acceptance context such as TRA, TAM and UTAUT, has been often applied also to IT continuance context. (Bhattacherjee & Farbar, 2011)

However according to Bhattacherjee and Farbar (2011) the applicability of these traditional acceptance models to continuance context is limited, because the behaviour of acceptance and continuance is distinct. The first refers to first-time adoption of new technology and the latter to long-term use of existing technology. Hence, they introduced a separate determinant framework for the continued use. The Acceptance models were developed for IT systems that offered only utilitarian performance related benefits, but contemporary systems have greater range of benefits including also hedonic benefits. Hence the main distinction between traditional IT acceptance and more modern continuance research is the latter’s emphasis also in IT experience, enjoyment and satisfaction. Also Forquer, Christensen and Tan (2014) validated this claim, that from continuance perspective both hedonic and utilitarian beliefs should be considered as determinants.

### 4.2 Diffusion of innovation framework

Diffusion of innovation theory (DOI) by Rogers (2003) understands innovation as an idea, product or process perceived as a new by the adopting social system or its members (p.11). Whereas diffusion is defined as the process, where the innovation is communicated over time among the individuals within a specific social system. (p.5) While adoption theories tend to take a micro perspective, diffusion theory includes also a macro perspective as it is focusing on the spread of the innovation within a social system. Instead of telling how to facilitate adoption, it is more descriptive in character explaining why adoption occurs. (Straub, 2009) While diffusion theory can explain also a passive spread of an innovation, however in this study the theory is applied into organizational innovation adoption context, where an innovation is actively implemented with planned actions. (Greenhalgh, Robert, Macfarlane, Bate & Kyriakidou, 2004). The main elements from DOI will be introduced under the topics Innovation decision process, Innovativeness, Innovation characteristics, Social system and Communication.

#### 4.2.1 Innovation decision process

The innovation decision patterns suggested by Rogers (2003) are optional, authority, collective and contingent. Usually in organizational setting the adoption decision is contingent, meaning first made by an organizational decision-making unit either as authority
or collective decision and then followed by either optional or forced individual level decision. The primary decision and how it is communicated influences the secondary adopter’s willingness to adopt, and for example if the secondary adopter perceives that the adoption is not rational, negative responses might arise. (Kim, 2015) The primary adoption decision can in some cases be explained also through the pressures coming from organization’s external environment such as competitive, governmental, isomorphic and legitimacy pressures. (Kee 2017) Sometimes these external pressures can encourage organizations to adopt an innovation as a fad or fashion without actual utility to the organization, leading to rejection among individuals as the decision is not perceived to be based on efficient-choice perspective. (Abrahamson 1991)

Referring to Rogers definition of adoption, Frambach and Schillewaert (2002) suggest that the adoption process can be regarded as a success only when the innovation is accepted in individual level and they refer to this adoption process as intra-organizational acceptance. Based on this contingent organizational decision-making, Gallivan (2001) suggested that while the primary decision is based on organizational objectives and technology availability, the secondary non-voluntary adoption process of individuals is strongly influenced by the managerial interventions and social influence in addition to facilitating conditions including both individual, organisational and innovation related factors. Also change management models are based on this two-staged decision-making approach as their focus is in facilitating the change process through application of managerial practices. (Kim, 2015)

The innovation-decision process model by Rogers (2003), which is visualised in Figure 5, explains the decision process an adopter goes through over time when adopting an innovation. The process model provides understanding on the individual level adoption but in the context of diffusion, referring to multiple individual adoptions, and hence in DOI the individual adoption process can’t be separated from the diffusion process. The process consists five stages, knowledge, persuasion, decision, implementation and confirmation, and Rogers identifies previous experience, felt need/problems, innovativeness and norms of the social system as the prior conditions for the process. Additionally, the process is influenced by innovation characteristics and individual attributes such as socio-economic factors, personality characteristics that guide the information seeking, and communication behaviour, referring to access to change agents. (Straub, 2009) McVaugh and Schiavone (2010) refer to these earlier mentioned influencing variables as innovation, organizational and individual conditions. Innovation conditions refer to the technology features, organizational construct to the social structures, cultural and relational attributes, and individual construct to the personal learning conditions, which determine the individual’s likeliness to acquire the needed knowledge, competencies and capabilities to work in the new environment.
As diffusion is perceived as one form of communication, different types of communication channels are perceived to be the enablers for the whole adoption decision process, where new ideas spread from individual to another. As shown in the Figure 5, these communication channels are influencing all five stages of the process. According to Rogers in the first stage adopter acquires knowledge about the innovation; gaining awareness about what the innovation is about, how to use it and why it is adopted. When individual has gained some knowledge, adopter proceeds to persuasion stage, where he forms negative or positive attitude toward the innovation. The attitude formation can be altered by increasing knowledge through the communication channels by providing for example technology education, practice and a clear vision for adoption. Third step, decision, leads to either rejection or adoption of the innovation. Individuals tend to want to try the innovation in their own context before making the adoption decision, hence vicarious trial can accelerate the decision-process. (Sahin, 2006)

In implementation stage, the individual acts upon the decision made. (Straub, 2009) At this stage the innovation is often also reinvented, meaning adapted and modified, which accelerates the adoption and further institutionalization of the innovation. (Sahin, 2006) Through adaptation the innovation tends to have better fit with the organizational needs and problems and for example when external consultant’s role is reduced in the process and internal resources take more active role, reinvention will increase and hence also adoption accelerate. (Kee, 2017) In the last confirmation stage, the attitudes play a key role whether the adoption decision will keep. If individual is not satisfied with the performance of the innovation, it doesn't meet the needs of the individual or adopter receives conflicting messages about it, innovation use might be discontinued. (Sahin, 2006) One limitation for the process model is described to be that it doesn’t consider the whole implementation process of IT as it is perceived to lack the post-adoption stage of the process. (Hameed, Counsel & Swift 2012)
4.2.2 Innovation characteristics

Original DOI theory by Rogers (2003) suggested five innovation characteristics that assist in the adoption and diffusion of innovation. Individuals form perceptions of the Relative advantage, Compatibility, Complexity, Trialability and Observability of the innovation when deciding about the adoption. According to Rogers the concept of relative advantage reflects the superiority of the innovation over the previous idea it is replacing. The perceived relative advantage can consist of financial, social or other types outcomes perceived as gains by the adopter and the better the innovation is, the faster the adoption process will be. (Straub, 2009)

Kee (2017) points out that the concept of relative advantage is very similar to the concept of perceived usefulness in the technology acceptance model (TAM) of Davis (1989). In DOI theory, Perceived compatibility reflects whether the innovation is compatible with the existing values, experiences and needs of the potential adopters and high compatibility is perceived to predict higher adoption. (Kee, 2017) In technology diffusion context one of the most consistent findings has been this compatibility aspect, in more specific, the innovation needs to be compatible with the tasks of the organization. (Tornatzky & Klein 1982; Cooper & Zmud 1990)

Complexity means the perceived easiness to understand or use the technology and it is suggested that high complexity tends to create frustration among individuals and has negative association with adoption. DOI’s complexity construct is perceived to be very similar to the construct of Ease of use in TAM. Observability reflects the degree of how comprehensively the positive results reached with the innovation are visible to others. Often observability construct is combined with visibility and communicability constructs introduced later in the chapter as all of them are related the visibility of the results, and together and separately are perceived to increase the likelihood for adoption. (Kee, 2017) Also, if everyone else use the innovation, it is more likely that the individual will adopt it. (Straub, 2009) Trialability reflects how easily individuals can experiment with the innovation and high trialability tends to lower the perceived risk and uncertainty experienced by the individuals. (Kee, 2017) As a part of extensive adoption theory review by Wisdom, Chor, Hoagwood and Horwitz (2014) the association of these attributes with innovation adoption was confirmed but the list was also complemented for example with the concept of perceived risk, which was negatively associated with adoption.

The innovation characteristics list by Rogers was extended by Tornazky & Klein (1982), who added constructs of cost, profitability, communicability, social approval and divisibility to the list, based on their review of earlier diffusion literature. Communicability referred to how describable the benefits of the innovation are to others, social approval to the degree innovation creates social status gains, and divisibility the degree the innovation can be experimented in limited basis. However, they concluded that only three characteristics seemed to have consistent relation to adoption; relative advantage and compatibility having positive and complexity having negative association. While Rogers’ innovation characteristics is about perceptions of the innovation itself, Moore and Benpasat (1991) investigated the perceptions of using the innovation. Due to this approach change of the study compared to the
Roger’s, Moore and Benpasat refined and re-labelled the variables into relative advantage, compatibility, ease of use, result demonstrability, image (alike to social approval), visibility, trialability and most importantly perceived voluntariness, as DOI had previously ignored this autonomy aspect. Result demonstrability refers to the tangibility of results and visibility describes the degree the innovation is visible in the adoption context. These constructs have been validated since, simultaneously suggesting that acceptance outcomes, referring to usage behaviour, should be separated into two parts; current use as determinant for future use intentions. (Agrawal & Prasad, 1997)

Later research by Nan, Zmud and Yetgin (2014) has summarised and integrated these constructs and suggested that the relative advantage is the main attribute in explaining the variance in innovation diffusion. The definition of relative advantage is summarised into value-addition in general, considering also for example social (e.g. status) and hedonic (e.g. enjoyment) outcomes in addition to the traditional utilitarian work and task related positive outcomes and improvements. Additionally, arduousness has been suggested as an innovation characteristic that covers all the previously introduced constructs that can be related to the effort needed to adopt it. Characteristics within this last construct were described to include radicality (requirement for changes), complexity (requirement for learning), ease of use (easiness to apply), compatibility (organizational fit), trialability (ability to experience) and observability (observable value).

4.2.3 Innovativeness

Innovativeness is defined as the degree the adopter unit is early at adopting the innovation, it can be understood both as an individual and social system attribute affecting the adoption decision. In Individual’s adoption-decision context it is understood as willingness to try out new technologies, hence also as an individual attribute or trait. (Agrawal & Prasad, 1998) However according to Rogers (2003) individual’s innovativeness is influenced not only by individual’s own characteristics but also by the organizational characteristics. DOI recognizes that organizational innovativeness is influenced by individual attributes, more specifically leader attitude towards change, internal characteristics of the organizational structure such as size, slack, centralisation, complexity, formalization, interconnectedness and external characteristics of the organization reflecting for example the system openness. (Oliveira & Martins, 2011)

Existing research believes that centralisation and formalization influence negatively, and specialization, professionalism and differentiation, positively the innovation adoption within organizations. Additional influencers suggested by Damanpour and Schneider (2006) are size, complexity, financial resources and external communication. Organizational complexity is characterized by diverse knowledge base, which facilitates creativity and complex organizations tend to have also better access to information. Whereas size can be either a facilitator or barrier; on the other hand, it can be an enabler for required resources, but the robustness caused by size can also hinder innovativeness. Thus, it has been suggested that organic structures might facilitate the initiation of innovation adoption and mechanistic structures facilitate the implementation. (Damanpour & Schneider, 2006)
Innovativeness of adopters is reflected in adopter categories introduced by Roger’s (2003) and these groups are named as innovators, early adopters, early majority, late majority and laggards. Innovators are described to be individuals who tend to stand high levels of uncertainty about the innovation and are able to understand and apply technical knowledge. The early majority tends to accept innovation based on a careful consideration of its attributes, their peers respect them, and their opinions and evaluations are valued in the social system. The early majority is rather considerate before they fully accept the innovation, but late majority is even more cautious in their decisions; the eventual adoption decision might be strongly affected by social pressure. Laggards are characterized by their suspiciousness and the scepticism causes that their awareness and knowledge about the innovation is also lagging. (Kee, 2017) Individuals within these groups are perceived to share individual level characteristics related to personality, socioeconomic conditions and communication behaviours. (Straub, 2009)

4.2.4 Social system & Communication

Rogers (2003) defines social system as a group of units that are interrelated to each other by being engaged to accomplish a shared goal (p.24). The main factors within social system influencing the innovation adoption are the social structures, system norms and opinion leaders and change agents. These shared social norms and structures within the system influences how the innovation penetrates in the organization. (Straub, 2009) With norms Rogers (2003) refers to established behaviour patterns within the social system, perceived as a guide and standard for the behaviour of individuals (p.27). In some cases, these norms can act also as barriers for change. Social systems can be understood at different levels, and in organizational context, the social system surrounding an individual can be understood for example as the team, department or company as a whole. The structure of the social system can influence the adoption process through formal or informal structures. Social structure means the formal bureaucratic and hierarchical structure, whereas communication structure is described to represent the informal communication within the organization. (Rogers, 2003).

Knowledge and awareness of the innovation is often acquired through one-way communication of information, but as diffusion of innovation is understood as a social process, persuasion happens largely through two-way communication of social influence. This persuasion in diffusion process is often occurring through informal opinion leaders, who tend to influence the potential adopters by being close to those whom they influence, influential, credible, popular and accessible. Due to these characteristics they are perceived as experts, trustworthy and relatively objective in regard to the innovation, however they are not necessarily always innovators, actually in most cases their judgement about the innovations are negative. The influence of opinion leaders will support the innovation adoption only if opinion leader’s attitudes are supportive toward the change, they are positively identified with the innovation and the social system at large is supporting the change. It is perceived that key factor in development of successful managerial intervention is the change agents, who work for the change agency and provides information, advocacy and implementation support. Usually these change agents aim to identify the opinion leaders within the organization and
utilize them to influence the other organizational members in the normal peer conversations. (Dearing, 2009)

Communication is the process where information about the innovation is shared in organizations both through informal and formal structures and networks, thus individual adoptions are heavily influenced by these communicative structures. Communication channels enable the whole process of adoption by allowing the information exchange between individual experienced with innovation and individual new to innovation. The information exchange can include both objective and subjective evaluations of the innovation, however it is said that individuals tend to form their opinions based on the subjective evaluations of their peers and diffusion process influenced strongly by imitation and modeling. (Rogers, 2003)

The communication can be direct communication, observations of peers or mass media influence, but also the degree of access to the innovation influences the adoption process. (Straub, 2009) The mass media channels reach large audience, create knowledge and spread information and are used often to create initial awareness of the innovation in knowledge stage of the adoption process. Whereas interpersonal channels involving face-to-face communication are more persuasive and more effective in relation to for example change resistance, hence it is used in the persuasion stage of adoption process, where individuals form their attitudes towards the innovation. And for example, communication between individuals who are homophilous, meaning for example sharing same beliefs, education, social status, is suggested to be more effective and to have greater effects for knowledge gaining, to the formation and change of attitudes and behaviour change. (Rogers, 2003)

4.3 Change management frameworks

This section will focus on introducing models, which conceptualize change as a governance process enabling the change to be institutionalized. Because one of the research questions set for the paper is to understand how management is able to facilitates the innovation adoption, the focus in this chapter will be in the change models, which introduce recommendations for managerial practices during change.

4.3.1 Lewin’s 3-stage model

The foundations of many existing organizational change models are the work of Lewin. Lewin’s model understands the process of change through the stages of unfreezing, moving and freezing as visualized in Figure 6. According to Rosenbaum, More and Steane (2018) this process-model is often understood to isolate the management of change into a one-dimensional linear process, whereas in reality Lewin’s model is more iterative and comprehensive in character than thought due to the linkages to action research, force field theory and group dynamics. In addition to the process description, they describe it to include considerations related to the need to identify the positive and negative countervailing forces, understanding resistance as a group habit and the role of group decision-making in change in relation to the individual and group motivations.
Lewin (1947) researched the change as a social phenomenon, suggesting that group dynamics play an important role in the process of planned change. In order to make change happen in a social system, the social habit, which is described as a barrier to change, needs to be broken. This social habit can be understood as an “inner resistance to change” and as a force opposing the change and maintaining the current state of being. (p.32) In order to overcome this resisting force, an additional force is needed to unfreeze the habit. If the organization manages to diminish the value of the social habit, also the resistance will be diminished, hence individuals shouldn’t be aimed to be change individually, rather as a part of group. This encourages organizations to take group-level strategic approach to change. Lewin states also that group decision facilitates change, because shared decision decreases the role of personal preferences and increases the eagerness to act as a member of the group. For example, group discussion will help to direct the individual's motivations collectively toward the direction wanted. Also group decision links individual’s motivation to action and generates a freezing effect, as individuals tend to keep to their decision and commit to their group. Hence involvement and participation of individuals to the adoption decision and planning activities increases the probability also for individual level adoption, acceptance and commitment, even if individual’s personal preferences would be against the change. Hence social dynamics play a pivotal role in change processes. Inspired by Lewin’s work, resistance has been viewed as the negative response to organizational change, which needs to be overcame by the management to make organization succeed in change initiative. However, according to Piderit (2000) resistance doesn’t always reflect negative intentions, but in fact, also positive intentions to drive the benefit of the organization, might motivate a negative response.

Schein (1992) contributed to this three-stage model by adding a cognitive aspect to the stage of unfreezing. Schein understood the unfreezing stage of change as an organizational preparation for change and as a process of psychological disconfirmation. For unfreezing the organizational context, the organizational members need to be provided convincing and visible data about the need for change. This requires intense communication and education from the management side. However, even the individuals would be aware about and believe the need, they aren’t necessarily motivated to act accordingly. To reach the change motivation and willingness to learn something new a quilt or anxiety needs to be aroused within the individuals. However simultaneously they need to feel psychologically safe, meaning that the future change needs to be perceived as manageable, and management needs to create this sense of safety for example providing training and practice, coaching and rewarding efforts, legitimizing mistakes and developing norms that support experimentation.
While Lewin’s models have received notable attention in the change management field last decades, it doesn’t give much practical help for managers to manage change initiatives. Hence, other change models that provide more practical level guidance to organizational practitioners have been developed using Lewin’s ideas as foundation.

