University of
South-Eastern Norway

Implementing change in the maritime industry

How to manage digital change in shipping companies

Candidate name: Ola Kalland Dyregrov

University of South-Eastern Norway
Faculty of Technology, Natural Sciences and Maritime Sciences

Master Thesis

05.2021

1

Abstract

The purpose of this thesis is to research the best practices of implementing digital change in shipping companies, and the challenges with implementing digital change. The research is based on a qualitative research method. The data collection was done through semi-structured interviews. The participants were managers with experience within digitalization and change processes within shipping companies. The findings regarding best practices of implementation support established theory. These practices are a clear strategy; top-down management; change agents and sponsors of change; clear communication channels; inclusion of the people undergoing change; and facilitate for activities that sustains the change. The challenges of implementing change are lack of digital competencies; lack of leadership capabilities; cost focused industry; long life cycle of ships; competitive market; industry in early stages of digitalization; and implementing change while staying operational. The thesis contributes to the established theory on change management. Another contribution is gathering new knowledge on the challenges with digital implementation in shipping companies.

Keywords: Change management, implementing digital change, digital challenges in shipping companies, resistance to change, digital capabilities.

Acknowledgements:

I would like to acknowledge everybody who participated and helped through the process of writing the thesis. To the interview participants who took time to share their experiences and knowledge about the subject. To Jan Van Tiggelen, my supervisor from DNV, who helped with throughout the process and getting participants. To my supervisor, Marius Imset, for giving guidance on how to structure and write a thesis.

Table of Contents

List of tables and figures

Introduction

Description of the research problem

Each year a shipping company seeks to lower their expenses to gain bigger margins in a competitive market. The costs of operating a vessel has increased for the past three years (Drewry, 2019). Shipping companies are sensitive to market shifts and shocks that affects demand and rates. Technological advancement is a solution to reduce costs, increase efficiency or increase safety onboard the vessels (Stopford, 2016). A fleet that can be managed with the use of less crew and onshore personnel both increases safety and reduces operational costs. Using technology to change their processes might be met with resistance or acceptance.

Digitalization is when an organization rebuilds around the technology, and fully integrate it in their operations (Westerman, Bonnet, & McAfee, 2014). Management of change is an important step in the process of digital transformation. There are several theories about change management in organizations, but this research will focus on the implementation phase of the change management process. More specifically the research questions are:

RQ 1:

What are the best practices of implementing digital change in shipping companies?

RQ 2:

What are the challenges facing shipping companies that attempts to implement digitalization?

The goal of the thesis is to gather knowledge and identify possible discrepancies about digital change in shipping companies. This is an area with little previous research. The aim is to identify the best practices of implementing digital change and compare with established theory. The second goal is to create knowledge about the challenges during the implementation phase.

Structure of thesis

        The first part of the thesis is an introduction. The goal is to give a description of the research problem the thesis seeks to explore. The second part of the thesis is a literature review. This part introduces the theoretical framework for the thesis. The main topics the thesis explores are change management theory and explanation of terms; explanation of change models used in change management projects; and theoretical approach to implementation barriers. The third part of the thesis breaks down the methodological methods used. The goal of the chapter is to highlight the methods used to gather and analyse the data. The fourth part of the thesis is findings. This part presents the findings from the data collected from the interviews and analysis. The next part is discussion, where the findings are compared with the theoretical framework of the thesis. The last part of the thesis is the conclusion that summarizes the findings of the research questions.

Literature review

This chapter gathers established theory on the subjects of change management. The literature review forms the theoretical framework of the thesis, which will be explored throughout the later chapters.

Define organizational change

"… you could define change management as the proactive identification and management of modifications to your project."(Baca, 2005, p. 2).

Organizational change is the process of going from a current state, to a new desired state (Dawson & Andriopoulos, 2017). Change can be a response to the environmental factors, external factors, or internal factors (Pathak, 2010). Advancement in technology and the need to integrate them in order to stay competitive, has made change an integral process of organizations (Dawson & Andriopoulos, 2017). Organizational theory approaches change as something that is inevitable (Baca, 2005). Organizational change is not a homogeneous process, and there are examples of many change projects that have failed (Dawson & Andriopoulos, 2017). Organizational change is somewhat a paradox, planning for something unknown. Change management is about managing the uncertainty.

Three elements to change management (Baca, 2005, p. 2) :

1. Authority level of the project manager
2. Setting up an environment that fosters good change management
3. Setting up a system that helps you determine a change has been requested

Leading and implementing business change

A challenge in change management is how change can affect the employees (Jones & Recardo, 2013). Change can lead to fear, confusion, and distrust in the management team, but also throughout the different levels in a company. Jones and Recardo breaks down change management into two factors: Understanding and embracing (2013). The management must create an understanding of why the change is necessary, and what the role of the employees are. Embracing is about knowing that people react different to change and identify the reasons for each reaction.

8

Jones and Recardo identified two types of change, simple change and complex change (2013). Simple changes have targets that are well defined; the outcome is predictable; it is quick to initiate and implement; and there is a limited number of affected stakeholders.

