CHANGE MANAGEMENT & DIGITALIZATION

A case study of digitalization in the Norwegian public healthcare

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Foreword
This master thesis is written as the final step of the Master’s programme in Information Systems at the University of Agder (2016-2018), and will grant 30 credits upon completion. The master thesis deals with a study of digitalization and change management pertained to the public health sector. The main objective was to identify vital elements that facilitate and contribute to the achievement of planned change in Norwegian healthcare digitalization projects.

The study has been a very interesting and memorable journey. We have studied four projects within three huge hospitals in Norway’s largest health trust.

We wish to thank all those that have contributed to our master thesis, both in the manner of counseling and feedback. We show great gratitude to our supervisor, Carl Erik Moe. Thank you for shaping this master thesis through your constructive feedback. Last, but not least, we also thank all our informants from Akershus, Innlandet and Sørlandet hospital for giving us insight in your enterprises and providing us with information. We are highly humbled by your willingness and availability to support us throughout the whole study.

Kristiansand | 04.06.2018

Written by
Criyonit Kayoka Wa Kayoka & Christian Fjelde Lima
Summary

IT projects have a high rate of failure due to the complex nature of organizations. Several elements are connected, where changing one element causes a domino effect. The objective of this master thesis was to identify and study important elements that can contribute to achieve planned change in digitalization projects in the Norwegian public healthcare sector. Through a literature review on change management and digitalization, we discovered that such projects are prone to a high failure rate in the context of healthcare digitalization. Our purpose is to gain understanding on how to increase the likelihood of implementing IT-based change projects successfully in complex healthcare organizations.

The study was conducted following a qualitative research approach on four projects from Akershus, Innlandet and Sørlandet hospital. One project, the critical information project, was about improving an existing IT system at Sørlandet hospital. The other, the EPJ standardization project, was about redesigning the core patient information system in Norway’s biggest health trust. A total of 15 semi structured interviews were conducted with 10 informants with different roles and positions in the projects. In addition, we got access to supplementary project documents and reports. We identified several organizational characteristics at the hospitals, and have described these following change management theories and models based on Jacobsen (2012), and Jacobsen & Thorsvik (2013).

Our findings show that organization maturity related to change, top management support, management anchoring, training, employee involvement, culture, and communication were the most crucial elements for successful digital change in the three projects. A tight relationship between these elements seemed to give a high probability of goal achievement in such complex organizations. We found out that change management as well as other project management methods, such as PRINCE2, were important, but not crucial, for successful IT-based change implementation. Further, we found that change and project management methods were used to a lesser extent than expected, and that practice differed significantly from literature. Findings from the projects show that common sense can also work as well as change and project management methods.

This study contributes to research literature by increasing the understanding on the topic within Norway’s largest health trust. It can give better ground for implementing IT-based changes into large and complex organizational systems, and what considerations to evaluate. The study was conducted in a context of three hospitals in the largest health trust in Norway, but the findings may apply to the general healthcare.

The study was, however, limited in several ways. First, there were in average only three informants from each project, which gives a thin data basis. Second, nearly all the informants functioned in manager positions in the projects. Perspectives from both more ordinary employees and managers could give a richer picture on the research question. We therefore recommend further research to target more nurses, doctors and other health professionals who work daily with enterprise processes and who depend on IT systems.
7. CONCLUSION AND IMPLICATIONS .............................................................................. 74
  7.1 Conclusion ............................................................................................................. 74
  7.2 Implications for theory and practice ................................................................. 74

8. REFERENCES ................................................................................................................. 75

9. APPENDIX .................................................................................................................... 81
  9.1 Appendix 1 – Full list of literature search result ............................................... 81
  9.2 Appendix 2 - Interview guide - Management .................................................... 84
  9.3 Appendix 3 - Secondary interview guide .......................................................... 85
  9.4 Appendix 4 - “Informasjonsskriv” ..................................................................... 86

Figures
Figure 1 - Search process .............................................................................................. 5
Figure 2 - Direct management and two forms for indirect management ............... 8
Figure 3 - Phases in planned change ......................................................................... 9
Figure 4 - Driving forces, change agents and change processes .......................... 12
Figure 5 - An organization’s central elements ......................................................... 13
Figure 6 - The focus of strategy E ............................................................................. 15
Figure 7 - The focus of strategy O ............................................................................ 16
Figure 8 - Internal and external context’s relation on change .................................. 17
Figure 9 - Lewin’s three-step-model for change ....................................................... 20
Figure 10 - Life expectancy in Norway .................................................................... 23
Figure 11 - Most important aspects of successful change [image] ...................... 32
Figure 12 - Analysis process ...................................................................................... 43
Figure 13 - Regional standard, Sørlandet hospital ............................................... 47
Figure 14 - Use of strategy E and strategy O ......................................................... 55
Figure 15 - Crucial and important elements ............................................................. 61

Tables
Table 1 – Search procedure ....................................................................................... 4
Table 2 - Result of literature search .......................................................................... 6
Table 3 - Informant overview ..................................................................................... 40
Table 4 - Document list .............................................................................................. 41
Table 5- Data collection overview ........................................................................... 41
Table 6 - Core IT/IS systems in SEHT ......................................................................... 48
1. INTRODUCTION

This master thesis focuses on what project management can do to achieve planned change in digitalization projects through change management. The purpose is to understand and contribute with knowledge of important elements that increase the probability of IT-based change project goal achievement.

We live today in a society where technology drastically keeps changing our lives. Extreme high-speed innovations in technology and globalization has resulted in a kind of turbulence where nothing remains stable. More than ever, it has become crucial to adapt to the changes happening around us. For businesses and organizations, failure to adapt and change can quickly result in tremendous consequences. Managing change has therefore become a key competence for project managers. Moreover, it is very important to understand the limitless possibilities of technology and exploit the potential. The ability to manage changes that are caused by technology is thus increasingly needed.

Change management in a public digitalization context is not very well covered in the academic literature, although the ability to change is necessary in such contexts. Furthermore, research highlights the complex nature of public organizations, and recommends studying the complex natures by building theoretical bridges and performing in-depth studies on change processes (Kuipers et al., 2013, p. 1). Literature has rated change management as one of the most critical factors for successful change (Beldi et al., 2010; Umar, Khan, Agha & Abbas, 2016). However, there are many scandalous stories related to IT implementation in the Norwegian public sector.

Furthermore, digitalization is a megatrend in the Norwegian businesses (Regjeringen, 2016, p. 11). We therefore saw this as an opportunity to contribute on the field by raising understanding of goal achievement.

Hospitals are the biggest enterprises in Norway and include thousands of employees. The South-Eastern Health Trust is the biggest health care trust in Norway and include 9 hospitals that provide treatment for over half of the Norwegian population, 2.9 million.

As such, this master thesis is based on a study of four cases conducted at three hospitals in Norway.

1.1 Research questions

Our objective for conducting this study is to increase our understanding on how to successfully implement IT-based change projects. Norwegian public hospitals are going through several change processes related to digitalization. This master thesis is therefore conducted on the Norwegian public health sector. The study is limited to the following research questions:

RQ: "How can management achieve sustained planned change in digitalization projects through change management"?

To illuminate the research question, we have studied a major IT project called “EPJ standardization project” at Akershus, Innlandet and Sørlandet hospital, and a smaller
IT project called “Critical information project” at Sørlandet hospital. We collaborated with people that had central tasks in the projects. Access to a diverse group of informants with different management-related positions in the projects, gave us a rich overview on how to lead digital change through change management.

The purpose of the study was to investigate, and map important practices performed by managers and identify the outcomes of these practices. We investigated the competence and abilities managers had, and the methods they used to implement change. Hospitals operate in huge, complex and unpredictable environments that are under constant development. Understanding how to master such environments is therefore necessary to ensure safer, faster and better patient treatment. In extension to the main research question, the following supplementary questions were defined:

- SQ 1: What deviations from change management were found?
- SQ 2: What challenges were identified?
- SQ 3: What measures were used to meet the challenges?

Both the main research question and the supplementary questions were answered in the light of prior research and analysis of our findings.

1.2 Motivation

During the whole master program at the University of Agder, change management has always interested us. We have always had a genuine thirst for learning more about technology, and how organizations can optimally benefit from its potential. Having taken a course about change management and organizational change during the master program, our choice of this topic therefore fell naturally. The reason for combining the two topics - digitalization and change management - is that the former always leads to change and therefore requires the latter. As a research field, change management in combination with digitalization has been given little attention, and digitalization is moreover trending in Norway. This has given us extra motivation for combining the two topics and get a closeup from real projects.
2. RESEARCH AND LITERATURE

We used a two-piece approach to find relevant research literature. A literature review on our topic, digitalization through change management (CM) in healthcare, was conducted. In addition, highly cited research material, including the web, articles and books, were used as the basis for the study. The presentation of CM and digitalization is divided in two; first in a general way, and then in a healthcare context.

2.1 Literature review

There are several methods for searching for literature. We preferred a straightforwardly method for conducting the literature review, and chose a method written by Kitchenham (2004)\(^1\). Kitchenham’s method fell naturally as the method is directed towards our topic. The author describes three stages that the method is based on:

1. Planning the review
   a) Identify the need, and b) specify the research question

2. Conduct the review
   a) Search for literature, b) select literature, c) assess quality and d) perform data syntheses.

3. Report the review

Finding literature that covered both CM and digitalization within healthcare, required advanced databases, whereby Oria and Google Scholar were used. The databases allowed us to perform advanced search and thus maximize the chance of finding the most relevant literature. Healthcare-specific databases, such as PubMed and MEDLINE were also used for article search. Moreover, several articles were found through other articles’ citations and reference lists. The goal of conducting a literature review was to highlight main points addressed in prior research concerning the topic. Table 1 shows a list of the search terms that were used.

Table 1 – Search procedure

<table>
<thead>
<tr>
<th>Search phrase</th>
<th>Additional search phrase</th>
<th>Database</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Digitization in healthcare&quot; / &quot;healthcare&quot; / &quot;health-care&quot;</td>
<td></td>
<td>Google Scholar</td>
</tr>
<tr>
<td>&quot;Change Management&quot;</td>
<td>+ &quot;Digitization&quot; / &quot;Digitalization&quot;</td>
<td>Google Scholar</td>
</tr>
<tr>
<td>“Change Management”</td>
<td>+ &quot;Critical success factors&quot; / &quot;CSFs”</td>
<td>Oria</td>
</tr>
<tr>
<td>&quot;Digitization&quot; / &quot;Digitalization in healthcare&quot; / &quot;healthcare&quot; / &quot;health-care&quot;</td>
<td>+ &quot;Management&quot;</td>
<td>Google Scholar</td>
</tr>
<tr>
<td>&quot;Digitization” / &quot;Digitalization in healthcare” / &quot;healthcare” / &quot;health-care”</td>
<td>+ &quot;Information technology project” / &quot;IT project”</td>
<td>Oria</td>
</tr>
</tbody>
</table>

\(^1\) The method is adjusted according to our need.
Literature was found by combining the different keywords in the search fields of the databases. In the first stage, the combinations gave over 5,000 hits. In stage 2, we filtered and limited the hits to literature written within computer science, information technology and/or information systems, written in English and peer reviewed. This reduced the hits down to 1,385. In stage 3, we limited the hits more by including only articles that contained the following the keywords: digital, change, public, healthcare. We then had 63 hits. In stage 4, we read abstracts and sometimes several chapters, and then chose articles based on relevance. We then got 16 articles. This procedure is illustrated in figure 1.

**Figure 1 - Search process**

To reduce bias, ensure quality and ensure the articles’ credibility, some exclusion criteria were also defined. The exclusion criteria included:

- Articles specifically about patients and patient treatment
- Articles that were focused on technical implementation only
- Articles that were not written in English

After removing duplicates, using the inclusion and exclusion criteria in the databases, we were left with the articles listed in table 2. For the full overview, see appendix 9.1.
<table>
<thead>
<tr>
<th>#</th>
<th>Author</th>
<th>Year</th>
<th>Objective</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Agarwal et al.</td>
<td>2010</td>
<td>Survey the landscape of existing studies on Health Information Technology</td>
<td>HIT can enable new forms of care delivery, especially in preventive care, long-term care and outpatient care.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(HIT).</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Aanestad &amp; Jensen</td>
<td>2011</td>
<td>To focus on approaches used to plan, conduct, and manage the realization</td>
<td>IS implementation strategies differ with respect to flexibility of stakeholders. Implementation strategy must deal with multiple stakeholders and be able to mobilize and coordinate them.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>of nationwide IS in healthcare.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Burke et al.</td>
<td>2011</td>
<td>Determine HIT’s effect on outcomes, including quality, efficiency, and</td>
<td>Technological benefits are emerging in organizations. Dissatisfaction with Electronic health records remains a barrier in achieving the potential of HIT.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>provider satisfaction.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Cresswell &amp; Sheikh</td>
<td>2013</td>
<td>Provide an overview and extract potentially generalizable findings across</td>
<td>Technical, social and organizational considerations need to be deliberated when attempting to ensure that technological innovations are useful for both individuals and organizational processes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>notoriously difficult implementations of health information technologies.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Ingebritsen et al.</td>
<td>2014</td>
<td>Examine evidence of associations between clinical management and successful</td>
<td>Clinical managers can positively contribute to successful IT adoption in healthcare organizations. They should cultivate necessary IT competencies, establish mutual partnerships with IT professionals, and execute proactive IT behaviors to achieve successful IT adoption.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>IT adoption in healthcare organizations.</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Gomes et al.</td>
<td>2016</td>
<td>Propose an approach that assumes that project management will mediate the</td>
<td>Hospitals do not invest in engaging or motivating healthcare professionals about the advantages that IS/IT solutions could bring to them. This makes it difficult to catch their attention. IS/IT projects have low participation and little involvement from healthcare professionals, and thus most of the projects are largely unknown to most people.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>relationship between organizational maturity and success of IS/IT project.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Ziemba &amp; Oblak</td>
<td>2015</td>
<td>Identify CSFs for CM in IS projects.</td>
<td>Relationship between CM and IS are one of the most important determinants for successful IS projects.</td>
</tr>
<tr>
<td>8</td>
<td>Voet</td>
<td>2016</td>
<td>Explain the relationship between direct supervisors’ change leadership and</td>
<td>Change leadership contributes to change recipients’ commitment by providing high-quality change communication, and stimulation of employee participation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the commitment to change of the change recipients.</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Schmidt et al.</td>
<td>2017</td>
<td>The development of a framework for the analysis of cutback management by</td>
<td>Managers, in cutback-management environments, can be positioned at the intersection of various imperatives.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>connecting context, content, processes, outcomes and management of</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>cutback-related change.</td>
<td></td>
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</table>
As table 2 shows, little has been researched on both digitalization and change management in a healthcare context, simultaneously. It is rather project management, leadership, IT adoption and consequences for failing to do so, that has received much of the attention in research. Although much research has been conducted both on the digitalization and change management field, we claim that there is relatively little research on the two in relation to each other, especially in a public healthcare context. This study therefore aims to contribute to the understanding of this identified gap.

2.2 Topics, terms and definitions

There are several definitions and perceptions around the terms that are used as pillars in this study. This section defines terms and topics that are important for the further development of this study. The definitions are based on two popular books on organizational management and change management: Jacobsen (2012), and Jacobsen & Thorsvik (2013). Further, the change management and organizational theory pioneers, Kurt Lewin and John Kotter, are also included.

2.2.1 Management

There has been an explosion of publications on the topic of management the last decades, concerning what managers can do to make organizations more effective, competitive, adaptable and more innovative (Jacobsen & Thorsvik, 2013, p. 416). But what is management? There are many definitions on what management is. The consensus is that management is:

“A special behavior that an individual exhibit to influence other people’s thinking, attitude and behavior.” (op. cit.).

This definition of management is thus a psychological and philosophical question. In an organizational context, management is about making people work to achieve certain goals, motivate them to perform more and thrive at work (op. cit., p. 416). There are mainly two types of management; direct and indirect management. The former includes all forms of interaction and communication between the management and subordinates, such as meeting with employees, participation on arrangements, etc. Indirect management includes all the ways that a manager can influence the subordinates without interacting with them directly (op. cit., p. 417). This is illustrated in figure 2:
This opens for mainly four approaches to study management (op.cit., p. 419):
1. Study what managers do and which tasks they have in their work
2. Study what characterizes good managers as individuals, meaning a manager’s personality traits
3. Study which management style managers should use to draw the potential from employees
4. Study how managers can give direction and meaning to an organization

In this master thesis, we studied what project managers said was important and what they did in four projects, which includes mostly approach 1 and 3.

2.2.2 Change
Stability and predictability characterized earlier organizations, whilst modern organizations are characterized by change. Organizations nowadays can be closely related to human being - it is whether they develop or die. Organizations that do not manage to do so, are more likely to lose their competitive edge (Jacobsen & Thorsvik, 2013, p. 384). Where there is development, there is change. So, what is change?

In a very general description, change is briefly the difference between one point in time and another point in time. In an organizational context, this can include changes in technology, goals, strategy, structure, culture, work processes, etc. This requires a (change) process, the process an organization goes through to change from the existing situation to a desired future situation (op.cit., p. 385).

2.2.3 Planned change
Another dimension entails the consideration of whether change is an intentional, controlled process or a result of coincidences. An intentional, controlled change process occurs because of some people seeing some problems or opportunities, set goals to solve these, and act. Change is a coincidence when it happens randomly and “passes by” for the people that experience the change. Random change happens without being noticed by the affected. In this study, the focus was on change as an intentional, controlled process aimed to achieve a certain goal, also called planned change.

The need for planned change occurs because of an existing lack of a desired condition or discovery of new possibilities within some organization-related areas, such as market possibilities, finance, competition, etc. (op.cit., p. 386). Planned change happens in a teleological model, consisting of the four phases illustrated in figure 3:
Planned change is based on an analysis of the current situation, identification of problems or opportunities in the environment, finding solutions, and implementing the solutions in the organization (op.cit.).

2.2.4 Change management
Jacobsen (2012) defines change management (CM) as the activities, tasks, and assignments that are performed to make people work in a change induced environment. This entails managing individuals, groups or organizations, walking them through a change process, from the existing condition to the desired future condition. Based on the definitions provided in the previous sections, change management is, roughly speaking, about utilizing section 2.2.1 to achieve section 2.2.3.

We live today in an ever-changing competitive society, where lasting stability no longer is granted. Changes has become part of our everyday lives and are now happening more quickly than ever before. Organizations’ need for adaptation and adjustability to technological innovations, shorter product life cycles, increased globalization, new employee and customer requirements and expectations, and increased competition, require change initiatives. To survive and prevent the business from coming into disharmony with market needs, requirements and expectations, managing change has become an important competency for managers.

2.3 Organizational change literature
For the last decades, organizations have drastically changed in the way they operate. From being most occupied with achieving business stability, today’s organizations are more concerned with adapting to the changing business environments, whether through design of different bureaucratic structures to standardize people’s behavior, or by shielding core processes from external influence (Jacobsen, 2012, p. 16). Change is necessarily neither good nor bad, but is happening in a business matrix, including all industries, enterprises and societies. Continuous change has thus become the new norm, or the new “stable” (op.cit., p.22). This section aims to provide answers to questions related to why and how change happens (op.cit.).
2.3.1 Driving forces

There has always been research on why and how social systems, that organizations use are required to change (Jacobsen & Thorsvik, 2013, p.18). Different researchers have laid the basics of different perspectives and terms for change. According to research, each of the perspectives represents fundamentally different sequences of events and causal mechanisms that explain how and why change occurs. These sequences and mechanisms are what lies behind change activities. Jacobsen (2012) calls them driving forces (op.cit., p. 37). In the following, five perspectives are presented, and briefly described as different types of driving forces:

**Perspective 1 - intentions as a driving force:** the first driving force is based on a model called "The teleological model" (see figure 3), where change happens as a result of people seeing a problem and engaging in solving the problem. This perspective includes an analytical and rational approach for change. It entails a perceived need for change, an analysis of problems that need to be solved and how to solve them, or opportunities and how to capitalize on them. It further entails a strategy for how to implement the change, and an evaluation of the extent to which the change initiative solved the problem or capitalized on the opportunity (op.cit., 38). So here, change is caused by a business related "problem" and happens with the purpose of solving this problem.