4.3.2 Kotter’s 8-step model

Kotter’s model was first published 1995 and book explaining the model in more detail level was published 1996. Based on his own practical experience Kotter (1995) suggested that organizations that succeed in change tend to go through a set of stages and if organization skips some of these needed stages, the change will fail. Based on these most common change related errors, Kotter created an 8-step process model that helps in transforming the organization. The steps needed are establishment of urgency, formation of a change coalition, development of vision and strategy, communication of the vision, empowerment, creation of short-term wins, consolidation and institutionalisation. These steps are visualized in Figure 7. Rosenbaum, More and Steane (2018) suggest that Lewin’s (1947) three stages of unfreezing, moving and freezing can be also associated with Kotter’s 8-step model. They suggest that the first four steps can be seen as a part of the Lewin’s unfreezing change stage, whereas empowerment and creation of short-term wins can be reflected in moving stage. Lastly consolidating and institutionalization represent the freezing step.

According to Kotter (1995) creating urgency for change is important, because change program requires the co-operation of many individuals and without motivation to change, organizational members won’t support the change initiative. Kotter suggests that successful change starts with a group of individuals looking into the market, to the competitive realities and potential opportunities or crises, and to get individuals motivated this identified information needs to be communicated broadly and dramatically to the social system. In a review of Kotter’s model, Appelbaum, Habashy, Malo and Shafiq (2012), found significant
support to the importance of urgency, but pointed out that also timing and pacing of events is crucial as rushed change doesn’t allow time for individuals to adapt, may increase tiredness towards the change initiative and lead to decay.

According to Kotter (1996) creating a change coalition is necessary for successful change and should be characterized by position power, expertise, credibility and leadership. Position power refers to involving enough key players and expertise to the representation of different viewpoints and ability to make informed decisions. Credibility means that the group should be respected by the peers and by ensuring the leadership involvement the group is able to drive the change. (Appelbaum, Habashy, Malo & Shafiq, 2012) Appelbaum, et. al. (2012) state that change success is dependent on visible and continuous support and facilitative top management.

In relation to the third and fourth step, Kotter (1995) suggests that creating and communicating a vision helps to direct the change initiative and developing related strategies will support achieving the created vision. Development and communication of clear and appealing vision created a picture of the future for the stakeholders and helps to clarify the chosen direction. Without one, the change effort can easily end up consisting of separate projects that doesn’t contribute to the shared goal. The vision should be communicated in all channels possible and the guiding coalition should show an example what comes to the new behaviours. However, to get individuals support the change they need to believe that change is also possible to reach. Relatedly, Appelbaum, et. al. (2012) point out that even the importance of clear vision is generally accepted, the importance of implementation of that vision is even more crucial.

The empowerment step consists of getting rid of obstacles, changing the underlying systems and structures and encouraging for innovative activities and actions. (Kotter, 1995) Kotter (1996) suggest that these change barriers can be related to structures, systems, skills or supervisor attitudes and states that for example training is important factor in empowerment process. (Appelbaum, Habashy, Malo & Shafiq, 2012) Appelbaum, Habashy, Malo & Shafiq (2012) claim that employee empowerment has received wide support in change literature and for example creating team ownership for the change and employee participation contribute to the successful change.

According to Kotter (1995) the concept of short-term quick wins refers to planning and creation of visible performance improvements. Kotter claims that, because transformation takes time, it is important to maintain the change momentum by meeting and celebrating short-term goals. These wins convince the individuals that the change is delivering the expected outcomes and hence encourage for commitment. The management should recognize and reward employees for delivering these performance improvements.

Consolidation refers to the fact that after initial short-term successes, the transformation effort needs to continue to produce more change and the organization needs to be aligned to the new way of working. For example, the systems, structures and policies that don’t fit the new vision
should be changed and organization should be hiring, promoting and developing employees to create capabilities to implement the vision. And institutionalization refers to the fact that the changes need to be embedded to the culture of the organization, otherwise the change will be subject to degradation. (Kotter, 1995) Kotter (1996) identified two critical factors for institutionalization; making the performance improvements visible to the employees and ensuring that also the next generation of management will represent this new approach. (Appelbaum, Habashy, Malo & Shafiq, 2012)

Later on, Kotter himself has (2012) refined the steps to match with the contemporary turbulent and disruptive business environment, claiming that hierarchy and conventional change management approach has limited ability to create success in this rapidly developing environment. Kotter suggests that in order to realize the rapidly emerging change opportunities, organizations need to deploy dual operating system, where individuals work as a part of management driven hierarchy and more adaptive and flexible strategy-driven network. In this new context Kotter describes the earlier introduced eight steps as accelerators, processes that will enable the strategy network to function, and emphasises the meaning of communication in creating volunteerism and building momentum for the change.

Pollack and Pollack (2015) conducted a research by using the original model in the roll out of a change program and ended up validating the model, claiming that it was an effective way to manage the change on strategic level. However, they pointed out that the change process was progressing at different speeds at different organizational levels, meaning that the eight steps describes better the change process of individual groups than the change process of the organization as a whole. Also, some situational adaptation to the steps was required, for example several guiding coalitions were needed to roll out the change. Based on a literature review about Kotter’s model, Appelbaum, Habashy, Malo and Shafiq (2012) concluded that all Kotter’s steps seem to be still relevant for organizational change efforts and make significant contribution to understanding organizational behaviour and development. However, they concluded that there haven’t been many studies that would have validated all the steps, except Kotter himself. Appelbaum et. al. also criticized the model for its rigid approach, which requires that the previous steps needs to be implemented to proceed to next one and pointed out that not all steps are relevant in all contexts. Additionally, they claimed that the model doesn’t provide detailed enough help to solve the difficulties organizations face during implementation for example related to change resistance.

### 4.3.3 Change institutionalization framework

Based on Lewin’s 3-stage conceptualization together with social learning theory Armenakis, Harris and Feild (1999) designed a model for facilitating and institutionalizing change. They suggest, “The process of institutionalization at system level is the process of building commitment to the changed state at the individual level” (p.100). In addition to the strategic aspect it is described to incorporate also more individual level attitudinal approach to change. Armenakis, Harris and Feild (1999) describe how the change message in the model reflects the individual’s cognitive uncertainties about the change, as it is acknowledged that changes
that are perceived positively by individuals tend to be easier to institutionalize. Hence, it is a comprehensive framework that offers strategic and tactical level recommendations for managers, simultaneously increasing the understanding of change process in the individual level. The model is visualized in Figure 8 and consists of three main parts; the change process, change message and reinforcement through influence strategies.

Figure 8. Model for institutionalizing change. (Armenakis, Harris & Feild, 1999)

Process of change institutionalization

The process part of the model includes four stages; readiness, adoption, commitment and institutionalization. According to Armenakis, Harris and Feild (1999) readiness is the state consisting of beliefs, attitudes and intentions in relation to the change effort, and adoption occurs if readiness is sufficient, meaning that individuals are embracing the change and resistance is reduced. In adoption stage individuals are starting to act according to the new behaviour, however the new behaviour can still be rejected. Acceptance of change leads to commitment and only when it is in place, change is institutionalized. Similarly, Choi (2011) describes readiness and commitment as attitudinal states individuals hold toward the change and they reflect the individual’s judgement of the change effort. Readiness reflects the assumptions, expectations and impressions of individuals in relation to the need for change
and to what degree they produce positive outcomes to the individuals and to the organization. Some readiness researchers have also incorporated the perceived capability of an organization to carry out the change to be covered in the concept of readiness. Whereas through exploration of many individual definitions for commitment to change, Choi suggests that commitment to change is a “force (mind-set) that binds an individual to a course of action deemed necessary for the successful implementation of a change initiative”. (p. 484) Choi describes that these attitudinal conditions are influenced by change specific situational variables related to the change content, process, context and individual level constructs. Also Holt, Armenakis, Harris & Feild (2007a) described the determinants to readiness, which is formed by beliefs, to be change content covering the attributes of the change, context covering the attributes of the environment, process covering the steps taken during change process and individual attributes reflecting the individual level characteristics of the people involved in the change.

**Key beliefs & Change message**

Armenakis, Bernerth, Pitts and Walker (2007) define belief as a subjective opinion about the truth, which might not be subject to systematic verification. They describe that the idea of beliefs as precursors to behavioural reactions is already familiar from the acceptance field, and perceptions about the innovation attributes are also partly explaining the resistance or embracement of an innovation in DOI research. Hence, they conclude that it is the individual beliefs that organization should aim to influence to ensure successful change.

Holt, Armenakis, Harris & Feild (2007a) describe that readiness is influenced by beliefs related to capability to implement proposed change, the appropriateness of the change and fit with the organization, leaders’ commitment to proposed change and the benefit organizational members gain with the change. According to Armenakis, Harris and Feild (1999) the concept of change message incorporates all the efforts to introduce and increase commitment toward change among organizational individuals and the message content should be designed to give answers to the main uncertainty beliefs individuals have toward change. It is seen as an opportunity to generate motivation and alter their individuals’ beliefs through communication. Hence the change message construct also in the change institutionalization model is reflecting the five key beliefs identified to influence the change process, which are discrepancy, appropriateness, self-efficacy, principal support and personal valence.

Discrepancy reflects the need for change, appropriateness reflects if the change is appropriate in relation to the discrepancy and self-efficacy means the perceptions about the individuals’ and organization’s ability to implement the change successfully. Principal support covers the beliefs related to whether C-level provides enough information and communicate commitment to the change and personal valence describes the perceived benefits for an individual. (Armenakis, Harris & Feild 1999.) Armenakis and Harris (2009) point out that even all five beliefs are required to be covered to reach change success in the model, some research has been suggesting that there would be differences in the significance of the beliefs,
meaning some would be more crucial for success than others depending on the context or stage of the change.

It is also suggested that these beliefs as measures are useful for all change process stages, both to predict individual’s readiness level for upcoming change or to increase understanding on how individuals feel about the already implemented change and assess for example the commitment level. The assessment of the beliefs is able to reveal the degree of buy-in and deficiencies that might negatively influence the change success and hence it can be used as a help to determine whether the content or process of change should be modified. (Holt, Armenakis, Harris & Feild, 2007b) Change institutionalization framework is not the only framework that has used the concepts from user acceptance field to inform change management. Based on successful application of behavioural intention frameworks to change management context, it has been suggested that for example targeting people’s attitude toward change, perceptions of subjective norm and perceived personal control can be effective strategies to increase change support. (Jimmieson, Peach & White, 2008)

**Reinforcement & Influence strategies**

Readiness, adoption and commitment can be created in organizational setting by communicating the message of the change and reinforcing the message with influence strategies. Also change agents’ and organizational members’ attributes are mediating the change message together with the reinforcement with influence strategies. Through credibility and social dynamics change agents can increase the innovativeness and commitment toward change and in organizational membership construct two main factors are influencing; individual differences and organizational differentiation. The first construct relates to the innovativeness of an individual, and to the similarity between the opinion leader working as a change agent and individual. The communication between individuals who share for example similar social status is more effective in regard to altering attitudes. The second construct reflects the sub-cultures within organization, change initiated outside individual’s own group might be perceived more threatening. (Armenakis, Harris & Feild, 1999) These ideas related to organizational member’s attributes and communication power are familiar also from the DOI research.

The influence strategies suggested by Armenakis, Harris and Feild (1999) include persuasive communication, active participation, management of information, human resource management practices, formalization activities, ceremonies and rites and diffusion practices. Active participation tactics include three concepts; enactive mastery, vicarious learning and participative decision-making. Enactive mastery means gradual development of skills, knowledge and efficacy through involvement and practice, whereas vicarious learning is about observing and learning from peers. (Armenakis & Harris, 2002) Persuasive communication is about transmitting the message with the help of different channels such as emails, speeches and memos and is often strengthened with external and internal information. However, it’s is not as effective as active participation, as the latter is about is about profound self-discovery. (Armenakis & Harris, 2009) Armenakis and Harris (2002) describe that when
this self-discovery is combined with the leadership allowing the employees to participate in change, management demonstrates that they trust the employees and their judgement. This is perceived to create a feeling of partnership between the leadership and employees.

Management of external and internal information means making the views of others available and hence offers a vicarious learning opportunity for the individuals. Management can bring in for example external experts, such as consults, to offer their opinions (Armenakis & Harris 2002) or internally management can for example embed employee attitudes and indicators regarding the productivity and performance gains to the message. (Armenakis, Harris & Feild 1999) HR practices consist of 1) staff selection, including firing, hiring and acquiring, 2) performance appraisal, like feedback and compensation in the form of performance reward, and 3) availability of individual training and development. Whereas the concept of rites and ceremonies refers to activities taken to encourage the organizational members to let go of the past, simultaneously reinforcing the individuals to adopt new ideas, values and behaviours. (Armenakis, Harris & Feild 1999)

Diffusion practices can include for example piloting activities to experiment and test the innovation before sharing it with potential adopters and organizational sponsorship like financial support. In addition, parallel learning systems (PLS), which promote change by creating teams that represent the various interests of organizational members, simultaneously creating commitment toward the change and contributing to institutionalization of it, are perceived as a tactics to diffuse change. (Armenakis, Harris & Feild 1999) PLS represents the same concept as Kotter’s (1995; 2012) change coalitions and the parallel network structures that complement the formal hierarchical structure to accelerate adoption and diffusion. And lastly, formalization activities refer to the changes in formal activities such as structures and procedures to demonstrate the support toward the change. (Armenakis, Harris & Feild 1999) All these constructs are different forms of learning strategies, which aim to teach the individual ways to improve their performance in change. (Armenakis & Harris, 2009)

In accordance with the institutionalization model, also Malik and Grag (2017) concluded in their research conducted in the IT industry, that change effort success is dependent on the ability of an organization to accelerate the individual’s support toward change and gaining their willingness to commit to change in affective level. Learning culture, inquiry and dialogue, and knowledge sharing structure were identified as determinants for affective commitment to change directly, and through change resilience construct. They emphasise the need for an environment where individuals can have a dialogue and freely voice their concerns. Even the change would have created some hindering negative beliefs and resistance, such environment would enhance individuals to develop abilities to adapt to changes.
4.4 Integration of theories & Conceptual model

The aim of the study was to create a better understanding about the intra-organizational adoption of innovation and what factors are perceived to influence the adoption process. To reach this aim, concepts from the innovation diffusion, user acceptance and change management frameworks were explored and integrated to create the conceptual model visualized in Figure 9.

![Figure 9. The conceptual model for the study.](image)

The conceptual model was built on the idea that acceptance frameworks recognizes the influence of external variables and enables the integration of additional concepts to the models through the belief constructs. Hence also in the conceptual model, the contextual factors are seen to influence the adoption and acceptance process through the key beliefs construct. Holt, Armenakis, Harris and Feild (2007a) suggested that the content of change, context of change, process of change and individual attributes are the main constructs that
influence the readiness for change and similarly also Rogers (2003) recognized the influence of innovation characteristics, individual attributes and social system attributes on the adoption of innovation. Due to the similarities in these attribute categorizations, the influencing variables in the conceptual model were arranged under the categories of innovation attributes, organizational attributes and individual attributes. The innovation attributes reflect the content of change and organizational attributes the context of change. Whereas the process of change is reflected in the managerial facilitation attribute construct, which describes the strategies and tactics used by the management to facilitate and accelerate the adoption. The two sections below explain more closely the integration of the frameworks and their concepts in relation to the innovation, organizational, individual and management facilitation attributes.

4.4.1 Innovation, Organizational & Individual attributes

The influencing factors incorporated to the Innovation attributes column were relative advantage, complexity, trialability, observability, job-fit and voluntariness. The concepts of relative advantage, complexity, observability and trialability are derived from the innovation characteristics framework of DOI theory by Rogers (2003). Nan, Zmud and Yetgin (2014) describe that relative advantage incorporates value gains related to social, hedonic and utilitarian outcomes. Also UTAUT (Venkatesh, Morris, Davis & Davis, 2003) suggested the concept of image as a determinant for acceptance, but as the concept of image refers to status gains the concept is reflected in the relative advantage in the conceptual model. However, another concept from UTAUT, voluntariness, is incorporated separately as it doesn’t overlap with other concepts. Concept of compatibility introduced in Rogers’ (2003) innovation characteristics framework is placed into the organizational attribute construct as it describes the fit of the innovation with the values, experience and problems/needs of the individuals within the organization. However, because in UTAUT (Venkatesh, Morris, Davis & Davis, 2003) a concept of job-fit was described to be a determinant for technology acceptance, this compatibility between innovation and a specific job is incorporated to the Innovation attributes column.

