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CHANGE MANAGEMENT SUCCESS IN IMPLEMENTATION OF CHANGE CONTROL AND RELEASE MANAGEMENT PROCESS AND TOOL

ABSTRACT

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IT Service Management processes have been part of the everyday life for a long
time already in large corporations' Information Management departments.
Change Control and Release Management process execution is varying - in this
thesis there is a case study for developing the process in the case company.
Theoretical framework is built on concepts of process development and change
control and release management. Perspective to these is change management
and the measurement of change management activities within the implementa-
tion project. Research was quantitative with a questionnaire sent to 268 mem-
bers of ERP development community in the case company and 68 responds.
The core finding from the user perspective on successful implementation was
how well they knew the messenger of the change. The person communicating
on the upcoming change and its necessity has a big role in promoting the suc-
cess of system implementation. This confirms the known role of change man-
agement in development projects and inspired the case company in implement-
ing stronger change agent networks for future implementations.

Keywords: Change Management, Change Control, Release Management, ERP,
SAP, Process Development

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IT palvelunhallinnan prosessit ovat jo pitkään olleet yritysten tietohallinnon jokapäiväistä elämää. Järjestelmämuutosten tekninen hallinta järjestelmäkehityksen osana on kuitenkin kirjavaa. Tässä pro gradu -tutkielmassa tutkitaan yhden tapausesimerkin kautta teknisen muutoshallinnan prosessin kehittämistä. Tutkimuksen teoreettinen viitekehys rakentuu prosessikehittämisen ja teknisen muutoshallinnan käsitteiden ympärille. Tutkielman näkökulmana on muutosjohtaminen projektin onnistumisessa ja käyttöönotossa sekä muutosjohtamisen mittaaminen. Nämä käsitteet tuodaan mukaan viitekehykseen. Tutkimuksen empiirinen osuus toteutettiin kyselytutkimuksena, ja kysely lähetettiin tapausyrityksen 268 ERP kehitysyhteisön jäsenelle. Keskeisimpänä muutoshallinnan onnistumiseen vaikutti yksittäisen käyttäjän näkökulmasta viestintuoja. Eli henkilö, joka kertoi käyttäjälle tulevasta muutoksesta, sen tärkeydestä ja roolista järjestelmän kehityksen prosessissa. Tuloksella vahvistetaan tietojärjestelmätieteissä tunnistettua muutosjohtamisen roolia kehitysprojektien onnistumisessa. Käytännön tasolla tapausorganisaatiossa pyritään jatkoprojekteja varten perustamaan kattavia avainhenkilöverkostoja, joiden kautta kaikki loppukäyttäjät verkostoituvat ja jokainen saa viestin heille tutulta ja luotettavalta henkilöltä.

Asiasanat: muutosjohtaminen, muutostenhallinta, ERP, SAP, järjestelmäkehitys, prosessikehitys

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1   INTRODUCTION

When enhancing large Information Systems, the stability of organization's productive activities should be considered carefully. Different types of process development occur in organizations constantly, and the means for it varies frequently. The research area focuses on organizations dealing with enhancement and maintain activities within large and complex Information Systems. These organizations' mission is to deliver stable production environments and application development to respond to the demand from the customer. Customer could be internal business departments or external, when the organization works as a vendor within specified contract. In this research the focus will be internal information management department and their role in delivering software to internal business departments – their customers.

The number one priority in these organizations is the productive system, and here enters the Change Control and Release Management processes within Information Management departments of large companies. General supposition is that the bigger and more complex the system grows - the process for change control and release management grows with it. The perspective of Change and Release Management process is the system - not the users. The process is setup to protect the production environment. The people using the process are only secondary priority.

The academic motivation is to combine the concepts of technical processes for controlling the changes in system landscape and the people aspect of change management activities such as effective communications, training and handling the user's feelings of losing their control (Klaus & Blanton, 2010). Finding the means for measuring the change management success was an important aspect.

The case study in this research is a Change Control and Release Management tool and process implementation project, within global energy and marine sector technology company. The Enterprise Resource Planning (ERP) system landscape with its core software and all the supporting satellite systems designed for specific business transactions forms the whole system landscape for the ERP Center of Excellence organization to support and enhance. They have been struggling from uneven quality of development and testing in their ERP application area. This, together with unclear change control and release man-

agement process, led to manual errors in deploying the changes to production environment. Lack of transparency in the process led also to unawareness of 1) the system status, 2) ongoing developments and 3) overlapping of different developments.

Case company was willing to find the solutions for these challenges by providing better governance i.e. data quality on system changes and safeguarding the transports with built in functionalities in new Change Control and Release Management process and tool provided by SAP. Their need was to have more stable production environment in their ERP landscape and more transparent change control for it to be audit proof and reliable. In addition, the process should be improved in a way that the whole organization can reduce the time spent on operating the change control and release management process.

The target is to research the process improvement and tool implementation through the lenses of change management of people. What needs to be considered when communicating to the users about the new implementation of the tool and process for change control and release management. The goal is to understand how the implementation of new Change Control and Release Management process and tool was perceived by the users and to understand how the success of a process change could be measured. The research question is:

- How to measure the success in a process change?

The research methods are presented briefly in the next subsection. Thesis has been divided into theoretical framework, case study, results, discussion and finally conclusions. Theoretical framework has been built on the concepts of process development in Information Systems, Change and Release Management, Change Management and the measurement of Change Management activities. This combination concludes the research area and they are drawn together in the summary following their respective sections.

The process development case study is the Change Control and Release Management process and tool implementation in Case Company's ERP Development community which is reviewed from the perspective of Change Management activities. The questionnaire and the case process with changes are presented. The measurement of organizational change management success is performed with a survey derived from the MINDSPACE approach. MINDSPACE is the framework to understand human's intuitive behavior. Results are presented following with the discussion and conclusions drawn from the results.

1.1   Research structure

This research focuses on organizational change management within the context of process development and technical change control and release management processes. Research is divided between literature review and an empirical quantitative case study. Theoretical framework includes both the process de-

velopment and change control and release management process concepts. In addition, theories on organizational change management and the area of measuring the organizational change management are reviewed. The summary on theories will conclude the research area altogether and form the basis on the case study. The research methods are presented briefly in the next sub section.

This research consists with introduction and five sections. In the second section the key concepts are reviewed based on literature starting with process development and change control and release management processes. Following the research context, the change management theories are reviewed finalizing with the topic of measuring the change management. Theoretical starting point is concluded in the summary. Third section presents the case study and approach for measuring the success of change management with MINDSPACE. Fourth section conducts the results from the study. Discussion on the findings is covered in the fifth section following the conclusions in the sixth and final chapter.

1.2   Research methods

The goal of this research is to understand how the organizational change management succeeded in the implementation of new Change Control and Release Management process and tool within the Case Company. MINDSPACE by Dolan et al (2010) covers the context model of human behavior. Instead of focusing on the cognitive model of behavior assuming people making rational choices based on their best interests, this research observes the user's intuitive model of processing their environment. Based on this assumption on people behavior, this research will deduct if the organizational change management was successful during the implementation.

This research is a quantitative study and conducted with a questionnaire (Appendix 1) based on the attributes in the Dolan's et al (2010) MINDSPACE. MINDSPACE approach is explained in detail under the section for case study. Research is executed for Information Management department in a large global energy and marine industry company. New version of an application lifecycle management (ALM) application SAP Solution Manager and its core functionalities were implemented in a project called SAP ALM and Test Automation during 2018. In the scope of the project was Change Control and Release Management process (ChaRM), Test Management strategy and tool implementation as well as Process Management tool for proper documentation of existing business processes. In the scope of this case study is only the ChaRM functionality and its implementation.

2 PROCESS DEVELOPMENT AND CHANGE MANAGEMENT

This section will cover the theoretical ground for the thesis. There are four subsections for central concepts of Process Development, Change Control and Release Management, Change Management and measurement of Change Management. Process development is presented through process improvement principles and models. Similarly, the Change Control and Release Management processes are presented through two common IT frameworks COBIT and especially ITIL. Change Management section dives into the concept of change in IT and its management practices. The last concept of measuring the Change Management focuses on the measurement practices that are available for measuring change. The section will end with conclusions.

2.1 Process development in information systems

Process development is discussed by presenting two principles for Process improvement: Six Sigma and Continuous Service Improvement Program (CSIP). In the Continuous Service Improvement Program (CSIP) there are five different activities, which target to improve the existing process. Coelho and Rupino da Cunha (2009) have used this specifically in IT Service Management process improvements at their Grefusa -case study.
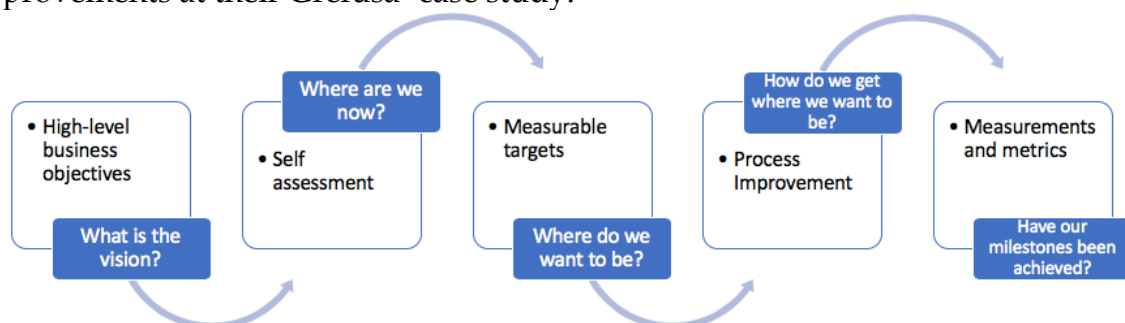

Figure 1 Continuous Service Improvement Program (CSIP) adapted from Coelho and Rupino da Cunha (2009)

In the beginning of the CSIP vision must be stated. What do we aspire? What is the high-level aim of ours? There's no need to really have any specifications on how to achieve those targets. Vision part of the program is important in making the message crystal clear for the stakeholders to get the buy-in from the personnel. The second part is the self-assessment of the as-is situation of the organization. Where are we now? How do we compare to others on our field? There are ready made questionnaires for organizations to perform the self-assessment. Most important part is to raise the awareness on the current situation. (Coelho & Rupino da Cunha, 2009.)

Based on the self-assessment values organization should define in the third phase the characteristic on the target level of performance on the process. With a gap assessment report the comparison is possible between the aspired and the current status of an organization. How do we get there where we want to be? (Coelho & Rupino da Cunha, 2009.)

The use of the A.R.C.I. model (Coelho & Rupino da Cunha, 2009) may help organization to setup for the change by identifying the person who ultimately holds accountability (A) for the processes future success or failure, the responsible (R) is taking the responsibility of the correct execution of tasks or meeting the agreed deliverables and timelines. The individuals consulted (C) who has the subject matter expertise required on process success, and in addition there are directly and indirectly impacted individuals that needs to be informed (I). Because it is a change that needs to be performed in the fourth step: How do we get where we want to be? (Coelho & Rupino da Cunha, 2009.)

The needed change in the existing process or in a dependent process needs to be defined in this step. Usually these types of changes are affecting to the way of working of the employees and in all these types of changes it is crucial to have the management support on the initiative in addition to the previously stated accountabilities and responsibilities. End result is otherwise mainly confusing, and the employees are reverting back to old habits and processes. (Coelho & Rupino da Cunha, 2009.)

Last, but not least, step in the CSIP is the evaluation on the performance of the program. The objectives have been set earlier, and in the end the evaluation should take place in comparing the objectives and the result. The earlier set goals can be defined with the Critical Success Factors that the process has, which gives small number of defined goals for an organization within ITIL process implementations. The KPIs per each CSF should be set and monitored to confirm that the objectives are being achieved. (Coelho & Rupino da Cunha, 2009.)

In the Six Sigma paradigm the quality improvement is focusing to the operational excellence and cutting waste in the processes where that is found. Six Sigma is elaborating on the how, but it is not providing instructions on what to do or any best practices especially not in the area of IT Service Management (ITSM). ITIL on the other hand defines on what service management is and defining its key metrics and objectives. Six Sigma is providing the quality improvement aspect also to IT Service Management. Chan, Durant, Gall & Raisinghani (2008) states that these two approaches together, Six Sigma and

ITIL, are great combination on quality improvement of ITSM processes. (Chan, Durant, Gall & Raisinghani, 2008.)

Chan, Durant, Gall and Raisinghani (2008) covers also the DMAIC model of process improvement as seen in Figure 2. In the DMAIC similarly as in the CSIP the measurement is the key on making improvements. The DMAIC comes from define, measure, analyze, improve and control. There are 7 steps. First step is to define the process that is to be improved and state a target. What is the Y or the outcome measure? In the second step there is the measurement, measuring the current state of the process; what is Y's current performance? In the analyze-phase there are two steps. First one is to develop cause-and-effect theories on what could be causing the issue; what are the potential Xs? What may be causing the problem? The next step is to search for the real causes and scientifically prove the linkage between the cause and effect. (Chan, Durant, Gall & Raisinghani, 2008.)