**Perspective 2 - change as lifecycles:** this perspective views organizational change in a special and predictable manner that follows a special development pattern. The conception of this perspective is that an organization’s age is closely related to its complexity. In the beginning, the organization is young and small, and thus less complex, but with time and evolvement, the organization gets bigger, acquires more money, people, and technology, and starts dealing with an increased level of structure, scope, and complexity (op.cit., p.40). In this perspective, change is a part of life affiliated with organizations in the same way as with human beings. Evolvement, and therefore change, is not a choice, but a natural way of growing and survive.

**Perspective 3 - change as evolution:** this perspective is much based on Darwin’s theory on the development of species. Here, we find organizations competing for limited resources in a market (op.cit., p.45), such as universities competing for students or football teams competing for the best players. The main view in this perspective is, like in Darwin’s theory, that it is not the strongest, nor the smartest, but the most adaptable species (organizations) towards change, that survive. The least adaptable towards change, dies out and opens possibilities for new market establishment for other organizations. Here, change is a way of responding to the conditions in the environment (op.cit., 46).

However, the evolutionary perspective also argues for change as a process caused by the organization’s internal circumstances (op.cit., p.47). An example for this is found in healthcare. It is difficult to change the way medical professionals work, such as how to perform an operation or give a syringe/injection-based treatment, through centralized decisions. Change rather happens because of development of new knowledge through research and science. Scientific research gives new insight and/or models for nursing and care, and thus causes change in how the professionals work. Such changes are not necessarily decided by people within the organization, but are rather a reflection of internal circumstances (op.cit.).
**Perspective 4 - change as a dialectic process:** This perspective presents change as a process caused by power struggles between different stakeholders within an organization. Change happens when a thesis meets an antithesis, and eventually creates something new (a synthesis). Power struggles and politics are important driving forces here. In this perspective, the strongest, unlike Darwin’s theory, wins and thus get to create the change (op.cit., p. 48-49). Here, change happens because of conflict between different stakeholders within the organization.

**Perspective 5 - change as anarchy:** The main term in this perspective is coincidence. This perspective argues for the fact that change can also occur without any intention of solving a problem, need for development, resource competition or any of the driving forces mentioned above. The perspective assumes that social systems as organizations, are too complex to get an overview over. Too many things happen simultaneously for it to be controlled. It is rather people, naturally with different ideas, values and needs, that meet, combine ideas and interests, and thus create change based on the need that is presented. It is neither the strongest, smartest nor the most adaptable, but the one with a solution to the actual problem, that gets his/her decision through. Here, change happens as a coincidence, based on where and how stakeholders meet (op.cit., p. 50-51). This perspective seems to contrast perspective 1 to some extent in the fact that change here does not happen intentionally, but randomly.

As mentioned earlier, the focus of this study is planned change. Perspective 5 is therefore not the focus in this study, but was still included to show different types of perspective and driving forces for change.

**2.3.2 Change agents**

Sofar, driving forces have been presented as objective and faceless elements “hanging in the air”. It is therefore important to point out that driving forces are - to start with - faceless nor objective elements. However, the objective and faceless driving forces need someone to identify them as causes for change and put them in a context (organization). As such, driving forces are objective elements that need subjective representatives to be causes for planned change (op.cit., p. 55). We illustrate the point with an example of the aging population, which is explained more in later chapters. The aging population is a big challenge to the Norwegian society, both inform offinance and labor. It is challenging the healthcare sector, and several change measures (e.g. digitalization, nursing homes) have been initiated to handle it. However, the aging population did not create the need for change by themselves. Someone, e.g. the government, had to identify it as a challenge, convey it as a challenge to the public and come up with change measures for the society to get engaged into solving the challenge. Today, it is evidently perceived as a real challenge, and the Norwegian healthcare sector is still working to deal with it.

The people that identify and convey change, are called change agents. Based on this, there is no doubt that the most important driving force in planned change are change agents (op.cit., p. 63). Jacobsen (2012) describes change agents as actors - could be owners, managers or employees - within an organization, that initiate the change process (op.cit., p. 28). According to the author, there will always be at least one change agent behind planned change. Change agents catch up signals that make change necessary, create an atmosphere of need for change in the organization, and a plan for solving the issues and achieving the change (op.cit., p. 55). This create three stages for how planned
change is introduced into an organization:

5. Driving forces as they are
6. Driving forces as they are perceived, and
7. Driving forces as they are formulated

This, however, does not mean that all driving forces must be subjective, but the point is that the objective driving forces need to be registered, identified, interpreted and conveyed by somebody. This is illustrated in figure 4.

![Diagram](Image)

*Figure 4 - Driving forces, change agents and change processes (Jacobsen, 2012, p. 56).*

### 2.3.3 Content

It has become normal in new research to consider organizations as systems (Jacobsen, 2012, p. 65). These systems can be divided into several elements that form an organization. This includes at least three elements: 1) tasks, 2) people and 3) technology (op.cit.). Every organization’s purpose is to solve some tasks, which is the reason for its existence. A hospital treats patients, a university educates students, and a lawyer is required to be a legal counselor and spokesman for a client. Organizations thus obviously consist of people, as hospitals must have doctors, a university needs professors, and a law firm needs lawyers. These people then depend on some type of technology to solve their tasks. This can be a tool, such as a stethoscope or a blackboard. But, technology is tools used to solve a task, and thus also be the knowledge accumulated by a lawyer, teacher or doctor (op.cit., p. 66).

There is an extension to the three elements that strongly influence how people use technology to solve tasks, including 1) goal and strategy, 2) formal structure, 3) enterprise culture and 4) power relations. The objectives and goals are what the organization wants to achieve (Jacobsen & Thorsvik, 2013, p.37), and strategy is how to achieve these objectives and goals (op.cit., p.42). Formal structure describes how work, teams, systems and responsibilities are distributed within the organization (op.cit., 70-72; Jacobsen, 2012, p. 67). Enterprise culture is generally the basic common experiences, values and norms that most people within an organization possesses (Jacobsen & Thorsvik, 2013, p.130). Power also generally implies a person’s (or a group’s) ability to overcome eventual resistances to achieve a specific result. All these elements are part of an organization’s content (op.cit., p. 167).

The elements can be divided into two main parts; formal and informal. The former refers to formally adopted elements such as rules, routines, formal structure, technology and formal power relations (op.cit., p. 72), and serve as the organization’s skeleton. They give the organization form, and at the same time requirements to what is expected of its members. The purpose with formal elements is to direct members of the organization towards a specific direction (op.cit., p. 120).
Interaction between- and combination of the formal elements creates the informal elements overtime. These often include the contrast between expected behavior, and performed behavior (op.cit., p. 126). We provide an example: suppose delay is strictly prohibited and condemned at work. Employees will in the beginning avoid coming in late for work as part of the routine. However, with time, delay intolerance will eventually begin to characterize the organization’s culture. Employees will no longer avoid delay as part of routines, but rather as part of a developed habit. After ten years in the organization, it will be awkward rushing in late for work. The other way around, if management is not strict concerning delay, employees risk to develop a habit of coming in late for work. Informal elements are thus the unseen, hidden elements that slowly creep into an organization. The older the organization, the more extensive the informal elements are.

Finally, the formal and informal elements together determine how work is done in an organization, and thus the results (output) that will be produced. Figure 5 illustrates what has been described concerning content.

![Figure 5 - An organization's central elements](image)

In most of the cases, planned change is about improving some elements in the content to get a step closer towards the goals (Jacobson, 2012, p. 68-77). This can be by a procurement of new technology, improving existing or developing new products and services, outsourcing or shutting down a department, etc. The complexity of change thus depends on what type of content is about to be changed.

*Change on formal and informal elements*

Based on the description of the different organizational elements, it can be said that it is easier to make changes in formal elements as these are formally and officially described in routines, rules, etc. Change in informal elements, however, seem more difficult to change. It is easier to replace technology than culture; it is easier to change a work process than informal power relations. The reason is that informal elements, when first established, are fundamentally stable and hard to “break”, and require time.
2.3.4 Scope
Modern organizations can much more be characterized with human beings in the way that they must undergo different degrees of change as humans do. Life is, for simplicity’s sake, a journey of change and development. Things such as starting in a new job, getting new friends, or a new car are examples of less dramatic changes. However, events such as getting married, having a child for the first time, or losing a close relative, set clear traces in our lives and are more dramatic. The examples are used to illustrate that some changes are dramatic and break with the past, while others are more of an adjustment, and a development of something that already exists (op.cit., p. 78).

Jacobsen (2012) describes two scopes when implementing a change initiative. The first one is described as an “incremental change” and the second is “radical change”. The first type seeks to adjust the existing situation, improve the balance between different elements within the framework of a strategy, technology or by configuration. This scope is depicted as less dramatic and has a sense of constant development and evolution. The other scope - radical change - breaks or deviates from at least one element, which eventually will lead to change in several areas, and includes drastic changes (op.cit., p. 89).

It is difficult to clearly distinguish between incremental and radical change in an organizational change context. An incremental change in organization A can be dramatic for organization B and vice versa. Introducing new technology into core processes can result in a dramatic experience for one organization, but be slightly unnoticeable for another organization, etc. The distinction between incremental and radical change is therefore defined based on how the affected experience the change. Also, it is often normal to combine these two and create a blended scope that includes some characteristics from both types (op.cit., p. 86).

2.3.5 Strategy
As previously mentioned, strategy is the road to the goal, a description of what to do to achieve a desired result. Jacobsen (2012) says the following:

“Organizational change is a kind of chaos. A variety of conditions are being changed at the same time, the scope of the changes, the environment and the often-occurring resistance from different groups, create a variety of connected processes that are extremely hard to predict and nearly impossible to fully control”. (Jacobsen, 2012, p.151).

What the statement is saying, is that conducting change is a challenging task. There are forces that both go for and against change. Predicting the result in such a complex task is difficult. However, as the focus in this study is on planned change, we go for the assumption that planned change is possible, given that two conditions are met; 1) the right management for change and its context, and 2) the right strategy (op.cit., p. 151-152). This means that there are more strategies to conduct change with. There are also mainly two strategies used to conduct organizational change; strategy E, for “economy”, and strategy O, for “organization”.

14
**Strategy E**

The author says the following concerning strategy E:

“Strategy E seeks to create increased economic value, often in form of profit for owners. The strategy’s focus is on the formal structures and systems […] is driven forth by top management with significant help from external consultant […] It is used when change is planned and programmatic.” (op.cit., p. 152).

As stated in the quote, top management plays a central role in this strategy. The basic idea is that top management is the agent behind change. Top management identifies the need for change, prepares a solution to cover the need and implements the solution into the organization. Strategy E, therefore, is roughly referred to as a strategy that uses formal power to carry out the project independently and without regard to the resistance expressed. It is also referred to as a dictatorial, “top-down” approach as it basically does not leave “play room” for other participants than top management. The strategy is normally used in projects where change is of a dramatic type, where there is need for a quick solution and change is an “emergency”.

Furthermore, the strategy is also used for change projects where the focus is on the formal elements, as mentioned in the quote. It is related to projects where results can be measured and be expressed in number or quantity, such as reduced time spent on patient treatment due to new technology. However, it must be said that focus on the formal elements does not mean that the informal elements are ignored. For instance, change on structure will over time have influence on culture, for example if the change means an employee will lose colleagues, and must get to know new ones. And, change on the formal power relations will over time cause new informal power relations. As such, change to any of the elements will end up causing change to the informal elements. The idea with strategy E is that one should change the formal elements since they will end up changing the informal elements. So, in general, a dramatic change/scope requires such an aggressive approach (op.cit., p. 152-165).

Figure 6 illustrates the main idea of strategy E:

![Figure 6](image_url)

**Figure 6 - The focus of strategy E**

**Strategy O**

The author says the following concerning strategy O:

“Strategy O has the objective of developing the organization’s human resources so that they will be able to implement strategy and learn from the experiences from change measures. The strategy’s focus is to develop culture to create great commitment. An instrument used here is a comprehensive degree of participation, and one relies to a lesser extent on external consultation and financial incentives. Change happens slowly, less planned and less programmatic.” (op.cit., p.153).

The main difference between strategy O and strategy E, is the conditions that are emphasized. As the quote implies, strategy O is “friendlier” because it is participatory and democratic, where employees are seen and heard. Besides, change through this strategy is not seen as a one-time event, which is the case for strategy E, but as an incremental development. The idea behind strategy O is that one should change behavior first, and then formal elements (op.cit., p.166). So, a less dramatic change/scope requires a democratic approach (op.cit., p.90). This idea is illustrated in figure 7:

![Figure 7 - The focus of strategy O](op.cit., p. 174).

**2.3.6 Process**

According to Jacobsen (2012), process is what happens, should happen or happened between a relatively stable state (A1) and a new equivalent state (A2). As mentioned earlier, change is not a one-time event, but a series of connected events that happen over a period. Other important elements during a change process are thus time and timing.

**Time**

Time is key and a crucial element in all change projects. We cannot talk about change without talking about time because it is time that allows us to make comparisons between different points in time. Prior to the process, it is important to ask questions such as “when should the change be implemented”? “how much time do we need”? “how long will it take to get done with task 1”? etc. Such questions are of course difficult to give exact answers to, but they indicate the importance of time (Jacobsen, 2012, p.118).
**Timing**

Timing is also an important element to consider. While time indicates for example how long time should and will be used on a task, timing awakens to life elements that are happening at the same time as the change project. For example, it would be bad timing to implement change in a period of high sickness absence. It would not be a good idea to implement change when everyone has gone into a “vacation mode” and is not motivated to do any special effort at work. Even though there is more than enough time to implement the change, things happening parallel to the change, can make the implementation challenging (op.cit., p. 126).

**2.3.7 Context**

Context is important to study because every organization fully depends on things that are outside the organization. Schmidt et al. (2017) refers to context as an organization’s internal and external environments. Internal elements include characteristics of the organization, such as technology, culture, routines, etc. A hospital is totally different from a grocery store, and a school operates differently from a car workshop. Moreover, a context in hospital A can still differ from the one in hospital B, even though both are hospitals. The structure, culture and power relations differ from each other due to the difference in people, values, norms, etc. at the workplace. External context includes things such as money, manpower, suppliers, competitors and customers. For instance, the public-sector hospitals may have characteristics that are based on typical bureaucratic public organizations, strict or restrictive rules in management environments, etc.

Figure 8 illustrates the relation of internal and external context of an organization’s ability to change.

![Figure 8 - Internal and external context’s relation on change](image)


Context is closely related to timing and can thus also contribute to make change challenging. And often, the bigger the organization, the more challenging the change. This creates the supposition that smaller organizations are easier to change than bigger organizations (op.cit., p. 91-116).

There are more elements that play significant roles in planned change, but the elements described throughout section 2.3 are the most important and relevant aspects that we chose to include in this study. These will be discussed in the later sections. We also use the opportunity to translate some English words that might be difficult in Norwegian:
- White Paper → stortingsmeldingen
- Office of the Auditor General (OAG) → riksrevisjonen
- National registry → folkeregisteret
- General practitioner (GP) → fastlege
- Summary care record → kjernejournal
- Ministry of Health and Care Services → Helse-og omsorgsdepartementet

2.4 Prior research - Change management

This section describes important elements that can help project managers increase the likelihood of implementing changes successfully, and thus serves as a pointer for change managers.

2.4.1 Crucial elements for successful change projects

Research highlights that many project managers in the public sector lack knowledge about fundamental stages needed for successfully transitioning organizational change projects from one condition to another (Kuipers et al., 2013). This lack is not only limited to how to implement change, but there is also a lack of understanding how the implementation of technology influences many other parts of the project, and further the organization (op.cit.). Knowledge about implementation techniques therefore needs to be considered by project managers. In the following, we describe a part of Aladwani’s (2001) framework that is of relevance for this study, including four elements:

Management commitment: managers are the most influential individuals at a workplace, and the biggest supporter of any change initiative. Managers ought personally to desire the change, show commitment to the initiative, and be positive towards change. Furthermore, it is equally important that this attitude is displayed to other participants, especially employees, and attempts to transmit the positive impulses throughout the organization. Additionally, top management commitment is also important for change project success. Top managers hold the key to decisions and resources. Such projects, where there are many different powers and interests involved, thus require the top management to support the strategic vision in order to ensure long-term success (Aladwani, 2001).

Gilley et al. (2009) also document important findings in their research. The authors highlight that a manager and his/her approach to change management influences the actions and processes that facilitate change in a work environment (Gilley et al., 2009). One of the many challenges of this outlook is the ability to identify productive and non-productive behavior, and to distinguish them from one another. The behavior that managers display in general, and specifically under change projects, influences the actions that facilitate change in the work environment (op.cit.). Such assertions display the importance of management behavior in a digitalization process.

Employee involvement: an important step to consider when approaching CM is a framework outlined as a strategy by Aladwani (2001). According to the author, the first phase of managing IT based change, is to identify and approach attitudes, possible resistance from those that the change will affect and influential groups in the organization. A way to identify these attitudes is engaging in dialogue with individuals and ask about their
needs and concerns. The answers then ought to give the project management the foundation for a solid starting point in determining the employees’ immediate resistances to the change and how to possibly accommodate them and mitigating the resistance in the long run.

Further, it is important that managers gain the support from well-known individuals and opinion leaders in the organization. These are individual a that have considerable influence within their groups. This tactic increases the chance to obtain support from employees, and further facilitates the management to influence employee opinions.

Furthermore, during this stage management ought to ensure that the opinion leaders are effectively participating in the implementation process and make them feel included. Such an approach prepares employees for the coming change, the scope and will help project managers to understand and hopefully satisfy their expectations. It also creates, or at least increases, the feeling of ownership amongst the employees (op.cit.).

**Ability to overcome resistance:** the next phase in the framework is the strategy implementation phase. In this phase, the management uses the gathered information from the previous phase. To design and implement an overall strategy that deals with employee concerns and reduce its damaging potential (op.cit.). Communication is a major key in this phase. Managers must be able to communicate the benefits of the digitalization initiative to the affected workers. It is important to make employees understand why they should bother with engaging themselves in the implementation of the change. Poor communication can be considered devastating to a project’s overall success. A cumulative effort to increase credibility and awareness about the project is also important for the management and ought to be planned for. However, managers must watch out for unrealistic expectations from the employees, which potentially can increase the amount of resistance (Aladwani, 2001).

**Training:** Most of a project’s effects are seen after the project has ended. Based on this, it is important to train employees on how the end product of the project should be used. Giving employees proper training on how to work in a new condition, for example how to use a new system, decreases fear and makes employees more comfortable with the change (op.cit.). Success in this area can help the project management to reduce project costs, and the distribution of the available allocated resources. Furthermore, if project managers are able to overcome resistance, employees might embrace the project with stronger enthusiasm. This can help employees develop a more positive attitude towards the change and increase the level of acceptance and adoption of the new digital technology (op.cit.).

Success in these elements form a good basis for achieving change project success in utilizing change management.

**2.4.2 Lewin’s model**
There are several other noteworthy strategies regarding change management and digitalization projects. According to Beldi et al. (2010), the highest probability of change project success is facilitated by the combination of management and employee efforts, effective technology and close collaboration amongst the people involved and elements in the project (Beldi et al., 2010). Markus (2004) suggests an approach for projects where CM is used in combination with the implementation of a digitalization project. The author suggests a phase-by-phase approach, e.g. implement one function, accommodate processes in accordance the new function, and the use of training for this
new function and its processes. Moreover, Jacobsen (2012) also suggests that to achieve organizational change, management ought to make sure that the driving forces for change are greater than those against. To facilitate successful change, change agents either must reduce the resistance that is expressed towards change, or attempt to magnify and increase the forces that desire the change.