In addition to the concept of compatibility, the Organizational attributes column include also the concept of organizational norms and innovativeness, resource factors and the use and support of others. The concepts of innovativeness and norms come from DOI (Rogers, 2003) in which the latter one is described to be influenced by leader attitude toward change, system openness and organizational characteristics and structure. (Oliveira & Martins, 2011) The concept of resource factors in the conceptual model reflect the availability of resource-based factors such as money, skills and cooperation of others. Ajzen (1991) suggested in TPB, that these factors influence the individual’s ability to perform the requested behaviour and hence also acceptance. While Ajzen’s concept of cooperation of others refers to the resource-based ability to perform, the concept of social factors as a determinant for acceptance in UTAUT (Venkatesh, Morris, Davis & Davis, 2003) refers to the fact how much the other individuals in the social system are using or supporting the technology. Due to this difference, the use and support of others is added separately to the conceptual model. In Individual attributes column personality, socio-economic factors, communication behaviour and innovativeness are
introduced as individual characteristics influencing adoption process in DOI by Rogers (2003). Whereas gender, age and experience are derived from UTAUT model. (Venkatesh, Morris, Davis & Davis, 2003)

4.4.2 Managerial facilitation

As suggested by many researchers within the innovation diffusion research innovation adoption within organizations consists of two or even multiple stages. (Frambach & Schillewaert 2002; Kim 2015; Gallivan 2001) First, organizational level adoption decision is made, which is followed by the secondary adoption and acceptance process, which institutionalizes the innovation or change. Due to this contingency leadership has the ability to facilitate the innovation adoption process in the organization with strategic and tactical practices. Also UTAUT model suggests that facilitating conditions, referring to objective environmental factors that makes acting according to the change easier, as a one determinant influencing the acceptance. (Venkatesh, Morris, Davis & Davis, 2003) Hence also in the conceptual model managerial facilitation is an influencing construct for the intra-organizational secondary adoption and acceptance process. In their model for institutionalizing change Armenakis, Harris and Feild (1999) suggested Active participation, HR practices, Management of information, Persuasive communication, Rites & Ceremonies and Diffusion Practices as influence strategies that would facilitate the change process. These six influence strategies form the core of the managerial facilitation construct of the conceptual model. However, these key strategies were complemented with additional tactics derived from other change management models, DOI and acceptance frameworks. This integration of concepts is shown in Table 1.

Table 1. Tactics and strategies for managerial facilitation and reinforcement of change.

<table>
<thead>
<tr>
<th>Active participation</th>
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<tr>
<td>Enactive mastery</td>
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<tr>
<td>User involvement in design</td>
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<tr>
<td>Vicarious learning</td>
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<td>Collective decision-making</td>
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<tr>
<th>HRM practices</th>
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<tr>
<td>Feedback &amp; Reward - Extrinsic motivation</td>
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<tr>
<td>Training &amp; Development</td>
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<td>Staff selection</td>
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<tr>
<th>Management of information</th>
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<tr>
<td>Exchange of internal organizational information</td>
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<td>External expert knowledge</td>
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<tr>
<th>Persuasive communication</th>
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<tr>
<td>Interpersonal channels - Opinion leaders</td>
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<tr>
<td>Communication between homophilous individuals</td>
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<tr>
<td>Urgency</td>
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<td>Short-term wins</td>
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<td>Change vision</td>
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<th>Formalization</th>
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In relation to the Active participation construct, Armenakis, Harris and Field (1999) suggested enactive mastery, vicarious learning and participative decision-making as influence strategies. Lewin’s (1947) 3-stage model supported the concept of participative decision-making, claiming that group decision facilitates change, because shared decision decreases the role of personal preferences and increases the eagerness to act as a member of the group. Additionally, also TAM mentioned that user involvement in design of the system influences the acceptance. (Venkatesh & Davis, 1996)

Whereas in relation HRM practices and to the concept of training and development suggested in change institutionalization framework, Kotter’s (1995) model refers the concept of empowerment. For example, with the help of training activities organization can remove change barriers related to skills of the organizational members. (Appelbaum, Habashy, Malo and Shafiq, 2012) Also Venkatesh & Davis (1996) mention the influence of training in the final version of TAM. Similarly to the concept of feedback and reward introduced in change institutionalization framework (Armenakis, Harris & Field, 1999), UTAUT (Venkatesh, Morris, Davis & Davis, 2003) suggested extrinsic motivation factors as a determinant for acceptance.

Management of information refers to the exchange of internal information and utilization of external expert knowledge to provide a vicarious learning opportunity for the organizational members. (Armenakis & Harris, 2002) Together with persuasive communication, this construct can be associated strongly with DOI (Rogers, 2003), as communication channels and information exchange enable the whole adoption and diffusion process. Rogers defines communication as the process where information about the innovation is shared in an organization both through informal and formal structures and for example interpersonal channels are suggested to be more persuasive compared to mass media channels. Hence the persuasion in diffusion process is often described to happen through informal opinion leaders, who tend to influence the potential adopters by being close to those whom they influence, influential, credible, popular and accessible. (Dearing, 2009) Suggested both by DOI and change institutionalization framework, also communication between homophilous individuals is perceived to be more effective in changing attitudes and behaviours. (Rogers 2003; Armenakis, Harris & Feild 1999) In relation to persuasive communication Kotter (1995) also emphasises the importance of communication of change urgency and vision in gaining individuals support towards change. Hence according to Kotter management needs to for example communicate the urgency dramatically to the organization. Also within DOI framework communicating and providing a clear vision is seen as a tool to reinforce persuasion. (Sahin, 2006) In addition, communicating short-term wins was added as an
additional tactics for persuasive communication as Kotter’s (1995) model suggests that short-term quick wins convince the individuals that the change is delivering the expected outcomes and hence encourage for commitment.

Diffusion practices construct is supported also by DOI framework. It is suggested that as individuals often want to try the innovation in their own context before making the adoption decision, hence vicarious trial can accelerate the decision-process. (Sahin, 2006) This vicarious trial is a similar concept to piloting activities suggested by the change institutionalization framework. In relation to the parallel learning systems (PLS) also Kotter (2012) has introduced similar idea of creating network structure in parallel to the formal hierarchical structure to accelerate adoption and diffusion. Also change coalitions in Kotter’s (1995) original model are referring to same idea of creating a team from the organizational members to support the diffusion and institutionalization of change. Similarly, also change agents are acknowledged to carry important role in providing change support for the organizational members both by DOI and change institutionalization framework. (Rogers 2003; Armenakis, Harris & Feild 1999)

4.4.3 Key beliefs

When designing the managerial activities to be taken, it should be considered what kind of message these practices are sending and contributing to. All three theory streams and determinant frameworks within them are acknowledging the role of beliefs in determining the outcome of the adoption process, whether individuals accept or resist the change. Hence it is the beliefs of the potential adopters that needs to be influenced. (Armenakis, Berneth, Pitts & Walker, 2007) By designing the change message to give answers to the main uncertainties individuals have toward change, leadership can increase the motivation toward the initiative. (Armenakis, Harris & Feild, 1999) Hence also in the conceptual model the influencing variables are seen to influence the adoption and acceptance process through the key beliefs construct. The key beliefs introduced in the frameworks chosen are summarised in Table 2.

<table>
<thead>
<tr>
<th>TRA (Ajzen &amp; Fishbein, 1975)</th>
<th>Behavioural beliefs &amp; Outcome evaluation (Determinants for attitude toward behaviour)</th>
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<tbody>
<tr>
<td></td>
<td>Normative beliefs &amp; Motivation to comply (Determinants for subjective norm)</td>
</tr>
<tr>
<td>TPB (Ajzen 1985; Ajzen 1991)</td>
<td>Behavioural beliefs &amp; Outcome evaluation (Determinants for attitude toward behaviour)</td>
</tr>
<tr>
<td></td>
<td>Normative beliefs &amp; Motivation to comply (Determinants for subjective norm)</td>
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</table>
When the definitions of these concepts are compared, it is possible to identify some similarities and complementarities and hence the conceptual model integrates these key beliefs under five main beliefs as follows,

1) **Perceived benefits.** Perceived usefulness, performance expectancy, personal valence and behavioural beliefs/outcome evaluations are dealing with the beliefs related to the outcomes and the benefits of the behavioural change.

2) **Perceived effort.** Perceived ease of use, effort expectancy and behavioural beliefs/outcome evaluation are related to effort beliefs.

3) **Perceived social pressure and influence.** Principal support, social influence and normative beliefs/motivation to comply are all related to the perceived influence and pressure of social context.

4) **Perceived need and appropriateness.** Appropriateness and discrepancy are beliefs concerning the need for change and if the change initiative is appropriate for the need.

5) **Perceived capabilities.** Control beliefs and self-efficacy beliefs share the focus on the perceived capability to perform and availability and access to resources, both individual and system level.

All three theoretical streams have also process view on the adoption and change. The process view of these frameworks and models is integrated and summarised in Table 3. While all change management frameworks cover the three change stages suggested by Lewin (1947), DOI and the chosen acceptance frameworks don’t incorporate the post-adoption stage. For example, in DOI the confirmation stage is perceived to refer to the continued adoption and diffusion of innovation, not directly to the institutionalization and freezing of change. And as suggested by Bhattacherjee and Farbar (2011) traditional acceptance frameworks don’t directly explain the continued use of a technology as they are focused on the first-time adoption. Hence separate IT continuance frameworks are designed for this purpose.
Table 3. Integration of the process view of the theoretical frameworks of the study.

<table>
<thead>
<tr>
<th>Lewin’s 3-stage change model (Lewin, 1947)</th>
<th>Unfreezing</th>
<th>Moving</th>
<th>Freezing</th>
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</thead>
<tbody>
<tr>
<td>Change Institutionalization framework (Armenakis, Harris &amp; Field, 1999)</td>
<td>Readiness</td>
<td>Adoption, Commitment</td>
<td>Institutionalization</td>
</tr>
<tr>
<td>Diffusion of innovation framework (Rogers, 2003)</td>
<td>Knowledge, Persuasion</td>
<td>Decision, Implementation, Confirmation</td>
<td>-</td>
</tr>
<tr>
<td>Acceptance frameworks: TRA, TPB, TAM, UTAUT (Ajzen &amp; Fishbein 1975; Ajzen 1985; Venkatesh &amp; Davis 1996; Venkatesh, Morris, Davis &amp; Davis 2003)</td>
<td>Beliefs, attitudes, intentions</td>
<td>Actual use behaviour/Acceptance</td>
<td>-</td>
</tr>
</tbody>
</table>

5. Case introduction

This chapter describes briefly the context and background for the implementation of RPA within Stora Enso Finance and summarises the timeline and key events related to RPA implementations.

5.1 Stora Enso & Finance delivery organization

The company in focus of this thesis is Stora Enso, one of the leading companies in forest industry, which is currently undergoing a transformational journey from a traditional paper producer into a sustainable renewable materials company. (Stora Enso, 2018a). In total they have about 26,000 employees around the world, in over 30 countries. Stora Enso consists of 5 divisions, Consumer board, Packaging solutions, Biomaterial, Wood Products and Paper. And customers vary from packaging to construction industries and from publishers to printing houses. In addition to these five divisions Stora Enso has also supply and support functions and other operational units such as logistics, IT and HR. (Stora Enso, 2018b)
According to the megatrend mentioned earlier, also Stora Enso has identified digitalization as one of the key enablers for the transformation and currently their IT and Digitalization unit aims to identify and accelerate the use of new technology opportunities to increase for example efficiencies in the internal business processes and gain competitive advantage. RPA is one of these technological innovations, which is perceived to provide great scaling opportunities and together with cognitive technologies it will forward the transformation of the traditional paradigm of knowledge work. To stay on top of this digital development and create competitive edge in the marketplace, Stora Enso has decided to start providing RPA technology as a service for their group functions and drive implementations of this technology company-wide. The first group function to undergo RPA implementations in Stora Enso was Finance delivery.

Finance delivery is the global financial shared service centre for Stora Enso. It offers financial services for the majority of Stora Enso’s business units, mainly within Europe. The Finance delivery function is utilizing a hybrid model, where majority of the services, meaning the transactional finance operations are outsourced. However Stora Enso is supporting the outsourcing partners and offering in-house financial services with its internal teams located in various countries in Europe, for example in Finland, Estonia and Czech Republic. During the implementations, the Finance organization was divided into three process streams, record-to-report, order-to-cash and purchase-to-pay. Finance development function is then supporting these three separate streams. Simultaneously to this RPA project Finance delivery was also going through an organizational transformation, which was about to change the structuring of the organization. However, the organization chart valid during the investigated implementations is visualized in Figure 10. Each of these three Finance streams have been driving RPA implementations within their own processes and recently also other support functions and business units in Stora Enso group level have started to implement RPA, for example HR and legal units. As the RPA was initiated and program designed in IT and Digitalization unit, also RPA project management is currently located in this unit. While the Finance delivery is in charge of the practical implementation activities, the implementation decisions are made in collaboration with the project management located in IT and for example RPA methodology and infrastructure centrally governed from the IT and Digitalization unit.

Figure 10. Organization chart for the Finance Delivery function within Stora Enso.
5.2 Timeline for adoption process of RPA

The initial idea to deploy RPA within Stora Enso was born in the IT and Digitalization unit. However, the initial decision to adopt it in Finance delivery was made collectively between Finance delivery and IT function. During April 2016 the original initiator started to look into the RPA from technical point of view and suggested a Proof of Concept (POC) to understand RPA better as a technology and explore the potential business benefits and practical applicability. The POC idea was then introduced and sold to the top management to get their support for the initiative as it was recognized to be the most powerful way to get the project up and running. Eventually CEO was the financial sponsor for the POC and Finance delivery collaborated as a business stakeholder, as its management was already familiar with RPA and hence were very interested and curious about the opportunities and benefits RPA could potentially deliver in the area of financial services.

Services from an external supplier were bought to conduct the POC, as RPA specific in-house capabilities didn’t exist at that point. The preparations for the POC were started in Finance delivery during September and POC finalized during December 2016. Four processes were chosen for the POC based on an opportunity screening. The chosen processes weren’t end-to-end processes, rather sub-processes to scope down the POC and remove excess complexity. The POC proved that RPA was able to automate processes, even the results and success of implementations varied between the implementations. However, the general conclusion was that man-days could be saved with the help of RPA.

Early 2017 was spent on convincing that Stora Enso should proceed with RPA in Finance delivery. Starting from February, Finance delivery together with IT started to map out and choose the potential processes to be automated with RPA for the first phase of the adoption. Some process teams in Finance delivery also started further preparations for the development of RPA robots while they were waiting the finalization of the contract signing between the IT and service provider. The project proposal for the first phase of RPA deployments was compiled, approved and funds granted from the Digitalisation fund in May 2017. With the help of the external partner the RPA project went live during the summer 2017. The project consisted of two streams; the automation stream focused on the actual RPA deployments, robot development and implementations, and the organizational set up stream focused on planning the organizational set up, RPA Center of Excellence (CoE) and development of internal capabilities. In the organizational setup stream, eventually a hybrid model was chosen for Stora Enso, meaning central CoE was responsible for RPA in group level and was supporting the local CoE built to the Finance delivery organization.

For the first phase of RPA deployments Finance delivery identified 9 processes to be automated with RPA by the end of 2017, however not all implementations were brought to live within this timeframe. By the end of 2017 Finance delivery had 5 robots live, others still in production. The implementations were conducted in iterative manner and also new developments had been started in addition to these original 9 processes. Additionally, also in-house robot development was started. At the time of the empirical study, Finance delivery
was still finalizing the development and implementations of the first phase of RPA project. However, Finance delivery had already identified dozens of additional processes and sub-processes, which could be potentially automated in following years. The timeline described above is visualized in Appendix 2.

6. Empirical results & Analysis

The focus of the interviews was on the perceptions of workforce in relation to the adoption process of RPA. The main research question was set to explore the factors perceived to influence the adoption process, more specifically the innovation, organizational and individual factors and secondly investigating how management has been intervening the adoption process. The sub-questions complemented the main research questions by focusing on how the described factors influenced the process. Based on these research questions and to ensure a comprehensive view on the adoption, the interview guide was focused to five main areas; process of adoption, perceived RPA characteristics, organizational environment, individual reactions and attitudes and managerial interventions. The findings and analysis will be structured under the categories of innovation, organizational, individual and management facilitation attributes. The themes found from the empirical data will be then analysed against the factors introduced in the different categories of the conceptual model.

6.1 Innovation attributes

The first construct described to influence the adoption process in the conceptual model is the innovation attributes. Under this category all the key findings and perceptions related to the RPA technology itself are described. The five main factors identified were RPA benefits, RPA risk and threats, Ease of understanding and use, Development effort and RPA-process fit, and in following sections the more detail level findings related to each of these themes are described.