STEPS		QUESTIONS
1. Understand what process is to be improved and set a goal	Define	What is the Y or the outcome measure?
2. Measure the current state	Measure	What is Y's current performance
3. Develop cause-and-effect theories of what may be causing the problem	Analyse	What are the potential Xs or causes? What may be causing the problem?
4. Search for the real causes of the Problem and scientifically prove the cause-and-effect linkage	Analyse	What are the real Xs or causes? What is really causing the problem?
5. Take action.	Improve	How can the understanding of the real causes of the problem be exploited to eliminate or reduce the size of the problem?
6. Measure to verify improvement has taken place	Control	Did Y really improve?
7. Take actions to sustain the gains	Control	How can the Xs be controlled so the gains in Y remain?

Figure 2 DMAIC model adapted from Chan, Durant, Gall and Raisinghani (2008) according to Chieh (2007).

The Improve phase is to take the action on fixing the problem. Answering questions like "How can the understanding of the real causes of the problem be exploited to eliminate or reduce the size of the problem? How can this Y=f(X) understanding be exploited?" In the controlling phase both the measurement of verifying the improvement and actions to sustain the gains are taking place. (Chan, Durant, Gall & Raisinghani, 2008.)

It is agreed in literature around Software Process Improvement that the measurement of the results in any software process improvement initiative is significant part of the possible success of such initiative. Even though the importance of measurement in the context of process improvements is acknowledged, there is only little agreement on what actually should be measured. Lack of proper approach for measuring the initiative is influencing to the high failure rate of these improvements. (Unterkalmsteiner, Gorschek, Islam, Cheng, Permadi & Feldt, 2012.)

There are two concepts of developing a process. One is so called top-down approach where the actual process is compared to "best practice" processes. The improvement points are then mapped from the differences perceived from the practice. This is also referred to term "prescriptive improvement". Central part of both of these approaches is the measurement to control the process change and confirm the achievement of appointed goals of the initiative. (Unterkalmsteiner et al., 2012)

The second type of process improvement is according to Unterkalmsteiner et al. (2012) the Pre-Post Comparison, which is an approach to measure the success of the initiative. In Pre-Post Comparison the outcome of improvement initiatives is evaluated by comparing the success indicators' values before and after the improvement initiative took place. The definition of success indicators, which can be interpreted as metrics, are in crucial role since the measurement of the success is based on the metrics used. In addition to the definition of the metrics, according to Unterkalmsteiner et al. (2012) the major difficulty lies in identifying reasonable baseline values to compare the results against. (Unterkalmsteiner et al., 2012.)

2.2   Change Control and Release Management process

Coelho and Rupino da Cunha (2009) interprets Callahan (2004) by noting that from the several IT management models that are used, IT Infrastructure Library (ITIL) and Control Objectives for Information and related Technology (COBIT) appears to be the most familiar and most used frameworks to support the implementation of IT processes. In this section both of these main frameworks will be defined. Especially the change control and release management process within those is to be identified and further defined.

2.2.1 COBIT

COBIT was published by the IT Governance Institute and ISACA (formerly, Information Systems Audit and Control Association). Compared to ITIL, COBIT is not providing elaborative guidebook on managing the IT operations but presenting a structured IT governance model for enterprises. It is an accepted framework for strategic IT governance implementation (Coelho & Rupino da Cunha, 2009). According to Mangalaraj, Singh and Taneja (2014) enterprises

pursue cost optimization and maintaining the risks related to IT on an acceptable level.

In addition to these IT has one very important part to play in complying with laws and regulations. Mangalaraj et al. (2014) also raises the collaboration between business and IT as the key factor on IT becoming more than a support function. From COBIT 5 enterprises may find framework for assisting them in achieving their targets for enterprise IT governance and management. Tools for value optimization between benefit realization and risk optimization and resources can also be found in COBIT 5. (ISACA, 2012.)

Change Control and Release Management is included in Service Introduction in IT Governance (Figure 3). When releasing new solutions to production environment Service Introduction and Operations are responsible for the quality of the solution. Quality Assurance is secured in addition to change and release management procedure following, also by accurate test management, Business unit approvals and managing the service level requirements and changes. (Grüttner, Pinheiro & Itaborahy, 2010.)
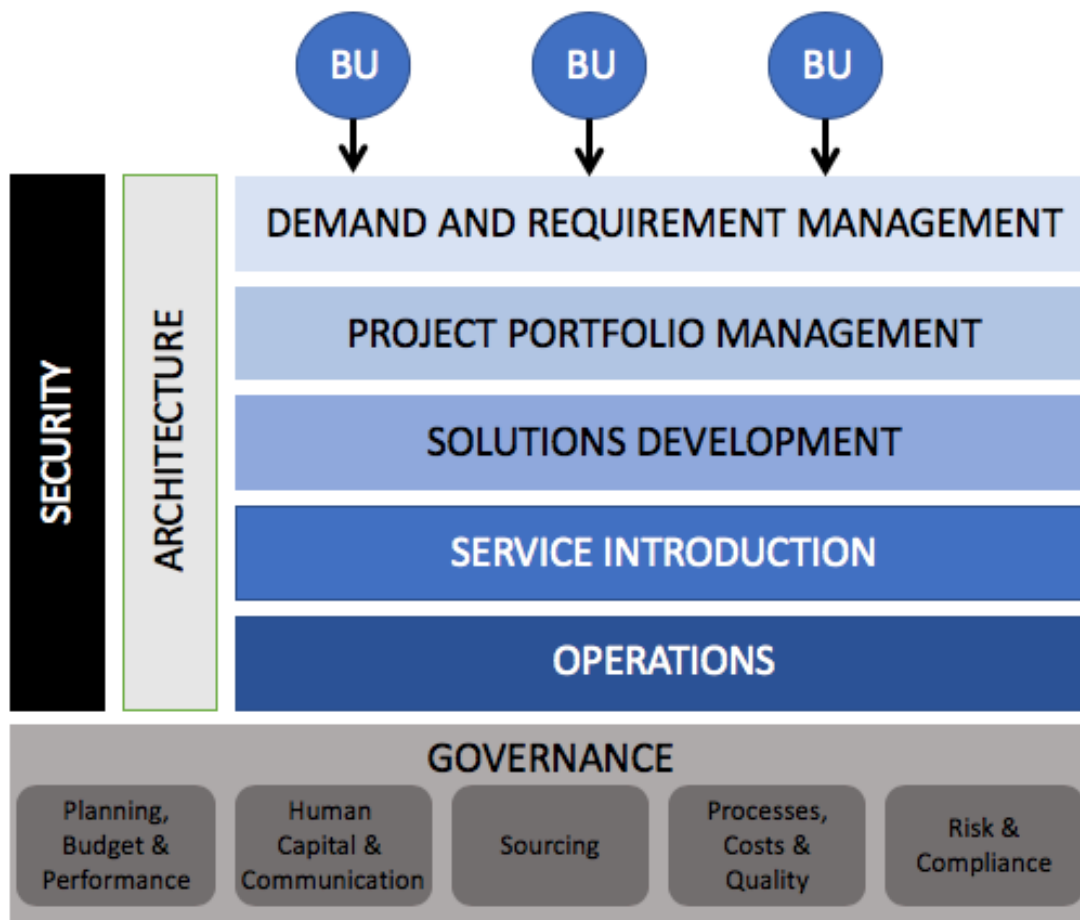

Figure 3 Operational model of IT in IT governance implementation for Brazilian Bank adapted from Grüttner, Pinheiro and Itaborahy (2010, p.7).

The requirements towards IT are controlled within the Demand and Requirement Management layer. There are the relationships between businesses and IT, within which the understanding on the business area and activities should be.

Demands are gathered in this layer and based on the needs also project proposals are put to the IT portfolio queue. Project Portfolio Management is then responsible on analyzing the alternative proposals - identifying the conflicts and advantages in each separately but foremost as an entity. In Project Portfolio Management the IT committees are organized for decision making and the organization is responsible on the project management and monitoring. (Grüttner, Pinheiro & Itaborahy, 2010.)

In the Solutions Development the application and infrastructure solutions are created. These demands are coming from the projects prioritized in the above layers. Within the layer the is also the function of Solution Integration with values of reusing of previously built components, integrations to existing third party systems and fully making use of the existing IT architecture. Solutions Development is giving their solutions to the service introduction layer - where the quality assurance is working. Operations are taking over after the service introduction has deployed the solution to users. Their most important task in IT environment is to maintain the IT services at agreed level of quality. Incident and problem management is their responsibility. (Grüttner, Pinheiro & Itaborahy, 2010).

In the Architecture layer the standards of the architecture are defined, and the critical topologies for the organization are developed. They can also help the Business Analysts in the Demand and Requirements areas on identifying recommended architecture or already existing solutions from the IT landscape. Governance and Security are providing the edges for the IT Governance and from the Governance IT is receiving the toolset to improve the IT Management capabilities, external knowledge, strategic planning and costs, process and quality management. Also, the Risk, Security and Compliance area is part of the Governance. In the Security layer, vertically on the IT Governance will deliver guidelines, strategies and policies to manage information security. All the layers should run IT based on these rules, procedures and standards maintained in the Security layer. (Grüttner, Pinheiro & Itaborahy, 2010.)

2.2.2 ITIL

ITIL is more detailed framework in nature. In this section we will be focusing on the ITIL framework and the perceptions of it towards change and release management processes. Primary target of ITIL is to raise the quality of IT services delivered to business. Tools to reach that goal in ITIL framework are increasing the service efficiency and the user satisfaction. Originally the ITIL was developed by the OGC (Office of Government Commerce). ITIL has become the de facto standard in the IT Service Management for the past decades. (Coelho & Rupino da Cunha, 2009.)

Chan, Durant, Gall and Raisinghani (2008) claims that organizations can amongst other things be more agile with their responses, define standards, adopt new trend and regulate compliance with the help of ITIL. Also, according to Chan et al (2008) framework is not giving any strict guidelines on how to setup the IT organization but giving a way of structuring and documenting the

common processes used in the whole organization. Before adopting ITIL organization should understand that ITIL is not about adopting to some strict process model, instead it is a way to organize one's services. (Chan, Durant, Gall & Raisinghani, 2008).

The full ITIL Service Lifecycle can be seen in the Figure 4. In addition to the Change Control and Release and Deployment processes Service Transition includes Planning and support, Asset and Configuration management, Validation and Testing, Change Evaluation and Knowledge Management. (Cabinet Office, 2011.) Release Management process is the final tier in the Service Transition and focuses mainly on releasing simultaneously large-scale IT change clusters to production environment e.g. upgrading the organization's ERP system (Coelho & Rupino da Cunha, 2009).

The changes to the software, hardware or any other IT service are managed with the Change Control process, and at the end of the process each change is either authorized or denied. Change Control is responsible on applying the required changes with zero or only minor impact to business. This is to be done by assessing the risks of each individual change on the IT infrastructure component level and also using the Configuration Management Database for identifying the relationships and impacted systems. (Coelho & Rupino da Cunha, 2009.)
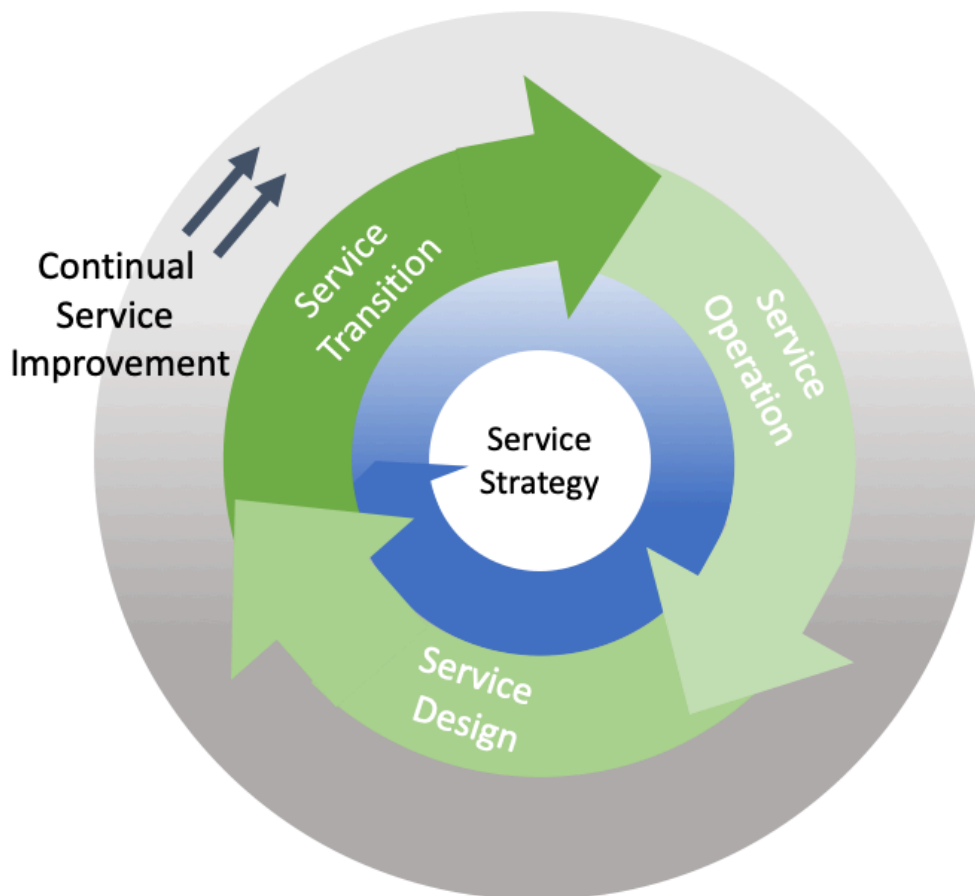

Figure 4 ITIL Service Lifecycle adapted from Cabinet Office (2011, p. 3).