Complex change is where targets are more strategical and transformational (Jones & Recardo, 2013). They are often of a larger scare with an unpredictable outcome. This type of change is dependent on more resources and takes more time to implement.

Why change?

The factors that impact change are either internal or external; reactive or proactive. Change due to external factors are influenced by forces outside of the organizations (Dawson & Andriopoulos, 2017). Change driven by internal forces are coming from withing the organization. An external factor can be globalization, where domestic organizations compete with global actors. They are driven to change in order to stay competitive. Another example is significant technological advancement. Financial limitations are examples of internal drivers of change.

Scale and type of organizational change are two important factors. The matrix created by P. Dawson, presents four different categories of change (Dawson & Andriopoulos, 2017). Along the X-Axis there is Reactive and proactive change, and along the y-axis there is scale of change. The measures for going through change depends on where it is in the presented matrix. Organizations need to identify if they are reacting or predicting a future state that they want to adapt to.

Change is a difficult subject, as it can be met with resistance Barriers to change. Beer created a list of "six silent killers" to organizational change (Beer, 2021, p. 17):

1. Poor horizontal coordination and collaboration
2. Unclear strategy and/or values, and conflicting priorities
3. Ineffective senior team
4. Leader's top down or laissez fair (hands off) style
5. Inadequate leadership development and leadership talent
6. Poor communication down and up (inability of truth to speak to power)

Implementing Change

Implementing the change is a process consisting of several steps. McArdle and Hanson breaks the implementation phase into five steps (2006). The first step is to prepare the organization for the change. In this step the management creates a strategy for implementation and an overview of the available resources. The next step is to present the change. During this phase, the strategy is communicated throughout the organization in order to have a common understanding of the tasks. The two next phases are to implement the change activities and monitor the change processes. During implementation, the management must continually evaluate the progress and address possible issues that occurs. The final step is to support the middle management who is implementing the change and support the personnel who are affected by the change.

Cummings and Worley broke down the implementation phase into four activities: Activity planning, commitment planning, change management structures, and managing the learning process during change (2015).

Activity planning is like McArdle and Hanson's first step, where the management creates the strategy and implementation plan. The management should be focused on making the implementation plan adaptable and cost effective (Cummings & Worley, 2015). The plan should consist of midterm milestones, which are used to measure progress of the implementation process.

Commitment planning is when the management seeks out personnel who can oversee the implementation process (Cummings & Worley, 2015). These are called change agents and are strategically placed in positions to monitor the implementation process. The next activity is to create the change management structures. That is when the change agents are placed in critical roles such as a temporary project manager, or a task force made up of people representing different organizational functions.

The final activity is to facilitate for a learning process during the implementation (Cummings & Worley, 2015). They break this activity into four practices: create a system view of the organization, create shared meaning, after actions reviews, and local self-design.

Change management models

ADKAR

Jeff Hiatt created ADKAR, a change management model about how organizations implement change and involve the employees in the process (Hiatt, 2006). The acronym stands for Awareness, Desire, Knowledge, Ability and Reinforcement. The model breaks down the process of change into five logical steps (Dawson & Andriopoulos, 2017). Change starts with creating awareness about the scale and scope of the project. The next step is creating desire, where the goal is to create a desire to be involved in the change process. The ADKAR model separates knowledge into two phases. The first phase is to build knowledge about the process of changing, and the second phase is built knowledge with regards to the desired state. Ability is acting on the knowledge gathered in the previous step. When the change is implemented, management must ensure that the new practices are used. Reinforcement is about continually evaluation of the implementation and deterring from pivoting back to the previous state.

Overview of the five steps:

- Awareness
- Desire
- Knowledge
- Ability
- Reinforcement

Criticisms of ADKAR

The model has been criticized to downplay the role of change leadership (Dawson & Andriopoulos, 2017). It focuses on the individuals in the organization. Criticism stems from the view that organizational change and resistance is influenced by the organizational structure, and not by individuals resisting change (Burnes, 2015). The resistance is the symptom rather than the key issue.

USAID

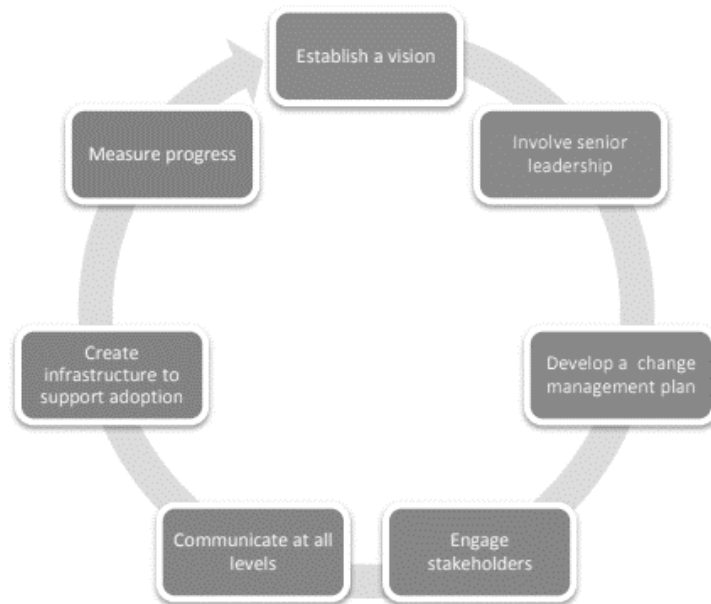Figure 1.1: Change Management Best Practices