6.1.1 RPA benefits

The attraction points and advantages of RPA were well understood by the organizational members; all 21 respondents were able to identify and describe perceived advantages of RPA. From Finance delivery perspective RPA was expected “to make the processes more efficient, to finally reach cost savings, FTE reductions, quality and speed.” (R16) One respondent described that when RPA is scaled, and full benefits reached, it would deliver advantages related to cost, workload, customer experience and process streamlining (R13). With the help of RPA, organization could actually increase the output volume without increasing the headcount (R14). In total five respondents referred to the feasibility to deploy RPA as its advantage (R20, R16, R14, R12, R3). One respondent described that in Stora Enso group level there is actually more demand for RPA than ability to deliver it, and the respondent perceived that the expected benefits associated with RPA had created the high expectations and eagerness to adopt RPA (R14).
In relation to the outcomes of the first implementations, strongest focus among respondents was in time-saving advantages. All 21 respondents referred to the time-saving gained through RPA as an advantage, and eight respondents referred to the measured man-hours saved in specific process automations (R15, R18, R11, R1, R21, R16, R2, R5). 10 respondents mentioned that now after the implementations the process employees had saved time to do more analytical and value-adding work (R16, R8, R7, R5, R9, R15, R11, R17, R13, R2) and eight respondents emphasized that this time-saving was happening during the hectic closing time (R15, R11, R2, R17, R13, R1, R12, R18). These man-hours saved were expected to become more visible in future through centralization, which would allow more and better quality of analytical work but also enable FTE reductions (R11). One respondent described that the bigger benefits, such as hard savings and top line improvements were expected to appear increasingly in the future as the organization is learning, increasing skills and experience (R20). One respondent described the time related benefits of RPA as follows,

“This (RPA) is now releasing time in the hectic closing time to more value adding things. There I would see really a benefit from this decrease in workload. Robots doing fast work.” (R11)

In addition to this time-efficiency perspective another major advantage identified with RPA were the advantages that contributed to process worker satisfaction. In total by 11 respondents this manual transactional work that was automated with RPA was described as boring (R8, R7, R16, R14, R21, R20, R18), dumb (R11, R12), non-enjoyable (R4) or non-motivating (R1). From process worker perspective deployment of RPA also decreased the stress (R9, R2, R1, R4) and need for over-work hours during the hectic closing time (R2, R1). One respondent perceived that the reactions and attitudes toward RPA were positive, because the organizational members were actually seeing the benefits of RPA (R4). Another respondent explained the influence of RPA toward the work conditions in Finance delivery,

“You have to understand that previously when we did manually, we did always over hours but nowadays that is not the case. Nowdays it is not so intense during the closing, that you have to use every minute, to sit and do, and do, and do. Now it is not that stressful anymore, work divided evenly, and closing done easily.” (R1)

6.1.2 RPA risks and threats

While the RPA advantages were visible to respondents, they also shared perceptions about the negative sides of it. R16 described the RPA as “quick, cheaper and flexible but then not so robust, very sensitive” when compared to traditional IT systems. 15 respondents described that the current risks and future threats with RPA to be related to the RPA’s sensitivity or technical reliability aspect (R15, R18, R2, R13, R12, R14, R3, R11, R16, R5, R21, R8, R7, R17, R9). One of the main challenges with RPA was perceived to be that the external systems have critical impact also to RPA (R3, R5). One respondent explained that as RPA is connected to various systems, the risk emerges if the system changes aren’t seen in the operational level beforehand, and the robot stops working (R12). Another respondent described to be afraid of the fact that the processes change quite a lot, meaning that also the robots need to be updated often (R8). Due to the technology’s sensitivity aspect, one respondent described that if something could be automated with a traditional system, it might be better and more safe option as setting up an RPA process requires continuous checking that
it works, and control over the changes in external environment (R16). However, it was also pointed out by one respondent that the performance issues are not always directly a problem of RPA, but the untrustworthiness is rather stemming from the source systems (R14). R17 described this risk related to sensitivity to environment changes as a barrier for adoption,

“I think for instance, changing systems, that is a valid risk already still now. So, this is something, that of course we need to have some kind of controlled way of doing system changes, but these systems are not handled by FD. So this is coming from outside, so from that side I see a risk still currently.” (R17)

Two key future threats identified from the empirical data were if the robots stopped working in critical time just before closing (R3, R11, R2) or if the quantity of workforce will be decreased and there wouldn’t be enough workforce to cover the tasks when a technical problem would occur (R3, R16). Currently with five robots it was described to be easy to check that everything is working fine, but when the number of robots will increase, also the monitoring would become more challenging. For this reason, it was perceived as important to have sufficient checks in place to control that the robots deliver the correct outcome (R16). Sufficient detection systems were perceived to be important also due to RPA’s high speed, as with RPA’s speed also the mistakes would happen fast (R14). One respondent described that also losing the visibility, expertise and understanding over the process when it is automatized is a threat if the robot stops working (R5).

“I am personally concerned about failure in critical time during for example or just before closing and if something breaks and we don’t have manual workforce anymore in the company to cover it up. Then we are in a big trouble.” (R3)

Capability development related to business continuity and incident management was perceived to be needed to manage the reliability related risks (R21). One respondent described that there are high expectations for the centralized CoE in relation to this IT change management aspect (R12). And when asked if there was a solution available for these incident management related uncertainties and threats, one respondent described,

“I haven’t heard, but I am sure there is, because in banks and insurance companies they have been using these (RPA’s) for years.” (R16)

In relation to RPA’s future workforce implications, nine respondents explicitly mentioned that they are expecting FTE reductions in future (R15, R14, R3, R4, R8, R11, R12, R16, R20), but it was also mentioned by nine respondents that job loss wasn’t perceived as a threat (R18, R2, R6, R7, R8, R1, R19, R3, R9). The threat of job loss was for example perceived to impact more the employees, who are doing the outsourced jobs (R3). One respondent explained that the robot wouldn’t be able take over all existing tasks and also new tasks would emerge that couldn’t be done with a robot (R2). For example, roles related to coordination, monitoring and maintenance of robots was expected to emerge by eight respondents (R15, R3, R18, R8, R6, R12, R20, R9). However, there was still some level of uncertainty related to this capability topic, as one respondent, when asked if they would be happy to see robots become more intelligent, answered with a laugh,
“No, no, it would take our jobs!!! No!!” (R7)

### 6.1.3 Ease of understanding and use

Eight respondents described that RPA technology was perceived as easy to understand (R14, R1, R6, R8, R7, R11, R20, R9). At first the technology was perceived a bit confusing, but later on when it was shown on a screen how it is working and from where it takes the data from, the logic was understood (R1). The possibility to see how RPA works in practice was perceived to help in increasing the understanding by five respondents (R7, R4, R11, R18, R1). One respondent described the complexity of RPA technology as follows,

“I think it is pretty straightforward and simple when you get in to it; it is not any huge algorithm or mystique around it. So, I would consider it as a rather straightforward and simple tool itself. The complexity may be coming in when we should be adding more understanding and more complex processes on top of RPA.” (R20)

However, mentioned by five respondents, understanding RPA from a technical perspective on detail level was seen challenging for process people (R15, R18, R1, R3, R9). It was brought up by six respondents that to use the technology, meaning to build and maintain the robot, technical knowledge and capabilities were perceived to be needed (R6, R11, R4, R12, R16, R19). RPA was seen easy to use if the person has technical background or previous experience from programming (R4, R19, R6). One respondent described how her initial expectations related to the ease of use of RPA didn’t fulfil,

“Before we started this journey we, at least I, imagined based on certain experiences of others that this could be even ran by our process teams. So somewhere it is said that this technology is so easy that anybody can learn, so that our process experts could even learn these and do these robots by themselves. But then it turned out that it is not that easy. So actually you need to have, at least with the tool we have selected, you need to have these technical capabilities.” (R12)

### 6.1.4 Development effort

Even though in total five respondents referred to the feasibility to implement as RPA’s advantage (R20, R16, R14, R12, R3), the development stage of RPA wasn’t necessarily as effortless and quick as initially expected. Five respondents brought up how their initial expectations related to the easiness to deploy RPA weren’t fulfilled and after the first RPA implementations they were surprised how long the development and implementation of the RPA eventually took compared to the initial expectations (R18, R12, R11, R10, R9). R10 described that even they knew that they weren’t choosing any easy cases for automation, the eventual adoption journey was more complicated and slower than previously thought. Also, the promises of consultants and tool providers weren’t realistic for the process automations chosen in Finance delivery and the implementation processes ended up taking longer than expected (R12, R11). However, one respondent expected that now when the organization had experience from the early implementations, learned from them and had accumulated in-house RPA knowledge, building the robot would also become quicker (R11).

“The biggest surprise for me has been that when we started this and met many consultants it was kind of common view that it takes roughly 4-8 weeks to robotize a process, four weeks to a simple process and eight
weeks to complex process. So, it was then a surprise to see that all of our process automations took more than eight weeks to complete, I would say even three months was the average that we managed to do. So it was taking longer than we expected.” (R12)

One reoccurring theme in the empirical data was the references to the performance issues occurring during the development of RPA, and was mentioned by 13 respondents (R16, R19, R15, R5, R17, R4, R8, R7, R21, R6, R1, R18, R2). One respondent described that if there was a lot of dependencies in the process to other systems and changes within them, performance issues occurred (R5). The exception handling within the process was described to lead to issues with output quality and development timeline (R4). Another respondent perceived that the main barrier for the adoption of RPA was the fact how standard the process is; if there are exceptions in the process, the robot can’t function (R16). It was concluded that short, harmonized processes should be chosen for RPA; choosing complicated and long processes made the implementation to be very extensive, time-consuming and heavy job (R17). Four respondents described that these repeating performance issues during development affected negatively the attitudes during the development (R21, R19, R7, R1). One respondent mentioned that the robots needed monthly attention, there were changes in underlying systems and continuous error-messages were occurring and these factors together were perceived to negatively influence the attitudes of individuals (R19). The initial negative reaction was explained also with the fact that at first the robot didn’t function properly (R1). When the performance issues disappeared, and RPA cases were finally successfully validated, one respondent described that also her attitude turned more positive (R7). One respondent described,

“RPA hasn’t been so reliable, there has been some challenges. That has been partly causing a bit tiredness. So yes, there is benefits, but there has been also challenges.” (R21)

Additionally, in relation to the development effort one of the main findings and issue brought up by 10 respondents was the RPA’s requirement for detailed process descriptions, which were perceived as time-consuming (R7, R8, R1, R10, R14, R15, R20, R19, R12, R9). One respondent described that it was needed to go through the processes on a keystroke level, step by step, following all the steps human had taken to execute the process and hence this part was perceived as the hardest part of the deployment as it takes a lot of time (R14). Another respondent described that as the creation of the documentation was quite challenging, despite the enthusiasm toward the RPA project, this effort gave time to time the feeling that RPA will never take off (R10). Additionally, it was described that the external development partner required these descriptions on very detailed level, whereas when developing internally the process descriptions could be done in more high-level speeding up the development process (R4, R19, R12).

“One thing was this robot documentation effort that was needed in consulting project, when developers were not at all familiar with the finance processes so that our detailed process descriptions were still not detailed enough for developers, so that was one thing that caused these delays. So we needed to do extra documentations in very, very detailed level” (R12)
6.1.5 RPA-Process fit

As already brought up in previous section, RPA’s fit with the process and effort needed to develop RPA was perceived to be related; four respondents (R10, R17, R5, R4) described that there is a dependence between the process selection and development complexity and outcome. One respondent concluded that choosing complicated and long processes made the implementation to be very extensive, time-consuming and heavy job and hence short, harmonized processes should be chosen for RPA (R17). And another described the relatedness as follows,

“Specifically (output) accuracy has been definitely one thing, and also this relates to the chosen processes. So if the process itself is not as structured as you would like it to be, then you really might have some issues, when you are trying to automate a broken process. If you understand what I mean. If there is a lot of exception handling it might cause the timeline to be exceeded and it causes also some let’s say inaccuracy in the end result.” (R4)

It was brought up by five respondents that RPA is not the most suitable solution for every process or case (R12, R17, R14, R20, R4) and by nine respondents that RPA should be considered only as one alternative for process automation among other automation technologies (R20, R21, R17, R16, R12, R11, R13, R14, R19). One respondent described that the main learning from these early RPA implementations had been gaining the knowledge which processes are actually suitable for RPA (R20). At the beginning of the adoption process knowledge related to what processes are the optimal for RPA and in what processes it actually works was perceived to be lacking. Individuals needed to choose the processes without knowing too much from this area, but now with the early RPA experience this knowledge was gained (R21).

“So one of my conclusions was that perhaps we selected certain process areas which were not that ideal for robots at least as such. So perhaps we should have considered some changes to the processes first, but this is just something that we have now taken the lessons learned from the first phase and this is exactly what we aimed to do as well.” (R12)

Five respondents mentioned that they can see promising possibilities for scaling especially in outsourced processes (R14, R17, R12, R21, R3) and the focus for future was described to be in the centralized processes, because there the set-up is a lot more harmonized (R17). One respondent described that currently Finance delivery have been focusing on in-house processes, but if thinking about the outsourced processes, which are focused on simple volume tasks, even bigger potential with RPA can be seen (R21). Five respondents emphasized that work needs to be done for example with master data and process harmonization before RPA can be utilized full-scale (R17, R13, R10, R16, R19).

“Not sure in short term. But there are several levels (for scaling). First is what we can do immediately, what has been already in the pipeline. When we will harmonize our processes and the way of working, more and more things can be automated in a simple way. And the next step would be really this artificial intelligence or machine learning, which could be considered as one option.” (R19)
6.1.6 Analysis

The five themes found from empirical data under the category of innovation attributes will be integrated and analysed under three topics; RPA Advantages and risks, Complexity of RPA and RPA-Process fit.

RPA Advantages and risks

The organizational members were able to identify multiple RPA benefits both at the organizational and individual level, and even short-term and long-term. However, one of the main findings was that the RPA was associated especially with time-related benefits, which demonstrates that this type of benefits has been the most visible to the organizational members in general. In specific, RPA deployment was identified to free time to move from boring, non-enjoyable transactional work to analytical work and decrease the workload during closing time. While understanding these benefits were perceived to influence the willingness to adopt RPA, it was also explicitly mentioned that seeing these benefits in individual level generated positive attitudes toward the RPA. Based on these empirical descriptions RPA advantages can be perceived to be both visible for the organizational members influencing the adoption and acceptance positively.

This association between the advantages and the adoption process is also something that both diffusion, acceptance and change management frameworks recognize suggesting that perceived value associated with the innovation influences the adoption decision, the motivation to use it and commitment towards it. Relative advantage as an innovation attribute is recognized to influence the adoption positively and by Tornazky and Klein (1982) said to be one of the three innovation characteristics that have had consistent positive association with adoption. Also Nan, Zmud and Yetgin (2014) mentioned that the relative advantage is the main attribute in explaining the variance in innovation diffusion within social system. In the key belief construct of the conceptual model for this study, the concept of perceived benefits summarised the key concepts from acceptance and change management frameworks that dealt with the beliefs related to the expected outcomes and perceived benefits. Perceived usefulness in TAM, performance expectancy in UTAUT, personal valence in Change institutionalization model and behavioural beliefs in TPB and TRA, can be associated with the positive influence of beliefs related to the advantages of RPA for the adoption process and acceptance of technology. Also Kee (2017) described how DOI’s relative advantage can be understood to capture the same value gains as the perceived usefulness in TAM.

Also, the concept of observability in DOI (Rogers, 2003) can be associated with the empirical data as observability is defined as the degree the positive results gained with the innovation are visible to others. In the case study context, the organizational members were perceived to see and understand the benefits, and even not all development teams were actually finished with their implementations, they were able to describe for example the time-related advantages reached by other development teams. Kee (2017) also described how observability of the results is also closely related to for example the concepts of visibility and communicability, which all together are associated with increased likelihood for adoption.
Tornazky and Klein (1982) suggested the communicability and Moore and Benpasat (1991) introduced the visibility and result demonstrability constructs influencing the adoption. Even these concepts are not incorporated to the conceptual model, also in relation to the empirical data attributes such as communicability of the results, visibility of the RPA in Finance delivery and result demonstrability, can have influenced the fact that time related advantages were the most referred advantage. For example, time related gains are easy to measure and embed to the message communicated, which might be explaining why also in the empirical data many respondents were able to describe the specific hours saved with the RPA, even these savings weren’t reached with their own robot.

Nan, Zmud and Yetgin (2014) suggested that the value and the relative advantage the innovation generates incorporates both social, hedonic and utilitarian outcomes. In the empirical data the initial interest towards RPA came from the benefits that could be measured on financial terms. For example, quality, speed, efficiency of process execution, FTE reductions and cost savings can be associated with utilitarian outcomes. Tornazky & Klein (1982) for example separated the cost and profitability of the innovation to its own construct influencing adoption. However, one important finding from the data was that in addition to these utilitarian time-saving advantages, RPA was also described to remove non-enjoyable and boring work from process workers and even to decrease stress and need for overwork hours. These benefits can be associated better with the concept of hedonic outcomes. For example, Bhattacherjee and Farbar (2011) suggested that factors related to IT experience, satisfaction and enjoyment, determines the continued use of the system. While the main organizational interest for RPA adoption might be in the utilitarian and hard benefits, the hedonic advantages described also in the empirical data can actually be in the key role to create commitment and willingness to continue the use of RPA in individual level.

However, in addition to the advantages, RPA was perceived to have also some downsides. The second theme was Risks and threats of RPA, and the strong focus and agreement on sensitivity and related reliability issues of RPA as a potential risk and future threat suggests that these risks have already been visible at the early stages of RPA deployment. The acknowledgement of the risks can also inhibit the adoption and diffusion of RPA, because to decrease the risk it was suggested that RPA should be implemented only to processes, which can’t be automated with traditional solutions, which are more robust. While the original DOI doesn’t consider the concept of risk as an innovation characteristic influencing adoption, later innovation research has acknowledged its influence, and review conducted by Wisdom et al. (2014) suggested that perceived risk-taking has a negative association with adoption. However, even RPA is an innovation in the Stora Enso context but because other fields have been using the technology for years, the perceived risk-taking with RPA isn’t maybe as great as with some other technological innovations. So, if weighing the benefits and risks, the perceived benefits have probably stronger influence on the adoption. Also due to the visibility of the risks the organization have also been able to start to prepare for them and developing IT change management procedures, that will decrease impact of the risk toward the adoption and diffusion of RPA.
Complexity of RPA

The Complexity of RPA includes the themes of ease of understanding and use and development effort. Traditionally in DOI (Rogers, 2003) this effort to use and deploy innovation has been captured in the concept of complexity as a part of Innovation characteristics research. Complexity reflects the perceived easiness to understand or use the technology and is identified to have negative relationship with adoption. (Kee, 2017) This concept of complexity can be associated also with empirical data. One of the main findings in relation to the theme of Ease of understanding and use was that while RPA was perceived as easy to understand on high-level, understanding it from technical perspective was challenging for business users. And to use the technology technical background was perceived to be needed. So, the perceived complexity of technology can be seen to be dependent on the background of the individual; from process people perspective RPA is more complex than from technical developer perspective.

As the RPA implementations are business led, process teams were deeply involved in the development of RPA and choosing for example the processes for automation, the complexity to understand RPA from technical perspective and complexity to use it can be seen to hinder the adoption process. While on high level RPA is easy to understand, which according to the theory can be perceived to facilitate the adoption, the complexity in technical level can complicate the adoption process. For example, process teams might have perceived that they don’t have the capabilities to develop RPA successfully. This can be associated with the concept of self-efficacy in change institutionalization framework (Armenakis, Harris & Field, 1999), which is also embedded to the conceptual model in the Perceived capabilities, and describes the beliefs related to the capabilities to carry out the change successfully. If the process people perceived that they don’t understand RPA fully and don’t have the capabilities to carry out the development and implementation, these beliefs might actually inhibit the adoption process.