Kurt Lewin (referred in Jacobsen, 2012) illustrates this in his change model. Lewin meant that all planned changes that happen in organizations passes through the phases: unfreeze → change → refreeze. His model is the source of most models and literature on planned or continuous change. It provides a high-level approach for change and gives managers or other change agents a framework to implement a change effort through (Jacobsen, 2012, pp. 185-200).

**Phase 1 - unfreeze:** the first phase is called “unfreeze” and is about preparing the organization for change. Change agents identify the need for change and make this an “emergency” situation and convey why the organization needs to change. The goal is to unfreeze the elements, such as structure, systems, etc., that are blocking or maintaining the existing, undesired situation. In this phase, the change agents also apply the relevant elements described in the previous section, and other elements we have already described, to harvest as much support as possible.

**Phase 2 - change:** an important perspective in Lewin’s theory, is that change is not an event, but rather a process. He thus calls this phase for “change”, referring to the transition, the process and the content that is being changed to achieve the new stable, desired condition. In this phase, the change agents, together with the organization, implement the change itself and cover the gap. Also, in this phase, several of the described elements are used to direct the organization towards the goal.

**Phase 3 - refreeze:** the last phase, “refreeze”, concerns itself with making sure that the intended changes achieved the goal of the project, and that the new condition reflects this goal correctly. It means that the new work-processes are continually used as intended and incorporated into everyday usage. The changes should be institutionalized, to ensure stability within the organization. Training is an important element in this phase.

Success at this stage, usually means that the organization has achieved a new stable condition. The model is illustrated in figure 9.

![Figure 9 - Lewin's three-step-model for change](image)

2.4.3 Mintzberg’s organizational management theory on situational factors

Mintzberg (1989) argues that management is influenced by situational factors within the specific organizations, meaning that there is no single approach suitable for all organizations. He mentions that some of the factors include the age and size of the organization, the technical characteristics of its environment, such as stability and complexity, and its power relations (Mintzberg, 1989, pp. 106-109). Concerning size and age, the author argues that the older an organization is, the more formalized its behavior will be. An old organization is very likely to have a set of ways of solving tasks, which causes behavior to be more repeatable and predictable and as such more likely to be affected by formalization. The size of the organization influences management as well. The author also argues that large organizations are more prone to formalizing and specializing their jobs. From our understanding, this requires more effort of coordination from the organization’s management, which at the end creates more hierarchy. Lastly, the author adds that an organization’s general structure reflects the age of the organization (op. cit., p. 106).

The environmental context is also a situational factor that influences the management. As mentioned earlier, environment refers to various characteristics of the organization’s context (op. cit., p. 108). The author argues that the more dynamic an organization’s environment, the more organic its structure. He therefore argues that an organization in an unstable environment, where little changes, can easily rely on standardization for coordination. However, when changes do occur, it will make the various conditions within the organization become more unstable and dynamic (op. cit.). Mintzberg also argues that hostility towards management in an organization’s environment can lead to a temporarily structural centralization, atop-down hierarchy. In such scenarios, management will often fall back to strict coordinating mechanisms. External control, from e.g. the government, can also cause the organization to become careful about its actions regarding change. Mintzberg says the following to illustrate the significance of external power:

“The two most effective ways to control an organization from the outside are to hold its chief executive officer responsible for its actions and to impose clearly defined standards on it” (op. cit., p. 109).

This causes management to be held more accountable, especially the management of a public-sector organization, which are subject to governmental rules, policies, and regulations.

2.5 Prior research - Digitalization

For the past few decades digitalization has become a fashion word, trending in all corners of the society. From kindergarten to the government - everyone is digitalizing, and the trend does not seem to slow down. But what exactly is digitalization, and why is it so important? This section seeks to answer that question, and includes the definition of the term, the need for digitalization, digital technologies in healthcare, experienced challenges in healthcare, and critical success factors for successful healthcare digitalization.
2.5.1 Digitization or digitalization?
We have noticed a slight ambiguous and mixed use of the terms digitalization and digitization. Some use the terms correctly, whilst others use the one term when referring to the other. We therefore want to make a distinction between the terms for clearness sake. According to Brennen and Kreiss (2016), digitization is the process of creating a digital version of something physical or analog, such as a watch, document scanning, images, sounds, etc. It is simply the process of converting and/or representing an analog, physical object into a digital format (Brennen and Kreiss, 2016). As such, digitization is about duplicating a record from something physical to something digital.

Digitalization on the other hand, is a term used where a process is being transformed into something digital by the adoption or increase in use of digital technology by an organization, industry, sector or country (op.cit.), and can briefly be defined as: “The integration of digital technologies into everyday life” (Markovitch and Willmott, 2014).

There are many definitions of what digitalization is, based on discipline and sector, but the point is still the same as in this definition. Digitalization is the process of improving business activities and processes by using digital technologies. It entails improving existing or adopting new technologies and to integrate them into daily business activities (Edmead, 2016). The main difference is therefore that digitization entails copying/scanning something already existing a multiple number of times, while digitalization entails making digital technology part of the daily life. Both developers and consumers of digital technologies are contributing to the digital technology improvement.

There are several concepts used to define what digitalization in healthcare entails. The most common definition is the following: “The use of information technology or electronic communication tools, services and processes to deliver better healthcare services to facilitate better health” (Rose, 2017).

This master thesis is focused on digitalization, in the sense of digitalization as a project where IT is the main element that is being changed.

2.5.2 Need for digitalization in the Norwegian healthcare
A century ago, the situation in Norway was characterized by poor living conditions, bad nutrition, congestion, and poor hygiene and sanitation. This caused several poverty related diseases such as tuberculosis and other infections, and treatment of these diseases were poor as well. Today, the living conditions are far better. Development of more effective medicines and societal development have drastically changed the living conditions. The Norwegian population today are generally healthy. Life expectancy is increasing, and there has been a significant reduction in early death of cardiovascular diseases in the few past decades (Regjeringen, 2013).
Society, however, faces other healthcare-related challenges. Statistics show that there is a demand for doctors increasing with 3% each year in Norway, giving the Norwegian society a need for 1,170 new doctors each year. Meanwhile, new prognoses show that in Denmark there will be a shortage of 5,500 doctors by 2035 (Fløttum, 2014), and similar numbers may apply to Norway. Furthermore, a recent report from the Association of America Medical Colleges, estimates that the United States alone risks losing as many as 100,000 doctors already by 2025, in addition to the existing supply shortage in primary care physicians (Rose, 2017). On the other hand, there is an increase in the number of patients worldwide, mainly due to life expectancy, where Norway is expecting a 60% increase due to an ageing population by 2040 (SSB, 2017). Statistics show an increase in life expectancy throughout the whole century up to the year 2100. The combined life expectancy of men and women is expected to be 82 years in 2020, and 90 years in year 2100 (Regjeringen, 2013). Figure 10 illustrates the life expectancy development in Norway from 1850-2020. Green indicates women, blue indicates men.

![Figure 10 - Life expectancy in Norway](image)

The table indicates that the need for doctors, nurses and health professionals will increase. The Norwegian society, as well as the world in general, needs more health workers to deal with this challenge. But oppositely, statistics in Norway show that the number of health workers are decreasing (SSB, 2017).

The ageing population is a national challenge both physically and financially, and the costs need to be reduced. Since the amount of carers and nurses per elder are decreasing, its leading to an increasing need for new effective tools to solve the problem. The challenges mentioned above can be solved by efficient digital technologies that enable healthcare workers to improve their services and do more with less. Information technology (IT) is the tool that is being looked to as a means for making healthcare safer, more affordable and more accessible. In the Norwegian healthcare, digitalization is thus no longer an option, but an imperative.

Digital technologies offer many advantages, such as customer and citizen satisfaction, cost reduction, increased income and efficiency, as well as better, easier and faster service.
delivery in commercial business. In healthcare, where health is at stake and situations at worst concern life and death situations, the main reason is naturally to maintain and improve patient treatment quality and among others meet the mentioned challenges (Markovitch and Willmott, 2014).

2.5.3 Digital technologies in healthcare
As previously mentioned, digitalization is strongly driven by information technology (IT). With the fast technology evolution, new smart IT devices, mobile applications, self-driving cars and now Artificial intelligence, Augmented Reality, Virtual Reality and Internet of Things (see 2.5.5) making an influx into society, it is easy to get an impression that IT leads to progress - which is true. However, this tip of the iceberg shows only one side of the spectrum - that is - advancements in lighter applications directly used by end users (e.g. smartphones, mobile apps, cars, etc.). Literature, however, paints a different picture when it comes to implementation of heavier applications such as Enterprise Resource Planning (ERP), Customer Relationship Management (CRM) and Supply Chain Management (SCM) in general.

In healthcare, Health Information Technology (HIT) is the most commonly used term for health-related enterprise systems. HIT is IT applied to health and healthcare to support health information management across computerized systems and secure exchange of health information between consumers, providers, payers and quality monitors (Jones et al., 2014). HIT is an umbrella term for several technologies to store, share and analyze health information. According to literature, there are several benefits in using HIT, as it has the potential to improve the health of individuals and the performance of providers, yielding improved quality, cost savings, and greater empowerment of patients in their own healthcare (Burke et al., 2011). HIT includes among others the following technologies:

- **Electronic Health Record (EHR):** This is where a doctor keeps records of patients’ health information, such as allergies, medical history, immunizations, charts and prescriptions. Up to recently, most doctors stored this information in paper files. EHRs, also known as electronic medical records, are electronic systems that store patient health information. EHRs allow doctors and nurses to more easily keep track of a patient’s health information and might enable them to access the information whenever needed. EHRs also make it easier for doctors to share information with specialists and others so that everyone who needs this information has it available when needed (HealthIT, 2018). There is also a system called Personal Health Record (PHR), which is a lot like an EHR, except that the patient controls what kind of information is stored in it. A PHR can be used to keep track of information from your doctor visits, but can also reflect your life outside the doctor’s office and your health priorities, such as tracking food intake, exercises and blood pressure (HealthIT, 2016). EHR is the equivalent term for the Norwegian abbreviation “EPJ”. Since EHR is a more popular term, we use it whenever referring to the technology, but use EPJ whenever referring to the regional EPJ standardization project.

- **Clinical Decision support systems:** Clinical decision support systems (CDSS) are computer systems designed to impact clinicians’ decision making about individual patients at the point these decisions are made. According to Berner and LaLande (2016), there has been an increase in the level of human-made medical errors in healthcare that at worst have caused death. With the focus on preventing such errors, CDSSs have been developed. The systems have functioned as key elements for systems’ approaches to improve patient safety and care quality and
have functioned also as a key requirement for improved use of EHRs. Integrating CDSSs into healthcare processes is challenging. However, when successfully integrated and properly used, they have the potential to make significant improvements in the quality of patient care (Berner and La Lande, 2016).

- Welfare technology: Welfare technology is a common designation of technical installations and solutions that can improve individuals’ abilities to manage themselves in their own homes and helps to ensure life quality and the dignity of the user (Direktoratet for e-Helse, 2018a). Welfare technology is thus a user-oriented technology meant to support and empower users’ safety, security and enable self-reliance. According to the Norwegian directorate of health, there are a lot of gains related to the use of welfare technology, including better services and more effective use of resources. Welfare technology includes among others localization technology (GPS) to dementia patients, electronic medication support and digital security alarm systems. Over 200 municipalities already use welfare technologies in Norway (Helsedirektoratet, 2018).

- E-prescription: E-prescription is an electronic version of a normal paper-based medical prescription. It allows your doctor to communicate directly with a pharmacy. After a medication has been e-prescribed, the patient can go to any pharmacy to retrieve the medicine without having to bring the paper prescription (Direktoratet for e-Helse, 2018b).

2.5.4 Upcoming technologies in healthcare
The technologies described in section 2.5.4 are already-existing technologies in most modern hospitals. Because of the digital technological improvement, several technologies have emerged. In this section, we describe the most popular upcoming technologies. The use of some of them, e.g. AI, is more advanced in other industries (such as automotive industry). However, in healthcare, the technologies are still premature, but are planning to be used significantly to improve healthcare services.

- Artificial Intelligence
Artificial Intelligence (AI) is a branch of computer science and a discipline in the study of machine intelligence. AI is about developing intelligent machines or systems imitating, extending and augmenting human intelligence through artificial means and techniques (Shi, 2011, p.1). AI is typically defined as the ability of a machine to perform cognitive functions we associate with human minds, such as perceiving, reasoning, learning, interacting with the environment, problem solving, and even exercising creativity.

Examples of technologies that enable AI to solve business problems are robotics and autonomous vehicles, computer vision, language, virtual agents, and machine learning. Most recent advances in AI have been achieved by applying machine learning to very large data sets. Machine-learning algorithms detect patterns and learn how to make predictions and recommendations by processing data and experiences, rather than by receiving explicit programming instruction. The algorithms also adapt in response to new data and experiences to improve efficacy overtime (Chui & McCarthy, 2018). The iPhone’s application Siri, Google’s driverless cars and Tesla’s autopilot, which have the hardware needed to drive all alone with a safety level significantly higher than with a human driver, are a few examples of AI (Sajan, 2018).
The alternatives of AI are being tested in South-Eastern Health Trust (SEHT) as a new type of collaboration tool developed by academic and research communities in the regional health organization. The tool, called Decide, combines decision analysis with algorithms that retrieve patient experiences and personal priorities placed into an app on the phone by the patient. By using Decide, the doctor and the patient should then find the best treatment and dosage together (Baugstø, 2017). Moreover, in March 2018, a new, precise, fast and self-learning AI system was developed at Sørlandet hospital. The system is developed by two members of the Center for Artificial Intelligence Research (CAIR) community at the University of Agder, Geir Thore Berge and Tor Oddbjørn Tveit, and is used to help doctors make safer choices for the benefit of the patients. It will work just like an X-ray and a blood test. Just as a doctor must interpret X-ray images, blood samples and information from the computer before treatment is determined, information from Decide does not tell the doctor which treatment to execute, but obtains relevant information about the patient so that the doctor can make a safer decision (Helse Sør-Øst, 2018a).

- Internet of Things
In the last couple of years, it has been next to impossible not to come across the term "Internet of Things" (IoT). Numerous IoT-based products and services are being introduced in developed societies. Politicians, companies and practitioners increasingly acknowledge IoT as a real business opportunity (Wortmann and Fluchter, 2015). As IoT is making its influx into our information society, no common definition or understanding of what it encompasses, exists yet. However, IoT entails the use of radio-frequency identification (RFID), sensors, the Internet, physical and digital components, and technology in general to connect everyday-life things together.

Solutions such as real-time monitoring of parking space, intelligent street lighting, patients’ surveillance and chronic disease management are being explored. At its core, innovation in IoT is characterized by the combination of physical and digital components to create new solutions. For instance, a refrigerator is used to store food products. If enhanced with IoT, the refrigerator may additionally detect storage level and send an alert to the owner’s smartphone. When buying groceries, the owner can thus always remotely check what is lacking in the refrigerator. Similarly, the primary function of a light bulb is to provide light in a specific location. If enhanced with IoT technology, it may detect human presence and serve as a low-cost security system, which in the event of intrusion can activate a flashing light mode and send an alert to the owner’s smartphone (Wortmann & Fluchter, 2015).

IoT thus offers great opportunities in connecting people and things together. The technology can be used to improve patient care and treatment, and equipment maintenance. It can empower telemedicine by letting patients get help where they are most comfortable - home. With the help of sensors that a patient is carrying, doctors can remotely track and provide answers on the patient’s health condition in real-time. In this way IoT connects a patient to the doctor even closer and such increase care quality (Microsoft, 2018).
- Robotization
The development of automation enabled by technology, including robotics and AI, promises higher productivity, increased efficiencies, safety and convenience. However, robotization and other innovations also raise challenging issues about their broad impact on jobs and skills. Many business processes carried out by humans today have the potential to be automated. Further, anything that can be automated, will be automated. This is changing the nature of the future of work. With today’s technology, roughly half of the tasks that people do can be partly automated, and 5% of jobs can be entirely automated with today’s technology. It means that all jobs are going to be affected over time, and that the way we work will shift over time as machines, AI and machine learning start to take some pieces of the work we do. This will require people to adapt and change (Manyika, 2017a).

Increasingly more people now work side-by-side or with robots, and increasingly more tasks are being automated, like for instance self-service ordering in restaurants, automated cashier systems and surgery robots (Manyika, 2017b). However, robotization is difficult to integrate in healthcare. Much of the tasks in healthcare include physical activities such as walking, running, sewing, cutting and several other tasks that require dynamic movements. The probability for automation in healthcare is much lower compared to other industries. At today’s technological stage, robotization can be used mostly for decision support through others means, such as AI and IoT as mentioned earlier. Robotization and automation in other industries can, however, release labor force to the healthcare industry (Karlsen, 2016).

- Augmented and virtual reality
Lastly, there are the two technologies Augmented and Virtual Reality (AR/VR) that has emerged over the past few years. Offering an extended and an ear-reality experience, Augmented Reality (AR) and Virtual Reality (VR) respectively simulate bits of our world using high-performance computers and sensory equipment. Having taken the world by storm with Pokémon GO, AR and VR have also long been used for difficult and dangerous jobs. As such, AR and VR have been used among others to train airline pilots to land a jet, space scientists to take trips to space or surgeons to carry out brain surgery, all in pretended/virtual/augmented reality environments empowered by AR and VR (Woodford, 2018).

At Innlandet hospital, VR and AR-technology is at full speed, and many projects are on the waiting list. For instance, the orthopedic department at the hospital in Elverum is trying out the use of VR glasses for pain relief. Furthermore, several partners have joined to bet on VR and AR technology (Fuglehaug, 2017).

These are some of the technologies that will impact the healthcare industry greatly in the future. We may expect resistance to some of these technologies.
2.6 Challenges related to digitalization in healthcare

This section is based on prior research. Most of the research cited in the section is done in the healthcare industry. General IT-based research is also included to help paint the picture of healthcare from an IT industry perspective. The study includes therefore seminal and recent studies from 2010 up to 2018, with exceptions in cases where older articles have been very interesting.

As mentioned earlier, the main goal of digitalizing is to innovate existing processes and improve the way of doing things. Therefore, digitalization often triggers change. The main field of this study is focused on the digitalization process and change sustainability after the digitalization project. We focus on practices that managers do during the change processes and efforts done to make change sustainable after the project’s completion. The health sector is becoming increasingly digitalized and technological advances seem to promise improved healthcare through IT/IS. According to Agarwal et al. (2010), several studies found that HIT when implemented correctly and used properly has a positive impact on healthcare quality, including improved vaccination rates, patient safety and a lower mortality rate.

However, in contrast to these positive impacts, the implementation and adoption of HIT show a more pessimistic view. This means that the technology itself brings positive effects to business processes, but the implementation process and the ability of hospitals to adopt the technology is challenging. As such, there is often a gap between the expected outcomes of HIT and the actual results realized (Agarwal et al., 2010).

Norwegian research findings have also shown that there is a gap between the gains that are expected and those that are realized by the introduction of new technologies in health services (Grønli, 2016). A study by Alami (2016) discovered that 25% of IT-related health projects experience outright failure, and up to 50% of the projects require material rework, and that project management is documented to be a major cause of IT project failure (Alami, 2016).

Literature mentions several other challenges, stating that the many challenges that technological changes face are partly caused by poorly competent public managers (Kuipers et al., 2013). Research suggests that the problem is due to project managers’ limited understanding of change implementation techniques (Gilley et al., 2009). According to Pagon et al. (2008), competency can be understood as the ability of an individual to activate, use and connect the acquired knowledge in the complex, diverse and unpredictable situations. Prior findings also show that implementing technological based changes require attention and commitment from top management. Managers have the task of encouraging employees to embrace change, and at the same time reduce fear that employees might have related to failure of mastering and comprehending the change (Umar et al., 2016).