In the Change Control process, one controls the full lifecycle of all changes. The purpose is to enable the delivery of beneficial changes with minimum disruption to business and IT services. To mark the scope of service changes in ITIL, it is good to define that all the additions, modifications and removals of anything that may have an effect on IT Services is in scope. Thus, it means all changes both in hardware and software, licenses, architecture, processes, tools and anything that is configured in the IT landscape. The scope for the changes is wide, but usually the changes in business strategy, culture or any abstract organizational changes are out scoped from the change management alongside some operational activities like repairing a printer. (Cabinet Office, 2011.)

In Change Control there are 3 different categories identified for changes. Standard changes, Normal changes and Emergency changes are defined separately and each one of them has different purposes and processes from the perspective of authorization, deployment and evaluation. Standard changes are defined as low risk changes with small impact to business and IT services. These are usually also pre-authorized. Emergency changes must be implemented as soon as possible; however, they need formal handling by Emergency Change Advisory Board (ECAB). Normal changes are defined as anything but these two. So, all the changes that are not pre-authorized or emergent in nature. (Cabinet Office, 2011.)

Usually Normal changes are medium risk and medium impact change requests that needs formal handling. In day to day life of IT department the Normal change type is normally used in IT development projects as well as in continuous development initiatives. The forum for governing these normal changes is the Change Advisory Board (CAB) which is responsible on supporting the authorization of changes to production environment as well as to assess, evaluate and prioritize changes. CABs can be many in one organization per function, application or area. (Cabinet Office, 2011.)

The Figure 5 is illustrating a specific process used in IBM Service Management for deploying a software upgrade (Lindquist et al., 2007). In practice it's difficult to separate change control and release management from each other, since in practice often the development teams are responsible on the building, testing and deploying the changes (Lahtela & Jäntti, 2011). In the Figure 5 the Change Control and Release Management processes are explained with the Service Request process. When Request for Change (RFC) has been generated, usually, by user or customer, the change management process is initiated after the approval flow has been completed. From the Figure 5 you can see the description of the relationship between these three processes implemented based on ITIL. The release management process is integrated to the change management process at two different points with separate processes: assessing the impacts and deploying the change. (Lindquist et al., 2007.)
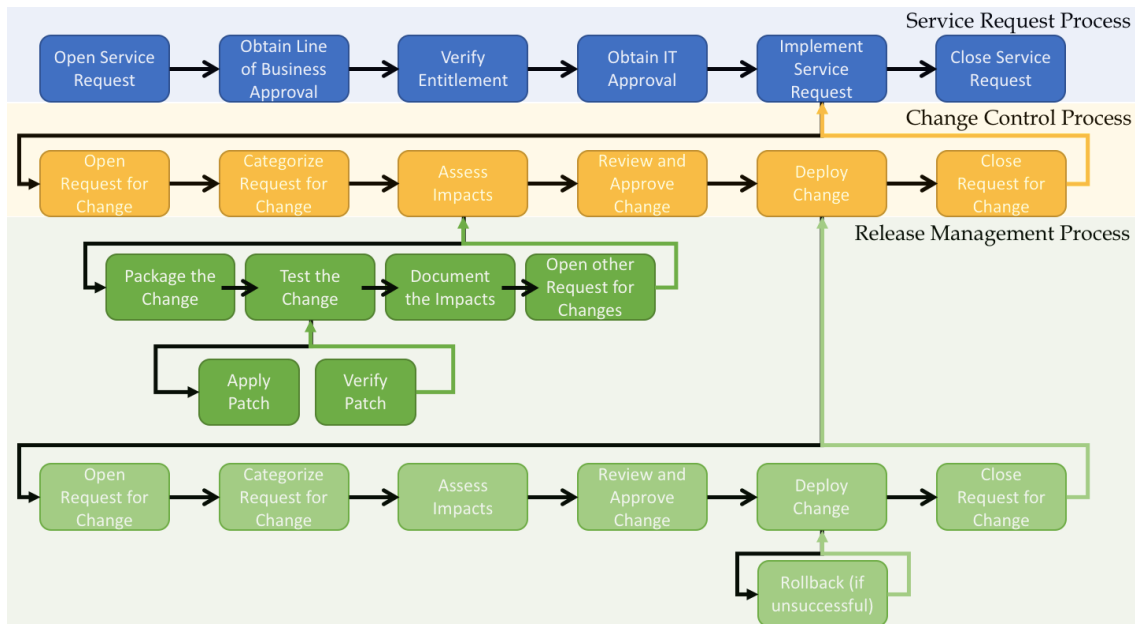
Figure 5 Change Control and Release Management activities for deploying a software upgrade adapted from Lindquist, Madduri, Paul and Rajaraman (2007, p. 426).

Elsewhere, Lahtela and Jäntti (2011) defines release management process based on ITIL to consist of nine different parts:

1. Release Policy

2. Release Planning

3. Design, Develop and Build

4. Release Test

5. Release Acceptance

6. Roll-out Planning

7. Communication preparation and Training

8. Distribution and Installation

9. Release Closing (Lahtela & Jäntti, 2011)

Change Control is closely connected to Release Management process following that Change Control is triggering the need for a release and defining the scope of the release (Lahtela & Jäntti, 2011). According to Sun, Xiao, Bao and Zhao (2010) the Change Control process consists on the operations that are handling the modifications, increasing or removing the different installations in IT landscape. Installations can be, but are not limited to hardware, software, different environments, systems or applications. Target is to control by the means of standard methods and procedures the changes in quick and effective manner. The changes are then handed over to release management which is responsible on applying the group of tested and accepted changes to production environment and ensure the stability of the system. (Sun, Xiao, Bao & Zhao, 2010.)

Klosterboer (2008) defines Change Control and Release Management as a common package, according to his book, there is no point to implement one

without the other. In his book release management and change management are pointed out through an analogue of conductor being the release management and musicians the change management. Release management for an organization is focusing on the strategy of releasing products to customers, whereas the change management is focusing to the operational changes made to the system on a much shorter time span. Release deployment is only a tactical discipline which is transporting the changes to production, which is only a minor part of Release Management, if even that. (Klosterboer, 2008.)

Overall there are three different levels in the maturity of IT organization. First one is the IT as Technology provider, which means that IT is mainly concerned on the infrastructure and the availability of the applications and not the big picture provided to customer. The next level on the maturity is IT as service provider, which means that IT is governing the services and their quality provided to the internal and sometimes also external customers. IT governance is to be discussed when the highest level of maturity has been reached as strategic partner in creating value to the business. (Salle, 2004, p. 1 according to Chan, Durant, Gall & Raisinghani, 2008.)

2.3   Managing organizational change

Change in information systems in a nutshell according to Lyytinen and Newman (2008) is a generation and/or implementation and/or adoption of new elements in social and technical subsystems that store, transfer, manipulate, process and utilize information. As time has passed the research in change management has shifted focus from technology as deterministic to more human centered. In the human aspect the technology is seen more as an outcome of social action and strategic choice. (Orlikowski, 1992.) In this subsection the nature of information system change, change agentry and change management and leadership concepts are discussed.

2.3.1 Nature of information system change

Social inertia is that feeling, when no matter how hard you push nothing seems to be happening. According to Keen (1981) only small increments are possible when implementing a system into complex social systems. Compromises are crucial aspect of an implementation as the individuals are adapting to the change. The more active cause of social inertia is the people owning their data, which they are not ready to give up to the information system. When targeting a strategic large goal with IS implementation, it conducts from small victories. (Keen, 1981.)

Lyytinen and Newman (2008) on the other hand describe the nature of information system change as primarily episodic and punctuated, instead of incremental and cumulative. In addition, the change is a multi-level change: It happens in the work system (execute, coordinate, manage information related

work), building system (commands resources, enacts routines to follow through the change and solve the issues related to uncertainty, ambiguity and complexity) and the organizational environment (including both work and building system). The change is triggered when gaps are injected in any of the systems: work system, building system or the environment. (Lyytinen & Newman, 2008.) The environment has the organizational context including the resource, authority, culture and political systems. In addition, there is the environmental context, which then includes the organization's social, economic, political, regulatory and competitive environments that influence and are influenced by the other levels of the system. (Lyytinen & Newman, 2008.)

- Execute
- Coordinate
- Manage information related work

Work System

Building System

Organizational environment

- Command resources
- Enact routines
- Solve uncertainty, ambiguity and complexity

- Resource
- Authority
- Culture
- Political systems
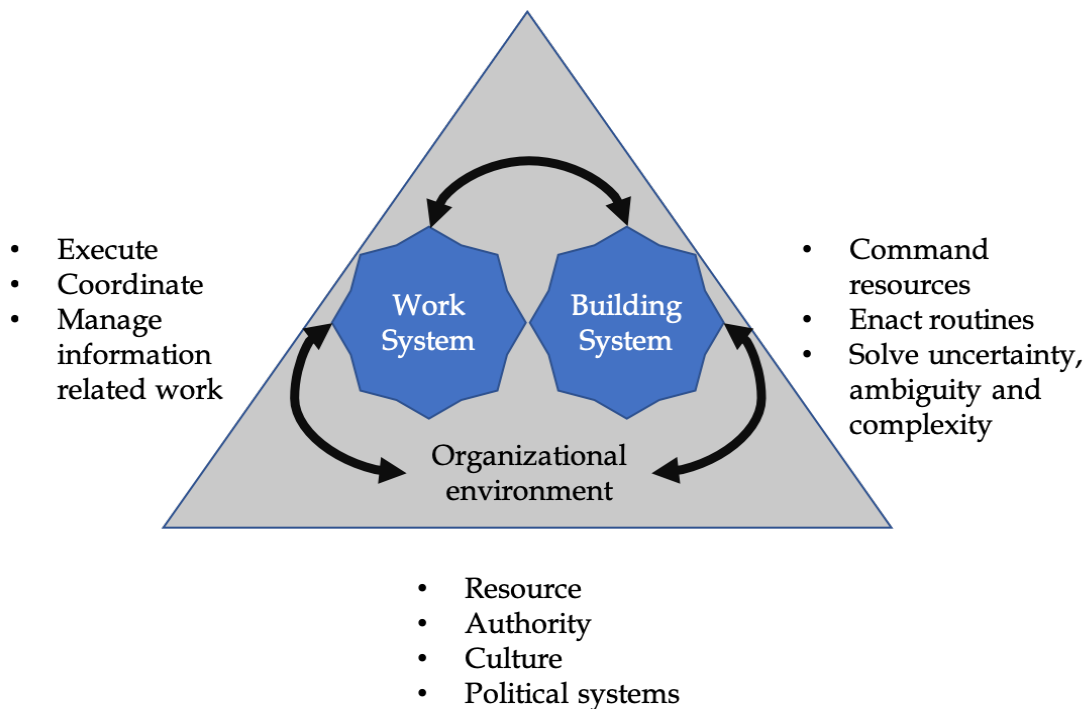
Figure 6 Multi-level change by Lyytinen and Newman (2008).

Information Systems development is as much a political as it is a technical process (Keen, 1981). Organizations are filled with conflicting priorities, objectives and values of individuals within the organization. Pluralism is present in any organization and it's extending as the group size of individuals grow. Changes driven from the directors (Down-and-Out) are relying on commonality of the organization, and in Up-and-In tries to limit the problem by limiting the scope of the change at hand. In case there's no consensus in the group, the Up-and-In approach fails. The bigger the change is, the more political rationality is required. Negotiations and coalitions are to be mobilized to reach the support required for the new proposal of change in the organization. (Keen, 1981.)

There is a clear connection with owning information and power. The individual, group, department or organization who owns data over other units, has the power of filtering, distributing and sharing the data. Information system implementation is a threat on their position and power. Counter implementation is when the resistance against the implementation is present and has killed

the innovation. The tactics to avoid the counter implementation is to set the goals and broad strategic mumblings into operational objectives and specific contracts. The response to the counter implementation actions is to respond with opposite actions, to make contracts with the users on the change, seek out the resistance and respond to it early on. (Keen, 1981.) "Politics are the process of getting commitment, of building support, of creating momentum for change; they are inevitable and perhaps desirable in a world where choice is difficult and the future full of ambiguity and uncertainty." (Keen, 1981, according to Wildavsky, 1974).