Key findings related to Development effort theme in empirical data were that the detailed process descriptions and performance issues during the development were perceived to challenge the adoption process. It is suggested that complexity of innovation causes frustration (Kee, 2017), and also in the empirical data it was described that challenges during development lead to tiredness toward the RPA initiative and created beliefs that RPA will never take off. While one of the main advantages of RPA was perceived to be easiness to deploy RPA, interestingly in the empirical data the actual ease of use and effort needed was perceived to be higher than the initial expectations. In TAM (Davis, 1989) the beliefs about ease of use is one of the two constructs determining the acceptance and according to Kee (2017) is described to capture the same content as concept of complexity in DOI. This concept of ease of use is also embedded to the Perceived effort belief in the conceptual model, together with the concepts of effort expectancy derived from UTAUT and behavioural beliefs from TRA and TPB models. The theory and empirical data can be associated with each other also here. While the ease of deployment was seen as an advantage of RPA increasing the attractiveness, the actual development effort needed to implement RPA was higher than
expected. If the expectations aren’t aligned with the reality, and expected benefits higher than what RPA can deliver, individuals might get disappointed to RPA, which might hinder the individual level acceptance and eagerness to apply RPA.

**RPA-Process fit**

In relation to RPA-Process fit theme, it was brought up several times that RPA is not the optimal solution for all processes and should be regarded only as one automation alternative. Also, the level of development effort and outcomes needed was perceived to be dependent on the chosen process; simple, short and harmonized processes should be chosen. Respondents saw the biggest potential in outsourced processes as they are characterized by these factors. This demonstrates that in such processes the complexity to implement RPA is perceived to be smaller and hence more attractive.

These fit related issues can be associated also with the theory related to innovation characteristics, incorporated to the innovation attribute construct in conceptual model. The concept of compatibility was introduced by Rogers (2003) and is described to reflect the compatibility of the innovation with the values, experiences and problems of the individuals within the social system. Kee (2017) explained that high compatibility is perceived to predict higher adoption. While this compatibility construct in DOI doesn’t directly reflect the issues related to RPA-process fit, in technology diffusion context this fit between the task and innovation has explicitly been emphasized. (Tornatzky & Klein 1982; Zmud & Cooper 1990). Also UTAUT suggested the job-fit to influence the acceptance through performance expectancy beliefs. In relation to the empirical material, this concept of job or task can be understood as the processes RPA is implemented in.

Also in the empirical data the respondents had recognized this need for RPA-process fit, and choosing suitable processes for RPA automation was perceived to facilitate the adoption process. If non-suitable processes were chosen the complexity of the development increased. As originally easiness to implement RPA was perceived as its advantage, applying RPA to wrong processes can be seen to inhibit the possibility to reach such benefits. So, if this is translated to the theoretical terms, RPA can be understood to have higher relative advantage and lower complexity when implemented in simple processes, and lower perceived relative advantage and higher complexity if implemented in too complex processes. So, if we analyse the RPA-Process fit theme against the conceptual model for the study, we can perceive that the RPA-process fit influences the Perceived effort and Perceived benefits beliefs in conceptual model, which mediate the relationship between innovation attributes and the adoption process.

**6.2 Organizational attributes**

The second construct described to influence the adoption process in the conceptual model is the organizational attributes. Under this category all the key findings and perceptions related to the organizational environment and conditions are described. The four main factors
identified were RPA – organization fit, Previous experience, RPA capabilities and Internal organizational support, and in following sections the more detail level findings related to each of these themes are described.

6.2.1 RPA – Organization fit

In Finance delivery there was described to be both strategic and operational need for RPA. RPA was explicitly mentioned as an enabler to realise the Finance delivery strategy by seven respondents (R3, R12, R21, R5, R16, R13, R19). There was perceived to be a lot of manual transactional processes in FD and the new strategy encouraged the organization to automate transactional tasks to be able to put more focus on analytical work. The need to adopt RPA was perceived to come from there. (R5) One respondent described that RPA was one of the enablers in the toolbox in relation to the digitalisation strategy and could be used to remove boring work and increase speed and efficiency. (R16) In addition to the strategic fit, six respondents described that Finance delivery had operational problem related to hectic month-end closing or quality issues that RPA could solve. (R11, R16, R13, R20, R1, R10) The closing needs to be done very quickly and was perceived to set heavy pressure for the Finance delivery employees. (R20) And this time pressure was described to create stress for the process workers. (R1, R13) One respondent described the RPA to target especially this time pressure, releasing time to do more qualitative work during the closing time. (R11)

Additionally especially with outsourced processes, there had also been repeating problems with quality due to high employee turnover and RPA was seen to decrease this human-error related problem. (R10) As RPA had capabilities to run rule-based tasks with speed and required accuracy, it was perceived as a solution also for this problem. (R13) One respondent explained the match between RPA attributes and the organization,

“Speed and quality obviously are always important when closing of the books has to be done very quickly and if we can help that at all, it’s great. And reducing boring transactional work is a good target for any organization, that people can then do some value adding work, where real thinking is needed. Like analytics, instead of just boring work where you just go to one place and click, and copy paste data from one place to another. It is very boring.” (R16)

In addition to the described fit with the organizational need for RPA, RPA was also described to fit the organization from procedural perspective. R12 described that RPA was a good fit for Finance delivery as an organization as they have a lot of manual transactional processes, which are due to global process model rather structured. Having such robust, mature and structured processes and documentation in place supported the decision that Finance delivery would be the first function within Stora Enso to adopt RPA. (R12) In relation to the RPA-procedural fit, another respondent described that Finance delivery had been working with automation technologies and also outsourcing already in the past, and even RPA as a technology was a new thing in the organization, the workforce was seen to be used to trying to avoid manual tasks and finding new ways to do things more efficiently. (R21) One respondent described that some streamlining and re-thinking of the processes was definitely needed to automate with RPA but because the process documentation already existed due to outsourcing, it made also the streamlining was easier. (R3) However despite the perceived fit between Finance delivery and RPA, some harmonization of processes was described to be
needed before implementations. For example, three respondents described that during the development it was noted that some in-house processes that were chosen to be automated weren’t that harmonized between the performing organizational members and some process re-engineering was required. (R11, R15, R20) One respondent described,

“It (RPA) has challenged our policies and practices, different processes, how agile they are and how well those can be adapted to suit best for RPA.” (R20)

6.2.2 Previous experience

It was described that Finance delivery was quite capable of doing things from SAP perspective, and this experience was also perceived to help in the RPA development. (R11) However especially RPA-specific implementation experience, learnings and better understanding, were perceived to be needed to develop greater ability to scale-up (R20) and develop robots faster. (R11) One respondent described with experience one learns what you should concentrate on in the development and implementation of RPA. (R9) Limited skills and understanding about RPA was seen as a barrier for adoption and through experience these barriers could be diminished. (R20)

“It takes the lessons learned. Learning is needed when starting the project. But I am confident that once we have the knowledge in-house and now also experience from several ones, I think it is quicker to build a robot for certain process.” (R11)

More specifically the main finding related to organizational experience was that six respondents emphasized the role of the pilot project, POC, in creating better knowledge about the capabilities of RPA and positive attitude toward RPA. (R17, R12, R21, R3, R11, R13) After the pilot project people saw that RPA could be something that really works, which decreased the resistance toward it. (R11) One respondent also described that the POC experience created trust and confidence to continue and made it easier for individuals to get on board. (R12). On the other hand, it also created better understanding on the limitations of RPA, one respondent described that based on the POC they understood that the basic RPA solution wasn’t capable of answering to their requirements and hence should be enhanced with other technologies to match better their needs. (R3)

“Finance already did some first POC’s in this space and based on those experiences our teams already saw that there is opportunity in this area. So they learned a lot based on those, certain things were understood that maybe it’s not that well supporting those kind of processes, but on the other hand in these and these areas we really see huge opportunity. So the interest was there already but then also these experiences that our team had already, so that was creating trust and confidence that this is definitely something we want to continue.” (R12)

6.2.3 RPA capabilities

Finance delivery hadn’t worked earlier with RPA, so the needed capabilities were originally missing and hence developed and acquired during the adoption process. It was brought up by six respondents that to use the technology, meaning to build and maintain the robot, technical knowledge and capabilities were perceived to be needed (R11, R4, R12, R16, R6, R19) and three respondents emphasized that RPA development team needed to have knowledge about
both financial processes and the technical side of RPA. (R3, R16, R10) Seven respondents emphasized the role of the external partner in bringing in the technical capabilities needed to be able to develop and maintain the robots. (R14, R16, R3, R5, R19, R20, R12) The external partner was described to have the resources and competence in place and was able to help with the planning and designing of internal capabilities and related organizational set up, Centre of Excellence structure. (R19) However due to the RPA technology being new, it was stated that it is still long way to go and a learning curve for both internal and external resources to develop the capabilities to build reliable robots. (R19) As RPA hadn’t been applied widely to finance sector before, even the capabilities and knowledge of external partner was questioned. It was suggested that if external partner would have had more experience where RPA is applicable, perhaps the selection of process areas could have been done more successfully (R12).

As the centralised CoE and related capabilities weren’t in place in time as planned, the external partner’s resources were still needed in developments, implementations and maintenance of RPA. (R19, R20, R12) However two respondents described how all the RPA benefits related to speed and cost couldn’t be reached due to this dependency of external partner. (R4, R14) It was also mentioned that working with an external partner increased bureaucracy and slowness in the process and caused more stress and problems as the pressure for the development was coming from two directions. Whereas working with internal RPA development was perceived as very positive. (R4) One respondent described the influence of this reliance on external partner capabilities as follows,

“What we really need to do in Stora Enso somehow is to make the development of RPA, first of all faster and then cheaper. So currently it is taking quite a long time, even though we have many resources form the external partner, from the idea to actually getting the RPA automation done. And all the analyses and decision makings take too long time and it is too expensive. So, my expectation is that when we start to ramp up our own competencies for the RPA, then we can skip all kinds of sourcing processes and things like that.” (R14)

One of the main findings related to the RPA capabilities was that despite the technical support provided by the external partner five respondents explicitly mentioned that more IT support and resourcing would have been needed during the development. (R17, R4, R11, R10, R15) One respondent described that the lack of dedicated IT resourcing and support from their side has been a big issue and barrier in the process. As RPA is built around other IT systems and business people are busy with other work, IT help would have been needed from the beginning of the project to solve emerging issues. (R4) More IT support would have been needed also when selecting the processes, to evaluate what is the best alternative for the automation as it was learned that RPA is not always the smoothest way to do it. (R11) One respondent described that the high-level heat mapping done with IT wasn’t sufficient to succeed in process selection. (R17) While the process side resourcing was perceived to be planned well, it was perceived that they weren’t prepared how much technical resourcing development of RPA would require and finding out the right contacts from IT during the development and getting the dedicated resourcing had been causing the main delay for the adoption process. (R10) However one respondent perceived that there wasn’t need for
involving IT, as the IT part was outsourced to the external partner, who supported sufficiently with the technical issues. (R5) One respondent described the lack of IT support as follows, “Well we didn’t have any resources in the beginning for the robotics, if we think about technological point of view. We didn’t get any support from out Stora Enso internal parties, so we were basically business people designing this and business people trying to understand how this works and what are the risks in our robotic development. So that has been a bit rocky road.” (R17)

6.2.4 Internal organizational support

After the initial scepticism of some organizational members had disappeared, all 21 organizational members described to have positive attitude towards RPA and its implementation. When asked about the main facilitator for the adoption process of RPA, one respondent described it to be the open atmosphere towards developing things (R10) and another emphasized that employees has been very adaptive and eager to find processes for automation. (R21) It was described that within Finance delivery everyone has been more or less eager to start the development (R3) and employees within the process teams described to be eager to get new RPA developments and more help from robots. (R18, R8, R1)

“Well I think that people have been adaptive to this idea to automate, it is helping a lot. Also, they have been really eager to find the processes that could be automated, and this is of course not always natural when your work is about to get automated. But on the other hand, we are now only touching the surface, so there has not been yet automated any remarkable processes.” (R21)

19 respondents perceived that RPA had a strong management support. 5 respondents described the management support towards RPA and digitalisation as an enabler for the adoption. (R21, R3, R4, R16, R11) One respondent emphasized that the strong top management support, and the aim and resources they have provided, made it possible for FD to be a forerunner in this RPA area. (R11) The digitalisation fund was described to give possibilities to start utilizing new technologies in Stora Enso and Finance Delivery. (R21) The top management was perceived to put a lot of money and support for the topic, which helped in taking concrete actions with RPA. (R3) One respondent explained that there had been more financial resources available than actually needed. (R16). Also, the push and the positive attitudes was described to help in proceeding with the RPA cases and perceived as a key facilitator for the RPA adoption. (R4) One respondent described the influence of top management support towards the RPA adoption as follows, “This would not be possible without the top management support, because we need the consulting to be in the budget and we need the okay from the management that we are putting time and effort on this, we have the licence, the tool. So all these things have a cost, so those have been approved by the top management. It is a big enabler. (R16)

6.2.5 Analysis

The key findings found from the empirical data under the category of organizational attributes, will be analysed under the four main influencing factors; RPA’s organizational fit, Previous experience, RPA capabilities and Internal organizational support.
The organizational fit theme reflects the suitability of RPA to the internal organizational context of Finance delivery. Finance delivery was described to have structured, mature, transactional processes with existing process descriptions, and these internal procedural factors were perceived to have influenced the decision to pioneer and adopt RPA in Finance delivery as the first organization in Stora Enso. In addition to the procedural fit, one of the main findings within this theme was that respondents recognized also a strategic fit between Finance delivery and RPA, and it was perceived as an enabler for the strategy. Secondly, RPA was perceived to be helping in the organizational operational problems related to month-end closing and quality issues. These empirical findings demonstrate that RPA has perceived as a suitable technology to the organization, both at strategic and operational level, facilitating the adoption.

Also, adoption theory recognizes that the suitability of the innovation to the adoption context influences the adoption process. The theoretical term compatibility, introduced by Rogers (2003) as a part of DOI, reflects whether the innovation is compatible with the existing values, experiences, needs and problems of the individuals within the social system. High compatibility is perceived to predict higher adoption. (Kee, 2017) In addition, the norms of the social system reflecting the way things are done in the social system, previous practice and felt need/problems is suggested to influence the adoption decision as prior conditions. (Rogers, 2003) In the empirical case context, both the procedural traditions and the Finance delivery strategy and vision focusing on digitalisation can be perceived to reflect the values and norms of the organization. Whereas the need/problem part of the compatibility concept can be reflected in the time-pressure and quality issues Finance Delivery was perceived to have. As mentioned in earlier sections, the time related advantages of RPA were the most referred advantage in the empirical data, and as the month-end-closing was described as an issue in Finance delivery, the fit between the technology and organization in this case is visible.

Also, the concepts of appropriateness and discrepancy introduced in change institutionalization model (Armenakis, Harris & Field, 1999) and embedded also to the conceptual model for this study in Perceived need and appropriateness construct, can be associated with these findings. These theoretical concepts reflect the beliefs related to need for change and the appropriateness of the suggested change for the specific need. According to the original model they are two of the five key beliefs that determine the individual level acceptance of change and the eventual institutionalization of it, and the better the fit between the constructs, the more likely the institutionalization is. Having such a clear and visible fit between the need for change in Finance delivery and appropriateness of RPA in enabling and solving the needs and problems both at strategic and operational level, can be seen to facilitate the adoption process of RPA and also help in creating the needed commitment to institutionalize it.
Previous experience

The second theme emerged under the Organizational attribute category was previous experience, which can also be associated with the theoretical concept of compatibility (Rogers, 2003) and more specifically with the experience part of the definition. One of the findings from the empirical data was that having the earlier experience from RPA and especially from piloting of RPA with POC was beneficial for the adoption process and later implementations as it increased understanding and knowledge about RPA, but also created trust, confidence to continue and made it easier for individuals to get on board. Limited skills and understanding about RPA was perceived as a barrier for adoption and through experience these barriers could be diminished. These responses demonstrate that the experience with RPA was perceived to increase the capabilities, decrease the resistance and increase the commitment toward RPA. In addition, the concept of trialability by Rogers (2003) as one innovation characteristics suggests that the ability to experiment with the innovation has a positive association with adoption as it decreases the perceived risk. (Kee, 2017) Also in the empirical data the POC experience and experimentation of RPA was perceived to increase the trust, meaning that also the risk associated with it decreased.

Also, Ajzen (1991) as part of TPB suggested that the individual's ability to perform a behaviour is influenced by the access to or availability of resource factors such as money, skills and cooperation. In relation to the empirical data, the experience with RPA was perceived to increase the RPA skills, meaning that after the POC Finance delivery had better availability and access to the skills required to succeed in RPA implementations, hence also the beliefs related to the capability to succeed increased. In the conceptual model for this study, these capability beliefs are embedded to the Perceived capabilities construct, which consist of Control beliefs derived from earlier mentioned TPB and Self-efficacy derived from the Change institutionalization model.