User involvement also proves to be beneficial as it enhances user satisfaction and acceptance by raising realistic expectations about system capabilities (Fortune & White, 2006). Change projects—including digitalization projects—often suffer from “hard” implementation strategies focusing too much on the technical elements. Such strategies need to be tempered with a softer, more behavioral, and knowledge-centric approach. Furthermore, several roles are required to
implement and manage successful public-sector information systems, each with different skill emphases in the organizational, business and technological areas. Often, experts in one domain need further education in the other areas (Sarantis, Smithson, Charalabidis & Askounis, 2010).

Furthermore, the quality of implementation and organizational readiness influence post-implementation success. Central factors to achieving expected changes, are among others project management, training and education. Effective training is considered very important to equip users with the necessary skills and tools to use the new digital system efficiently in their day-to-day activities. Education, internalizing the knowledge embedded in enterprise systems, is one of the most critical strategy for achieving success in IT projects (Ram, Corkindate & Wu, 2013). To facilitate change management and improve public technology projects, clear leadership from the top and better delivery downwards where managers bring experience from prior projects and use these to improve project designs, instead of starting each project with a blank paper, is required (Sarantis et al., 2010).

2.6.1 Adoption barriers

It is indicated that improper application of HIT might be harmful to healthcare quality. The imperative of HIT innovations to improve the quality and safety in healthcare is firmly established as a high priority in today’s digital age. However, when compared to other industries, the adoption in healthcare is reported to be slow (Cresswell & Sheikh, 2013, p. 74). Meanwhile, the introduction of HIT in business processes has failed to achieve projected benefits and cost savings because of shortcomings in the design and implementation of HIT systems, including safe and effective use of these systems (Bowman, 2013, p. 1). The consequences for failure include data being lost or incorrectly entered, displayed, or transmitted, leading to loss of information integrity, which again leads to a high risk for HIT-caused medical error, harm, or death. The adoption of HIT is therefore essential for the transformation of the current healthcare system into one that is more efficient, safer, and which consistently delivers high-quality care (Bowman, 2013). But the consensus is that HIT adoption is slow (Cresswell & Sheikh, 2013).

Literature identifies central factors that inhibit the adoption of information systems in healthcare, including financial, technical and social. The most underlying factor is, however, the complex environment of interrelated social and technical issues situated within healthcare institutions. The consensus is that introducing technology within such complex organizational systems is not a straightforward process (Agarwal et al., 2010).

These complex organizational systems make the nature of HIT introduction somewhat difficult. This results in shortage in the most important factors associated with adoption, deployment, diffusion, infusion, integration and more (Cresswell & Sheikh, 2013). Due to poor functionality, physicians, doctors and other healthcare personnel resist HIT implementation (Agarwal et al., 2010). The problem lies in the interaction between the people working within the organization and technology. However, problems can also include issues that are beyond human-technology interaction, such as strategy (Cresswell & Sheikh, 2013). With respect to environmental factors, researchers have identified the important role of regulation. As the healthcare industry is heavily regulated by the government, changes in regulation tend to have a significant impact on how hospitals adopt HIT (Agarwal et al., 2010).
There are different types of risks related to EHR implementation. Literature identifies the following most common types:

**EHR System Design Flaws**: as healthcare core processes are becoming increasingly dependent of software, EHR system are likewise becoming more complex in design. A flaw could be a bug or an error that can corrupt, delete or misplace data, causing a carer to misjudge information. Such a flaw in an EHR, a system containing thousands of medical records, including allergies or diseases, could negatively affect patients drastically (Bowman, 2013, p. 2).

**Poor System Usability and Incorrectly Use**: in addition to design features and functions, errors can also result from incorrectly system use caused by system complexity, and as such the system becomes less user-friendly and user interfaces get confusing. Even though EHRs do not impact patient care directly, but through human intervention, the technologies are still so complicated that the health carers sometimes are limited and thus cannot exercise human intervention competence. For example, a doctor may rely on a computer-generated diagnosis, a pharmacist an e-prescription and so on without fully understanding the algorithm behind the diagnosis or the prescription. Poor EHR system design and incorrect use can cause EHR-related errors that jeopardize the integrity of the information in the EHR, leading to errors that endanger patient safety or decrease the quality of care. Such unintended consequences may also increase fraud and abuse and can have serious legal implications (Bowman, 2013, p. 3).

### 2.6.2 Security and privacy

The challenge of securing large amounts of electronic medical records stored in a variety of forms and in many locations, while still making it available to authorized users, is huge (Murtaza, 2012). Security and privacy of personal health information (PHI) is thus a highly consequential and controversial area.

In terms of healthcare, security and privacy are defined as the following:

"Information that relates to your past, present, or future physical or mental health or condition; to the provision of healthcare to you; or to past, present, or future payment for the provision of healthcare to you" (HealthIT, 2017).

This includes information that doctors, nurses, and other healthcare providers put in your medical record, conversations a doctor has about your care or treatment with nurses and others, information about you in your health insurer's computer system, billing information about you at your clinic, information used by companies or individuals that provide data, billing, or other services to doctors, hospitals, health insurers, and other healthcare organizations (op.cit.).

As large quantities of clinical data are digitalized and captured in EHRs and other digital databases, patients are growing concerned about their privacy and security (Agarwal et al., 2010). Information security and privacy in the healthcare sector is therefore an issue of increasing importance. The adoption of digital patient records, increased regulation, provider consolidation and the increasing need for information exchange between patients, providers and payers, all point towards the need for better information security (Appari & Johnson, 2010), underscoring the urgency of finding appropriate policies to protect the privacy of patients whilst reaping the benefits of digitalization (Agarwal et al., 2010).
Privacy is viewed as a key governing principle of the patient–physician relationship. Patients are required to share information with their physicians to facilitate correct diagnoses and treatment, and to avoid adverse drug interactions (Appari & Johnson, 2010). Therefore, it is vital to make digital information more secure and ensure anonymization of identified PHI as these are critical to ensure patient trust in a digital health-care system (Agarwal et al., 2010). Although health information security and privacy has been widely discussed in other fields, such as social science and business press, the academic literature lacks systematic investigation to identify and classify various sources of threats to information privacy and security. Evidence, however, suggests that a lack of adequate security measures has resulted in numerous data breaches, leaving patients exposed to economic threats, mental anguish and possible social stigma (Appari & Johnson, 2010).

On the Norwegian ground, several attacks have been done to SEHT, the most recent happening in 2018 where patient health information got into the wrong hands, totally unknown the board of the health trust (Tholens, 2018), who later admitted that there has been poor IT security and little focus on privacy in SEHT. It has been easy to sneak into patient records for IT consultants and other healthcare professionals. In addition, hundreds of unauthorized IT-employees located in foreign countries have had access to sensitive health information of almost 3 million Norwegian citizens (NRK, 2017).

2.7 Critical success factors for digitalization
This section includes seven CSF factors highlighted in literature. These factors are critical for digitalization project success.

A study conducted by IBM identified five key barriers that prevent change management (CM) activities in digitalization projects, which include the following:
- CM benefits are not clear, 69%
- CM activities are not clear, 53%
- Role of change professional is not clear, 49%
- Lack of skilled CM resources, 43%
- CM is too expensive, 26%

This is to be understood that CM benefits in most projects are unclear or poorly communicated to the people involved in the process. Further, activities as in what to do, when, by whom, and the role of change professional are not communicated clearly, followed by the lack of skilled CM and financial resources. Based on the survey, the following chart was developed showing CSFs for successful change.
**Figure 11 - Most important aspects of successful change** [image]  
(Gorman, 2014).

**Top management sponsorship:** research shows that an actively engaged top management is the top driver and most important factor for ensuring project success (PMI, 2014). Primary top management responsibilities include among others: supporting the project team for resources and visibility, support the team when facing extraordinary difficulties and coaching of the project manager (Petty, 2018). Other tasks include ensuring that the project’s goals are aligned with the company strategy and providing ongoing direction as the project unfolds. Unlike project managers, whose focus mostly is on day-to-day executions, top management’s role is much more strategic, focusing on creating conditions for success instead of tactical implementation (Ashkenas, 2015). Yet, organizations do not fully recognize the importance of this role (PMI, 2014). The lack of top management sponsorship increases the risk of project problems such as failure, suboptimal performance against time, cost and quality (Petty, 2018).

Nevertheless, project management quality is essential. Managing a project is managing resources, namely time, money, product, and lastly people (Schiff, 2017). Managers’ ability to plan is thus important to balance all the resources. Copper (2016) states the following:  
"Poor planning in project management is the number one mistake that leads to project failure. If something does not start right, it would be delusional to think that it will end right“ (Copper, 2016).

Poor planning means that the schedule that the team is supposed to follow is not set out, the budget is not estimated, scope is not defined, and neither are team member responsibilities. With such a plan, the team is as good as blind. There will be no deadlines to meet and nothing to work towards, hence creating a lazy atmosphere among team members (Copper, 2016). Besides, when it is all said and done, every project boils down to money. With more money, one could probably get more people to do the job more quickly and deliver more. Money determines the amount of material procurement, etc. Without money, there is no project. Planning the budget is thus crucial (Harrin, 2015). People—the most important resource in every project—must also be managed. Managers fail to clearly define team members responsibilities and track these,
leading team members to walk blurred sighted with low productivity and unable to work efficient on the project.

**Shared vision**: shared vision means organizational anchorage through involvement and adequate attention in the organization and management team. Management should recognize and communicate the need for change, decisions are taken on anchoring and organization of the work, decisions are taken on concrete improvement areas, frame conditions are ensured, and milestones and results are sought (Basmo, 2010). The top management should have quality and work method on the agenda. Middle managers should prioritize and steer the project based on their competence and need. Finally, employees are to be involved through continuous dialogue with the department management at, for instance, personnel meetings. A shared vision is achieved when the line from top management to “lower” employees are on the same page (op.cit.).

**Employee commitment**: the Norwegian healthcare industry is facing endless changes, and effective management of such change is an important competency currently required by organizations (Janet, Susan & Paul, 2008). The growing frequency and complexity of workplace change in the Norwegian healthcare industry thus require employees to adapt to change without disruption. As managers make decisions for coping with change, they must consider not only how hospital performance will be affected, but also how employees will be affected. Employees work with the day-to-day tasks and know best about business processes. Their embrace of and commitment to change are thus highlighted as very significant to digitalization project success (Voet, 2016). Successful implementation of digitalization change often requires employee acceptance and support due to the relationship between commitment and such important outcomes as job performance, employee behaviors, willingness to share knowledge, absenteeism and tardiness (Fedor, Caldwell & Herold, 2006).

Research has posited that employees' positive attitudes toward a change is a necessary, initial condition for successful planned change. Employees' commitment to a change, as expressed by a willingness to exert effort on behalf of the change, is important if the organization is to realize the expected benefits from the change initiative (Fedor, Caldwell & Herold, 2006).

**Enterprise culture**: as described in earlier sections, enterprise culture is the set of common values, norms and reality contexts that evolve in an organization when members interact with each other and the environment (Nilsen, 2016). While values are what are perceived as important and worthwhile to work for, norms are the social rules that determine which attitudes, actions and behaviors are considered acceptable or unacceptable. According to Voet (2016), social factors such as culture and behavior are the biggest challenges in change projects (Voet, 2016).

The IBM study mentioned above showed that many organizations fail to successfully manage change because of existing social factors within the organization. It was found that many organizations do not embrace a change-centric culture, despite that change is the new constant that organizations always will face (Gorman, 2014). According to the study, reasons for failure lies much in already-existing factors, and little in the new technology being implemented.
**Obstacles to information interchange:** the fundamental problem of this obstacle is communication. Jacobsen & Thorsvik (2013) describes communication as the glue that holds an organization and all its internal and external elements together. Basically, two actors are involved in a communication process; a sender and a receiver. The two actors communicate through a communication channel. The communication process simply happens in a manner where the sender sends a message through a channel, the receiver receives the message and gives a reply based on the message. As such, roles are exchanged in a communication process (Jacobsen & Thorsvik, 2013, p.278).

Although the three reasons of failure described above play major roles, communication is just as important as the other reasons. Communication can threaten the survival of any project. Project managers guide team leaders at every step of the project, as team leaders guide team members - and the other way around. Effective communication back and forth in the project is thus crucial for a successful completion (Cervone, 2014, p. 75). However, effective communication is somewhat difficult. Like good health, it is taken for granted and is noticed first when a serious problem has occurred. Too often, there is no harmony between the sender and the receiver. The sender intends to communicate a message, but unconsciously communicates the message not as intended and the receiver understands the message not as communicated nor intended. Achieving mutual communication harmony among a project team is close to impossible (Sissors, 2013).

**Need for internal ownership:** there is no doubt that many team members work on projects because they must. As such, the likelihood of performing productively and efficient is much lower, full creativity is absent and one waits to be constantly directed. Such an attitude often occurs when the concerned does not see or understand the importance of the project, but is left without choice. On the other hand, working on a project because you want to, makes a whole difference. Things turn upside down, the motivation boosts, you become passionate and can identify yourself with the project. What was initially perceived as unimportant is now necessary, and things get a lot easier. This difference is identified as internal ownership (Olsson & Berg-Johansen, 2016). Creating internal ownership is the most difficult thing for every manager. Those who succeed in doing so in most projects, have exceptional management skills. However, this is something most managers struggle with, and therefore it contributes to failure (Sarantis et al., 2010).

**Need for business case:** a business case (BC) is briefly an analyzed and documented argument meant to convince the business’ decision-maker to approve a business-related project. The BC should give the management an understanding for the potential, uncertainty and risk of the project, but also consequences for failing to carry out the project in question. The BC provides an easier overview over the preliminary benefits, helps to catch possible problems early and get a total overview over resources that are required to succeed with the project (Carroll & Shabana, 2010, p. 85).

A business case therefore gives a picture of the status quo, the objectives and how to achieve them. As the project begins, the BC establishes the ultimate objectives of the project to all stakeholders, explains what has to be done and the justification for why it ought to be done. As the project progresses, the BC functions as the “guide” directing everyone involved in the project, and also helps see whether the project is still on track. After the
project is completed, the deliverables have been applied and are in use, the BC becomes the measure to assess the anticipated value. Therefore, the BC is a reference point before, during, and after a project has been completed (Herman & Siegelaub, 2009). Such an argument is what most managers, according to Sarantis et al. (2010), fail to put in place. At the end of the day, it displays a lack of vision and strategy - which any project can hardly succeed without. The common ground for the CSFs is, however, that successful change in digitalization projects is facilitated by the combination of management and employee efforts, effective technology and tight collaboration between those involved in the projects (Beldi et al., 2010). However, an iterative and incremental approach to implement digital change can often be a good strategy. This can be done for instance by implementing a new IT function and its related processes in each phase. An example could be: new function, its new enterprise processes and training (Markus, 2004).
2.8 Kotter’s prerequisites for successful change

Finally, we include a section that covers successful change implementation through change management. Based on Lewin’s model (see 2.4.2), John P. Kotter, the guru within change management, further developed a model that includes 8 phases that should be adequate for achieving successful change. The phases seem to embody successful change initiatives (Jacobsen & Thorsvik, 2013, p. 404).

1) **Create urgency for change**: this means to create and spread an atmosphere that change is an emergency and urgent. The point is to show that things will go seriously wrong if change is not implemented, and to get people understand the seriousness.

2) **Define a clear vision**: a clear vision on what the change initiative is aiming to achieve must be formed, as well as the strategy for achieving this.

3) **Communication**: the vision and the strategy are communicated throughout the whole organization, and change agents exploit every occasion to make employees understand the vision and what is being changed. Communication should be a continuous process to motivate employees.

4) **Create a coalition behind the change**: it is important to have a strong team, key people, that support the change initiative. Here, it is important to include people that will be affected by the change, or representatives.

5) **Remove obstacles**: in this phase, every element that is between the existing condition and the future desired condition, is changed.

6) **Quick wins**: it is important to show improvement that is visible, has immediate benefit, and can be delivered quickly after the project begins. Employee performance during the change project is also rewarded.

7) **Consolidation**: changes that work, get consolidated in new structures and processes. The changes become part of the business.

8) **Anchoring the change in the organizational culture**: change is a real success first when it is part of the organizational culture. The values that support the vision should be visible in daily operations.
3. RESEARCH APPROACH

This section includes approaches, techniques and tools that were used to collect, process and analyze data. But before that, we will first, present the philosophical paradigm that were chosen for this thesis, which was the “Social constructivism” paradigm as described by Creswell (2009). Second, we present our chosen research methodology for this research project, which is a qualitative case study and features a description by Jack & Baxter (2008). Third, this chapter will describe the tool, semi-structured interviews, used to collect data and our justification for this choice, as well as the advantages and disadvantages of this data collection technique. Furthermore, the section will feature a description of our interview process and the considerations that were deemed necessary. Fourth, an overview of informants, as well as an overview and descriptions of the documents that were provided to us through the interview process is included. Last, a summary of the gathered data shall be explained, before the chapter goes into detail about challenges related to analyzing large amounts of data.

A description of which analysis method is also depicted in this chapter. The chosen method for this aspect was Creswell’s 6-step analysis method and is explained step by step. Validation and ethical concern issues are also described in the last portion of this chapter and a thorough explanation of how we faced these issues is also explained.

3.1 Philosophical paradigm

The choice of philosophical assumption during this project came down to the paradigm known as “Social constructivism” by Creswell (2009). This paradigm is typically seen as an approach that adheres to qualitative research. It bases itself upon the “social constructivist” assumptions saying that individuals gain contextual understanding about a subject influenced by environmental factors (e.g. workplace, culture or residence).

This assumption allowed us to look for complexity regarding the topic and establish a variety of opinions to consider (Creswell, 2009).

Open discussions with our informants has been essential when utilizing this paradigm, which we used to gain insight and research further how the contextual factors (historical, cultural, etc.) influence opinions. In addition, this perspective also keeps in mind the researcher’s own interpretation of the data and situation at the organizations being studied. Conclusively, the end goal of this paradigm is to interpret the view of others and align it with an inductively generated literature (op.cit.).

3.2 Research method

The study is based on a qualitative case study of four projects. Qualitative case study methodology provides tools for researchers to study complex phenomena within their contexts (Baxter & Jack, 2008).

“It is an approach to research that facilitates exploration of a phenomenon within its context using a variety of data sources. This ensures that the issue is not explored through one lens, but rather a variety of lenses which allows for multiple facets of the phenomenon to be revealed and understood” (op.cit.).
A qualitative case study is thus used when the researcher’s objective is to understand *how and why* different outcomes occur in different contexts. Our main research question is: *How can management achieve sustained planned change in digitalization projects through change management?*

The study thus seeks to understand the depth of the topic and is therefore based on a qualitative approach (Hoffmann, 2013). Sander (2017) describes two types of research designs when trying to answer a research topic, including a descriptive and an exploratory design. The former is suited for research where the researcher seeks to answer topics related to what, who, how, etc. (Sander, 2017). For this project’s aim, which is to study how managers can achieve planned change, both exploratory and descriptive design are suitable. However, we preferred a descriptive design as it allowed us to consider other elements which helped us understand the underlying factors to our research questions (e.g. context, timing, content, etc.).

The question is attempting to figure out a phenomenon from a variety of information sources. The phenomenon can be studied using different methods for data collection, such as interviews and observations.

### 3.3 Data Collection

In the study, data was collected directly from informants through interviews. In addition, we got access to several project documents and reports. Advantages of an interview, are that the researcher gets to control what information to fetch out of the interviewee. Further, the informant provides varied amounts of data through an interview compared to other forms of data collection. However, a disadvantage of an interview, is that indirect information can infiltrate direct information, and the researcher sees the picture through the eyes of the informants. Documents provides the researcher with a richer picture and a deeper insight in the phenomenon. Further, the researcher does have to transcribe the interview. However, documents can also create confusion as the information can outdated, imprecise and difficult to interpret accurately.