Culture's nature then again has been seen as stable, persistent, and difficult to change. Change in culture takes time and usually is counted in years. (Leidner & Kayworth, 2006). Information Technology can affect the culture as the 1) data warehousing capability improvements led to changes in customer service, flexibility, empowerment and integration values, or, 2) workflow management system implementation strengthened cultural values related to customer orientation, flexibility, focus in quality and performance orientation. (Leidner & Kayworth, 2006.)

IT has potential to be part of an organizational culture change. Especially in large scale projects where new structures and business processes are implemented within the system (e.g. ERP systems). Leidner and Kayworth (2006) also states that certain types of values are influenced by different technology artefacts. Within the introduction of new information system, there may occur conflicts in the values. Leidner and Kayworth (2006) argue that by reconciliating these conflicts, IT can mildly pressure the values playing a role in the conflict leading to a reorientation of values. Via the reorientation of values, it can be seen that IT is influencing the culture over time. (Leidner & Kayworth, 2006.)

On what comes to technology, Orlikowski (1992) has identified two schools in defining technology. The technological imperative school defines technology as objective reality, something that is given and how and when it's used has a deterministic role. In the strategic choice school, technology is defined as a human construction, dynamic and the means in developing and interpreting the technology are reflecting the social interests and motivations. (Orlikowski, 1992.)

Limitations and contributions of the strategic choice and technological imperative school are covered in the structurational view of technology. Both traditions were partially correct but limited on their own. Orlikowski (1992) proposed that technology has a dual nature as both an objective reality and as a product of social construct. With this view on technology we can see it as human agency enactment and as institutionalized. In the structurational model there are two significant notions on the technology. First, social practices cannot be determined by the technology. Human is always needed to use the technology and it includes a possibility of "choosing to act otherwise". At the time of the article the new artificial intelligence domain had not produced agencies whose actions can be predetermined, and this aspect was not considered by Orlikowski (1992) The second notion is that technology is both facilitating and constraining in its role of conditioning the social practices. It's not only constrain-

ing or enabling, but technology does both in the context of conditioning the actions of human agency. (Orlikowski, 1992.)

2.3.2 Change agentry

Markus and Benjamin (1996) are discussing why IS Specialists should do the IT change management. Obviously, the business leaders should do their part in the change management, but when they fail to do that, it is often the IS Specialist who need to step up to turn the ship towards success. This is of course the case when the IS Specialist is an effective change manager, which is not self-evident. The change management skill improvement for IS Specialist adds to their organizational credibility. Simultaneously effective change management requires credibility. And again, an effective change management builds on the credibility. As the IS work being highly outsourced, it requires the IS Specialist to work as a change manager toward the vendors and internal organization. (Markus & Benjamin, 1996.)

In case the project is radical the activities on change management should be emphasized such as establishing management commitment and vision, prototyping and detailed design of the new process, informing stakeholders, defining and analyzing the new process concepts, designing the human resources structure and reorganization. The activities do not have to occur in that specific order, but those activities support the organization to embrace the change. (Kettinger, Teng & Guha, 1997.)

Iveroth (2010) defines hard and soft factors of information systems change. Hard factors are technological, economical and structural whereas soft factors consist of people, social and organizational aspects. According to Iveroth (2010) hard factors are enabling the change, whereas the soft factors are what make the change successful.

Iveroth's (2010) hard factors can be interpreted to be in a strong role in Markus and Benjamin's (1996) traditional IS change agent model where it is assumed that technology is the sole actor in organizational change and the change agents has nothing else to do than slowly change the technology. In the traditional model the focus is on building the technology, not in achieving results more broadly in the business. (Markus & Benjamin, 1996.)

In the facilitator model the organization itself is responsible on the change. In the model the IT department is to take the responsibility on the training since it is profound part of the success of information system. Therefore, there is potential to reduce the separation between the IS Specialists, clients and users enabling better IT management, systems and increased level of credibility of IT department. (Markus & Benjamin, 1996.)

The third model for change agentry by Markus and Benjamin (1996) is the Advocate model where in similar way as in facilitator model, the people are seen as the target of the change management activities. Although there are differences between the three model, as the traditional model sees change agentry as something where the change agent is trying to fulfil the users' needs and facilitator model where the agent helps the users to realize their targets. In the

advocate model the change agent is actively pressing the organizations interests and shifting the minds of the change targets. (Markus & Benjamin, 1996.)

Iveroth (2010) presented the four dimensions of change in the commonality framework for IT enabled change starting from simple to more complex: In the *Common ground* the change agent is acting in a role of a messenger, transferring the message between the change agent and the recipient of the change. It's important to communicate in the matter that the recipient is receiving and comprehending the message. Usual example is an email of instructions to change coding style of a document. (Iveroth, 2010.)

Change agent is working in the role of an expert and translator when building the *Common Meaning* overcoming the interpretive differences between change actors by means of learning and reflection. It is built on social interactions between the change agent and the recipients and also on the interactions within the recipients themselves. (Iveroth, 2010.)

When establishing *Common Interest* for the change, the change agent is engaged with relational activities, both political and supportive. Political activities include aligning interests by negotiations and informal relationships in the role of a negotiator. Through the supportive activities change agent is working in the role of a coach – managing feelings and emotions and motivating the change recipients. The common interest change aims to revise the behavior and mindset of people from the practices they are comfortable with towards the new aligned practices, thus it is also the most complex in nature out of all the change dimensions. (Iveroth, 2010.)

Stabilizing the *Common Behavior* with monitoring, communication and intervention activities, which all are securing the recurrent and long-term behavior aligned to the new IT change. The Change agent is acting more in the role of an observer and intervener. This dimension as well as the common ground are relying on the hard factors of the change. The common behavior related stabilizing activities are performed after the IT has been implemented making this dimension different from the others. The successful outcome builds on change acceptance and smoother change process. (Iveroth, 2010.)

2.3.3 Management and leadership

Klaus and Blanton (2010) discussed the issues related to especially enterprise system implementation such as new Customer Relationship Management or Enterprise Resource Planning system. They raise the concept of psychological contract which is the "-- beliefs that individuals hold regarding promises made, accepted, and relied on between themselves and another" (Klaus & Blanton, 2010.) Based on the violations to this contract between the employee and company, the employees react to the changes appearing to their day-to-day life depending on the means to present the change to the employees. One of the reactions may be user resistance which can vary in the amount of force put against the change in the work organization. (Klaus & Blanton, 2010.)

Each employee has their own desired level of the determinants described in Table 1. There are three different types of issues employees can phase in the

situation of a change. These types are individual issues, system issues and organizational issues. Klaus and Blanton (2010) raise the uncertainty as an example: Emily's level of uncertainty can be reached with not having his job on the line, while Jack's desired level of uncertainty is met as long as his daily tasks are predictable. Management can help to overcome the uncertainty by facilitating new psychological contract with proper top-down communication. Important aspects of this are clear and consistent plans, which enable the people to understand *why* their psychological contract is being changed. (Klaus & Blanton, 2010.)

All these individual issues raise from the breach, or in the worst case, violation, of the psychological contract between the employee and the employer. In case management actions are not taken to prevent long-lasting breach, the user resistance will be present in the face of the change. What comes to the system issues, training should be used to tackle them by users. (Klaus & Blanton, 2010.)

In case the system is not supporting the established processes, the users will not understand the change without the communication and training of new processes and their fitting to purpose. Perceiving the breach of contract does not mean that the resistant behavior will occur by the user. The interpretation of the perceived breach of the psychological contract is what will determine, if the breach has been severe enough to trigger the resistant behavior. All the noted determinants should be addressed by the managers during the implementation of ES, if left unaddressed the likelihood of user resistance will grow. (Klaus & Blanton, 2010.)

Conclusions by Klaus: Users might take covert actions when facing a breach in their psychological contract. They might "forget" their tasks, insert data incorrectly or perform their tasks slowly. If management actions are taken prior the change or implementation of a new system, the psychological contract can be incrementally changed beforehand, when the users are more likely to support the change. (Klaus & Blanton, 2010.)

There's an assumption that the IS plays a central role in the manager's decision making. Decision processes are simple, and it was described by Keen (1981) as "multifaceted, emotive, conservative and only partially cognitive". Problems are to be simplified to a manageable format and instead of quantified information, rules of thumb, negotiations and habit have more force. The human information-processing has been characterized by Keen (1981) as simple, experiential, nonanalytic and effective. Formalized information systems pose a threat to users as they might be interpreted as criticism towards themselves. (Keen, 1981.)

As Iveroth (2010) states IT is linked to the daily work of the people, leading through a successful IT change requires management to tackle the IT itself and the implications in social and organizational spheres. (Iveroth, 2010.)

Table 1 User determinants for change. Adapted from Klaus and Blanton (2010).

Issue type	Determinant	Description	Example
Individual issue	Uncertainty	User is unclear of the future	Unknown future, potential threat, lack of clarity

Individual issue	Input	User's opinions are not considered	The thoughts and opinions of users were not sought out
Individual issue	Control/ Power	User loses control or loss of recognition as the expert	Leveled playing field, not the expert anymore
Individual issue	Self-Efficacy	Perceived lack of capability	Lack of confidence, lack of computer skills/abilities
System issue	Technical problems	Problems with the system	Bugs in system, features that don't work right
System issue	Complexity	System is complicated to use	Difficult to access, poor user interface that lacks logic or is not intuitive
Organizational issue	Facilitating Environment	Organizational culture is not conducive to the change	Lack of technology usage in organization, bureaucracy that is slow to change
Organizational issue	Communication	Communication to users is problematic	Lack of communication, users not hearing benefits of system, lack of coordination, users not understanding why
Organizational issue	Training	Training does not meet organizational needs	Lack of training, training seems to be a waste of time, incompetent trainers, timing of training, sufficiency of training
Process issue	Job/Job skills change	User's job or job skill requirements changes	Revised job description, different job tasks, new skills, new way of thinking
Process issue	Workload	User is required to put forth additional effort	Extra work, more work to get same info, extra time
Process issue	Lack of fit	Process problem between the system and organizational structure	Problematic changes to processes, new processes not working as planned

2.4 Measuring organizational change

Barki and Hartwick (1994) wrote about measuring the user participation, involvement and attitude. He curated in their article that one participates to information system development when they take part in or contributes to the system under development. It can be and should be in all the forms of direct and indirect, formal and informal as well as they should be performed alone and with others throughout the development process. The activities may be characterized also as responsibilities. (Barki & Hartwick, 1994.)

User participation was divided to three factors that were measured: User-IS-relationship, responsibility and hands-on activities. User-IS relationship covers the relationship between the users and IS staff. Responsibility includes the

assignments and activities that are traditionally performed by the project manager or leader. Hands-on activities are the activities the user performs themselves for the system development. (Barki & Hartwick, 1994.)

User involvement is reflecting the importance of the new system and personal relevance to the user. Attitude is an evaluative or affective judgment of a person, event or an object. User attitude is a psychological state which reflects the affective or evaluative feelings relating and concerning a new information system. Therefore, it is tricky to measure the user involvement without measuring the attitude within. In case the attitude should be excluded, the evaluative component in the user involvement is to be also excluded. User involvement and attitude are likely to be related. When user perceives the new system as important and personally relevant, it's more likely to raise also positive affective or evaluative feelings. (Barki & Hartwick, 1994.)

Individual behavior can be broadly divided in two ways: cognitive and context model of behavior. In the cognitive model, the presumption is that we analyze the incentives and make rational choices based on our best interests. This leads to change management that focuses on changing people's minds. In the context model of behavior focuses on the automatic processes how we act in order to adapt to our environment. The change management therefore relies more on the context within the people act instead of facts and information provided to them. The context model recognizes the sometimes irrational and inconsistent choices by people due to the environment they are influenced by. (Dolan, Hallsworth, Halpern, King & Vlaev, 2010.)

The cognitive and context models are founded on the idea found in psychology and neuroscience, in which these models are identified as system 1 and 2. System 1 being the intuition and system 2 the cognitive decision maker and analyzer. The MINDSPACE-approach (Messenger, Incentives, Norms, Defaults, Salience, Priming, Affect, Commitment, Ego) focuses on the variables of system 1 and how to find the key elements to effect on the "intuition" of people. The MINDSPACE was defined as a toolkit for public sector to nudge people's decisions to correct direction. By measuring the attributes within the MINDSPACE the feelings and attitudes toward a change can be seen. (Dolan et al., 2010.)

Yang and Yoo (2004) builds their theory on top of technology acceptance model (TAM) by Davis and Davis et al. According to TAM the two beliefs that determines the intention to use technology are perceived usefulness and ease of use. The first one is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" and the latter one as "the degree to which a person believes that using a particular system would be free of effort". (Yang & Yoo, 2004.)

Yang and Yoo (2004) added attitude (affective and cognitive) to the TAM model, emphasizing the role of attitude in the system implementation. They noticed in their study that the cognitive attitude is affecting the IS use, but the affective attitude is not explaining the IS use at all. Cognitive attitude was measured with scales wise/foolish, beneficial/harmful, valuable/worthless in prescribing the role of IS in performing their task. Affective attitude was measured by how they feel when using IS with scales: happy/annoyed, positive/negative, good/bad. (Yang & Yoo, 2004.)