RPA capabilities

In relation to RPA Capabilities theme, one of the main findings was that to be able to build, implement and maintain RPA robots successfully, technical RPA capabilities and knowledge was perceived to be needed and hence the existing in-house competencies, skills and knowledge was complemented with external partner’s technical resources. However interestingly despite these investments, one of the findings was that more dedicated internal IT resourcing was perceived to be needed. Empirical data described that IT support was perceived to be needed to solve the emerging technical issues during development, and for example finding the right IT contacts was currently perceived to cause the main delay for the implementation. This finding suggests that the individuals perceived that at the time of development they didn’t have all the capabilities needed for smooth implementation of RPA, which inhibited the adoption process. These findings can be associated with the skill and cooperation of others variables suggested by Ajzen (1991). He suggested that access and availability of these factors influence individual’s ability to perform behaviour and that they could be reflected in the beliefs related to perceived behavioural control. Hence the belief
construct of Perceived capabilities in the conceptual model capturing the concepts of control beliefs and self-efficacy, can be associated also with this finding of lack of IT resourcing.

**Internal organizational support**

Ajzen (1991) suggested as a part of TPB that resource-based factors, including co-operation of others money and skills, influence the individual’s ability to perform a suggested behaviour and hence also the acceptance. And in UTAUT Social factors, referring to the use and support of other within the social system, was perceived to influence the acceptance. (Venkatesh, Morris, Davis & Davis, 2003) These resource and support factors were also referred to in the case study context. For example, in the empirical data both employees and management were perceived to be supporting the RPA and have positive approach towards it. Employees were described to be adaptive and eager to diffuse the RPA in the organization and for example management was described to provide all the needed resources. Without these resources the adoption of RPA wouldn’t be possible, hence they were perceived as an enabler to pioneer and proceed with RPA.

The management support can be associated also here with the beliefs related to the individuals’ and organization’s capabilities to succeed in the proposed change and adoption. These capability related beliefs refer specifically to the theoretical concepts of control beliefs in TPB and self-efficacy in change institutionalization model. Additionally, also in DOI the concept of Innovativeness is influenced by the organizational members and especially by the attitudes of leadership. (Oliveira & Martins, 2011) According to Rogers (2003) this organizational innovativeness reflects how early the organization is adopting the innovation. This can be seen also in the responses in empirical material that mention that the management support enabled the pioneering or RPA, in other words, being an innovator with the RPA in Stora Enso and Finance sector in general. However in relation to innovativeness, there is also multiple other factors that affect how early adopters are at adopting innovations, that weren’t directly investigated in this study. These are the internal characteristics of the organization such as size, slack, centralisation, complexity, formalization, interconnectedness and external characteristics of the organization reflecting for example the system openness. (Oliveira & Martins, 2011)

The positive and open atmosphere towards developing things was perceived as one of the main facilitators for the adoption process. From theoretical perspective this finding can be associated with the influence of social environment towards the adoption. For example, this concept of social influence is embedded to TRA and TPB (Normative beliefs/Subjective norm), UTAUT (Social influence) and change institutionalization frameworks (Principal support), and hence also embedded to the conceptual model of the study through the Social pressure and influence construct. For example, in TRA (Ajzen & Fishbein, 1975) and TPB (Ajzen, 1985) the individual’s beliefs about how important the referent group thinks that performing the behaviour is and individual’s motivation to comply with those expectations influences the individual’s acceptance. Hence, also in the empirical context it is expected that the attitudes and perceptions of both management and other employees influence the
acceptance of individuals, especially if individual has the motivation to act upon the expectations of others. Hence also in the empirical context it is expected that the strong organizational support both at management and employee level has facilitated the RPA adoption and implementations.

6.3 Individual attributes

The third construct described to influence the adoption process in the conceptual model is the individual attributes. Under this category the findings and perceptions related to the influence of individual attributes are described. In following sections, key findings from the empirical data will be described under the main theme of individual reactions.

6.3.1 Individual reactions

When asking about their current personal attitudes toward RPA, all 23 respondents saw it as a positive initiative. However, eight respondents emphasized that there was some scepticism and resistance at the beginning of adoption process, but it was perceived to disappear and turn to more positive attitude when individuals saw the robot succeeding. (R2, R1, R17, R15, R21, R7, R11, R13). Three respondents explained the differences in initial reactions with personality differences; some people are more sceptic and some people more open to new things. (R9, R21, R1) Relatedly, two respondents referred to individuals’ trust issues toward robots. One respondent described that some individuals perceived it as difficult to trust to the robot and felt that human could do certain tasks more reliably themselves (R15) and the other described that she would never trust a robot more than a human. (R7) One respondent opened up her personal journey with RPA as follows,

“I will be honest about me. I was I think the only person in the team who was kind of pessimistic, not a pessimistic, but that kind of realistic. I was for example, I can’t expect that the robot can do all human work, yeah for example, I truly didn’t believe it. …. The turning point was when, I would say the first and after long time after the implementations, I saw that the robots checked the case absolutely correctly as we expected.” (R7)

In addition to the personality differences also time resources available on individual level were brought up; seven respondents referred to the time constraints influencing the adoption process. (R1, R15, R21, R5, R7, R8, R9) For example, one respondent described that the timing chosen for the implementation was perceived to be poor; the time and human resources were limited and heavy time pressure to finish the project in time. This created stress and team didn’t take it in a good way. (R1) R21 explained that there are other competing development projects ongoing, which occupy the employees’ resources and perceived that lack of individual level time-resources makes also the acceptance more challenging; people tend to have more positive attitude if they have time to concentrate on the project. And another respondent described that because he was so heavily involved in another development project, she couldn’t dedicate her time too much to RPA project and the lack of time was also reason for why she couldn’t follow the communication about RPA and participate in some training sessions. (R15) The development projects come always on top of everything else, hence increasing the total workload. (R5) One respondent described that the extra workload
that comes with development projects makes it difficult to indent individuals, hence there should be assigned additional project people also for RPA project. (R15) One respondent described that at the beginning of the RPA development, she felt unhappy to spend all the time with the project, not having any time to do her daily work. (R7)

“It has not been easy for people to concentrate to these automations, as we have had quite much operational tasks for people and also many other projects. That has been one thing that always when you have some extra it is challenging. And if you have really time to concentrate on one thing you feel it much more positive.” (R21)

10 respondents brought up during the interviews that RPA project was perceived as interesting. (R15, R18, R17, R8, R7, R5, R1, R13, R16, R21, R9) However, when the respondents were asked to specify their personal motivation to embrace RPA, the underlying factors varied. Following key themes were identified; intrinsic eagerness for operational development and efficiencies (R21, R16, R14, R11, R10, R5, R2), excitement and interest toward new technology (R15, R17, R19, R14, R6, R4, R16) opportunity to learn new (R20, R21, R19, R7, R1, R16, R13) and opportunity to be a pioneer in this area (R12, R3, R16, R2).

6.3.2 Analysis

The main finding was that all respondents described to have currently a positive attitude towards RPA, however at the early stages of adoption initial scepticism toward the initiative had occurred. Rogers (2003) explains these differences in the individual’s adoption with the concept of innovativeness and adopter categories; early adopters stand higher uncertainty and late adopters tend to be more sceptic toward innovations at the beginning. This theoretical idea of individual differences in adoption can be associated also with the empirical data. For example, the initial reactions were explained through the personality differences and the turning point from scepticism to positive attitude was described to be when seeing that the output was finally correct. This can be seen as a sign that also in the case study, some individuals that could be described as late adopters, didn’t feel comfortable with the early uncertainty and needed proof of success to accept the RPA. Also, both UTAUT framework (Venkates, Morris, Davis & Davis, 2003) and the concept of compatibility in Innovation characteristics framework (Rogers, 2003) suggest that the adoption process is facilitated if individual’s previous experience is compatible with the innovation. This means that if individual has been able to see that the RPA works successfully, this experience supports the adoption and acceptance of the RPA.

One of the key findings was also that the adoption process was perceived to be influenced also by the availability of individuals’ time resources. Even Ajzen (1991) didn’t explicitly mention time resources to influence the control beliefs, when describing the influence of resource factors such as money, skills and co-operation, time can be perceived as a resource that influences individuals ability to engage into a behaviour. For example, in the empirical data it was perceived that availability of time influenced the individual’s ability to be involved in the RPA project and participate in trainings. Additionally, the data described that if an individual didn’t have time to concentrate to the RPA project, the attitude was perceived to be more negative. As a conclusion, it is reasonable to suggest that also time resources, together
with the skill, money and cooperation of others, can influence the perceived capabilities of an individual. Additionally, one of the findings was related to the intrinsic motivation for individuals, however, none of the theoretical frameworks considered in this study explicitly explain the intrinsic motivation factors. But in the empirical material, these factors varied between individuals.

Despite the individual attributes were perceived to influence the acceptance of RPA, it seems that innovation and organizational attributes together with the management facilitation seems to have stronger influence, as they received more attention in the interviews. Also Lewin (1947) suggest that individuals tend to act rather as a member of a group than based on their personal preferences toward the change. This is because resistance toward change is perceived as a social habit and commitment to the current state, but if the value of this habit is decreased though other forces, also the resistance will decrease. These opposing forces in RPA’s case could be for example the perceived advantages made visible to the organizational members by the communication initiated by the management.

6.4 Management facilitation attributes

The fourth construct described to influence the adoption process in the conceptual model is the attributes of management facilitation. Under this category all the findings and perceptions related to management interventions are described. The five main factors identified from the empirical data are Management support, Communication, Experience and knowledge sharing, Skill Development and training and Employee involvement.

6.4.1 Management support

All respondents, except two, perceived that RPA had a strong management support. These two organizational members couldn’t directly say if top management support existed but perceived that the operational level support was in place and their own management deeply involved in the development of RPA. (R8, R7) It was described to be a group level decision coming from the executive management, that Stora Enso wants to be the forerunner in the digitalisation field and start experimenting with new technologies. (R12) The CEO was described to follow RPA progress carefully and management perceived to be communicating about RPA, new technology and digitalisation in general. (R14) The management commitment to RPA was perceived to be reflected in the development of a clear Digitalisation strategy and vision, which communicated a detailed shared goal to the organization. (R17) The top management support had been visible also through the financial investments in new recruitments to the Digitalisation area within Stora Enso. (R16) One respondent described that top management support toward digitalisation and automation made the RPA adoption process easier, but also more pleasant as one knew that one is working towards common good and goal. (R15) Five respondents described how top management support and the resources they provided were seen as a crucial enabler for adoption of RPA. (R21, R3, R16, R11, R4) One respondent emphasized that the strong top management support and the aim and resources they provided, made it possible for Finance delivery to be a forerunner in this RPA
area. (R11) The strong push and the positive attitudes in management were perceived to be the main facilitator for the adoption process and enabled that the teams could proceed with the RPA cases on practical level. (R4)

I think we are in that sense in a very good situation that our CFO and CEO are definitely pushing us towards digitalisation and now it is part of our company strategy as well. Stora Enso is putting a lot of money and effort on this digitalisation topic. So it clearly helps us also to move forward with these concrete actions with RPA. (R3)

By one respondent RPA was described to be forcefully pushed by the management (R17), however this strong support and push towards RPA was perceived to have also some downsides by three respondents. (R4, R17, R15) It was experienced that there was big push to use RPA in every case possible, while actually in some cases other automation technologies might be more efficient. (R4) And one respondent described that the strong push was perceived to cause negative pressure, as there were time constraints due to other urgent work. (R15) It was described that in some cases Finance delivery had been doing automations too fast, without thorough analysis what would be the most viable solution. (R14)

“There was this fiercely pressure to get this robotics up and running, we didn’t have the time to think what the correct automation methods are. Because for instance we could have had some kind of macros more easily for certain processes, perhaps not for these, but for other processes. So we could have this automation in place with different styles and that is only now I am hearing that as it took so long time, that we could have had something else.” (R17)

6.4.2 Communication

The focus of the communication in finance delivery was perceived to be especially in sharing the success stories, which was brought up by 10 respondents (R18, R12, R11, R5, R4, R21, R3, R13, R19, R16) Five respondents explicitly mentioned that hearing about success stories and positive experiences would create positive attitudes among organizational members (R21, R3, R13, R19, R12). Also hearing about the achievements of external finance communities and peers was perceived to create confidence and interest toward RPA deployment. (R12) The current communication around RPA was perceived to be focused on the positive side of RPA and in addition to sharing the success stories, the communication content was emphasizing the opportunity to move from routine to analytical work. (R5) One respondent described that the opportunity to learn something new and to develop one’s skills was also embedded to the message (R16). It was described that Finance delivery had communicated about the RPA progress, were honest about the challenges and shared the feedback of the people involved in RPA projects (R21), but in contrary another respondent described the communication content as follows,

“Mostly the success stories, let’s put it that way. I have few colleagues working next to me who has been working with RPA and with them we have discussed of course the issues as well. But the issues, since we are human, the issues are not the things that you may bring up in every single discussion or e-mail chain.” (R4)

Communication was perceived as a tool to decrease resistance and scepticism as in lack of understanding individuals tend to have an automatic reaction of seeing the negative side and developing fear. (R13) Individuals questioned if the robot could actually do the job in
question, and it was described by one respondent that convincing and building the trust was needed to turn the attitudes toward more positive. (R17) It was perceived that currently employee change management perspective wasn’t as crucial because the RPA’s impact was still limited. When RPA will be scaled, intelligent solutions combined with it, the hard benefits will become more visible and also change management considerations are seen to become increasingly important. (R20) It is suggested that communication is in key role in the management of the human side, “A true, clear and realistic message as possible, because people are smart, and you cannot start promising. Because most probably there is going to be some areas where we will not need people to anymore, unless they are able to evolve to some other task. I think the main thing is to be clear and open in communication whether what we are achieving but also about the future plan so that people feel more aware what is happening and what will happen.” (R13)

The most referred communication channel related to RPA was the calls happening in different levels of organization, and it was mentioned by 11 respondents. (R15, R11, R10, R20, R19, R16, R4, R3, R5, R2) It was described that in these CFO and group controlling calls the management was mainly informing about the progress with digitalization and automation in summary level. (R10) Information calls open to all within Stora Enso were also utilized and news about RPA published in specific internal sites, however it was perceived that even more channels should be used to reinforce RPA message and motivate people to join RPA journey. (R20) Additionally it was perceived that there were differences between the effectiveness of communication channels; just sending slides, e-mails, or publishing posts in web pages wouldn’t make people to relate and get interested. (R13) Additionally, RPA project was also embedded to the Finance delivery strategy and related vision and targets, and RPA related communication perceived to be visible also through it by eight respondents. (R15, R9, R16, R3, R10, R17, R12, R13) This clearly defined Digitalisation strategy was perceived to help to communicate the targets and concrete activities to the teams in order to move to the right direction. (R12) One respondent described that the strategy had been communicated clearly, giving a common goal for the organization, this was perceived to reflect also the management support toward the RPA topic. (R17)

“It’s basically coming out from every single source that we are having. As said it is part of our strategy and it is communicated also there and all possible monthly calls, CEO calls, CFO calls, our Group Controlling calls we are talking about it. Also presenting the practical things and examples, and also plans how are we going forward in this area.” (R3)

6.4.3 Experience and knowledge sharing

Even comprehensive information exchange like sharing concrete experiences, learnings and best-practices from the own environment was seen to be the most effective way to diffuse RPA within the organization (R12), the focus of the current communication in finance delivery was perceived to be in the success stories, which was brought up by 10 respondents. (R18, R12, R11, R5, R4, R21, R3, R13, R19, R16) Eight respondents mentioned that formal information and knowledge exchange between the process streams wasn’t happening that much or could be improved. (R18, R4, R7, R5, R10, R12, R17, R2) Organizational members were relying on corridor discussions (R10), own contacts within the organization (R17) and to
the colleagues sitting next by. (R4) It was described that teams didn’t always know what is happening in the other streams in relation to the RPA development and hence the issues didn’t come out. (R4) One respondent described that the knowledge sharing related to RPA was more of an announcement that new robot has been taken into use and explanation what it does, but issues encountered or feedback from other streams weren’t discussed that much. (R5) Three respondents recognized that such knowledge sharing between the streams could be increased. (R10, R12, R4) As there was no centralized project set up within Finance delivery, it was perceived that the issues the streams were facing during development weren’t coming up. (R17)

“The I am pretty sure that we have actually faced, all of our processes meaning p-to- p, o-to- c and r-to- r, the same issues. But then as there hasn’t been any project management from our side, it has been mainly an IT project, these has not been gathered and used. So basically, how I did it, I informally then called to other team members as I know them. (R17)

However, one respondent perceived that now with the local CoE, the organization was more open about identifying and getting all the issues faced by the process teams listed in relation to RPA development and process selection, as there might be some best practices. (R4) It was suggested that sharing knowledge at the beginning of the adoption process in relation to what RPA is actually capable to do and automate would be beneficial, as it was perceived that individuals had very varying expectations for RPA and some of them were not fully realistic creating misunderstandings later in the process. (R5) Two respondents described how they had too high expectations for the robot at the beginning of the project, and how they didn’t expect so many errors coming up during the implementation. (R7, R8) The expectations for RPA were that they would be able to automate end-to-end processes, but this turned out to be challenging. Instead it was suggested that RPA should be utilized more in small, easy tasks that could be automated fast, which would give also faster benefits (R21).