#### 3.3.1 Interview

Interviews help to clarify and understand the research. An interview is often flexible and open for unplanned events, such as ask follow-up questions, comments, asking the informant to explain more, etc. Since we have no experience in the healthcare, and were unfamiliar with the nature of healthcare, we chose to use semi-structured interviews to have an open arena where the interview could happen in a conversational manner, rather than completely following a set of questions.

Prior to the interviews, we developed an interview that functioned as a guide, and reviewed and approved by the supervisor. The interview guide was divided into two parts, one theoretically-based, and the other based on organizational-specific issues. Some interviews included both parts in one session, while other informants participated in two rounds of interviews. The interviews lasted 40 minutes on average. Approximately one-third of interviews happened through telephone as most of the informants were in faraway provinces (Akershus and Hamar). To ensure best quality, the interviews were executed under quiet circumstances either in person at the
informants’ organization or through speaker activated phone calls from group rooms at the university. This was done to reduce noise and disturbances. To capture the context around the interviews, one of us oversaw and conducted the interview, and other had the responsibility of taking notes. With the informants’ consent, we used a phone to record the interviews as well. All the informants were also informed that they will be totally anonymized down to position title (Oates, 2012, pp. 188-191). Table 3 contains the description of the informants that participated in this study, and dates the interview took place.

Table 3 - Informant overview

<table>
<thead>
<tr>
<th>#</th>
<th>Description</th>
<th>Interview form, date (F2F → face to face)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nurse and ICT consultant, Sørlandet hospital.</td>
<td>F2F, semi-structured, 01.12.2017</td>
</tr>
<tr>
<td>3</td>
<td>ICT advisor, Sørlandet hospital.</td>
<td>F2F, semi-structured, 16.02.2018. Follow-up: 02.03</td>
</tr>
<tr>
<td>4</td>
<td>ICT advisor and Project manager, Sørlandet hospital.</td>
<td>F2F, semi-structured, 26.02.18. Follow-up: 02.03</td>
</tr>
<tr>
<td>5</td>
<td>Project Manager, Akershus hospital.</td>
<td>Phone, semi-structured, 27.02.18. Follow-up: 07.05</td>
</tr>
<tr>
<td>6</td>
<td>Training manager, Akershus hospital.</td>
<td>Phone, semi-structured, 01.03.2018. Follow-up: 11.04</td>
</tr>
<tr>
<td>7</td>
<td>Project Manager, Sørlandet hospital.</td>
<td>F2F, semi-structured, 05.03.18</td>
</tr>
<tr>
<td>8</td>
<td>Project manager, Innlandet hospital.</td>
<td>Phone, semi-structured, 03.04.2018</td>
</tr>
<tr>
<td>9</td>
<td>Counselor and department manager, Innlandet hospital.</td>
<td>Phone, semi-structured, 24.04.2018</td>
</tr>
<tr>
<td>10</td>
<td>Training manager, Innlandet hospital.</td>
<td>Phone, semi-structured, 10.04.2018. Follow-up: 07.05</td>
</tr>
</tbody>
</table>

3.3.2 Document collection
Projects produce many documents, such as project justification, presentation files and project reports. These documents normally contain detailed information about the project, often much more than we would encounter from the interviews. As such, we asked informants for such documents, to the extent it was possible. The documents we got, were written both for project planning, experience reporting, and was written by the project managers and other members. As such, we counted the documents as reliable and used them as a supplementary source of information in the study. Table 4\(^2\) shows the documents we got directly from different informants.

\(^2\) Document title is directly translated from Norwegian
### Table 4 - Document list

<table>
<thead>
<tr>
<th>#</th>
<th>Document title</th>
<th>Description</th>
<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regulations on management and quality improvement</td>
<td>Standard presentation of regulations and supervisor for use for information or training</td>
<td>Power Point</td>
</tr>
<tr>
<td>2</td>
<td>Quality oriented management</td>
<td>Regional strategy for quality, patient safety and HSE 2018-2020</td>
<td>PDF</td>
</tr>
<tr>
<td>3</td>
<td>Experience report</td>
<td>Regional EPJ standardization Akershus University Hospital</td>
<td>PDF</td>
</tr>
<tr>
<td>4</td>
<td>EPJ standardization: General journal note and Joint Academic documentation</td>
<td>Requirements Specification and Technical Standard</td>
<td>PDF</td>
</tr>
<tr>
<td>5</td>
<td>Management and Quality Improvement</td>
<td>Regulations on management and quality improvement in the health and care sector</td>
<td>PDF</td>
</tr>
<tr>
<td>6</td>
<td>V1 Needs Analysis</td>
<td>Investigation of &quot;One Citizen - One Journal&quot;</td>
<td>PDF</td>
</tr>
<tr>
<td>7</td>
<td>Digital renewal - Regional EPJ</td>
<td>RegionalEPJStandardization - A patient journal in Health South East</td>
<td>Power Point</td>
</tr>
</tbody>
</table>

#### 3.3.3 Summary of data collection

The interviews, both F2F and by phone, formed the main information source. The supplementary documents served as additional information, whilst notes during interviews helped us map the context around interview sessions. We wrap the summary of data collection in table 5.

**Table 5- Data collection overview**

<table>
<thead>
<tr>
<th>Number of informants</th>
<th>10 informants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interviews completed</td>
<td>15 interviews</td>
</tr>
<tr>
<td>Relevant documents</td>
<td>7 documents</td>
</tr>
</tbody>
</table>

#### 3.3.4 Data analysis

The interviews and documents that we have conducted and received, have given us a large amount of data. This made data analysis a challenging process. Thus, we had to use an approach to make the process easier - the inductive approach. Thomas (2006) describes an inductive analysis approach used to analyze raw data. The author describes the approach as the following:

"Approaches that primarily use detailed readings of raw data to derive concepts, themes, or a model through interpretations made from the raw data by an evaluator or researcher" (Thomas, 2006, p. 237).
Due to the huge data amount, we used a tool called Transcribe, which The purpose for using this approach is to condense raw textual data into a brief, summary format and establish clear links between the research objectives and the findings derived from the raw data (op. cit.). The collected data was analyzed with attempts to reduce any preconceived biases. We have attempted to abstain from our own internal bias, when conducting the project (Oates, 2012, p. 38). Factors such as context, content, resistance and company size strongly affect the result of a project (Jacobsen, 2012). The nature around both the critical information and the regional EPJ standardization project was therefore taken into consideration when analyzing data.

3.3.5 Analysis method
The objective during this part was to make sense of the collected data. It involved an iterative process where we continuously reflected and asked analytical questions concerning the data (Creswell, 2009). Creswell details a guideline which was used for the project. These 6-steps were performed, as follows:

**Step 1. Organize and prepare:** This step was performed in the manner of gathering data in unique categories such as themes, patterns and interviewee categories (e.g. project leader, IT-advisor, employee). These were categorized in two groups, as previously mentioned; employees and managers, and interview guides were developed for each group.

**Step 2: Read through all the data:** It is important that this step is conducted continuously, and reflection is made upon the data iteratively. We transcribed all the interviews into separate documents to have the data in a readable format. This helped us organize the data, and gave us a good overview, and enabled us to ask follow-up questions for the informants. This resulted in a second round of interviews with some of the informants.

**Step 3: Begin a detailed analysis and a coding process:** This step is about categorizing the data even further, insub-topics, and additional characteristics to the different data. The categorization is done by separating data into groups corresponding to the established categories. It also made the categorization even more detailed, and the data simpler to analyze.

**Step 4: Use the coding process to generate a description of the setting or people as well as categories or themes for analysis:** This step is about adding a description that can be used to establish a detailed rendering of information about the people, places, and organizations in the overall setting. The descriptions can be further used in a coding effort to generate themes or categories. Creswell suggests 5-7 categories for a research study. These can then be used to create headings or major findings section of the study and will illustrate multiple perspectives and evidence for findings.

**Step 5: Advance how the description and themes will be represented in the qualitative narrative:** This is the part where we presented, discussed findings and evaluated them, and is included in the next few chapters. A section is dedicated to conveying the findings in an orderly manner, as well as detailed information about subthemes, and multiple perspectives from the informants.
Step 6: Final step involves interpreting the data: During this step we kept in mind the fact that we had to evaluate the findings and process what we managed to find out and learned during the project. Creswell includes a quotation, which says: “What were the lessons learned?” Which, is essentially what we have contemplated, and our interpretation of the findings has been presented, built upon the analyzed data and previously older literature and research on the topic. In the end we were able to either confirm or disconfirm established findings from the literature, which enables us to present new findings. Additionally, we have suggested other research areas that are worthy of further research, and that are related to our topic. The steps of data analysis are illustrated in figure 12.3.

![Analysis process diagram](Creswell, 2009).

3.4 Validation

There are elements that can help to ensure a study’s validity, which include the following (Creswell, 2009):

- **Credibility:** we prepared informants prior to the interviews by thoroughly explaining the topic and sending them sample questions of the interview. Each interview was transcribed and sent to the informants for approval. Some of the informants re-wrote and corrected errors before sending the end version back to us. Several informants used the “Tracking”-function in Microsoft Word to ensure that the last version of the transcription was as they intended. Also, studying and comparing several cases increases the study’s credibility.

- **Reliability:** sending transcriptions back to the informants has ensured that data in any way is not wrongly influenced. Further, the tracking function gave the informants constant insight into what was transcribed. To get exact answers, we asked some of the

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3 The figure is customized according to our research context.
informants to send answers to the follow-up questions via email.

- **Confirmability**: the researchers that has conducted this study did not have any knowledge or relation to the healthcare industry. Thus, everything was seen through the eyes of the informants.

3.5 Ethical concerns

The first thing we did was developing questions (interview guides) in a most possible general way, so that sensitive information would not come into the picture during interviews and conversations with informants. The informants were well informed of the goals and motivations of the study and were notified about their right as participants and that their participation required consent. Further, the informants were informed that they had the right to rescind their participation from the study at any time. Informants that live far away gave written consent over email. Openness, trust, responsibility and respect were highly appreciated and displayed towards informants.

All the data we collected was treated in a manner that sought to not compromise the interviewee’s privacy or personal safety. The collected data was stored and kept in a safe manner to ensure that the integrity and confidentiality of the data was preserved. Confidentiality has certainly been a concern that we made sure to be mindful of (Oates, 2012). The collected data has been presented in a manner that sought to avoid erroneous conclusions. As previously mentioned, the written format of each interview was sent to informants for review. This reduced the chances of misinterpretation, or transcription of low quality. The data cannot be twisted to answer our research question, or in any way agree with any of our pre-existing biases or assumptions. The data and data analysis presented in this report, was based on our interpretations of the findings in the data, and by utilizing validity measures to present the findings as precisely as we were able to (op.cit.).
4. RESEARCH CONTEXT

This chapter describes the main findings from our study conducted on the “Critical Information” project at Sørlandet hospital, and the “Regional EPJ Standardization” project conducted at Akershus university hospital, Innlandet hospital and Sørlandet hospital. In the following section we will use the term “The EPJ standardization project” when referring to the regional EPJ standardization project.

4.1 Organizations

This study was conducted in collaboration with three hospitals within the South-Eastern Health Trust (SEHT), a regional health company providing specialist health services. The company is organized under The Ministry of Health and Care Services that has overall responsibility for all hospitals in Norway. The state is the owner and grants money to hospitals over the state budgets. With the Norwegian hospital reform in 2002, the specialist health service was organized in four regional health authorities, where SEHT is one. SEHT provides specialized health services to almost 3 million people in Østfold, Akershus, Oslo, Hedmark, Oppland, Buskerud, Vestfold, Telemark, Aust-Agder and Vest-Agder, and SEHT is the country’s largest health trust. There are in total 78,000 employees in the healthcare institutions within the Southern-Eastern region. SEHT’s vision is to offer and provide good and equal healthcare to every citizen in need (Helse Sør-Øst, 2017).

In 2013, SEHT established a regional program, Digital renewal, for the renewal and standardization of work processes and technology. The program aims to ensure that the objectives of the ICT Strategy for the Region by 2020 are reached. Digital renewal consists of several larger and smaller projects and aims to digitalize to improve patient services and meet the society’s expectations. To carry out digitalization, there is a need for modernizing an aging and complex ICT infrastructure. Three hospital units participated in this study, including Sørlandet hospital, Akershus University hospital (Akershus hospital) and Innlandet hospital.

4.2 Projects

This section provides descriptions of the projects that were studied. This includes the critical information project and the regional standardization project.

4.2.1 Critical information project

The results in this section are based on the critical information project was implemented at Sørlandet hospital from August 2016 to May 2017. Critical information refers to any health-related information that is of importance for both patients and healthcare professionals. Things such as a drug reaction, an antibiotic intolerance, or allergy are examples of critical information. The project was about implementing a summary care record system in three hospitals in Southern Norway. Furthermore, an existing IT system, primarily used by doctors and nurses, was planned to be improved to offer improved and faster patient treatment. Our focus was to study what the project management did to achieve the planned changes; implementing the summary care record and improving the existing system.
4.2.2 The EPJ standardization project
The EPJ standardization project aims to standardize the use of IT systems at all health institutions in the region. The goal is to establish a solution for safe exchange of care record information across all the health enterprises in SEHT, so that all information is readily available and follows the patient throughout the course of treatment. This will facilitate safer, easier, faster and more effective communication between hospitals. Safer because all journal information is collected and follows the patient throughout the course of treatment, and the information is available for proper treatment at the right time in the right place. Easier because the patient does not have to repeat all his medical history anymore, the carer's work documentation is simplified, while the common system and similar use of the journal simplifies communication and collaboration. Faster because immediate access to journal information reduces the timespent by the carer, and electronic information flow facilitates faster patient treatment.

The EPJ standardization project helps achieve the goal of "one citizen - one journal". The project is divided into the three following projects:

Regional EPJ - Standardization
This project is working to standardize the use of DIPS (see next section) in hospitals. DIPS is used as a journal system at all the hospitals in SEHT, but the actual use and layout of the system differs from hospital to hospital. By standardizing the system, hospitals will get a similar DIPS configuration and use the system in a more similar way. This will make it both easier to interact and easier for health professionals to move between hospitals. Other benefits include:

- Facility of information sharing in a joint journal and support for the target in the White Paper "One citizen - One journal".
- Enabling implementation of the regional solution for automatic creation and ending of users in DIPS. This will close deviations in the treatment of patient information, revealed in connection with the Office of the Auditor General.
- More efficient management because the solutions to all hospitals are on the same regional standard.
- Introduction of national address registers that ensure uniform and automatic, up to date addresses registrations across hospitals.
- Enabling easier sharing of journal documents nationally.

This part of the project is also divided in three parts. The first part, Standard setup and configuration, which includes system development, configuration and customization. The second part includes standardizing work processes and procedures, whilst the third part involves training users to work on the new regional standard. The process is illustrated in figure 13.
Regional EPJ - Modernization

The project will investigate further modernization of DIPS through DIPS Arena. Initially, a conceptual investigation will be conducted which will include a pre-analysis report and a project description of how to proceed with using functionality in- and further broadening of Arena. The investigation will form the basis for a later decision on, and if necessary, the planning phase for when the project is to begin. The concept phase was implemented from 1st November 2017 to 1st February 2018.

Regional EPJ - Consolidation

Consolidating ICT in SEHT means that more than one health enterprise uses one regional ICT solution within a given area, for example within PAS and electronic patient records (also called journals). The project is working to figure out how to merge the electronic patient records in the region into one journal. The overall goal of this project is that the patient should have one journal in a comprehensive PAS/EPJ for the specialist health service in SEHT.

This study is about the “Regional EPJ standardization” implementation at Akershus, Sørlandet and Innlandet hospital. Additionally, the regional standardization of EPJ has been implemented at an earlier time at Oslo University Hospital, Hospitalin Vestfold, Sunnaas Hospital, Telemark Hospital and Betanien Hospital, Vestre Viken Hospital Innlandet and Revmatisme Hospital. During the fall of 2018, will see the implementation of the project at Østfold Hospital.

4.3 Core IT/IS systems in SEHT

Several fully integrated IT/IS systems support operations in the hospitals within SEHT, delivered by DIPS AS. DIPS AS is the main provider of e-health systems for Norwegian hospitals. The company has an agreement with three of the four health trusts. All hospitals in Northern Health Trust, Western Health Trust and SEHT have used the company’s main products, DIPS EPJ and PAS. DIPS AS also develops comprehensive solutions for electronic interaction between health enterprises and cooperative business in Norway. Two out of three Norwegian medical offices use DIPS solutions. Table 6 includes a short description of the core IT systems used in SEHT.
# Table 6 - Core IT/IS systems in SEHT

<table>
<thead>
<tr>
<th>IT system</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIPS</td>
<td>The core IT system in SEHT is called “DIPS” DIPS is a digital revolution for doctors, nurses and office workers, that hospitals have replaced the paper journal with. DIPS is an open, secure, structured and modern EPJ system for the world's most advanced healthcare. DIPS offers constant patient information availability so that necessary and important information can easily and quickly be found.</td>
</tr>
<tr>
<td>DIPS ARENA</td>
<td>DIPS ARENA is the most modern patient data system in the healthcare market. It is a newly developed and innovative electronic patient record system specially designed for the Norwegian healthcare system - along with Norwegian healthcare professionals. DIPS Arena simplifies, streamlines and safeguards the everyday lives of patients, relatives and health professionals. This allows patients to have a better overview of their own treatment.</td>
</tr>
<tr>
<td>Patient Administra tion System (PAS)</td>
<td>PAS is an extensive part of the system solution for the hospitals and includes, among others patient information and patient demographic information, timetable planning and booking of resources, finance, settlement, invoicing to the patient and public reimbursement.</td>
</tr>
<tr>
<td>DIPS RIS</td>
<td>A process support system for the work of a Radiological and Nuclear Medicine Department. The system offers a complete solution for planning, implementation, review and description of examinations. This supports the needs of users and makes working days more overviewed.</td>
</tr>
</tbody>
</table>
5. RESULTS

This chapter presents our main findings from the three hospitals. The results are presented in a format of element-for-element, where we present our findings following the different elements. The chapter begins with descriptions of how informants perceived digitalization and change management, and then carries on presenting findings concerning the different CM elements. The chapter ends with a summary of the findings.

5.1 Perceptions of digitalization and change management

To start with, the informants were asked about their knowledge concerning digitalization and change management to see how they perceived the terms compared to how literature on the topic defines the terms.

*Digitalization*

We got several answers on what digitalization is. By some informants, the term was described as a tool to simplify work processes, offer new types of services, replace paper-based solutions, automate manual processes, and increase the degree of self-service. Others described digitalization as the technology that was necessary to use and depend on to work more efficient.

“I perceive digitalization as the technology we need and depend on. What crazy consequences it gets if it does not work.” - Training manager, Akershus hospital.

*Change management*

Our findings show that CM is an important tool for achieving improved work processes. We asked what CM was and meant for them, some informants described CM as a conscious change of work processes over a period of time to streamline or increase the quality of the current process. They also said that change management requires that all relevant actors are informed and actively participate in the change work to succeed. Others said that CM is about getting people to understand that something must be done differently, accepting, wanting and getting it done.

“It is about preparing an organization to change and get it [the organization] through it [the change].” - Project manager, Sørlandet hospital.

However, although managers have good knowledge about CM, it was important to know how employees within the organizations perceived the term. Our findings show that CM is a negatively charged term for some employees. The following was mentioned:

“[...] the term 'benefit realization’ is a very negatively loaded word. So, whenever I mention change management, I hear, 'Yes, but we are doing it all the time'.”

The findings indicate that managers in SEHT have a coherent perception and understanding of CM. The informants naturally defined the term from the angle of their position and tasks, but show a common understanding of CM.
5.2 Organizational change elements
In this section we present main findings we uncovered concerning the different elements of change management. Quotes are included to show examples of what informants replied to the different elements.