Yang and Yoo (2004) also state that the managers should consider the positive attitude meaningful in their leadership, since people work and talk to each other expressing their attitudes daily. It is important to have a positive attitude around the system implementation to increase the system usage within users. Attitude can be changed quite quickly towards positive by direct influence of an individuals with enhancing e.g. motivations, memories, moods or abilities, by improving the contextual cues with classical conditioning or by consideration of persuasive messages with e.g. message credibility, two-sided communication or message memory. Although it's quick to change the attitude, efforts should be directed to maintaining the achieved positive attitude due to its unstable nature. (Yang & Yoo, 2004.)

Wakefield (2015) as well used the TAM model and measured technology acceptance with perceived ease-of-use and perceived usefulness. He wanted to understand the positive and negative effects, and how did those influence the intention to use the technology. That leads to measurement of both positive affect and negative affect in addition to the intent. Wakefield (2015) measured the perceived usefulness and ease of use with the measurements from Davis (1989). For the measurement of intent, they used Ajzen and Fishbein's (1980) measures whereas for positive and negative affect the measurement items were taken from Murray and Dacin's (1996) study. (Wakefield, 2015.)

Wakefield (2015) found that positive and negative affects both occurred in the evaluation of the usefulness of the technology. Even though there would be strong positive feelings on the usefulness the negative effects will not disappear. The perceived ease of use will not raise that many positive affects even though it would have been easy to use. Users tend to take credit to themselves, when they can easily navigate within the system. But when the perceived ease of use raises negative feelings it is influencing the user's intention to use the technology drastically. (Wakefield, 2015.)

Oja and Galliers (2011) highlight that emotions or moods should not be reduced from the situatedness. Both of them are necessary for understanding human action. Emotions are subject to a specific object, that is why we are angry *at* someone. Moods on the other hand are more general in nature and harder to identify and specify. Therefore, the moods are the background and bias for our action. Thus, we are less creative in problem solving when we are sad, and more process-oriented whilst on a sad mood. In the context of enterprise system usage, a person on a good mood might face an issue and try to overcome it creatively. If they are successful, it will stabilize their positive mood, nature of the enterprise system, user's identity and work practices. If the user is on a bad mood, quite opposite might happen in the intertwine of the system and user. When facing the problem, they might prolong finding the solution or give up altogether, which will strengthen their disposition. (Oja & Galliers, 2011.)

Oja and Galliers (2011) performed a qualitative field research within one company. By interviewing personnel in one company they found their stable positions in regards with the enterprise system. They found that the combination of human and system is unique for all the users, since each user has their own position where they use the system. It is both the tasks that belong to their

work profile but also the emotions and moods affecting how they perceive the system. (Oja & Galliers, 2011.)

User commitment plays a crucial role in the acceptance of volitional system implementation and use. Malhotra & Galletta (2005) build upon concepts of affective and continuance commitment when explaining the user's acceptance and usage behavior. Affective commitment based on the internalization includes the adoption of the wanted behavior by the system user based on user's perceived congruence with system's norms and values to their own. Internalization based commitment is strong and it bases on the fact that the user wants to use the system, not that they have to. (Malhotra & Galletta, 2005.)

Affective commitment which is based in the identification comes from the need to have a self-satisfying relationship with the influencers around the system. These influencers can be the managers, super users or other meaningful persons. Even though the user would not be interested on the system nor its content they feel that they should adopt the induced behavior. (Malhotra & Galletta, 2005.)

The continuance commitment refers to the rewards or punishments that will follow if the user will not adopt the usage of the system. Compliance based commitment occurs when user adopts the wanted behavior and expects a positive reaction from a person or a group or avoidance of punishment. Compliant behavior cannot be said to be volitional. User most likely sees the behavior as controlling and pressurizing, which has negative influence on the system user's attitude and intentions toward the system. (Malhotra & Galletta, 2005.)

Malhotra & Galletta (2005) performed quantitative research using surveys after first training and post implementation after six months of use. Measurement scales for perceived usefulness, attitude, perceived ease of use and behavioral intention were used together with commitment scales. The concepts were measured with seven level LIKERT-scale. Their findings implicated that the affective commitment had a significant positive influence on the user's intention to use the system whereas the compliance had a negative effect. Especially after extended use, it seems that the commitment has significant and direct effect on user's intention. (Malhotra & Galletta, 2005.)

Zhang (2013) draws together the definition of affect as "─is conceived of as an umbrella term for a set of more specific concepts that includes emotions, moods and feelings." Affect is an important aspect of being human. Under the umbrella term affect there is a core affect, which represents a mental acknowledgment of one's state. One example on core affect is how sleepy an individual is currently. One can easily fetch that information without requiring any cognitive or reflective effort. Stimulus as another concept of affect is an occurring event in one's environment that they react or respond to. It is more a psychological representation, which can be either real or imagined; or happened in the past or anticipated for future. (Zhang, 2013.)

The moods and temperaments are not in general occurring with stimulus. When we talk about affect residing within ICT triggered stimulus, the affective quality and affective cues are categorized in to these. Affective quality is the attribute of a stimulus which can trigger a change in a person's core affect. Whereas affective cues are the properties of such affective qualities. As an ex-

ample, the colors, button design and typography are the affective cues of an app which is the affective quality that will change the user's core affect. (Zhang, 2013.)

For measuring the affect between the user and the ICT stimulus, there are two types of affective responses. There are emotions which form by the stimulus and there's evaluation of the affective quality. When the respond comes from emotions, the user responds to a stimulus with emotions, describing the feeling they have when using an app. Other respond type would be, when the user evaluates the affective qualities of an app such as the typography or colors of a user interface. (Zhang, 2013.)

2.5 Summary of the theoretical starting point and research setting

Although, Dolan et al (2010) wrote about the MINDSPACE-approach referring to the domain of psychology and targets public sector in their attempts of nudging people's behavior. The same forms of thought processes can be seen in any other domain of people's life, since the system 1 as more intuitive and system 2, the cognitive decision maker, are within people as they act in every environment. Therefore, we can find the relation to change management in information technology as well. Utilizing MINDSPACE attributes when measuring the success of change management, assures that change management is focusing on nudging people into correct direction instead of purely pushing and regulating.

In the section focusing on Change Management concept the multiple natures of a change were revealed. Change can be punctuated (Lyytinen & Newman, 2008) or incremental along the social inertia (Keen, 1981). In the large cultural changes in organization, IT can have a major role in advancing or slowing down the change. Change agentry is an acknowledged way of advancing change within organizations by utilizing the key individuals with social capital in the organization.

COBIT and ITIL were discussed in section 2.2 and their role in governing the IT as an organization (COBIT) and processes (ITIL) was explained. Both frameworks have achieved a strong standing as frameworks guiding the organization of information management. It can be argued that with these traditional IT frameworks the focus is in the processes and organization structure and not in improving the services as it is with more modern frameworks. There the service and business performance improvement should be in the focus and not the processes themselves. Many times, it is forgotten that this is the target of the ITIL and COBIT frameworks as well. Especially with ITIL's complex nature it sometimes guides people to focus solely to the processes and not to the services with the help of the provided processes.

There are multiple other process development frameworks available as well including Six Sigma, Continuous Service Improvement Process and DMAIC. Unterkalmsteiner et al. (2012) points two different approaches for process improvement: top-down and Pre-Post comparison. Both these approaches have

their key in what is decided to be measured in the process. The top-down approach is performed with known "best practices" provided externally. The Pre-Post comparison on the other hand requires proper metrics to be used before the implemented change and after. They must be comparable to each other. (Unterkalmsteiner et al., 2012.)

Change Control and Release Management (ChaRM) processes are part of the IT Service Management processes which are set to support the software within the whole system landscape of an enterprise (Figure 7). In this research the focus is on the process change in the ChaRM process, which is controlling and governing the ERP development and maintenance activities. The control secures the productive business processes with demanding quality gates within the development and maintenance processes.
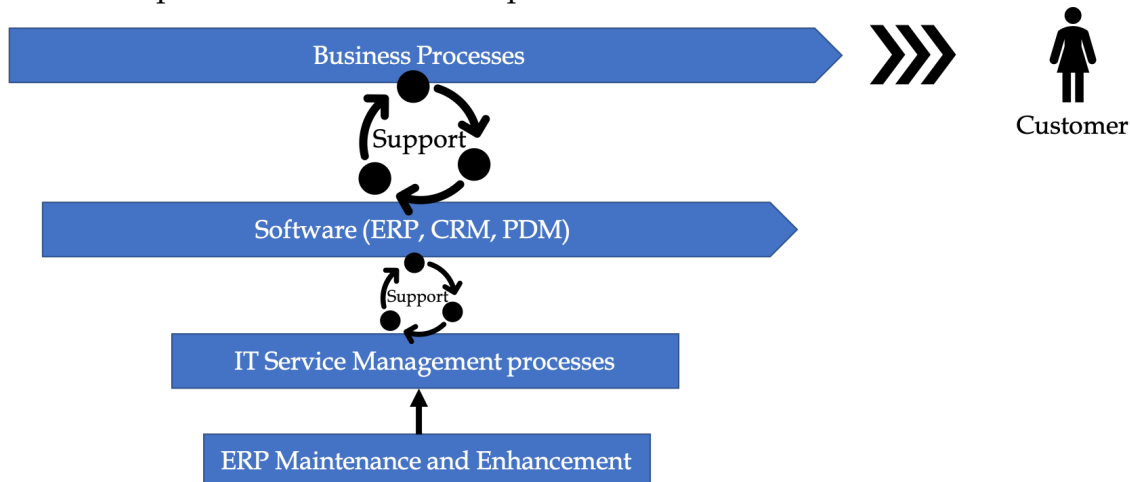
Figure 7 Process landscape: IT Service Management processes support the Software supporting the business processes.

The importance in measuring the process improvements to achieve the correct goals, in measuring the change in a correct manner and with compatible attributes is common nominator for the theoretical concepts discussed in this section. The general words of wisdom "you get what you measure" is very accurate in the change management. In the next section the case study will be presented.

3   CASE STUDY

This research focuses on the Change Control and Release Management process development. In this section the process used before the new tool is presented as well as the new process implemented during the case project. The process is used by the ERP Center of Excellence department in the central Information Management, all the external development partners and testers from the business units. The change implemented has made a big impact on a day-to-day work for the employees and partners when shifting from non-binding combination of global ITSM tool, excel and email process to fully tool-based Change and Release Management governing the whole spectrum of changes in the SAP system landscape.

3.1   Change Control and Release Management process

The Change Control and Release Management process, prior the implementation of the new process and tool, was utilizing the global centralized ITSM tool, excel sheets and emails. The earlier process is presented in Figure 8. The new implemented process for Change Control and Release Management can be seen in the Figure 9.

SAP Development team was using the global ITSM tool for governing the changes in SAP environment before the implementation of new process. There were four different sources for triggering a change in the SAP system. First there were Incidents, which were handled within the ITSM tool according to the Incident Management process. Prior implementing the ChaRM process and tool, not all the incidents were logged to the Service Portal available for users, but sometimes also direct email communication to known counterparts was used by the end users.

Second trigger was Enhancement Request as presented in the Figure 8. Enhancement Request is the object utilized in the ITSM tool to handle the Requirement Management process. The change process was triggered as presented in the Figure 8 by creating a story from the Enhancement Request. The Story

as an object has seven separate states, which were freely in use except for the UA Testing, Deployment and Complete. UA Testing state was utilized for recording the User Acceptance Test results, Deployment-state marked stories as ready for deployment to production and Complete-state marked for completion and successful import to production for the requested change.
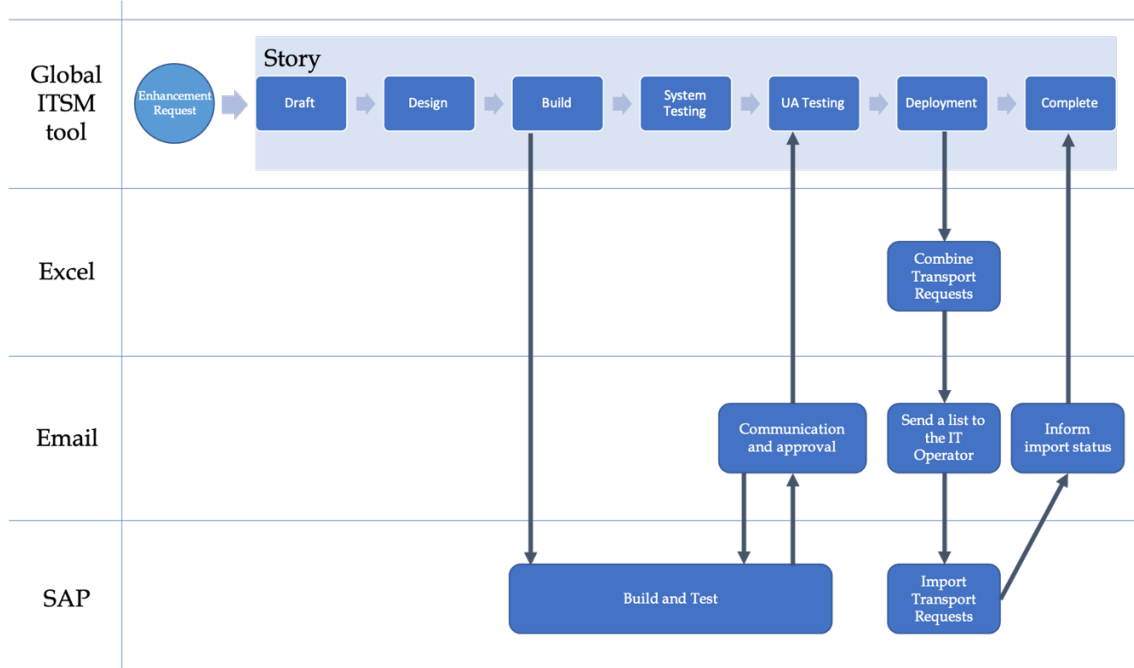
Figure 8 SAP Change Control and Release Management Process before ChaRM implementation

Third trigger were the ongoing projects within the Portfolio and Project Management office. They govern their scope in the different objects within the ITSM tool such as Projects, EPICs or Themes. The Project Management team can choose quite freely in which matter they want to manage their project. The changes were handled within story-objects in similar fashion as when the change was triggered by Requirement Management process.