6.4.4 Skill Development and training

Six respondents described that the skill development and learning in relation to RPA was happening through learning through practice mentality. (R18, R16, R12, R11, R1, R7) Learning by doing and gathering implementation experience was perceived to be the most effective way to learn the issues and what is possible to do with RPA. (R16) One respondent described that she didn’t understand to ask more training for RPA as she felt that by learning on your own one could find out the logic behind RPA and gain understanding on how RPA works. (R1) Other respondent explained that as they didn’t touch the technical side, there wasn’t need to develop any new capabilities and skills, it was only the mind-set of the robot that needed to be grasped. Through learning by doing they were able to gain the knowledge about the best way to robotize and what should be considered when planning for it. (R11) One respondent described that the self-education and becoming a specialist in her own processes, was a big advantage of the development process. (R7) Additionally it was suggested that if automations would be started with small tasks it would give the head’s up what is required for more complex automations. (R10) One respondent described that the short-term focus should be in these quick win sub-processes that could be later on then combined into more end-to-end processes. (R13)
“I think it is learning by doing, it is not sitting in the trainings, but really, when you are trying to robotize one process, then you learn what the issues are and what is possible.” (R16)

A few new people were acquired with technical expertise to the CoE team. (R12, R19) However described by four respondents, the formal training activities about the software in use was focused for the individuals carrying out the technical RPA development in this CoE (R19, R20, R10, R6) and common understanding between four respondents was that as process teams didn’t touch the technical side of RPA, no extensive training was needed for them. (R21, R11, R5, R1) However according to six respondents, to be able to succeed in process selection in future, increasing technical training and understanding among process people was needed. (R2, R17, R3, R13, R10, R4) One respondent described that even there was a separate technical CoE, also process teams need to get technical knowledge and training to be able to give ideas for automations and avoid misunderstandings in relation to what needs to be done and what the end result should look like. (R13) Another respondent described that there could be much more basic training for process people to increase the awareness that what can be done with RPA. (R3) On the other hand one process team member pointed out that due to restricted time resources, process people wouldn’t necessarily have enough time to do extensive RPA trainings on top of normal work. (R18)

6.4.5 Employee involvement

All 21 interviews were focused on the individuals who had been involved in the RPA project. 14 respondents described that the process teams and people had been involved in RPA decision-making by suggesting and selecting the processes to be automated. (R21, R18, R2, R9, R5, R17, R12, R18, R15, R10, R8, R16, R13, R1) It was perceived that these suggestions were taken into account in the final decision-making, and acknowledgment given from the management for participation to the project. (R18) Two respondents explicitly expressed that employee involvement is important to create positive attitude toward the initiative. (R13, R12) However so far it was perceived that quite limited amount of people was involved in the RPA project, and to give insights what RPA is about and increase understanding about it, it was seen important to involve people more in future. (R10) But for example monthly calls was seen as a good way to involve these members who were not working with the RPA development regularly. (R4)

“We have taken the approach to be open about it (RPA) and introduce it what it is all about. Really given people the chance, in specialist level to be part of it, so it is not something that you mystify, or you need to be afraid of, that someone else is now stealing your thing. That you are part of defining what you want the robot to do for you, and then as said to be part of the process all along when the robots are developed. You are all the time on top of it, you are testing it, you are giving feedback and so on. (R12)

Even process teams were involved to initiate the processes to be automated, the final decisions were made by a steering group. (R12) Two respondents described that process teams weren’t involved in the later stages of decision-making, agreeing and contractual things. (R10, R3) This lack of involvement was perceived to cause misunderstandings between the parties about for example the heaviness of the processes selected (R10) and
whether the chosen solution could actually deliver with the end-result needed. (R3) One respondent described that the project was handed over without opportunity to influence for example the timing of the project, which caused stress in the early development, created negativity among individuals and wasn’t seen as a good approach in general. (R1)

6.4.6 Analysis

The five key themes identified from the empirical data under the management facilitation attributes were management support, communication, experience and knowledge sharing, skill development and training and employee involvement, all of them analysed separately below in relation to the chosen theoretical frameworks.

Management support

In relation to the first theme, Management support, the key finding was that management was perceived to show strong support towards RPA and the resources they provided were seen to enable the pioneering of RPA and taking the practical level concrete actions with RPA. It was described to make the adoption process easier, but also more pleasant, as one knew that one is working towards common good and goal. Based on these empirical findings, Finance delivery can be perceived to have benefitted from the management support given to the RPA project. Also the change management theory suggests that management support is needed for successful change. Within the change management stream Holt, Armenakis, Harris & Feild (2007a) suggested that leaders’ commitment to proposed change influence also the individual’s readiness for change positively. And according to Kotter (1995) successful change requires creating a change coalition with strong leadership and relatedly Appelbaum, et. al. (2012) stated that visible and continuous support and facilitative management is necessary for change success.

The concept of principal support introduced in change institutionalization framework is embedded also to the Social pressure and influence construct in conceptual model together with the social influence factors derived from UTAUT and subjective norm in TPB and TRA models. Also in relation to the case study, as RPA was embedded to the strategy of Finance delivery, it can be assumed that organizational members sensed a strong pressure to realise the strategy, simultaneously accelerating also RPA adoption. However, on the other hand, one of the main findings from the empirical data was the perceived deficiency related to this pressure and strong push coming from the top management. The strong support and push was described to lead to a situation where not enough time was spent on evaluating if RPA’s capabilities were actually suitable to automate the specific process. In Kotter’s change model (1995) creating and communicating urgency is perceived as crucial tactics for management to accelerate change. Kotter describes that broadly and dramatically communicated urgency is needed to create motivation among organizational members to support the change. However, related to this urgency aspect Appelbaum et. al. (2012) pointed out that rushed change might not leave enough room for individuals to adapt to change in an appropriate way and this thought can be also associated with the empirical data, where there wasn’t left enough time to
actually understand the capabilities of the innovation that was adopted due to the strong pressure to adopt.

**Communication**

In relation to the second theme Communication, one of the main findings was that the communication in Finance delivery had been focusing on the positive side of RPA and specifically to sharing success stories from the Finance delivery’s own environment. It was perceived that hearing about positive experiences would also create positive perceptions about RPA. Vicarious trial is incorporated as a one diffusion practice in the conceptual model. In the DOI framework it was suggested that individuals tend to want to try the innovation in their own context before making the adoption decision, hence vicarious trial can facilitate the process. (Sahin, 2006) This can be associated with the empirical finding that hearing about successful trials of others can also support the adoption and acceptance process of other organizational members. Also, the management of internal information was mentioned as one tactics in the conceptual model. Armenakis, Harris and Feild (1999) suggest that as a part of the information exchange management should for example embed employee attitudes, and indicators regarding the productivity and performance gains to the message to facilitate the adoption process. Based on the empirical data, it seems that also the management of Finance delivery has been reinforcing the change message and facilitating the adoption by sharing the success stories.

Based on the empirical data RPA related communication was focused on channels that reach wider audience, as it was perceived that RPA topic was shared mainly through group calls. This tactic can be associated with Rogers (2003) concept of mass media channels. They are channels that reach large audience, create knowledge and spread information effectively in the social system and hence, they are often used to create initial awareness of the change. Focus on large audience in communication fits also to the Lewin’s (1947) considerations about change, as he suggests that individuals should be influenced as a group, not as individuals, as also the resistance toward change stems from a social habit. Also the empirical data recognized the role of communication in decreasing resistance, creating trust and persuasion. However wide-reaching formal communication channels aren’t always necessarily the most effective way to communicate. Both by DOI (Rogers, 2003) and change institutionalization framework (Armenakis, Harris & Feild, 1999) suggest that communication between individuals who share for example similar social status is more effective in regard to altering attitudes. Hence the formal communication isn’t the only channel that influences that individuals and actually informal discussions between organizational members or within teams might me more effective and persuasive in attitude formation than the formal discussions.

Additionally, one of the key communication related findings was that RPA was perceived to be visibly communicated also through the strategy and vision, providing a shared goal and direction for the organization. This tactic used in Finance delivery is also recognized by the theory and hence it is embedded to the conceptual model as part of Persuasive communication.
construct. Kotter’s (1995) framework suggests the development and communication of change related vision facilitate the change process by helping the organizational members to understand and act upon the chosen direction. And also in DOI framework as a part of persuasion stage, it is suggested that the attitude formation can be altered by increasing knowledge by providing clear vision for adoption. (Sahin, 2006)

*Experience and knowledge sharing*

The main finding in the empirical data related to experience and knowledge sharing was that even the success stories were perceived to be visible in communication, otherwise there wasn’t that much formal information exchange happening between the process teams. Increasing such knowledge exchange was perceived to needed, as it would help for example in creating realistic expectations and collecting issues related to RPA development and hence help in avoiding repeating the same mistakes as other process streams had made. It was also mentioned that currently this information exchange between the development teams was happening through informal channels using one’s own contacts, as so far there hadn’t been project management from Finance delivery side. However, it was recognized that the development of CoE would help with this aspect of revealing shared issues.

This idea related to learning from others is also reflected in the concept of vicarious learning in the Change institutionalization framework by Armenakis, Harris and Feild (1999) and management of internal and external information is said to generate such learning. (Armenakis & Harris 2002) This concept is also embedded to the conceptual model of the study in active participation construct. Vicarious learning means observing and learning from peers and perceived as a tactics that reinforce positively the individual level change acceptance. (Armenakis & Harris 2002). Also, according to Roger’s (2003), individuals tend to form their opinions based on the subjective evaluations of their peers and diffusion process influenced strongly by imitation and modeling. Learning from peers can help in developing individual’s skills and capabilities and hence also contribute to the self-efficacy beliefs of individuals. This self-efficacy concept is introduced in change institutionalization model and reflects the perceived capability to implement proposed change. (Holt, Armenakis, Harris & Feild, 2007a) This concept is incorporated in the construct of perceived capabilities in conceptual model for this study.

Based on this discussion, if there would be a more centralized channel for such experience exchange, also the issues would become more visible and observable to all organizational members. And for example, Malik and Grag (2017) suggested that to create affective commitment toward change an environment where individuals can have a dialogue and freely voice their concerns is needed.

*Skill development and training*

In relation to the Skill Development and training theme, main finding was that in Finance delivery the competence development with process people had relied on learning through practice mentality, whereas specific training activities were focused for a smaller group of
people who were in charge of the technical development of the robots. This was perceived sufficient, as the process people didn’t work with the technical side of RPA. Also Kotter (1995) and Armenakis, Harris and Feild (1999) recognize the empowerment of organizational members and training and skill development as tactics to reach successful change. Additionally, the concept of enactive mastery in change institutionalization model can be associated with this on-the-job learning tactics used in the Finance delivery as it means the gradual development of skills, knowledge and efficacy of individuals through involvement and practice. (Armenakis & Harris 2002) This concept is embedded to the Active participation construct in the conceptual model and in general, it is suggested that active participation as a tactics is more effective compared to persuasive communication, as it is about profound self-discovery. (Armenakis, Harris, 2009) This comparison can be related also to the empirical data if direct training sessions are regarded as a form of persuasive communication and learning by doing mentality associated with the enactive mastery concept, which is one part of the active participation construct. Then also theory would support the finding that learning by doing was perceived to be most effective way to develop RPA competencies and positive attitudes. Through the opportunity for enactive mastery, individuals develop positive self-efficacy beliefs.

In relation to the process selections it was also suggested that automations should be started with quick to implement small tasks that would then give head’s up what is required for more complex automations. Starting with these small simple tasks can be associated with one of the steps in Kotter’s (1995) model, as he suggests that creation of short-term wins will accelerate the change process. According to Kotter, these wins convince the individuals that the change is delivering the expected outcomes and hence encourage for commitment. And when individuals see that reaching these expected outcomes is possible, the perceptions in relation to the ability to implement change increases. In change institutionalization framework self-efficacy beliefs are believed to be one of the key factors influencing the adoption process and are defined as perceptions about the individuals’ and organization’s ability to implement the change successfully. (Armenakis, Harris & Feild 1999.) Hence focusing on simple RPA implementations at first is expected to facilitate the adoption process.

However, one of the key findings was that respondents perceived that to be able to choose suitable processes for automation, more technical knowledge and training also for process people would be needed. Kotter’s (1995) empowerment step reflects the barriers and obstacles that needs to be removed to succeed in change. These barriers can be related for example to skill limitations, hence empowering individuals involved in change through training is perceived as a crucial activity to reach success. (Appelbaum, Habashy, Malo and Shafiq, 2012) If people perceive that they don’t have sufficient understanding and knowledge about RPA as a technology, the control over the change and adoption process will be inhibited.
Employee involvement

The last theme under the Management facilitation was Employee involvement and one of the main findings was that respondents perceived that organizational members had been involved in the process selections and giving the ideas and suggestions for the automations. This finding can be associated with Lewin’s (1947) theory. He suggests that involvement and participation of individuals to the adoption decision and planning activities increases the probability also for individual level acceptance and commitment. Even if individuals’ personal preferences might be against the change, the shared decision decreases the role of personal preferences and increases the eagerness to act as a member of the group. And for example, with the help of group discussion the motivations can be directed towards wanted direction. Another finding was that according to few respondents, the ability to influence the decision-making later at the process was described to be limited, which was causing some misunderstandings about the expected outcomes between the development parties. Hence focusing on better discussion between the parties involved in the development, the motivations and expectations could be aligned better.

Also change institutionalization framework recognizes the positive influence of participative decision-making and the final version of TAM (Venkatesh & Davis, 1996) recognized the user involvement in design of technological system, influencing the acceptance positively as an external variable. In a similar manner as the empirical data suggested that creating opportunities for involvement was perceived to be positively influencing individuals, also Armenakis and Harris (2002) stated that by offering opportunities for active participation and involvement of employees, management demonstrates that they trust the employees and their wisdom. They stated that such involvement creates a feeling of partnership between the leadership and employees, influencing positively the change process.

7. Conclusions & Discussion

In this section the key findings from the empirical research will be summarised according to the two main research questions set for the study, after which discussion related to the contributions and limitations of the study, suggestions for future research, managerial implications and ethical considerations will be provided.

7.1 Innovation, organizational and individual factors influencing RPA adoption process

The first research question for this study was to identify the key innovation, organizational and individual attribute related factors that influence the adoption process of RPA and secondly explain how the organizational members have perceived these factors to influence the adoption process. Both based on the theoretical and empirical exploration all these three constructs were identified to influence the adoption process of RPA. The support between the theory and empirical part is influenced by the fact that they were developed and conducted simultaneously. The aim of the research was to find explanations from theory to the empirical
findings and hence the data collection and selection of frameworks were interactive and iterative.

The integration of theoretical frameworks and the conceptual model created based on them, suggested that the innovation, organizational and individual attributes affect the adoption process through the beliefs of individuals. The five key beliefs integrated from the different theoretical frameworks were summarised into five key belief constructs; perceived need and appropriateness, effort, social pressure/influence, capabilities and benefits. The main focus of the empirical analysis was to reflect the empirical findings against the innovation, organizational and individual factors found from the theory and incorporated to the conceptual model, but also connections to the key belief construct mediating the adoption process was done. The summary of the empirical findings in relation to the first research question and related sub question can be found from the Table 4. While the factors influencing the adoption process are separated under the innovation, organizational and individual attribute categories, findings related to how they influenced the adoption process are summarised in the descriptions of these factors. Hence the table reflects the answers to both research question one and to its sub-question.

Table 4. Summary of key empirical findings in relation to innovation, organizational and individual factors.

<table>
<thead>
<tr>
<th>Innovation attributes</th>
<th>Summary of key findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPA benefits</td>
<td>While the perceived short and long-term RPA benefits are diverse and observability of them seen to accelerate the adoption and contribute to RPA acceptance in general, the time-saving based RPA advantages are the most visible for organizational members.</td>
</tr>
<tr>
<td>RPA risks &amp; threats</td>
<td>Reliability issues stemming from RPA’s sensitivity is perceived to be the main risk and future threat and seen to inhibit the adoption of RPA, whereas job loss is not currently perceived as a threat.</td>
</tr>
<tr>
<td>Ease of understanding and use</td>
<td>Perceived complexity of RPA is dependent on technical knowledge and capability factors. For business users RPA is perceived easy to understand on high-level but detail-level technical understanding and using RPA is perceived to be more complex and requires previous technical experience and capabilities.</td>
</tr>
<tr>
<td>Development effort</td>
<td>RPA deployment is not necessarily as easy and quick as initially expected. RPA sets high demand on detailed process descriptions and if applied to non-suitable processes RPA’s performance issues will increase during development, which are perceived to influence negatively the individuals’ perceptions and attitudes.</td>
</tr>
<tr>
<td>RPA-Process Fit</td>
<td>RPA is not suitable for every process and only one alternative for process automation. If RPA is applied to unsuitable processes the development effort needed is experienced to increase, which also inhibits the possibility to reach some of the advantages of RPA.</td>
</tr>
<tr>
<td>Organizational attributes</td>
<td></td>
</tr>
</tbody>
</table>


RPA-Organization Fit | RPA’s fit with organizational procedures, strategy and shared operational problems is seen to facilitate the adoption by creating supporting conditions and need for RPA adoption.

Previous experience | Earlier experience with piloting RPA contributes to effective adoption by removing the limited RPA capabilities as a barrier and turning the attitudes more positive.

RPA capabilities | Development of RPA requires both deep process knowledge and technical RPA capabilities. Strong collaboration between business unit and IT is recommended to be able to access the required technical capabilities during development.

Internal organizational support | Employee and management support, their positive attitudes and provided resources, are perceived to enable and facilitate RPA adoption.

Individual attributes | Individuals personality, available time-resources, previous success with RPA and intrinsic motivation are factors that are perceived to influence the individual reactions and attitudinal stances during the adoption process.

In relation to innovation attribute construct, four key influencing factors were identified from the empirical data. These variables influencing the perceptions about the adoption of RPA were RPA advantages, risks and threats, complexity of the technology and its development and fit between the RPA capabilities and processes chosen. The visibility of perceived time-saving advantages was perceived to contribute positively to the process, whereas RPA’s sensitivity was perceived as the main risk and together with development complexity it was perceived to inhibit the adoption and acceptance of RPA. Interestingly the RPA-Process fit is an important factor that can either limit or facilitate the process. When choosing processes that match with the RPA capabilities, RPA is able to provide significant advantages, whereas when choosing too complicated processes in relation to RPA capabilities, the development effort and complexity increases inhibiting the adoption and acceptance of RPA. As a conclusion, the RPA-Process fit, meaning choosing the right process to be automated with RPA, has crucial impact to the perceived advantages and complexity of RPA and its adoption.