5.2.1 Planned change
Before the EPJ standardization project, each hospital in SEHT had a different version of the EHR system (DIPS). The different versions prevented seamless communication and information sharing. We give an example; suppose if a patient comes from Oslo and has a hypersensitivity reaction to an anesthetic, they come into the hospital after a drowning accident, enter the emergency room and are picked up in the system. If the doctor does not enter into or read the summary care record, it may potentially kill the patient. The goal of the EPJ standardization project was thus to prevent such cases by standardizing the EHR system, work processes and procedures, allow easier communication and information exchange within the whole SEHT. This entails consolidating all the databases into one regional database so that patients’ health information will be available independently of where the patient get treatment. The following was stated an interview:

“We have to standardize our systems, we must consolidate, and in the end achieve “one patient, one journal”.” - Project Manager, Sørlandet hospital.

Jacobsen (2012) says that a planned change process occurs because of some people seeing problems. The problems within SEHT seem to be the lack of health information exchange caused by the different versions of DIPS. At worst, death can be a problem. The author carries on saying people, after recognizing a problem, set goals to get rid of the problem and act (op.cit.). SEHT’s ultimate goals is “one citizen, one journal” defined in the Digital renewal program. Every citizen in Norway will have one journal that will be available at all public hospitals at the end. The current stage, however, is implementing this solution in the regions. Implementing this project is therefore SEHT’s way of acting.

Before the critical information project, DIPS was a mess due to irrelevant patient information that was stored in the system, which went beyond relevant information. It became a problem since most medical professionals began to ignore patient information in this system, at the expense of patient safety. The ultimate goal was therefore to remove unnecessary information, to ensure that only relevant information was registered. The followed was mentioned:

“We cleared from 42.000 down to 8.000 rows. So, we managed to remove quite a mess, much that was not valid and that had nothing to do [in the system]” - Nurse.

Based on this, both the EPJ standardization project and the critical information project went through all the phases of a planned change process (see figure 3). Therefore, both projects fall in the category of planned change.

5.2.2 Driving forces
The need for standardizing and merging databases in DIPS throughout the South-Eastern Norway region is the main driving force behind the project. Based on documents we got insight into, some of the reasons for standardizing are among others better and safer patient treatment, patient active health ownership, privacy safeguard and cross-functional IT systems. No specific driving force was found uniquely for the single
hospitals. The driving forces were thus the same within the whole SEHT.

The driving forces were different for the critical information project. At Sørlandet hospital, a major part of treatment is supported by the summary care record that contains important information about patients. A summary care record is supposed to contain only information that is critical, e.g. allergy. At the hospital, the system, however, contained even information about appointments. The following was stated:

"There was a lot of information that was not interesting in our DIPS [...] there could be such things as ‘the patient cannot meet on Thursday’ [...] It is a useful information, not critical.” - Project manager.

We have mentioned in section 2.3.1 that there are different types of driving forces. Based on the information we got from the informants, our findings indicate that the driving forces for both the EPJ and the critical information project, are part of the first perspective - intentions as a driving force. Both change projects happened because of people seeing a problem and engaging in solving it.

Thus, the projects were different and naturally had also different driving forces. The driving forces for the EPJ standardization project were among others a lack of information flow across hospitals, lack of standard processes and use of technology within the region, which resulted in a lack of information synchronization. Concerning the critical information project, the main driving force was the messy IT system that caused healthcare professionals not to read critical patient information, at the expense of patient safety. These were the identified reasons for why change was needed.

5.2.3 Change agents
The Norwegian government is the supreme owner of SEHT. The EPJ standardization project was thus mandated by the government, down to the health trust’s regional management, and then implemented by the local management at each hospital. Based on the interviews, the overall change agent for this project was the government itself. In one of the documents we got, the following was written:

“The health and care sector consist of many independent companies that are responsible for the priorities, procurement and operation of their own systems. This has resulted in many individual and different solutions. The government therefore wishes to modernize the ICT platform and work for a common solution for the entire health and care sector. The government's main objective is one citizen – one journal.”

Based on the quote, the government took the initiative to impose such a project directly on all the four regional health authorities, and thus all public hospitals in Norway. All the informants also said basically the same thing:

“The project is related to the White Paper 9 [...]” - Training manager, Innlandet hospital.

Based on the driving forces described in the previous section, the government seems to have identified problems, among others an aging and complex ICT infrastructure that was reducing treatment efficiency in healthcare, and then imposed the solution on the hospitals in the regions. However, it seemed like the hospitals also had good agents that perceived the need for change, regardless of the government. At Innlandet hospital, the following was stated:

51
“[...] the people I had in my workgroup were very good change agents. They were out in each of their hospitals and informed those closest to them, so that employees got closer information about what was happening.” - Department manager, Innlandet hospital.

Based on the quotes, we concluded that the government was the primary change agent for the EPJ standardization project. Therefore, through the regional health authority, the government managed to create good change agents (e.g. different managers) who conducted the project with high enthusiasm.

When it comes to the critical information project, we did not get a precise direct reply on a concrete change agent, but our findings showed that the initiative of the project came from within the hospital. As mentioned earlier, each hospital has its unique customized version of DIPS. The mess in the system, therefore, applied only to Sørlandet hospital, and not necessarily other hospitals. The following was also mentioned:

“We are the only ones who actually went in [the system] and cleaned up. The Directorate of Health actually gave us a small cake for the job”. - Nurse, Sørlandet hospital.

Of 9 hospitals in SEHT, Sørlandet hospital is, according to the nurse, the only hospital that conducted such a project. We therefore claimed that the need for change came from people inside the hospital, and not an external authority. The nurse continued saying that:

“[...] actually, they [management] were the ones who wrote the procedure, we really only agreed what was supposed to stand in it.”

The background for this project was, as already mentioned, mess in the IT system, and therefore reduced the use of summary care records in patient treatment. It was medical professionals that normally used the care record. Probably, the professionals have had enough of irrelevant information displaying in the system, but did nothing about the problem. We therefore assumed that somebody other than the medical professionals identified the problem and the risk it exposed patients to, and took the initiative. The project manager said:

“[...] it was an insanely boring job in the first place. So, I needed enthusiasts [employees] and their professional skills and willingness.”

Based on this statement, and: “... actually, they [management] were the ones who wrote the procedure, we really only agreed what was supposed to stand in it.”, it seems like the management played the active role in the project, whilst medical professionals were more passive. We therefore claim that the management was the change agent for the critical information project.

5.2.4 Content
The four projects we have studied were both based on improving IT systems. The EPJ standardization project redesigned DIPS to achieve the regional standard, whilst the critical information project made changes into the local DIPS. Based on the description of content in section 2.3.3, both projects thus fit into the formal elements-category.
The EPJ standardization project

Concerning the EPJ standardization project at Sørlandet hospital, the following was stated: “Standardized ICT solutions is important for “one citizen, one journal” [...] Common routines, procedures, based on best practices, are some of the benefits we get from this standardization.”

The EPJ-implementation at Sørlandet hospital happened quite late (5th of May) compared to our schedule. In addition, all the informants were too busy working to complete the project and did not have time to answer questions. Thus, we did not get the chance to get comments from the informants. One informant, however, sacrificed a minute and briefly replied that:

“The implementation is actually going better than expected.” - Project manager.

We were following updates on SEHT’s website. Around ten days after the project completion, we found several reviews on the website indicating that the project was successfully implemented. We include two comment that describe the project’s positive outcome (Helse Sør-Øst, 2018b):

“The program went on schedule and the project received many positive feedback from employees.” Further: “With the introduction of regional standards, we have benefited better access control and thus further enhanced patient safety… But the most important is that we have now laid the foundation for easier sharing of journal information in the region in the long run.”

Based on the positive feedback and the statement, we claimed that the local DIPS at Sørlandet hospital had been successfully redesigned and achieved the regional standard. This included changed routines and procedures, e.g. work processes. As mentioned, the EPJ standardization project is being implemented within the whole of South-Eastern Norway. The goal is thus the same for all the hospitals. Therefore, results concerning main elements, especially goal, strategy and scope, are the same for all hospitals, including Akershus and Innlandet and those at Sørlandet hospital.

The common content that changed as the result of the project, was access to different information, naming and document types. Based on a project report, the following major elements were changed as part of the content:

- Automated access control: user-IDs are now unique across the region, which means that employees now have the same username and password regardless of which hospital the user works at. Now, the ID can also be used on all the systems, including DIPS [and Metavision, Partus and Nutshell AD that we were not told anything about during interviews].
  - Integration: several systems, both SEHT’s and the National registry are now completely integrated into SEHT’s IT systems across the region. Document and information sharing now happens seamlessly.
  - Standard: the previous customized DIPS versions are now on the new regional standard.

- Critical information
  The content of change in the critical information project, also turned to be in the category of formal elements, as changes were made in technology. The main difference between the start and end of the project, was a tidier IT system. Prior to the project, and how DIPS was then, the routines
concerning information registration caused many errors. So, the project caused some changes in the routines so that errors no longer would occur. The major changes were therefore the fact that DIPS was now “fixed”. In addition to the implementation of the summary care record for the e-Prescription system in three hospitals in Southern Norway.

5.2.5 Scope
Jacobsen (2012) describes two types of change scopes; incremental and radical, where the former seeks to adjust the existing situation and second to break with the existing situation. The author mentions that the scope is defined based on the experience that the affected had with the change project. For that reason, the same change can be incremental for an organization, but radical for another (op. cit., p. 86).

The EPJ standardization project is part of the Digital renewal program, a huge, continual effort put forth by the government. It is characterized by a long chain of project development events which, when fully realized, seeks to complete the vision of: “one citizen, one journal”. The project is not a sudden change which introduces new technologies to the hospitals, radical new processes and procedures. It rather seeks to introduce gradual changes in already-existing systems. At the same time, the project aims to make incremental changes to standardize the existing processes and procedures at the hospitals.

The main changes caused by the EPJ standardization project are as mentioned: automated access control, system integration and standardization. There are not any radical changes concerning who gets access to what, but rather how that access is managed and distributed to employees.

“Information shall be available only when necessary for the employee currently in need of access […] to treat patients properly […] otherwise the access shall be terminated.” - Project Manager, Sørlandet hospital.

Some hospitals had their own way of retrieving patient information in cases where the patient came from outside the region. Further, the project started around the year 2012, and is developed, implemented and completed at all SEHT hospitals except one. Therefore, nothing indicated any sort of radical change. Everything indicated that the project scope was incremental:

“When a patient moves from Oslo to Stavanger, then there are differences in the information gathering process. In the long run this will be adjusted to be the same for every region.” - Project Manager, Sørlandet hospital.

The critical information project was also described as incremental. There were no radical changes done towards DIPS, but rather small changes. However, the ICT advisor highlighted that the scope interpretation could vary. Some departments might find the change to be radical, compared other departments. He said the following:

“You can, for instance, have two departments that work side by side, however, one of the departments use the system in one way, and the other departments use the system in another way. So, some might say “yes, this project will be completed as planned”, and others might say “No, we do not necessarily want those changes.” - ICT Advisor, Sørlandet hospital.
This confirms Jacobsen (2012) in the way that even if the change was equal for all departments, some might have different perspectives on how incremental or radical the change scope was. However, based on the statement below, the project was incremental:

“Yes, it must be the incremental [...] It is an effort to develop what we have, we are making improvements to the system [...]” - ICT advisor, Sørlandet hospital.

5.2.6 Strategy
According to Jacobsen (2012), strategy E is a top-down approach and uses formal power to carry out a project without regard to the resistance expressed. The EPJ standardization project was, as mentioned, mandated by the government. The hospitals had no other choice than conducting the project and had to redesign DIPS as decided by the government and the regional management. The author says that strategy is used when change is a one-time event. Changing the EPJ has not been such an event, but the strategy was still of the E-type. The following was mentioned:

“*Their mandate is to standardize all of the hospitals in SEHT.*” - Project Manager, Akershus hospital.

At these levels, we interpreted the strategy to be E. This is strategy is normally used when the change project is of a dramatic type (Jacobsen, 2012, p. 152), which was not the case with the EPJ standardization project. Coming down to the actual changes, the project was participatory and democratic as medical professionals, to a great extent, were seen and heard. The strategy therefore also seemed to align with strategy O. Strategy E is used when the first objective is to change formal elements, such as technology. Strategy O aims to change informal elements (e.g. culture) first. Based on the interviews, both strategies have been used, even though change has been targeted only on the formal elements (technology, processes, etc.). We illustrate the strategies used on different levels in figure 14.
The critical information project also combined the two strategies. To begin with, the initiative came from the hospital management, and the medical staff just had to get onboard with decision. The nurse said the following:

“It was actually the management that wrote procedures and we just agreed to it.”

The process was, however, democratic. Doctors, nurses and other medical professionals decided what information was to be removed and were involved throughout the process. Thus, both projects used what Jacobsen (2012) refer to as a hybrid.

5.2.7 Process
In organizational change, a process describes what happened between one state and another. It encloses what happens, should happen, or happened between the two states of time. Thus, the process is characterized by time. Time determines e.g. how long a task would take, when it should start, etc. (Jacobsen, 2012, p. 118). The author emphasizes also that many things might be happening parallel to the change project. Therefore, it is important to the timing of the change project (Jacobsen, 2012, p. 126).

The critical information project took place from August 2016 to May 2017. Often, the medical staff were leaving their daily duties to attend the project. They described the process as very tiring, as it entailed sitting up to 7.5 hours in front of two screens. The manager said the following:

“[…] the project was actually extremely boring, so I absolutely needed employees with enthusiasm, the drive and interest” - Project manager.

Concerning timing, the critical information project took place as a proactive reaction for the EPJ standardization project, which came few months after project completion. The project aimed to “clean” the system before the standardization of the EPJ standardization project took place. Exactly one year after the critical information project completion, the EPJ standardization project was also conducted.

The ICT advisor at Sørlandet concluded by saying that bad timing might impact employees negatively. Having many change initiatives occurring consecutively might drain the employees of energy. Particularly, when the change initiative is decided by organization’s top management, and acceptance might be the only way forward. The following was mentioned:

“Obviously, timing has a lot of significance, people do get tired. So, it does have an effect, but often we do not have much of a choice. Much of it is decided regionally, and we have to perform.” - ICT Advisor, Sørlandethospital.

The EPJ standardization project is, as mentioned, a chain project with several projects in the line. Implementation of the standardization part for all the hospitals takes place from 2016 through 2018. Our findings showed that the timing was somehow significant. Our findings showed that the project, to some extent, was influenced by where in the line the hospital was standing. The last hospitals to implement the project succeeded better than the first. This had to do with the fact that project reports were written and shared with other hospitals to make them aware of things to watch out for.
5.2.8 Context
Context refers to an organization’s internal and external environments, as described in section 2.3.7, where we also highlighted that each organization is unique. Although all the organizations that were studied are hospitals, these hospitals are still different and therefore possess different contexts. However, several external context elements, such as regulations, government and stability, are pretty much the same for all three hospitals, and in general all public hospitals in Norway. Our informants said nothing significantly concerning external context elements, and we therefore assumed these as less important for the study. For that reason, this section highlights mainly only internal contexts within each hospital.

Sørlandet hospital
The standardization seems to have been conducted better and achieved better results than other hospitals. Concerning internal context, the hospital is characterized by several advantages. There is very high level of competency, e.g. every participant in the project, and most of the employees are certified in PRINCE2, which highly increased the project’s successfulness.

“[Once I started working here] I suddenly hit a workplace where all employees, were certified on PRINCE2 [...] I find that there is a great understanding of project methodology here.” - ICT advisor.

In addition, there is a highly inclusive atmosphere at the hospital, where change is more acceptable compared to other huge organizations. The overall management at the hospital is open for change and willing invest resources in necessary change initiatives. The following was mentioned:

“Another thing that matters a lot is how willing managers, [including] top management, are to implement changes.” - ICT advisor.

There are two important external elements of context that contributed to the positive project outcome at Sørlandet hospital. The one is that the hospital was the second last, out of nine, to implement the EPJ standardization project. Project reports from those who implemented the project earlier have been of great help:

“ [...] it is advantageous to be the last in line. Others have done it before and can give you their experience.” - Benefit coordinator, Akershus hospital.

The other element is, as mentioned, the fact that the hospital had already cleaned DIPS thoroughly through the critical information project. We asked questions concerning an organization’s age and what it meant for change. Our findings showed that this element had little to say. It was rather the average age of employees in the organization or seniority that can be of significance. Several informants highlighted that younger employees were more flexible and willing to change, compared to older employees.

Further, the longer an employee had worked at the hospital, the harder it was for this employee to change. The following was said:

“ [...] it is the age of employee or the seniority that matters. If you have an office manager who has worked here for 40 years, then it is clear that it is more challenging [for him/her] to change things.” - Project manager, Sørlandet hospital.
Other informants mentioned that culture determined an organization’s willingness to change. If the basic culture promotes trying new things, desire of being in the forefront of development, then even an old organization would be much more changeable. Moreover, informants said that change happens all the time at Sørlandet hospital. Therefore, the hospital seemed to be getting used to changes even though people are exhausted by them. The hospital was described as adaptable to change and had a strong external context element - the government.

“Is there not a mantra now that says one must be ‘adaptable and willing to change?’ We constantly experience that when we have just introduced something, then something else new comes.” - Project manager.

Akershus university hospital
There are unique internal context elements that applied for Akershus. First and foremost, we experienced the hospital as “heavy” for change. Employees at the hospital wanted change, but not to change. The following was said:

“People participate in the game until they realize that they have to change. Then it is not so fun anymore.” - Benefit coordinator.

It was also challenging to get anchoring in the management, and to convey that people had to work after project was over, to realize the benefits. Based on the interview, people were sitting and waiting to receive a new system, instead of working to make it operate optimally. The changes at Sørlandet hospital were effectively conveyed to the affected employees, and top management was supportive of among others “buying in” superseding manpower, while employees were participating in the projects. At Akershus hospital, employees did not have the same conditions.

The following was mentioned:

“Many [employees] were not able to get well prepared for the changes, and some did not bother to take time to get into the changes either […]. There was and still is a lot of frustration among the staff.” - Training manager, Akershus hospital.

In addition, there were officially chosen instructors assigned to train the staff. Employees were involved in the testing phase, with 234 instructors who were responsible for end-user training. At Akershus hospital, they did not invest as much resources as the two other hospitals. It was difficult and challenging to get into the material. The majority of those who use DIPS daily, did not understand the consequences the introduction of regional standard and decision-making approach would have.

Another important element that was highlighted, was competence. It seemed like managers’ competence was something Sørlandet hospital invest in more than Akershus hospital. Managers at Akershus seemed not to have certification in project management methods, but managed to conduct the project.

“I have not studied change management. I have no certificate or anything like that” - Project manager, Akershus hospital.
The management, however, used other techniques to make the projects groups work. Among others, to put together a project with different people and make them work as a good team, the manager arranged a summer and closing party. In addition, the manager went around and talked to people, and asked them how they were feeling, if they had taken some coffee and encouraging them to just be present.

Innlandet hospital
We found that the internal context at Innlandet hospital also facilitated change. Like Sørlandet, superseding manpower was “bought in” once a week at Innlandet hospital. In addition, communication floated easily. Everyone was interested in doing well, to avoid getting something worse than they had prior to the project. In addition, people were very supportive, asking one another how far they had come, etc. Another element is that Innlandet hospital is one of the largest health trusts in Norway with over 8,000 DIPS users at over 40 locations (as big as all of Denmark). We therefore expected more complexity and problems with integrating the new version of DIPS. However, there was surprisingly little resistance in the project:

“[...] I expected much more resistance concerning how the new solution would be. It has to do with the fact that we informed so well that those who were using this [system], knew what it meant [...]” - Department manager.
Little resistance made change easier. Like the two other hospitals, Innlandet was not the first to implement the project either, but the third last. Experience from preceding standardization projects helped guide and estimate the project at Innlandet. However, the informants mentioned that it was challenging to balance both the project and the daily business parallel.

“What became problematic was that they had very few people left for ordinary operations.”