Fourth change trigger were Service Requests which are mainly system parameter data maintenance and very general in nature. These were either logged into the Service Portal or requested via email. These needed to be manually entered to the ITSM tool as changes and they were then informed to IT Operator via email.

Developers had to manually mark their Transport Requests to the stories or change -objects in the ITSM tool, containing their changes in development environment. This was one of the critical human error phases. Plenty of issues can happen in the production environment, if some Transport Request are missed or they are imported in incorrect order.

The Transport Request was imported to production environment, if it was in the daily spreadsheet sent to the IT Operator by authorized personnel maintained in the related list. Developer and IM Change Manager were technically able to have their changes to production by simply making the changes, testing the solution and sending the Transport Request to IT Operator – all by email

and excel. This was very critical loss in the audit process as well, which were to be solved by the new ChaRM process implementation.
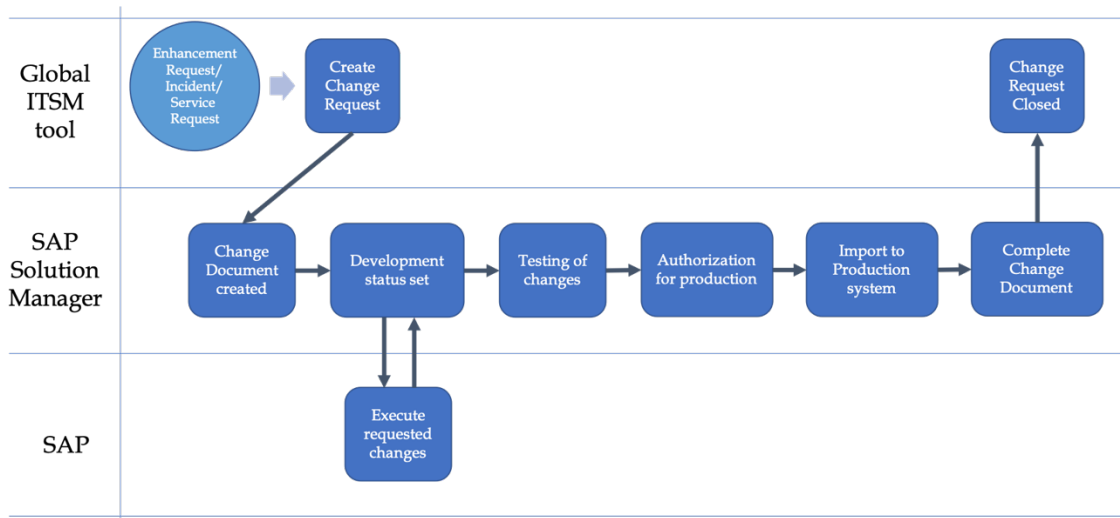
Figure 9 SAP Change Control and Release Management Process after ChaRM implementation

The sources for changes in SAP systems did not change when implementing the new ChaRM process. ChaRM as tool is in-built to SAP landscape and enables to govern the development process from the root. ChaRM tool is controlling the creation, release and import of Transport Requests containing the development objects, thus making it practically impossible for a user to not follow the implemented Change Control and Release Management process.

The ChaRM process was implemented for Standard Changes, Normal Changes and Urgent Changes. The Standard Changes is used for fulfilling the Service Requests which are preapproved by nature. Normal Changes are the most utilised change type since both independent requirements and project requirements are delivered by the Normal Change Document type. The Urgent Changes are used within the Incident Management process; thus, they are used for solving production issues.

The newly implemented ChaRM process within SAP Solution Manager eliminates the use of email and spreadsheets, storing all the data related to implemented changes within the tool for future reference.

3.2 MINDSPACE

There is a cognitive and context model for individual behavior. The cognitive model assumes that people make rational choices based on our best interests. This assumption leads to change management in which the focus is in changing people's minds. The context model focuses instead on the automatic processes of adapting to our environment as humans. It recognizes the fact that sometimes people do make irrational and inconsistent choices against our own best

interest. MINDSPACE approach tries to cover the variables of individuals intuition and it's derived from attributes:

- Messenger
- Incentives
- Norms
- Defaults
- Salience
- Priming
- Affect
- Commitment
- Ego. (Dolan, Hallsworth, Halpern, King & Vlaev, 2010.)

Messenger

As humans the weight we give to the information depends on the automatic reactions that we have for the source of the information. Common characteristics with the messenger and receiver reinforce the actions taken on the information received. This is especially true in the lower socio-economic groups. Authority cue is present when the messenger is an expert in their field. The credibility comes as given, even in the situations where the content of the message is false. Dolan et al. (2010) used as an example the relationship between nurses and doctors, where the authority cue is very strong for the doctors. (Dolan, Hallsworth, Halpern, King & Vlaev, 2010.)

Credible messenger will increase the likelihood that piece of information is seen to be true by the receiver. This can also be analyzed by cognitive means, if there is a consensus in the community: Do lots of different people say the same thing? Or to assess the consistency of the messenger: Do they say the same thing in different situations? (Dolan, Hallsworth, Halpern, King & Vlaev, 2010.)

Incentives

As humans our natural response to incentives is to strongly avoid losses. The possible losses loom larger than gains in situations in which we are urged to make decisions. If there is a possibility to lose a little money or gain a lot, we usually don't take the chance at all, so that we wouldn't end up losing any. We are also sensitive to prices and cost of our decisions. When evaluating the appropriate level of the incentive the reference point into which we compare, has a great impact to our evaluation result. (Dolan, Hallsworth, Halpern, King & Vlaev, 2010.)

Concept of mental accounts means that we allocate resources to different sections e.g. allocating money for rent, traveling or food. Then we compare the amounts that we are spending against the mental account balance, and not the value of our future purchase or full budget of ours. We also overweight the small probabilities, which explains the popularity of lotteries. (Dolan, Hallsworth, Halpern, King & Vlaev, 2010.)

Norms

Others' actions influence us in our day-to-day lives. The social and cultural norms are the rules or expectations, the ideal behavior people try to conform to. The conforming to norms is partly conscious, thus an act of cognitive behavior. There are automatic components in conforming to norms as well, since people do not recognize, if their actions have been influenced by others. Conforming behavior is sometimes difficult to explain in terms of "rationality", as an example an individual might not act in a dangerous situation in case they are surrounded by inactive persons. Norms work in a way that the more people are adhering to them, the more rest want to adhere it. (Dolan, Hallsworth, Halpern, King & Vlaev, 2010.)

Defaults

When nudging people to make better or desired decisions within their life or in a process, the power of default should be acknowledged. Default option is the decision that will become into use, if one makes no active choice. In the everyday life people usually accept the default option as it is. As an example, the amount of organ donors rose after the check box was by default 'Yes' instead of 'No'. People tend to follow the given default option, which does not require them to process the decision thoroughly. (Dolan, Hallsworth, Halpern, King & Vlaev, 2010.)

Salience

When attentional or cognitive resources are restricted, individuals focus only on the most salient behavioral cues and most decisions are made without proper information on the subject. People don't have resources to investigate each of their decision thoroughly before making one. Humans create mental anchors to support the decision-making process and rely on the information that seems relevant. (Dolan, Hallsworth, Halpern, King & Vlaev, 2010.)

Priming

Priming is an activity in which the words, sights and smells are used as primes to affect human behavior. Dolan et al. (2010) said that utilizing specific words like fit, lean, active can prime people to utilize more stairs in their daily lives. Also seeing smiley faces makes people drink more versus seeing frowny faces during drinking. (Dolan, Hallsworth, Halpern, King & Vlaev, 2010.)

In the context of implementation projects such as the case in this thesis, words like robust, reliable and centralized prime people into understanding the need for the project and system. Bringing the information on the change early on with project team's proper attitude and trust toward the solution can also affect the community's attitude towards the project.

Affect

Affect is the act of experiencing emotion, and our emotional associations can powerfully shape our actions. Feelings of disgust, joy, sadness and pleasure affect our financial decisions in the long- and short time spans and especially in the decisions under uncertainty. Consumers brand choice can be changed by repeated pairing of positive and negative words and images with a brand. (Dolan, Hallsworth, Halpern, King & Vlaev, 2010.)

Commitment

People tend to seek to be consistent with their public promises and reciprocate acts. To strengthen the commitment towards new system implementation or any new deal, the attempt to get public promises by the users or consumers should be made. Both the public promise and reciprocity should tune down the tendency to procrastinate and delay the decision making which in the long run would serve their benefit. Commitment to a case becomes more effective as the cost for possible failure increases. (Dolan, Hallsworth, Halpern, King & Vlaev, 2010.)

Ego

Ego comes from the desire to act in ways that make us feel better about ourselves. The actions that we take should support the impression of a positive and consistent self-image that we've built. Ego is also connected to the attribution error in which we attribute the successes to ourselves and failures to others and blame the circumstances or other people of our failures. We also have bias in self-evaluation, and we consider ourselves and our reference group to be above average. Though, when our believes and behavior are in conflict, the believes change easier than actions. (Dolan, Hallsworth, Halpern, King & Vlaev, 2010.)

When trying to influence people's behavior we should try to make them act differently instead of changing their minds by arguments. We should always have high expectations of people, since they perform the better the higher the expectations are. This effect is called the Pygmalion effect. (Dolan, Hallsworth, Halpern, King & Vlaev, 2010.)

3.3   Questionnaire and collection of research data

Questionnaire was carried out within the SAP development community six months after the new Change Control and Release Management process and tool implementation. The questionnaire had ten variables which were measured with three questions each, which were then combined as sum variables. Each MINDSPACE attribute had their own variable which were the explanatory variables for the variable J: intention to use the new Change Control and Release Management (ChaRM) in the future. In the Table 2 the variables are coded and mapped against the attributes in MINDSPACE. The data was collected six months after the implementation took place and was measuring the intuitive

aspect of accepting the new process and tool for Change Control and Release Management. Research data was collected by sending the link to online questionnaire form via emails and internal communication channel Yammer. The questionnaire was sent to 268 people in the SAP development community in Wärtsilä. People were given three weeks of time to respond to survey

Table 2 Mapping of questionnaire variables to MINDSPACE attributes

Code	Likert Question	Question	MINDSPACE attribute
A1	I received information on the ChaRM implementation in good time.	Were you able to prepare yourself for the ChaRM implementation?	Priming
A2	The ChaRM implementation was not communicated early enough.		
A3	I would have liked to receive information on the ChaRM implementation much earlier.		
B1	I received information on the ChaRM implementation from someone I know well.	Did you receive the information on the ChaRM implementation from someone you know well?	Messenger
B2	I would have liked to receive information on ChaRM implementation from someone I knew better.		
B3	I don't actually know well anyone who told me about the ChaRM implementation.		
C1	The implementation of ChaRM was necessary for my work.	Do you believe that the implementation of ChaRM was a necessary change?	Salience
C2	The implementation of ChaRM was necessary for my unit.		
C3	I don't believe that this change was necessary for my work community.		
D1	I think that the implementation of ChaRM was our best option for SAP change and release management in Wärtsilä and in our department.	Do you feel that the implementation of ChaRM was the best option for SAP Change and Release management in Wärtsilä and in your department?	Defaults
D2	I think we could have found better solution for SAP Change and Release Management.		
D3	It is not reasonable to carry out SAP Change and release management with other solutions than ChaRM.		