In relation to the organizational attributes, the empirical findings showed that RPA-organization fit, previous experience, RPA capabilities and organizational support were perceived to be the key factors influencing the adoption of RPA. The strong fit between RPA capabilities and the organizational procedures and needs is perceived to encourage and support the RPA adoption. And in relation to previous experience, especially early experience from piloting RPA is perceived to facilitate the adoption and acceptance. Additionally, as the use of RPA requires technical knowledge, IT resourcing is perceived to be needed during development and RPA capabilities accessible in order to fluently implement RPA. What comes to internal organizational support, both employee and management level support was perceived to be important enablers and facilitators for the RPA adoption. Management support was perceived to have important role especially in providing the needed resources. In conclusion, the organizational attributes seem to be supporting the RPA adoption especially
by ensuring the availability of resources and access to the capabilities perceived to be needed to adopt and implement RPA.

The individual attribute related variables gained the least attention of the three attribute constructs, but individual level factors perceived to influence the acceptance of RPA were identified to be personality, time-resources, previous success with RPA and intrinsic motivation. In conclusion, in organizational setting where individuals are acting as members of a specific social system, the perceived influence of individual level attributes and personal preferences in relation to the adoption might be insignificant, as the decision to use RPA is not in the hands of individuals.

7.2 Management facilitation in RPA adoption

The second research question and related sub-question were, what are the management practices perceived to influence the adoption process of RPA and how these factors are perceived to influence it. Both based on the theoretical and empirical exploration the management facilitation has crucial impact to the adoption process. The theory suggested that the management facilitation should be focusing first and foremost on altering the individuals’ beliefs, hence also in the conceptual model the influence of managerial practices toward the adoption process was mediated by the five key beliefs identified from the theoretical frameworks. The main focus of the empirical analysis was to reflect the empirical findings against the managerial facilitation variables described in the conceptual model, but also connections to the key belief construct were done. The summary of the empirical findings in relation to the second research question and related sub-question can be found from the Table 5. The factors influencing the adoption process from management intervention perspective are listed on the left side of the table. But findings in relation to the sub-question of how they influenced the adoption process are summarised in the descriptions on the right side of the table.

Table 5. Summary of key empirical findings in relation to managerial facilitation attributes.

<table>
<thead>
<tr>
<th>Management Facilitation</th>
<th>Summary of key findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management support</td>
<td>Visible top management support facilitates and enables the RPA adoption, but with too strong pressure and rush to adopt RPA might be applied to non-suitable processes, complicating the adoption.</td>
</tr>
<tr>
<td>Communication</td>
<td>Making RPA outcomes visible through communicating success stories in channels with broad organizational reach create positive RPA perceptions accelerating the adoption.</td>
</tr>
<tr>
<td>Experience and knowledge sharing</td>
<td>Experience and knowledge exchange through formal channels facilitate the adoption by bringing RPA issues visible to all, helping to avoid repeating the mistakes of others and creating realistic expectations.</td>
</tr>
<tr>
<td>Skill development and training</td>
<td>Gradual development of skills through practice is an effective tactics to create organizational RPA efficacy. However also formal technical training for process teams is needed to create the capabilities for effective process selection.</td>
</tr>
<tr>
<td>Employee involvement</td>
<td>Involving process people to process selection, RPA development, decision-making and RPA communication facilitates the process by increasing the individual’s control over the RPA project.</td>
</tr>
</tbody>
</table>

From the empirical data five main facilitating management intervention variables emerged; management support, communication, experience and knowledge sharing, skill development and training and employee involvement. Strong top management support was perceived to enable and facilitate the adoption of RPA, however interestingly too strong push was perceived also to complicate the adoption process if as a result the technology is used in non-suitable processes. As described earlier, in RPA context the fit between RPA and the process is perceived to be crucial because this fit is affecting also the perceived complexity of development and the advantages RPA is able to deliver. RPA related communication was perceived to be focusing on RPA success stories and alter positively the organizational perceptions about the RPA technology and its adoption. However, sharing also organizational experience and knowledge related to RPA development is perceived to facilitate the development for example by bringing the RPA related issues visible to all and aligning expectations. In relation to training and skill development the gradual development of skills through practice is perceived to be effective tactics to develop RPA capabilities, however availability of technical training is perceived to be important also for process employees to increase their capabilities to succeed in process selection. Lastly by involving organizational members to the RPA project is perceived to be important to increase the sense of control over the RPA technology.

7.3 Contributions

The purpose of the thesis was to gain better understanding on the adoption process of RPA with the help of perceptions of the organizational members, and explain these findings utilizing the existing innovation adoption related theories. Exploration and integration of diffusion of innovation, user acceptance and change management frameworks suggested innovation, organizational, and individual attributes together with management interventions to influence the individual perceptions about the innovation adoption process. As the conclusion section shows, also the empirical findings could be associated with these theoretical concepts.

The main theoretical contribution of the research is made by bringing organization and change management theory to the context of innovation adoption. This integration of theoretical frameworks into a new conceptual model created more comprehensive and clear view to the variables influencing the innovation adoption process and connecting the individual level change to the organizational level change. These two levels were connected by using the individual level beliefs and perceptions as a mediating construct and the contribution of this research lies in this conceptualization of innovation adoption as a dynamic phenomenon happening in several levels and in the recognition of several theoretical fields and dimensions to gain a comprehensive outlook on the forces influencing innovation.
adoption. The conceptual model is focused on the prevalent contextual attributes related to innovation, individual, organizational and managerial facilitation.

From empirical perspective, this study makes a strong contribution to the currently very limited RPA specific research by providing rich exploration and description of empirical data from the RPA adoption process and connecting these empirical findings with well-established theoretical frameworks related to innovation adoption. So far, the RPA related research has been focused on providing empirical best practices from case studies without theoretical positioning or theoretical explanation for the findings. However, if the results of this study are compared to the findings of existing RPA research both academic and commercial, consistency and similarities with past studies are visible. For example, with commercial research similarities can be found in relation to the importance of process selection and piloting activities, the influence of management support and need for IT-business unit cooperation. Whereas similarities with the existing academic research are for example the emphasis on RPA’s requirements for processes and the role of RPA benefits as a key factor in driving the adoption.

7.4 Limitations

The conceptual model providing the theoretical contribution is applicable for innovation adoption context in general as it doesn’t consider RPA specific literature or theory, however as a limitation it considered only specified theoretical frameworks. It doesn’t incorporate all the factors identified to influence the innovation adoption and as this conceptual model was guiding the collection of empirical data, also the interview questions were basing on the ideas introduced within these frameworks. This research design might have lead into a situation where some other key variables influencing the adoption in practice might not have gotten sufficient attention in the interviews and hence are also ignored in the findings. Additionally, the fact that the data collection method was chosen to be semi-structured interviews, the questions varied between the interviews and respondents had the opportunity to influence the course of the interview, might have led to overemphasis or omission of some important issues. Due to this reason, even the empirical data has been also quantified to some degree, the quantification shouldn’t be followed blindly.

As the empirical part of the research was conducted in RPA adoption context and utilized only one case organization, Stora Enso’s Finance delivery, the generalizability of the findings is also limited to these contextual factors and might not apply in other contexts. The findings of the research are dependent on the specific technology utilized, specific organizational conditions and specific individuals. For example, the organizational structures and resources, the attributes of RPA technology adopted, and the characteristics of the individual employees might vary significantly between different units even within the same company, and hence the adoption process and the key factors influencing it might also be very different between the adopting organizations. However, within the Finance delivery organization the findings have better generalizability as the sample incorporated individuals from all four streams of operations and from multiple hierarchical levels. However, as the streams were leading the
implementations independently, and the data from these streams was not analysed separately to protect the anonymity of respondents, the conclusions doesn’t represent directly the experiences of individual development teams. The findings only provide an outlook and integration of the topics and factors brought up in the interviews. Due to protection of anonymity of the respondents the organizational roles and for example demographics such as gender and age weren’t either considered in this study.

Additionally, as the data collection was focused only to the perceptions of experiences from a historical adoption event, they don’t necessarily represent the actual experiences or conditions. Due to the chosen research approach the findings can’t either represent any causality between the variables, they only describe the relatedness of separate individual factors based on the perception of the respondents, hence the described associations in the findings and conclusions is only qualitative and subjective in character. For example, in reality the issues brought up by the respondents might have been caused by for example some other development initiative occurring simultaneously in the Finance delivery setting.

7.5 Suggestions for future research

The suggestion for future research would be to investigate deeper these factors that were identified to influence the adoption process and refine the conceptual model based on the findings. In current form the model doesn’t for example suggest any causalities between the key beliefs that influence the adoption process and the innovation, organizational, individual and management facilitations variables. Hence research focusing on how the individual variables influence the specific key beliefs and how these factors together influence the different stages of the adoption process would contribute to this study, as in this research the different adoption stages weren’t considered. The conceptual model created in this study could also be tested in other contexts, applied to other innovations than RPA or utilized in more quantitative research to complement the current study.

Additionally, it is suggested to explore and compare case studies about RPA adoption either in different organizational contexts within the same company or between completely separate companies. This would contribute to the generalizability of the findings and hence advance the RPA research. From theoretical perspective also additional theoretical frameworks could be added to the conceptual model to advance the attempt to integrate the innovation adoption field. For example, due to the finding related to RPA-process fit, it might be relevant to add a framework that focuses specifically on this task-technology fit.

7.6 Managerial recommendations

From client organization perspective, the aim was to be able to utilize the early RPA implementation experiences to be able to point out some deficiencies from the adoption process and manage the future adoptions more effectively. Based on the exploration of adoption theory and created conceptual model for intra-organizational adoption of innovation, targeting the individuals’ beliefs can be an effective way to facilitate and accelerate adoption
and institutionalization of the innovation. Hence, it is also reasonable to believe that the findings from this study, which are based on the individuals’ perceptions about the adoption process of RPA, can be helpful in increasing understanding about the current deficiencies and the factors that influence the adoption of RPA. Even the effectiveness of the tactics management was already using currently to facilitate the adoption of RPA can be supported and explained by the well-established adoption frameworks, some issues and suggestions for improvement were brought up.

One of the main learnings is the importance of the fit between RPA capabilities and the processes to be automated, as it was perceived to influence many other influencing variables. The respondents perceived that this fit between the RPA and the process was related for example to the development effort and to the advantages RPA was able to deliver. If applied to wrong processes, the development became more complicated, performance issues occurred, and timelines exceeded, whereas when applied to suitable processes, more advantages could be reached, such as feasibility to deploy and cost benefits. The practical recommendation is to analyse carefully, whether RPA is able to provide the outcomes needed and if so, the RPA adoption should be started with simple, small tasks that provide quick benefits and gives the heads-up what is required for more complex automations. Later on, when RPA capabilities are more developed, the organization can move to more end-to-end view with RPA. This will be even more crucial when the adopting organization doesn’t have previous experience from piloting RPA, because in Finance delivery context the POC was perceived to be important factor in creating RPA capabilities and building acceptance toward the initiative.

Even the strong organizational support was perceived to facilitate the adoption, and especially the strong management support was perceived as an enabling factor, too strong push and pressure from management in communication was described to be one of the reasons why RPA was applied for non-suitable processes. Hence, while continuing the strong management support for RPA is recommended, it is important to make sure that in this early stage the process teams are provided enough time and equipped with required knowledge and capabilities to analyse the fit between the capabilities of RPA, process characteristics and needed outcome to make the process selections successfully. To improve the organizational members’ capabilities related to process selection, it is recommended to enhance the communication about RPA’s capabilities, knowledge and experience sharing between the development teams and increase the training for the process people.

It was perceived that the communication was currently focused on success stories, but the issues related to RPA and its development didn’t always come out. It was perceived that the knowledge and experience sharing between the development streams wasn’t sufficient to share and make the issues visible, and hence it is recommended to develop a formal centralized way to exchange such information to avoid that development teams will repeat the mistakes of others. It was also described that the initial expectations for RPA weren’t fully met in practice and it was perceived that currently the expectations for RPA were varying between the organizational members. Enhancing the communication and discussion related to
the actual capabilities of RPA would also be helpful in creating realistic expectations for RPA among organizational members and avoiding misunderstandings related to the outcome.

Currently respondents described that the support from IT was limited, and business people didn’t always have the needed knowledge to solve emerging issues related to the technical side of RPA. As the RPA implementations are business led, it is important to put strong focus on the cooperation between IT and business units to ensure the availability and access to the needed resources. Practical recommendation would be to clearly assign dedicated IT resources for the development teams and for the key individuals within them, to avoid delays and issues stemming from this lack of capabilities and limited of cooperation.

7.7 Ethical considerations

While ethical implications related to the methodology of the study has already been discussed earlier, it is also important to consider this aspect in relation the thesis as a whole. As the thesis was done for a client organization, the purpose and aim for the study wasn’t only to advance the academic research, but also to help the organization to manage the adoption of RPA better and more effectively.

The study was conducted in a context, where RPA was identified as a major opportunity for the company to automate human work and generate organizational savings as a part of more general digitalisation agenda, and the plan was to diffuse RPA companywide and even globally. In bigger scale, RPA together with more cognitive solutions is expected to transform the paradigm of the knowledge work, and even eliminate some job families. In practical level, the aim of the thesis was to identify both best practices and deficiencies from the adoption of RPA, to support the management in diffusing the RPA technology within the organization. Hence in bigger picture the paper can be seen to contribute to this automation phenomenon and obliteration of human work. While from organization perspective the thesis contributes to mainly positive outcomes such as reaching operational efficiencies and competitive advantage, from organizational member perspective the thesis can be viewed to contribute to development that is harmful for them in longer term. The fact that organizational members were asked to provide their insights to make the diffusion of RPA more effective, they were actually asked to contribute to the potential elimination of their own work. This can be perceived to be ethically suspicious. However, on the other hand with the help of the thesis individuals have received an opportunity to voice their concerns about the technology and to influence the course of development and diffusion of the technology within the organization.
8. References


### Appendix 1.

<table>
<thead>
<tr>
<th>Authors</th>
<th>Article</th>
<th>Type</th>
<th>Focus &amp; Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Post Adoption</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lacity, Willcocks &amp; Craig (2015c)</td>
<td>The IT function and Robotic Process Automation</td>
<td>Multi case study &amp; Qualitative interviews: Telefonica O2, Xchanging &amp; Utility</td>
<td>The role of IT &amp; involvement. Business-RPA alignment, Organizational design, RPA governance, Delivery methodology, Operational support, Organizational structure &amp; roles, Technical environment, Planning for scaling</td>
</tr>
<tr>
<td>Lacity &amp; Willcocks (2016a)</td>
<td>Robotic Process Automation: The next transformation level for shared services</td>
<td>Two case studies from shared service field &amp; Qualitative interviews</td>
<td>Shared themes &amp; RPA Governance. RPA projects business led, PoC removes pain points, Multifaceted business results, Organizations were planning for the future of RPA, C-suite adoption required, RPA capabilities should be embedded in business units, Rethinking the focus of work</td>
</tr>
<tr>
<td>Lacity &amp; Willcocks (2016b)</td>
<td>A new approach to automating services</td>
<td>Multi-case study &amp; Qualitative interviews</td>
<td>Factors for effective adoption process. RPA embedded into enterprise strategy, Creating understanding of the benefits of RPA within the organization, RPA capabilities distributed within the organization, Management support, Business operations led RPA project, Communicating attractive benefits, Early IT involvement, Preparedness for employee resistance</td>
</tr>
<tr>
<td>Fung (2014)</td>
<td>Criteria, Use cases and effects of Information Technology process automation (ITPA)</td>
<td>Literature review &amp; Qualitative Interviews for IT professionals</td>
<td>RPA task criteria, use cases, implementation effects. Criteria: e.g. High-volume &amp; value of transactions, Stable environment, Limited exception handling, Understanding of manual costs. Use Cases: e.g. Automated job scheduling, and ITPA integration. Pro's &amp; Con's: Repeatability, Predictability, Productivity, Integration, Performance, Efficiency - Job-loss, Re-skilling, Costly deployment, Diminishing personal touch</td>
</tr>
<tr>
<td><strong>Pre-adoption</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Lintukangas (2017)</td>
<td>Improving indirect procurement process by utilizing RPA</td>
<td>Single case study, Literature review &amp; Qualitative interviews</td>
<td>Utilizing RPA in indirect procurement process context: influencing factors. Task suitability, Incentives (Benefits, Employee Opportunities, Personal motives) Disincentives (Challenges, Limitations, Risks)</td>
</tr>
</tbody>
</table>


Appendix 2.

**Spring & Summer 2016**
- In April RPA idea born in IT & Digitalisation unit
- Support and sponsorship gained for PoC from Top management
- Finance Delivery chosen to be the Business stakeholder

**Fall 2016**
- Choice of processes for PoC
- PoC preparations in FD during September & October
- PoC finalized in December

**Spring 2017**
- Choosing of processes to be automated in February & March
- Preparations for upcoming RPA project started in FD
- RPA program designed
- Contracts with service provider signed
- Project proposal for funding granted in May

**Summer 2017**
- Project mode started within the two RPA streams (implementation & set-up stream)
- Collaboration with consultancy started
- Preparations for RPA implementations continued
- Trainings for in-house technical RPA capabilities started in July

**Fall 2017**
- First robots and processes under development
- First robots brought to live in October
- 5 robots live by the end of the year

**March 2018**
- Continuous development of new robots and processes to production
- Digitalization road-map with around 70 ideas