The last element that had a significant influence on the project’s outcome, was time [not to be confused with timing]. The HR manager, who also is an ICT advisor, said that the project could have achieved better results if only they had more time:

The project itself was implemented according to the timetables, and with quite high-quality solutions, I would say. Had we had a little better time, we could have gotten even higher quality [...]” - HR manager, Innlandet hospital.

Summary
To give a summary of the context, we found common external elements for all the hospitals, such as government involvement, regulations and other public conditions. These did not have significant influence on the projects. We also found internal elements, such as size, and relations among the staff, that did not play any significant role either. Our findings indicated that it was rather culture, seniority, time and timing were significant context elements.
5.2.9 Goals
The standardization project’s main goal at all the hospitals was to redesign DIPS and merge the databases within SEHT into one single database. According to the informants, this goal was achieved. All the hospitals in SEHT, besides Østfold (per May 2018), are now on the regional standard. As mentioned, we barely have any primary data on the project’s outcome from Sørlandet hospital, other than a comment from the project manager and reviews on the website that proves that the project was successfully implemented. We therefore assume that the project achieved its goals.

Concerning Akershus hospital and Innlandet hospital, the goal was achieved. Some of the informants said it was successful, but would not call it an inherent success. Most of the informants agreed that the goal was achieved, but that the successfulness could be discussed. This will be discussed in chapter 6.

“[...] the goal was to introduce standardization and it was done. The hospital had no choice [...] however, the question is how successful it was” — Training manager, Akershus hospital.

5.3 Summary of results
We found several elements that played significant roles for change at the hospitals in SEHT. Some of the elements were more significant than others. To summarize the results, we developed a figure of the main elements that influenced digitalization changeability in the three hospitals. Due to the different level of significance the elements had, we divided them in two parts; crucial and important. Crucial elements represent the elements that had to be in place to succeed with change, whilst the important elements represent elements that also influence, but to a less extent. Figure 15 shows the crucial and important elements.
Figure 15 - Crucial and important elements

As the figure shows, we found several elements that influence the change project’s ability to succeed. The important elements vary in their importance from project to project. E.g. it is important that the technology that is being implemented covers the need, but this is rarely a problem as most of today’s technology can be tailor-made. Rather, training employees on how to use the technology is more important. *Organizational maturity related to change*: this was the most crucial element. It functions as an umbrella definition for many elements and described the extent to which the organizations were able to change.

*Top management support*: this element was described as crucial, as top managers often hold resources that enable projects. Top management support can, for example, be freeing the staff to participate in the change project and put in substitute manpower.  

*Management anchoring*: the outcomes of the cases we studied strongly depended on the extent of anchoring in management. It is about getting the management to support and engage in the project.  

*Training*: Introducing new technology, or development of the existing, always involves change in several business areas. It is important to allocate good resources to educate employees on how to use the new technology, learn how to work in the changed work processes, etc. Training also helps not only with successful implementation, but also to maintain the new habits, that is the whole point. Orelse, employees risk going back to old habits and thus lose the whole essence with the change. We encourage organizations to use more resources on training. Failure to do so costs in the long run.

*Employee involvement*: this element is central, as it is employees who know the core processes best. Employees must be involved to a greater extent, be involved in decision-making, and give input. They must be seen and heard, as they after all are the
ones who are most affected by change.

**Culture:** it is important to have a culture that is positive to change. Such a culture will usually be flexible and adaptable. It is important to invest in culture, as well as working consciously and continuously with it. These were the biggest findings we have made. Note that all the crucial elements are part of the internal context. Therefore, we concluded that the internal context was the outstanding element for successful change.

**Communication:** this is also a crucial element. In such large organizations, it is difficult, but important that the information reaches its intended destination. In many cases, the information never reaches the destination, which creates "holes" in projects. The sender expects the receiver to be well informed when the receiver normally is not aware of anything. It creates a lot of frustration and inhibits the project. Communication is also important for preparing the organization for the coming change, informing about the new that is coming, and what the affected can expect, etc. A well-prepared organization has a greater chance of achieving successful implementation.

The rest; timing, business case, technology, power relations, structure and average employee age, are also important, but not crucial.
6. DISCUSSION

In this chapter, we discuss the findings from the study up against the research questions based on research literature. As written in the introduction, our study is circling around these research questions:

RQ: How can management achieve sustained planned change in digitalization projects through change management?

To answer the main research questions, we found it necessary to define the following sub questions:

- What deviations from change management were found?
- What challenges were identified?
- What measures were used to meet the challenges?

The discussion chapter is organized in a structure where we first answer to the sub questions and end with the main research question.

6.1 What deviations from change management were found?

During this study, we found that the use of change management in practice differed from theory. Our findings show different extents of how change management was used. This section therefore aims to answer our sub-question regarding change management deviations that we uncovered. But first, we discuss our informants’ perceptions of digitalization and change management.

6.1.1 Perceptions of digitalization and change management

In chapter 5, we presented different perceptions that our informants had concerning the term “digitalization”. This section discusses these perceptions compared to how literature defines the term. We asked the informants the following question: *how do you interpret digitalization?*

The informants interpreted digitalization as the technology we need and depend on at a workplace. Many could not imagine life without digital technologies any more. According to Markovitch and Willmott (2014), digitalization is the *integration of digital technologies into everyday life*. Digitalization describes the process of using digital technology to improve business processes (Edmead, 2016). Based on this definition, we uncovered that our informants were using the term “digitalization” when referring to digital technologies. According to the authors, digitalization is the process of integrating digital technology into business (or private) life, and not the technology itself.

In a healthcare context, digitalization is defined as the “use of information technology or electronic communication tools, services and processes to deliver better healthcare services to facilitate better health” (Rose, 2017). This definition corresponds to our informants’ perception of the term. Despite the slight misunderstanding of the technology, instead of the process, we confirmed that the informants had the right understanding of digitalization.
We presented also different perceptions concerning change management in chapter 5. The informants were asked the following question: how do you interpret change management?

Jacobsen (2012) defines change management as the activities that are performed to walk people, groups or organizations through a change process. Some informants said that change management was about getting people to understand that there exists a need for change. In addition, changemanagement was about making employees understand that change entailed working differently, and get them to accept the changes. Other informants described change management as a tool that is used to realize benefits, and as such, change management was closely related to benefit realization. Furthermore, informants described change management as an important competency that every manager should have.

Lastly, informants mentioned that focusing on change management is necessary for a project to succeed and to realize its benefits. Further, change management entails informing employees, since they know systems and processes better.

“[...] for a project to succeed one must focus on change management, and also the benefits.” - Training Manager, Innlandet hospital.

In brief, the informants’ understanding of change management correspond to Jacobsen’s (2012) definition. Therefore, we concluded that they understood what the term was about.

6.1.2 Deviations from change management
As mentioned earlier, we uncovered some deviations according to how change management was used in the projects. In this section, we present main deviations that was identified in the projects.

Our findings show that some managers did not have any formal background in change management. Nor had he taken any certification in change or project management courses. The following was mentioned:

“I have not studied change management. I have no certificate or anything like that.” - Project Manager, Akershus hospital.

Based on interviews, we found that change management was officially used less frequently in the three hospitals than expected. Several CM practices were used, but mostly unconsciously. Change management was strongly highlighted as an important tool, but was not prioritized to the degree that is suggested by the literature. However, this gave us some interesting insight.

Jacobsen & Thorsvik (2013, p. 416) say that change management is about organizing people and setting up activities to achieve goals, to motivate them and walk them through change. However, the project manager at Akershus, who did not use official method, yet used many of change management elements. The project manager involved employees, made the organization ready for change and used different techniques to overcome resistance. In addition, he made informed the top and middle management, ensured commitment and motivation and provided training to employees. These elements fulfill Jacobsen & Thorsvik (2013) description on how to use change management. Furthermore, the approach also aligns with the definition of
direct management. As described in chapter 2, direct management entails interacting and communicating directly with management and subordinates. Our findings showed that this was the case at Akershus, Sørlandet, and to some degree at Innlandet. The way the manager conducted the project, also fulfilled some of Kotter’s phases for successful change, including communication, create coalition behind change and remove obstacles. The benefit coordinator from Akershus said the following concerning change management’s impact on the EPJ standardization project:

“[Change management had] little [impact] because it was not being considered [...]” - Benefit Coordinator, Akershushospital.

Based on the quote, change management was neither prioritized nor considered during the project. However, it is worth mentioning that the benefit coordinator rated the project neither as successful nor a failure, but “somewhere inbetween”. Such a viewpoint can have affected the perspective of the informant.

Literature has rated change management as one of the most critical factors for successful change (Beldi et al., 2010; Umar et al., 2016). This did not correspond to our findings. Even though the degree of successfulness (discussed later) was disputed, some of the informants rather used PRINCE2, others used common sense, and still achieved project goals. Based on a piece of the data gathered from one of the informants, a work unit manager said the following regarding the use of Change Management:

“It was used very consciously really” - Department manager, Innlandet hospital.

Thus, we do not disclaim change management’s importance, but we disclaim the assumption that it is crucial for successful change. Our findings showed that other methods, such as PRINCE2 and common sense can as well conduct successful change.

Kuipers et al. (2013) says that project managers in the public-sector lack knowledge about fundamental stages that are needed to implement successful change. This claim did not apply to our study. Every informant in this study had higher education, and the majority were trained in one or several change management or project management methods. This was confirmed when among others the ICT advisor mentioned that all employees at Sørlandet hospital were certified in PRINCE2. Not only were the managers competent, but employees as well.

“[... all employees were certified on PRINCE2 [...] there is a great understanding of project methodology here.”

The informants from Innlandet hospital, however, mentioned that their work towards change management is very immature, and that they do not have a preferred method for change or project management: “Our work towards change management is immature. [...]. I know a bit of change management, but not all the tools. We do not have any preferred method. [...].” - Project manager, Innlandet hospital.

This statement could correspond to Kuipers et al. (2013) when stating that public sector management general lack change management competence. However, after assessing the overall EPJ standardization project, our findings show that managers in SEHT are competent and capable of implementing successful change.
6.2 What challenges were identified?

Our goal for this study entails, like mentioned in the introduction, to understand how to achieve planned change. Therefore, our interview sessions were focusing on three things. Informants were basically asked 1) to judge the project’s outcome, 2) describe the possible causes for the outcome and 3) explain potential areas.

Dwivedi et al. (2014) define goal achievement as “providing profits for organizations and employees. Profits includes profitability and better enterprise performance” (Dwivedi et al., 2014, p. 143). Concerning the critical information project, we got pretty much identical replies. All the informants agreed to have benefited from the project since information. After the project, patient information was registered correctly, and the system became tidier. Thus, the project was successful. Questions about the informant’s definition of “success” were not asked, however, the matching answers proved that all the informants viewed the project as successful.

“I absolutely see it as a success. We managed to clear and remove 34,000 rows with irrelevant information from the system.” - Nurse.

For this reason, we had no doubt that the project was successful and that goals were achieved. Even though we did not examine the EPJ standardization projects’ outcome at Sørlandet hospital, the project was also successful (see 5.2.4). The project’s outcome at Innlandet was also satisfying. The following quotes illustrate the informants’ view on the project’s outcome:

“[...] on a scale from 0-10, we scored an 8.” - Training manager, Innlandet hospital.

However, at Akershus hospital, we found that the successfulness of the project was disputed, as also the informants from both hospitals agreed to. Some described the project as successful, while the others meant it was medium successful. We found that there was a slight disagreement at Akershus hospital. In the project report we got from the hospital, the project was described as successful:

“In general, we have succeeded in introducing regional standards at Akershus hospital.

Our findings show different results, despite that all the hospitals implemented the same technology pretty much under the same external conditions, such as government regulations, budget, etc. We therefore claimed that the main element that made the difference between the hospitals was the internal context. We therefore became very interested in the internal context, and thus devote our focus on the EPJ standardization project in the further report. Basically, we compared the two more successful hospitals, Sørlandet and Innlandet, to Akershus hospital in the light of literature.

6.2.1 Organization maturity related to change

Hammer (2007), one of the most influential figures on the organization maturity field, developed a model, a Process and Enterprise Maturity Model (PEMM), that organizations can use to map their level of maturity and ability to change. He describes organization maturity as the extent to which an organization can manage, document, measure and continuously improve business processes (Hammer, 2007).
According to our findings, a major cause for the different project outcomes were strongly influenced by the level of maturity the hospitals had related to the project. This caused several things, both positively and negatively. Due to low maturity level, Akershus hospital experienced most challenges more than the other hospitals. Based on Akershus hospital’s internal context, it was clear that the organization had a low level of readiness for the change (Ram et al., 2013). The authors say that successful change requires clear management from the top and better delivery on the ground. However, this seemed to miss at Akershus hospital. Members of management had split opinions and opposing points of view. They did not have one voice, which might have created confusion among employees. Further, the delivery on the ground was poor as employees to start with were not aware of the consequences of the change, the process, etc. This made life harder for employees than before the project. The ICT advisor from Sørlandet hospital said the following concerning Akershus hospital:

“[..] we most likely have more competence than they perhaps have at Akershus.”

According to Bowman (2013), the adoption of HIT is essential for the transformation of the current healthcare system into a better one. This entails two things; first, having the ability to transform the current situation, and second, adopt the new technology, which both require competence. Looking at the context within Akershus hospital, it does not seem like transformation and adoption requirements were satisfied. In many areas, we found that Sørlandet and Innlandet hospital were in better shape to implement successful change. Informants described the former as highly mature around change due to experience and competence.

One of Kotter’s prerequisites for successful change is to form project teams that reflect the whole organization (Jacobsen, 2012). At Innlandet, project management used several measures that contributed to successful DIPS implementation, such as forming fulfilling teams and invest in training. At Akershus hospital, however, project teams were skewed distributed. Since the standardization project was an IT project, most members of the project were IT staff as well. This enforces the thought that the organization had lower maturity. As such, we claim that experience with change, as Sørlandet’s ICT advisor pointed out, is an invalid argument for succeeding with change. It rather seems like manager and employee competence increases organization maturity.

Based on our findings, Ram and colleagues seems to be right. When everything is said and done, we claim that organization maturity is the most important element for successful change. Low organization maturity weakens several other important elements. The element strongly influences elements such as culture and competence, and thus inhibits a project to go through the necessary stages in Lewin’s model and Kotter’s phases.

### 6.2.2 Training

Based on Cresswell & Sheikh (2013), HIT adoption in healthcare is slow. Further, the implementation of HIT in business processes has failed to achieve defined benefits (Bowman, 2013). There were several proofs in the cases that showed that training also is a crucial element in successful change projects (Ram et al., 2013; Gorman, 2014; Aladwani, 2001). Our findings show that employee training highly increases post-implementation success. We found out that investing adequate resources
on employee training and information, highly increases change project successfulness.

Our finding proved to be true based on Aladwani (2001) who lists training among the crucial element for successful change. Literature says that training should go in accordance with the change project’s development, e.g. developing a new function, its new enterprise process and training in line with each other (Markus, 2004). At Sørlandet and Innlandet hospital, we learned that almost all the employees were trained into the new work processes, and that training was made mandatory for every employee. Because of sickness and absence, nearly 90% of employees went through the training program.

"We got nearly 90% of the employees through training." - Project manager, Innlandet hospital.

In the post-implementation phase, the training manager at Akershus hospital realized that training during the project, had happened very randomly, and that many employees did not bother participating in the training. This might be caused by the fact training was not made mandatory at Akershus hospital, unlike Sørlandet and Innlandet hospital. When asked to assess the importance of training in a change project, some informants said the following:

“Training can be alpha-omega.” - Training manager, Innlandet hospital. The fact that such a statement comes from a training manager, emphasizes the importance of training on successful change. Training was classified among top 3 elements for successful change.

6.2.3 Anchoring

In the regional standardization project, anchoring was considered as a challenge at two of the three hospitals. In health-related terms, anchoring in a project means that the people who are responsible for project implementation own the project. It entails that they contribute to develop the project’s content, agree with content, recognize themselves as project ambassadors and make an effort in that direction (Helse Midt-Norge, 2018).

For the benefit coordinator, whose responsibility was to attain the standardization goal at Akershus hospital and support other benefit coordinators throughout the whole SEHT on the standardization project, it was difficult to achieve anchoring in management and getting people to understand the need for change.

Most of the informants described management anchoring as one of the most important elements in their projects. As presented in chapter 2, Basmo (2010) says that anchoring can be achieved when the people involved a project, from top management to “lower”employees, get on the same page. It is when the majority of those who are involved, can share the same vision - the project. Based on Gorman’s (2014) chart, the project at Akershus hospital lacked this element. The informants from Akershus hospital had completely opposing points of view when asked to judge the project’s outcome. The project manager described it as well performed and successful, and wrote so in the project report. Unlikely, the two other informants were not satisfied with results because it made life more difficult for employees.
The informants’ contradictory views strengthened the fact that anchoring might have been a problem in management at Akershus hospital. The importance of anchoring was strongly highlighted both at Innlandet and Sørlandet hospital. Informants from the hospitals said that having good anchoring in management was essential for such projects, adding that high anchoring in top management gives a much greater likelihood for success.

Assuch, there were a strong relation between management anchoring and project outcome. In three cases, management anchoring was not experienced as a challenge. We observed that these cases also experienced more satisfying project results, and that the case with a challenging management anchoring also experienced less satisfying results. Based on this, we find a strong correlation between our findings and Gorman’s chart and appoint management anchoring among the top 3 elements for success.

6.2.4 Communication
In the two cases we studied, some informants highlighted communication as a challenge. Cervone (2014) says that communication can threaten the survival of any project, and that effective communication is crucial for successful project completion.

In the different projects, we found different levels of effective communication. We found that the projects that in high extent achieved goals, also had a high level of communication efficiency, and opposite. Taking the organization’s size into consideration, communication was a challenge. The following was stated:

“Information to such a large and comprehensive organization is complex.” - Training manager, Akershus hospital.

Failure in communication inhibits Lewin’s phase unfreeze, a project can succeed first when this phase is established (Jacobsen, 2012, p. 185-200). The communication challenge can be due to many stakeholders that are involved in the projects. This challenge influenced Akershus hospital negatively as necessary information occasionally never reached the concerned. This seems to be the point made by Cervone (2014), since the problem of communication create a negative domino effect in several areas. The following was also said:

“[…] that's why I say it is alike everywhere. It [communication] is like breaking a code. Finding out how to convey this in a way that can help us make it. It is not easy.” - Benefit coordinator, Akershus.

Communication was clearly a challenge at Akershus hospital. However, based on the two quotes, it seems like it was challenging in the sense of people not taking time to consider the information. The training manager at Akershus hospital said that people among others were not replying to emails. This fact shows that the problem, based on Jacobsen and Thorsvik (2013), lied on receiver side. The receiver could, however, be both managers as well as employees. Thus, it seems like the standardization project at Akershus hospital in a certain way was characterized by a one-way communication to a level that contributed to inhibit project progress. The importance of communication was highlighted by all the informants from Innlandet hospital, through the following statements:

“Project training, communication and information work is very important. Good communication across all subprojects.” - Project manager, Innlandet hospital.
The quote above highlights a smart technique they applied at the hospital, namely dividing the whole project into several subprojects. This obviously helped to get better overview and thus better control over the project. The training manager emphasized the point (Innlandet hospital) briefly by saying: “One has to provide information”.

Another thing they did at the hospital, was to separate focus areas and work separately, but coordinated, with each area, including communication. Informants said that the project manager traveled around at hospitals [within Innlandet], several times, and informed people about how far the project had come, how it would be, etc. “At Sørlandet hospital, the same point was highlighted. They basically had full control [on the critical information project], even though communication could slip here and there, but they were very sure on what to do and who to do it. To a large extent, the tasks were distributed, and the management was in control.

Gorman’s chart (in figure 11), illustrates that communication is among important elements of successful change. Further, Aladwani (2001) says that poor communication can be considered devastating to a project’s overall success. Therefore, we claim that our findings are in line with the two researchers. Sissors (2013) highlights that achieving mutual communication harmony among a project team is close to impossible. Based on our finds, his claim seems to be right, and therefore this finding is credible, as also pointed by Kotter (through Jacobsen, 2012). Among the four elements listed in this section, communication did not reach top 3, but was also highlighted as very important.