(continue)

Table 2 (continue)

E1	We have committed to the new ChaRM implementation together with my colleagues.	Do you think that your work community is committed to the ChaRM implementation?	Commitment
E2	We have agreed in our unit that we will together facilitate the success of ChaRM implementation.		
E3	We have agreed with my colleagues that the ChaRM process should be used in future for SAP change and release management.		
F1	I have a good reason to use ChaRM.	Are you motivated to use the ChaRM?	Incentives
F2	I know that using ChaRM will ease my work compared to the earlier SAP Change and release management process.		
F3	I am motivated to use ChaRM.		
G1	I think that the implementation of ChaRM is mainly a positive thing.	Do you experience the implementation of ChaRM as a positive change?	Affect
G2	Implementation of ChaRM is a change for the better.		
G3	This is change for the worse in SAP change and release management		
H1	I am uncertain on my abilities and that I am not able to perform the needed tasks with ChaRM.	Do you experience uncertainty in using ChaRM?	Ego
H2	I believe I can handle the use of ChaRM as well as my colleagues.		
H3	I am afraid I cannot use ChaRM correctly and that would create a bad image of me.		
I1	I have noticed that other employees in my unit have taken the implementation ChaRM positively.	How do you see your colleagues in your unit are experiencing the change to ChaRM?	Norms
I2	My colleagues have a negative attitude towards ChaRM process.		
I3	My colleagues see the abandonment of old SAP change and release management process mainly as a positive thing.		
J1	I intend to continue using CHARM in the future.	Do you intend to use charm in the future?	-
J2	I will always try to use CHARM in my daily work.		
J3	I plan to continue to use CHARM frequently.		

4 RESULTS

The questionnaire was sent to 268 people in the SAP development community in the case company. Participants were given three weeks of time to respond to survey and there were 68 responds from different roles in the SAP community:
- 20 internal SAP Experts (Change Managers)
- 10 testers
- 15 developers (internal and external)
- 16 Application Maintenance Support team members
- 2 IT Operators
- 2 System Admins
- 2 Others

The response percentage was 25,4% and out of the 68 responds, three were dismissed due to inconsistencies. At the end 65 responds were analyzed. Table 3 presents the responds to the questionnaire and the means of each variable with their sum variable's Cronbach's alfa.

Table 3 Means and Cronbach's alfas for the variables

Code	Variable	Mean	Cronbach's alfa
A	**Were you able to prepare yourself for the ChaRM implementation?**	3,7846	.836
A1	I received information on the ChaRM implementation in good time.	4,06	
A2*	The ChaRM implementation was not communicated early enough.	3,91	
A3*	I would have liked to receive information on the ChaRM implementation much earlier.	3,38	
B	**Did you receive the information on the ChaRM implementation from someone you know well?**	3,7846	.681
B1	I received information on the ChaRM implementation from someone I know well.	3,88	
B2*	I would have liked to receive information on ChaRM implementation from someone I knew better.	3,49	
B3*	I don't actually know well anyone who told me about the ChaRM implementation.	3,98	

Table 3 (continue)

C	Do you believe that the implementation of ChaRM was a necessary change?	3,5469	.825
C1	The implementation of ChaRM was necessary for my work.	3,52	
C2	The implementation of ChaRM was necessary for my unit.	3,55	
C3*	I don't believe that this change was necessary for my work community.	3,57	
D	Do you feel that the implementation of ChaRM was the best option for SAP Change and Release management in Wärtsilä and in your department?	3,4205	.677
D1	I think that the implementation of ChaRM was our best option for SAP change and release management in Wärtsilä and in our department.	3,66	
D2*	I think we could have found better solution for SAP Change and Release Management.	3,34	
D3	It is not reasonable to carry out SAP Change and release management with other solutions than ChaRM.	3,26	
E	Do you think that your work community is committed to the ChaRM implementation?	3,8542	.815
E1	We have committed to the new ChaRM implementation together with my colleagues.	3,86	
E2	We have agreed in our unit that we will together facilitate the success of ChaRM implementation.	3,81	
E3	We have agreed with my colleagues that the ChaRM process should be used in future for SAP change and release management.	3,89	
F	Are you motivated to use the ChaRM?	3,7795	.825
F1	I have a good reason to use ChaRM.	3,97	
F2	I know that using ChaRM will ease my work compared to the earlier SAP Change and release management process.	3,51	
F3	I am motivated to use ChaRM.	3,86	
G	Do you experience the implementation of ChaRM as a positive change?	3,9385	.796
G1	I think that the implementation of ChaRM is mainly a positive thing.	3,89	
G2	Implementation of ChaRM is a change for the better.	3,95	
G3*	This is change for the worse in SAP change and release management	3,97	
H	Do you experience uncertainty in using ChaRM?	3,8201	.669
H1*	I am uncertain on my abilities and that I am not able to perform the needed tasks with ChaRM.	3,45	
H2	I believe I can handle the use of ChaRM as well as my colleagues.	4,06	
H3*	I am afraid I cannot use ChaRM correctly and that would create a bad image of me.	3,95	
I	How do you see your colleagues in your unit are experiencing the change to ChaRM?	3,4359	.646
I1	I have noticed that other employees in my unit have taken the implementation ChaRM positively.	3,45	
I2*	My colleagues have a negative attitude towards ChaRM process.	3,52	
I3	My colleagues see the abandonment of old SAP change and release management process mainly as a positive thing.	3,34	
J	Do you intend to use charm in the future?	4,0899	.858
J1	I intend to continue using CHARM in the future.	4,3	
J2	I will always try to use CHARM in my daily work.	3,94	
J3	I plan to continue to use CHARM frequently.	4,06	

In the Mann-Whitney U-tests the differences between the respondent groups were analyzed and the results are shown in Table 4. The null hypothesis in the test stands for the respondent group to not differ in relation to the whole respondent group. IM Change Managers differ in two hypotheses from the rest of the respondents. Both the B = knows the messenger well and J = intends to use ChaRM in the future are clearly above the mean within the group of Change Managers. The C = believes that charm implementation was necessary is also above the mean value, even though not statistically significant.

Testers deviate from the group the most. In the hypothesis test that the distribution of D = ChaRM was the best option for SAP Change and Release Management the testers responded significantly lower scores than rest of the respondents of the survey. Also, the E = work community is committed to using ChaRM revealed lower scores than in Non-Testers. Whereas the change managers were more committed and motivated to continue using charm, testers on the other hand gave the opposite signals according to the Mann-Whitney U test. This can be a result of the mandatory nature of ChaRM for Change Managers or the lack of training, guidance and information given to Tester group. The respondent group is not large, but some cautious conclusions can be drawn based on the U-test.

Developers as a group did not retain any unique positions under any of the hypothesis. The responds were near the average mean in all the categories, but slightly in the A = were you able to prepare for ChaRM and B = did you know the messenger well categories the developers responded below average. These are not statistically relevant, since the significance value is too high.

On the Application Maintenance Support (AMS) the answers were closer to the mean, and no hypothesis went to 0.1 significance. In the remaining groups of IT Operators, Other and Admins the respondent group was too small for performing a Mann-Whitney U-test.

Table 4 Mann-Whitney U-tests for user groups

User Group	Null Hypothesis	Sig.	Decision
IM Change Managers			
	The distribution of A is the same across categories of IMChangemanager	.259	Retain the null hypothesis.
	The distribution of B is the same across categories of IMChangemanager	.007	Reject the null hypothesis.
	The distribution of C is the same across categories of IMChangemanager	.068	Retain the null hypothesis.
	The distribution of D is the same across categories of IMChangemanager	.420	Retain the null hypothesis.
	The distribution of E is the same across categories of IMChangemanager	.242	Retain the null hypothesis.
	The distribution of F is the same across categories of IMChangemanager	.971	Retain the null hypothesis.
	The distribution of G is the same across categories of IMChangemanager	.394	Retain the null hypothesis.
	The distribution of H is the same across categories of IMChangemanager	.909	Retain the null hypothesis.
	The distribution of I is the same across categories of IMChangemanager	.843	Retain the null hypothesis.
	The distribution of J is the same across categories of IMChangemanager	.048	Reject the null hypothesis.
Testers			
	The distribution of A is the same across categories of Tester	.061	Retain the null hypothesis.
	The distribution of B is the same across categories of Tester	.051	Retain the null hypothesis.
	The distribution of C is the same across categories of Tester	.830	Retain the null hypothesis.
	The distribution of D is the same across categories of Tester	.014	Reject the null hypothesis.
	The distribution of E is the same across categories of Tester	.001	Reject the null hypothesis.
	The distribution of F is the same across categories of Tester	.779	Retain the null hypothesis.
	The distribution of G is the same across categories of Tester	.353	Retain the null hypothesis.
	The distribution of H is the same across categories of Tester	.302	Retain the null hypothesis.
	The distribution of I is the same across categories of Tester	.390	Retain the null hypothesis.
	The distribution of J is the same across categories of Tester	.004	Reject the null hypothesis.

Table 4 (continue)

Developers			
	The distribution of A is the same across categories of Developer	.241	Retain the null hypothesis.
	The distribution of B is the same across categories of Developer	.151	Retain the null hypothesis.
	The distribution of C is the same across categories of Developer	.911	Retain the null hypothesis.
	The distribution of D is the same across categories of Developer	.695	Retain the null hypothesis.
	The distribution of E is the same across categories of Developer	.696	Retain the null hypothesis.
	The distribution of F is the same across categories of Developer	.905	Retain the null hypothesis.
	The distribution of G is the same across categories of Developer	.880	Retain the null hypothesis.
	The distribution of H is the same across categories of Developer	.948	Retain the null hypothesis.
	The distribution of I is the same across categories of Developer	.956	Retain the null hypothesis.
	The distribution of J is the same across categories of Developer	.365	Retain the null hypothesis.
AMS team			
	The distribution of A is the same across categories of Applicationsupport	.300	Retain the null hypothesis.
	The distribution of B is the same across categories of Applicationsupport	.920	Retain the null hypothesis.
	The distribution of C is the same across categories of Applicationsupport	.562	Retain the null hypothesis.
	The distribution of D is the same across categories of Applicationsupport	.467	Retain the null hypothesis.
	The distribution of E is the same across categories of Applicationsupport	.599	Retain the null hypothesis.
	The distribution of F is the same across categories of Applicationsupport	.624	Retain the null hypothesis.
	The distribution of G is the same across categories of Applicationsupport	.768	Retain the null hypothesis.
	The distribution of H is the same across categories of Applicationsupport	.510	Retain the null hypothesis.
	The distribution of I is the same across categories of Applicationsupport	.279	Retain the null hypothesis.
	The distribution of J is the same across categories of Applicationsupport	.367	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

It can be interpreted from the correlation matrix (Table 5) that the variables B (messenger), C (Salience), E (commitment) and F (incentives) are statistically significant i.e. highly probable to be true in explaining the variable J, intention to use ChaRM in the future. Their correlation levels differ, and the Messenger

has the greatest influence of the variables to users' intentions to use ChaRM in the future as well.

Table 5 Correlation Matrix A

		A	B	C	D	E
A	Pearson Correlation	1	.540**	.133	.323**	.305*
	Sig. (2-tailed)		.000	.293	.009	.014
	N	65	65	64	65	64
B	Pearson Correlation	.540**	1	.351**	.230	.387**
	Sig. (2-tailed)	.000		.004	.065	.002
	N	65	65	64	65	64
C	Pearson Correlation	.133	.351**	1	.482**	.438**
	Sig. (2-tailed)	.293	.004		.000	.000
	N	64	64	64	64	63
D	Pearson Correlation	.323**	.230	.482**	1	.327**
	Sig. (2-tailed)	.009	.065	.000		.008
	N	65	65	64	65	64
E	Pearson Correlation	.305*	.387**	.438**	.327**	1
	Sig. (2-tailed)	.014	.002	.000	.008	
	N	64	64	63	64	64
F	Pearson Correlation	.064	.236	.697**	.487**	.479**
	Sig. (2-tailed)	.615	.059	.000	.000	.000
	N	65	65	64	65	64
G	Pearson Correlation	.229	.215	.629**	.485**	.509**
	Sig. (2-tailed)	.067	.086	.000	.000	.000
	N	65	65	64	65	64
H	Pearson Correlation	.171	.182	.417**	.426**	.355**
	Sig. (2-tailed)	.181	.154	.001	.001	.004
	N	63	63	62	63	63
I	Pearson Correlation	.160	.284*	.352**	.341**	.522**
	Sig. (2-tailed)	.204	.022	.004	.005	.000
	N	65	65	64	65	64
J	Pearson Correlation	.277*	.490**	.345**	.309*	.397**
	Sig. (2-tailed)	.028	.000	.006	.014	.001
	N	63	63	62	63	62

A=Priming, B=Messenger, C=Salience, D=Defaults, E=Commitment, F=Incentives, G=Affect, H=Ego, I=Norms, J=Intention to use ChaRM

Table 6 Correlation Matrix B

		F	G	H	I	J
A	Pearson Correlation	.064	.229	.171	.160	.277*
	Sig. (2-tailed)	.615	.067	.181	.204	.028
	N	65	65	63	65	63
B	Pearson Correlation	.236	.215	.182	.284*	.490**
	Sig. (2-tailed)	.059	.086	.154	.022	.000
	N	65	65	63	65	63
C	Pearson Correlation	.697**	.629**	.417**	.352**	.345**
	Sig. (2-tailed)	.000	.000	.001	.004	.006
	N	64	64	62	64	62
D	Pearson Correlation	.487**	.485**	.426**	.341**	.309*
	Sig. (2-tailed)	.000	.000	.001	.005	.014
	N	65	65	63	65	63
E	Pearson Correlation	.479**	.509**	.355**	.522**	.397**
	Sig. (2-tailed)	.000	.000	.004	.000	.001
	N	64	64	63	64	62
F	Pearson Correlation	1	.726**	.487**	.467**	.380**
	Sig. (2-tailed)		.000	.000	.000	.002
	N	65	65	63	65	63
G	Pearson Correlation	.726**	1	.563**	.557**	.255*
	Sig. (2-tailed)	.000		.000	.000	.043
	N	65	65	63	65	63
H	Pearson Correlation	.487**	.563**	1	.358**	.221
	Sig. (2-tailed)	.000	.000		.004	.087
	N	63	63	63	63	61
I	Pearson Correlation	.467**	.557**	.358**	1	.241
	Sig. (2-tailed)	.000	.000	.004		.057
	N	65	65	63	65	63
J	Pearson Correlation	.380**	.255*	.221	.241	1
	Sig. (2-tailed)	.002	.043	.087	.057	
	N	63	63	61	63	63

A=Priming, B=Messenger, C=Salience, D=Defaults, E=Commitment, F=Incentives, G=Affect, H=Ego, I=Norms, J=Intention to use ChaRM

5 DISCUSSION

The results are discussed in detail in this section. The correlation matrix was presented in the Results. It showed some statistical significance in the correlation of in time communication on the charm implementation and the future intention on using ChaRM. The early communication was not correlating more with the intention to use charm nor with other factors. It had some correlation with other factors but only small correlation to the measured intention to use charm in the future. Regarding the pressure put on the communication activities by literature (Iveroth, 2010; Klaus & Blanton, 2010) the expectation of it having more impact was not realized.

There were statistically significant and strong correlation between knowing the messenger and the future intention on using ChaRM. In the context of the project, the better the users new the project team and advocates for ChaRM the more they intended to use ChaRM in the future. This was the strongest relation found in the results and the emphasis on the change agentry within implementation of new systems and processes was revealed as meaningful in this research. The different models for change agentry by Markus & Benjamin (1996) and emphasis put on to the same by Iveroth (2010) are just a tip of an iceberg in the literature defending the roles of change agent and key user, especially within IS projects.

Understanding of the urgency and need for the ChaRM implementation created in the project's change management influenced to the perceiving of the necessity of the change, which then moderately correlated with the intention to use ChaRM. Some statistical significance was found in the moderate correlation of perceiving charm as best solution to the issues in SAP change and release management process with the user's intentions in using ChaRM. Also perceived commitment of colleagues correlated moderately with the intention to use ChaRM in the future. Common goals, understanding and support on the implementation within the community should support the intention to use ChaRM in the future as well.

Correlation with the intention to use ChaRM in the future and the motivation is statistically significant. Here the nature of the ChaRM application must be considered: the use of the system is not optional but forced by the system

controls. The motivation is for that reason forced and not built into the users with change management activities.

There was some statistical significance in the correlation of the perceiving ChaRM as a positive change with the intention on using ChaRM in the future. The uncertainty in using ChaRM didn't relate to the intention to use ChaRM in the future. User being certain or uncertain on their capabilities did not correlate to the future intentions. Even the environments perceived experiences were not correlating to the future intention in using ChaRM. The Figure 10 represents the correlations and strengths of correlations between the intention to use ChaRM and the explaining variables in the data as described above as well.
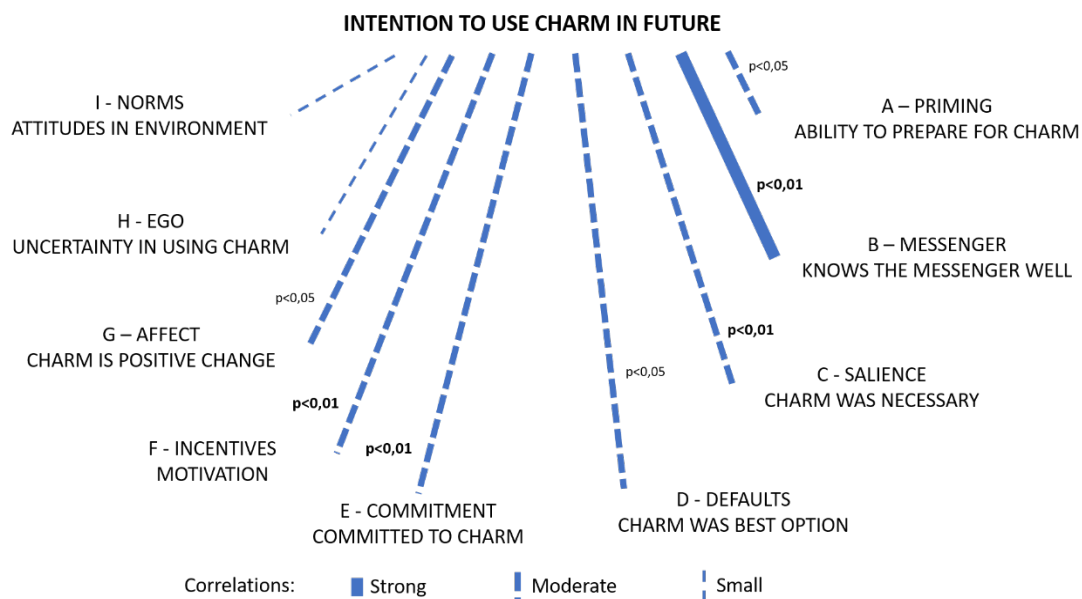

Figure 10 Correlations to variable "Intention to Use ChaRM in the future"

Strong correlations between the explaining variables were also found within the data. Priming; the ability to prepare for ChaRM implementation, correlated strongly with the messenger delivering the information on the upcoming change. When the user knew the messenger well, they received the information in time.

The perseverance of the necessity (Salience) relates to both the motivation to use charm (Incentives) and the experience of ChaRM being a positive change (Affect). If user understood the reasons behind the implementation of ChaRM and they agreed that there is a necessity in the upcoming change, they also saw the implementation as required and positive. This also affects their motivation towards using the newly implemented system (Incentives).

User's experience on the SAP Development community's Commitment to ChaRM relates to their perceiving ChaRM as a positive change (Affect). Users tend to lean on towards how they think others around them are thinking about the change (Dolan, Hallsworth, Halpern, King, & Vlaev, 2010), which is visible as well in the correlation between the Affect and Norms; experience of ChaRM being a positive change relates to the environments attitudes towards ChaRM.

The experience of ChaRM being a positive change relates to users' certainty of using ChaRM. The impact of Messenger is strong and highlights the aspect of having change managers involved within implementation projects. Proper Key User network is crucial for implementation projects in the future. And in the future projects should focus on choosing familiar messengers for all the groups and focus on effective communication towards all the users. The uncertainty in using ChaRM didn't relate to the intention to use ChaRM in the future. User being certain or uncertain on their capabilities did not correlate to the future intentions.

All in all, the correlations that were found to the intention of using ChaRM in the future were not strong except for the correlation to the messenger. So, the future intention is correlating to the extend the user trusts the change agent of the new tool or process. Many interesting correlations were found among the other variables, such as the correlation with the necessity of the change and both motivation and positivity around the change.

6 CONCLUSIONS

The goal was to combine the concepts of technical processes for controlling the changes in system landscape, and the people aspect of the change management activities. These change management activities are such as effective communications, training and handling the user's feelings of losing their control (Klaus & Blanton, 2010). Finding the means for measuring the change management success was important. The MINDSPACE-approach by Dolan et al (2010) was utilized when compiling the questionnaire used for research.

On case study level the target was to research how successfully the change management was carried out in the process improvement project. The acceptance of and intention to use the Change Control and Release Management (ChaRM) process and tool in the future was resulted in score 4,09 (on scale 1-5). Detailed results and discussion are found in their respective sections.

In the results it was seen statistically significant and strong correlation between knowing the messenger and the future intention on using ChaRM was found. The different models for change agentry by Markus and Benjamin (1996) and emphasis put on to the same by Iveroth (2010) are just a tip of an iceberg in the literature defending the roles of change agent, especially within IS projects. The study complemented the literature with this finding, and the case company has taken the change agent aspect into deeper consideration for future projects around their ERP endeavors.

Klaus and Blanton (2010) highlighted in their research many user determinants for change. According to them (Klaus & Blanton, 2010), one of the determinants is the complexity in the system and process, which is a change management issue to be solved to empower the user for future work. What was surprising in the case study results was that the uncertainty in using the system was not correlating to the future intention to use the tool and process. The new tool is forcing the user to follow the given process and there are no workarounds available on getting their system changes to production. This might influence the fact that the uncertainty of using the tool is not affecting to the future intention as could have been expected based on the literature (Klaus & Blanton, 2010).

ChaRM tool forcing users to obey the process by nature, supposedly influences the strong figures in the intention to use the tool in the future. Users don't have the choice of not using the tool since the change control process is in the core of their job description as developers of the system. That restricts the generalization of the results to tools and processes that are voluntary by nature. With the help of this study we are not able to interpret how the users would have taken the ChaRM process into use, if it would've been voluntary.

The correlations between the variables could be generalized to some extent. The MINDSPACE attributes and their internal correlations showed some strong correlations which should be further studied. Which change management activities would match to which MINDSPACE attributes, and how to combine the actions effectively within information system implementation projects. That would be an interesting aspect to research and build a change management framework for project managers within complex system implementations.

Utilizing MINDSPACE to measure the success of change management gave a good overview on different aspects of organizational change management and differences within respondent groups. This leads to an understanding of having different change management activities to reach users in different groups. Communicating to users from their perspective would increase the acceptance in all groups. In future ChaRM projects in other organizations the correlations found here could be utilized when planning on the change management activities.

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APPENDIX 1 QUESTIONNAIRE FORM

[Questionnaire was distributed in Microsoft Forms; this is a replicate]

Questionnaire on ChaRM usage. ChaRM was implemented in April 2018, how well does the following statements describe the implementation for you?

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
1. Were you able to prepare yourself for the ChaRM implementation?					
I received information on the ChaRM implementation in good time.	1	2	3	4	5
The ChaRM implementation was not communicated early enough.	1	2	3	4	5
I would have liked to receive information on the ChaRM implementation much earlier.	1	2	3	4	5
2. Did you receive the information on the ChaRM implementation from someone you know well?					
I received information on the ChaRM implementation from someone I know well.	1	2	3	4	5
I would have liked to receive information on ChaRM implementation from someone I knew better.	1	2	3	4	5
I don't actually know well anyone who told me about the ChaRM implementation.	1	2	3	4	5
3. Do you believe that the implementation of ChaRM was a necessary change?					
The implementation of ChaRM was necessary for my work.	1	2	3	4	5
The implementation of ChaRM was necessary for my unit.	1	2	3	4	5
I don't believe that this change was necessary for my work community.	1	2	3	4	5
4. Do you feel that the implementation of ChaRM was the best option for sap change and release management in the company and in your department?					
I think that the implementation of ChaRM was our best option for sap change and release management in the company and in our department.	1	2	3	4	5
I think we could have found better solution for sap change and release management.	1	2	3	4	5
It is not reasonable to carry out sap change and release management with other solutions than ChaRM.	1	2	3	4	5
5. Do you think that your work community is committed to the ChaRM implementation?					
We have committed to the new ChaRM implementation together with my colleagues.	1	2	3	4	5
We have agreed in our unit that we will together facilitate the success of ChaRM implementation.	1	2	3	4	5
We have agreed with my colleagues that the ChaRM process should be used in future for sap change and release management.	1	2	3	4	5
6. Are you motivated to use the ChaRM?					
I have a good reason to use ChaRM.	1	2	3	4	5
I know that using ChaRM will ease my work compared to the earlier sap change and release management process.	1	2	3	4	5
I am motivated to use ChaRM.	1	2	3	4	5

7. Do you experience the implementation of ChaRM as a positive change?

I think that the implementation of ChaRM is mainly a positive thing.	1	2	3	4	5
Implementation of ChaRM is a change for the better.	1	2	3	4	5
This is change for the worse in sap change and release management	1	2	3	4	5

8. Do you experience uncertainty in using ChaRM?

I am uncertain on my abilities and that I am not able to perform the needed tasks with ChaRM.	1	2	3	4	5
I believe I can handle the use of ChaRM as well as my colleagues.	1	2	3	4	5
I am afraid I cannot use ChaRM correctly and that would create a bad image of me.	1	2	3	4	5

9. How do you see your colleagues in your unit are experiencing the change to ChaRM?

I have noticed that other employees in my unit have taken the implementation ChaRM positively.	1	2	3	4	5
My colleagues have a negative attitude towards ChaRM process.	1	2	3	4	5
My colleagues see the abandonment of old sap change and release management process mainly as a positive thing.	1	2	3	4	5

10. Do you intend to use ChaRM in the future?

I intend to continue using ChaRM in the future.	1	2	3	4	5
I will always try to use ChaRM in my daily work.	1	2	3	4	5
I plan to continue to use ChaRM frequently.	1	2	3	4	5