Summary
To sum up this section, our findings show that there are many elements that influence change. The most important element to focus on is the internal context. This element encloses an organization’s special characteristics, and thus these characteristics are most influential. The most crucial element of all was organization maturity related to change. This element determines the performance of all other internal context elements. Training was identified as the second most important, followed by anchoring in management and then communication. These elements strongly reflect the maturity of the organization within the area that’s being changed.
6.3 What measures were used to meet the challenges?

The challenges mentioned in section 6.2 caused resistance and inhibited results. There are many reasons why resistance take place in change projects, among others professional disagreement, fear for the unknown, loss of social relations, changed powerrelations and double work during the project (Jacobsen & Thorsvik, 2013; Jacobsen, 2012). There also different ways of attempting to overcome resistance.

6.3.1 Organization maturity related to change

In the cases, we learned that both ordinary employees and managers at Sørlandet hospital were certified in PRINCE2. As mentioned earlier, an organization’s maturity is closely related to the overall competence within the organization, and not necessarily experience. As such, certifying the staff in a project management method, increases the management’s abilities to implement change successful. It also educates employees in contributing to successful change implementation as well. Seeing as the Norwegian healthcare is exposed to constant changes, SEHT imposed every hospital unit to use PRINCE2 as the official method for project management. Such a measure helps maintain and increase the maturity level on areas where the level was low.

However, several informants mentioned that this method basically only says what to do, but nothow to do it. As a response to this, two methods - Application lifecycle management⁴ and JIRA⁵ - were used at Innlandet hospital. At Sørlandet hospital, a method called Project Portfolio Management (PPM)⁶ was used. At Akershus hospital, they developed their own benefit method, where a benefit and a change map were developed. Through “workshops” project members discuss how to work on the method in cooperation with the medical staff to realize these benefits.

6.3.2 Training

Several informants mentioned that poor training caused resistance. In some cases, the hospital management thus used a few characteristics of strategy E to push the project forward, such as including external change consultants. A recommended solution to overcome resistance, is to involve and train employees (Aladwani, 2001). Such measures were utilized e.g. at Innlandet hospital where they invested heavily in training. Training managers were appointed as responsible for managing training. To pull employee to training, training managers used a technique where they ensured getting key people and “opinion owners” onboard. Further, top management replaced employees who were participating in the change project, with other temporary manpower. Furthermore, doctors, nurses and the staff went through several rounds testing new functions to get insight into the new condition. Ultimately, management began involving employees more in the projects through conversations, attendance at meetings, etc.

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⁴ Can be read at: https://www.inflectra.com/spirateam/highlights/understanding-alm-tools.aspx
⁵ Can be read at: https://www.atlassian.com/software/jira
⁶ Can be read at: https://www.pmi.org/learning/library/project-portfolio-management-techniques-7624
6.3.3 Anchoring
An important step towards achieving anchoring is to make the management recognize and communicate the need for change. It is about making the management and other key people get engaged in the project and give them a feeling of project ownership (Basmo, 2010). Concerning this challenge, a couple of measures were utilized. In some of the cases they established an anchoring group, whose task was to inform all parts of the organization about the coming changes, the project’s progress, etc. When needed, some managers used power to push information forward and get people do what they were supposed to. In addition, “quick wins” were used as a tool to increase anchoring among managers.

6.3.4 Communication
All the projects appointed a communication manager for the project to assure that information reached the destination. In addition, several communication canals were used to inform that employees had to attend on training courses. This was done among others by hanging up information posters on restrooms and having "stands" outside the canteen. In many cases, both managers, benefit coordinators and ICT advisors walked around the hospitals talking to employees, get them explain daily challenges and come with inputs. The objective was to create an arena characterized by open communication, meet employees where they are. These techniques reduced resistance (Aladwani, 2001) and increasingly more employee developed an internal ownership of the project (Olsson & Berg-Johansen, 2016).

There were several measures that were used to overcome challenges, but these were the main ones.

6.4 How can management achieve sustained planned change in digitalization projects through change management?

Literature describes many elements that contribute to achieve technology-based change. Gorman (2014) highlights seven elements (see figure 11) that are important for successful change. Our findings show also seven elements. Gorman’s elements that corresponds to ours, include top management support, management anchoring, culture, communication and employee involvement. In other words, the author’s elements applied to our study to an extent of 71%. Beldi et al. (2010) say that success in digitalization projects is facilitated by the combination of management and employee efforts, effective technology and tight collaboration between those involved in the projects. This statement corresponded also to our study. However, our findings showed that technology did not play a significant role on successful change, as most of today’s technology can easily be tailor-made.

Our findings show that planned change is influenced by several internal and external elements. These elements create a complex context around the change process and make it difficult to achieve goals. However, our results showed that the internal context of an organization plays the most crucial role on change ability. Based on interviews and project reports, planned change can achieved by focusing on the internal context elements. However, sustained planned change in a health information system can be achieved when there is success in the following areas: the organization’s maturity related to change, top management support, anchoring in management, training, employee involvement, culture and communication.
6.5 Limitations of the study

This study collected information from informants with different positions in three hospital units. This gave us a good overview on the most important elements to focus on when striving for successful digitalization change in healthcare in SEHT. However, a weakness in the study has been that we did not interview enough informants. The representation could therefore be better. Further, nearly all the informants that participated in the study, had a management-related position during the study. Thus, the representative group was skewed, and could involve informants with ordinary medical positions in a significantly higher extent.
7. CONCLUSION AND IMPLICATIONS

In this chapter, we present our lessons and recommendations based on this study. We studied a context of three hospitals in one of the Norwegian regional health trusts, but the findings may apply to healthcare in general. This is not a solution for implementing successful digitalization change, but rather a support tool. The goal was to identify crucial elements that facilitate sustained planned digitalization change.

7.1 Conclusion

Our findings show that there are many obstacles in the process of making change on core technology. In complex and large organizations an advantage can suddenly become a disadvantage if not handled carefully. Our findings show that management can achieve sustained planned change by focusing on an organization’s special characteristics—the internal context. The results show that maturity related to change, top management support, anchoring in management, training, employee involvement, culture and communication were most crucial when striving to achieve sustained change in the three hospitals. Elements such as technology, an organization age, size, business case, time, formal power relations, timing and structure are less significant. Further, our findings disclaim the fact that public sector managers lack the fundamental knowledge of how to successfully implement digitalization change. Managers that participated in this study were highly educated and possessed adequate knowledge prepare for change, overcome resistance, implement the change and make it persistent.

7.2 Implications for theory and practice

This study should contribute both to theory and practice within the field of change management in a healthcare digitalization context. Through literature review, we discovered that there was little research on the use of change management as the main methodology for digitalization change process, especially in healthcare. Moreover, classic literature on the topic need constant development as technological change is trending worldwide. Thus, this study contributes with an updated perspective based on three case studies from a large health trust in the Norwegian business community. However, to get a better answer to the research questions, we recommend future researchers to acquire a larger information source and collect input also from people with non-management positions.
8. REFERENCES


   - rapporter-og-utredningar
CPWdb&aid=07199011-6C63-432A-B23E-D347CA957A71


9. APPENDIX

### 9.1 Appendix 1 – Full list of literature search result

<table>
<thead>
<tr>
<th>#</th>
<th>Author</th>
<th>Year</th>
<th>Objective</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Agarwal et al.</td>
<td>2010</td>
<td>Provide an overview of the status of HIT research.</td>
<td>HIT can enable or facilitate new forms of care delivery, especially in preventive care.</td>
</tr>
<tr>
<td>2</td>
<td>Aanesta d &amp; Jensen</td>
<td>2011</td>
<td>To focus on approaches used to plan, conduct, and manage the realization of nation-wide IS in healthcare.</td>
<td>IS implementation strategies differ with respect to flexibility of stakeholders.</td>
</tr>
<tr>
<td>3</td>
<td>Burke et al.</td>
<td>2011</td>
<td>Determine HIT’s effect on outcomes, including quality, efficiency, and provider satisfaction.</td>
<td>92% of the recent articles on health information technology reached conclusions that were positive overall.</td>
</tr>
<tr>
<td>4</td>
<td>Bowman</td>
<td>2013</td>
<td>Examine the impact of unintended consequences of the use of EHR systems on the quality of care and proposed solutions to address EHR-related errors.</td>
<td>EHR systems can transform the way healthcare is delivered when designed, implemented, and used appropriately. Inappropriately designed and used, adds a layer of complexity to the already complex delivery of healthcare, leading to unintended adverse consequences such as dosing errors, failure to detect serious illnesses, and delays in treatment due to poor human-computer interactions or loss of data.</td>
</tr>
<tr>
<td>5</td>
<td>Cresswell &amp; Sheikh</td>
<td>2013</td>
<td>Provide an overview and extract potentially generalizable findings across notoriously difficult implementations of health information technologies</td>
<td>There are a range of technical, social and organizational considerations that need to be deliberated when attempting to ensure that technological innovations are useful for both individuals and organizational processes. These dimensions are inter-related, requiring a careful balancing act of strategic implementation decisions to ensure that unintended consequences resulting from technology introduction do not pose a threat to patients.</td>
</tr>
<tr>
<td>6</td>
<td>Ingebritsen et al.</td>
<td>2014</td>
<td>Examine evidence of associations between clinical leadership and successful IT adoption in healthcare organizations.</td>
<td>Clinical leaders can positively contribute to successful IT adoption in healthcare organizations. Clinical leaders who aim for improvements in the processes and quality of care should cultivate the necessary IT competencies, establish mutual partnerships with IT professionals, and execute proactive IT behavior to achieve successful IT adoption.</td>
</tr>
<tr>
<td>7</td>
<td>Gomes et al.</td>
<td>2016</td>
<td>Propose a new approach, which assumes that project management will mediate the relationship between organizational maturity and the success of IS/IT project.</td>
<td>In general, healthcare organizations do not invest in engaging or motivating healthcare professionals about the advantages that IS/IT solutions could bring to them. This makes it difficult to catch their attention. IS/IT projects have low participation and little involvement from health professionals and thus the majority...</td>
</tr>
<tr>
<td>#</td>
<td>Author(s)</td>
<td>Year</td>
<td>Summary</td>
<td>Notes</td>
</tr>
<tr>
<td>----</td>
<td>--------------------</td>
<td>------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>8</td>
<td>Grabski et al.</td>
<td>2011</td>
<td>A review of prior ERP research in order to draw an extensive examination breadth of ERP-related literature without any constraints to narrow timeframe or limited journal list.</td>
<td>ERP system implementation issues is no longer the primary concern, neither for implementers nor researchers. Organizational outcomes are not determined by the ERP implementation, but rather on the utilization of the ERP system.</td>
</tr>
<tr>
<td>9</td>
<td>Ziemba and Oblak</td>
<td>2015</td>
<td>An attempt to identify critical success factors for change management in IS projects by explaining changes in public organizations and the CM’s nature in this context.</td>
<td>The findings managed to identify 12 CSFs, and secondly showed practical issues concerning those CSFs, in the manner of the effect of CM on IS projects success. Furthermore, the study suggests a relation between CM and IS as one of the most important determinants for successful IS projects.</td>
</tr>
<tr>
<td>10</td>
<td>Gilley et al.</td>
<td>2009</td>
<td>Explore the characteristics of leadership behaviors in change-oriented environments.</td>
<td>Findings seemed to indicate that the value of leading change is an ever-increasing phenomenon. Furthermore, the findings confirm the perceived importance of specific leadership skills and abilities to be vital for project management.</td>
</tr>
<tr>
<td>11</td>
<td>Kuipers et al.</td>
<td>2013</td>
<td>The article presents a review of recent literature on change management in public organizations. Seeks to explore to which extent the gathered literature responds to earlier critiques regarding a lack of public organization contextual factors.</td>
<td>Findings indicate that there is a lack of detail concerning change processes and outcomes. Furthermore, there exists a gap between the common theories used to study change.</td>
</tr>
<tr>
<td>12</td>
<td>Aladwani</td>
<td>2001</td>
<td>Research the causes and reasoning for why top management face unwanted attitude from users when implementing ERP-systems. Furthermore, Aladwani’s objective is to describe an integrated, process-oriented approach to deal with those issues.</td>
<td>In order to overcome user resistance, top management has to study the causes for resistance, and address the needs of that cause resistance.</td>
</tr>
<tr>
<td>13</td>
<td>Beldi et al.</td>
<td>2010</td>
<td>Investigate how project team manages CRM implementation projects successfully.</td>
<td>In order to manage CRM-implementation successfully one has to utilize an integrated and balanced approach. It requires an appropriate system collection, effective re-engineering and development of organizational structures.</td>
</tr>
<tr>
<td></td>
<td>Author(s)</td>
<td>Year</td>
<td>Summary</td>
<td>Further Information</td>
</tr>
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<td>-------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>14</td>
<td>Markus, M.I.</td>
<td>2004</td>
<td>Illustrate the differences between “techno change” from typical IT projects implementation, and typical organizational change programs. Seeks to explain the approach required for “techno change”.</td>
<td>Maintains that an additive approach to techno change is not suited if one wants the best result. The article maintains that an iterative approach is better suited for techno change initiatives.</td>
</tr>
<tr>
<td>15</td>
<td>Voet</td>
<td>2016</td>
<td>Explain the relationship direct supervisors’ change leadership and the commitment to change of the change recipients.</td>
<td>Leadership contributes to change recipients’ commitment by providing high-quality change communication, and the stimulation of employee participation.</td>
</tr>
<tr>
<td>16</td>
<td>Schmidt et al.</td>
<td>2017</td>
<td>Develop a framework for the analysis cutback management by connecting context, content, processes, outcomes and leadership.</td>
<td>Managers can be positioned at the intersection of various imperatives. Cutback management is a specific type of change management.</td>
</tr>
</tbody>
</table>
9.2 Appendix 2 - Interview guide - Management

**Intervjuguide - ledelsen**

- individuelt, semistrukturert intervju Varighet: 30 min. – 1 ¼ time

**Tema**
Digitalisering og endringsledelse i norsk offentlig sektor

**Problemstilling**
"How can management achieve sustained planned change in digitalization projects through change management?"

- **Rammesetting**
  - Uformell samtale (2-5 minutter)
    - Hilsing, presentasjon av hvem vi er og hvilket institutt vi kommer fra o.l.
  - Informasjon om prosjektet og problemstillingen. Vi:
    - Forklarer bakgrunn og formål for samtalet
    - Forklarer hva intervjuet skal brukes til
    - Avklarer spørsmål rundt anonyimitet og taushetsplikt
    - Spør om respondenten har spørsmål eller om noe er uklart
    - Informerer respondenten om lydopptak, og sørge for samtykke til opptaket
    - **Starter lydopptak**

- **Erfaringer**
  - Overgangsspørsmål (5-10 minutter)
  - Avdekke erfaring og kjennskap til problemstillingen. Vi:
    - Avklarer og tar utgangspunkt i respondentens erfaring med eller kjennskap til temaet / problemstillingen
    - Ber respondenten fortelle litt om sitt arbeid / rolle, hvis passende

**Fokusering**
- Nøkkelspørsmål: 30-45 minutter. (Oppfølgingsspørsmål vilfølgenaturalig).
  Eksempler på spørsmål:
    - Hvilkenstilling har du i organisasjonen? Hvem fungerte du som prosjektleder?
    - Du har deltatt aktivt i EPJ standardiseringsprosjektet. Fortell litt om prosjektet
    - Ser du på prosjektet som en suksess eller mislykket?
      - Hva mener du gjorde at det ble en suksess/mislykket?
    - Hva vil du si var dit bidrag i prosjektet?
    - Hvilke tiltak tok du for å prosjektet gjennom?
    - Var ansatte involvert? I hvilken fase av prosjektet?
    - Hvordan ble ansatte rekruttert til å delta i prosjektet?
    - Hvordan du vil si at bruken av endringsledelse påvirket prosjektet?
    - Hvordan løste du motstand fra de ansatte?
    - Alt i alt, hva mener du er viktigst for å lykkes med slike prosjekter?
9.3 Appendix 3 - Secondary interview guide

**Hovedspørsmål**

Lederes oppførsel hemmer/fremmer atferdsendring hos involverte. Hvilken oppførsel er med på å fremme atferdsendring i organisasjonen?

Ulikefaktorerspillerinnpåutfalletavetprosjekt.Hvormyepåvirkningharfølgendedefaktorerpåendringenssuksess?

- Alder og størrelse på organisasjonen?
- Tekniske systemer og verktøy innad organisasjonen?
- Miljøet. Både det interne og eksterne?
- Maktforhold mellom ledelsen og gulvet, samt mellom toppledelsen og ledelsen.
- Timing. Påvirker perioden hvordan prosjektet ble planlagt og gjennomført?

Inkrementelle endringselleradikaletiltakEndelforfatteremeneratdefldestelelederemanglerfremdeleksompetansen/evnetilå gjennomførefundamentalestegforågjøreendringsuksessfull.Hvilkestekandettevære?

Teorihevedeterminarmeuklarikommunikasjonårdetgjelder: Endringens fordel

Endringens aktiviteter (hvem, hva, hvor) CM altfor dyrt

Litteraturensiedertvikligådefiningerebusiness caseforkantavetprosjekt.Harderehattetbusiness case?

En organisasjons modenhet har mye å si for hvor vellykket et endringsprosjekt kan være. Hvordan vil du beskrive sykehusets modenhet når det gjelder endring?

Hvor ofte skjer endring her?

- Hvilken betydning har budsjett for slike prosjekter?
Forespørsel om deltakelse i forskningsprosjektet

"Masteroppgave i Informasjonssystemer"

Bakgrunn og formål

Vi studerer informasjonssystemer ved Universitetet i Agder, avdeling Kristiansand. Til våren skal vi skrive masteroppgave som tar for seg tema: digitalisering og endringsledelse i norsk offentlig sektor. Formålet er å studere hvordan ledelsens kan oppnå vedvarende planlagt endring i teknologibaserte endringsprosjekter ved bruk av endringsledelse.

Problemstillingen er:

"How can management achieve sustained planned change in digitalization projects through change management"? Vi har valgt intervju som metode for innhenting av data til vår besvarelse av problemstilling og ønsker derfor å stille deg noen spørsmål relatert til det digitaliseringsprosjektet i organisasjonen.

Hva innebærer deltakelse i studien?

Deltaget i studien innebærer at det blir foretatt et intervju. Vi har laget en intervjuguide på forhånd som vi kommer til å bruke, men vil samtidig have muligheten til å følge opp interessante teman som dukker opp og stille oppfølgingsbryter. Spørsmålene i intervjuguiden vil omhandle generelt hvordan du opplevde endringsprosjektet. Det skal ikke forekomme personopplysninger i prosjektet.

Intervjuet vil ha en varighet på opp til en time og vil bli tatt opp på lydbånd. Dette gjør at vi lettere er tilstede i intervjusituasjonen.

Du vilStay completely anonymous, men hvis samtalen skulle lede oss inn på noe personlig så vil jeg stoppe lydopptaket.

Hva skjer med informasjonen om deg?


Frivillig deltakelse

Deterfrivilligåndeltautstuden, og dersom du ønsker å delta har spørsmålstilstanden, og jeg har kontaktmed oss eller vår veileder.

Studenter:

1. Criyonit Kayoka Telefonnummer: 91336274
   E-postadresse: criyonit@hotmail.com

2. Christian Fjelde Lima Telefonnummer: 46612124 E-postadresse: chrif13@gmail.com

Veileder:

Carl Erik Moe Telefon: 38141796
E-postadressen: carl.e.moe@uia.no

Samtykket til deltakelsestudien

Jeg har mottatt informasjon om studien, og er villig til å delta

-----------------------------------------------

(Signert av prosjektdeltaker, dato)