Figure 1: USAID Change processes (USAID, 2015, p. 2)

A model of implementing change was created by the United States Agency for International Development (USAID). This is a more specific and detailed model for implementing change (Dawson & Andriopoulos, 2017). The model is based on Kotter's 8, Lewin's and ADKAR. It comprises of seven steps.

The first step is establishing a vision is where the change agents visualize what the end-goal looks like (USAID, 2015). There has to be a relevancy for the stakeholders and their employees. What is meant by this is that the vision includes the involvement of the whole organization and stakeholders. As stated previously, awareness of change can limit resistance (Dawson & Andriopoulos, 2017).

The next step after crafting a vision is to involve senior leadership. USAID highlights the importance of the concept "sponsors of change" (USAID, 2015). Which means that the change needs support from integral members of the organization (Harrington, 2018). Involvement from senior leadership can bring legitimacy to the project. Involvement can also increase the possibility for long term success. If the stakeholders and employees interpret that

senior leadership are not sponsors of change, then they might be hesitant to institutionalize the change.

The change management plan consists of many parts that can improve the efficiency and the success of the change (USAID, 2015). The first step is to assess status about organization, create knowledge about readiness and lastly assess the ability to change. The plan should start off with the vision and goals created and start mapping out the stakeholders. Stakeholders can be either sponsors of change or resistors to change, which is why it is important to know who they are. This map can also be used to create the stakeholder matrix, which grades the amount of involvement they should have on the project (Freeman, 2010). Planning of resources needed and creating milestones for the projects are the next steps. These milestones should be time specific, as they are important to assess progress. One type of milestone measurement is using Key Performance Indicators (KPI). The KPI's are quantifiable measurements that indicates the performance of a specific task or goal.

A plan for communication channels depending on the different levels of interactions can increase information sharing efficiency and lower the barriers for sharing knowledge (USAID, 2015). Improved communication makes it easier to share metrics, roles and responsibilities. A change management plan should include a risk with risk identification, risk evaluation, risk handling and risk controlling. These phases is made to eliminate the risk, or if not achievable, minimize it (Project Management, 2017). The last part of the plan should be an overview of steps towards institutionalize the change. These are activities or processes that ensures the longevity of the change.

Stakeholder involvement should be an early prioritization and occur regularly throughout the project (USAID, 2015). The involvement should have meaning, unnecessary involvement indicates a lacking stakeholder analysis. Stakeholders' involvement can reduce barriers of change. Especially when there is an understanding of who is change champions and change resistors. These are important to identify to establish the balance of involvement.

Communication should also flow throughout the organization. The goal should be to spread vision, goals, and motivation for change. The stakeholders should be informed about the nature of the change, timing of implementation and significance for future operations. Senior management should address concern and fears raised from employees and

13

stakeholders. Transparency is important to show the involved parties progress and issues during the change.

The final parts of the change model consist of creating an infrastructure that supports adoption and measure the progress throughout the project. The infrastructure relates to organizational policies, procedures, and control systems. The measurement of progress is to follow up on the KPI's created during the planning phase.

Criticism of USAID:

Models that are too specific can underplay the complexity of change (Dawson & Andriopoulos, 2017). The research done on change management is careful about stating a definite way of doing things. This model might be less applicable through its straightforwardness.

The process of change

Through their research Dawson and Andriopoulos created ten key factors in organizational change (Dawson & Andriopoulos, 2017):

1. Assumption
2. Behavior
3. Participation
4. Patience
5. Team effort
6. Context
7. Difficulties
8. Ethics
9. Failure
10. Resilience

These ten factors have a logical structure that follow the change project throughout its lifecycle. The first five is about creating, motivating, and including the individuals of the organization. Every assumption should be challenged, and behaviors should be changed. The change agents should also identify the context of change and know that it is not homogenous. The change should also be in line with the company ethics and values. The last part highlights

the importance of extracting knowledge from failure, having knowledge about the organization's resilience.

They also created a list of nine considerations on the process of organizational change (Dawson & Andriopoulos, 2017).

1. No silver bullets
2. Shifting terrains are the norm
3. Allow time
4. Multiple voices
5. Learning experience
6. Training
7. Communication
8. Power-politics
9. Temporality and paradox

These are topics the change agents should have reflected on before acting on the idea to change. They should know that there is no simple universal way to change, and that risk will always be involved in the process. They should also follow a realistic timetable, as a rushed project might be rejected. It is also important to understand who is affected by the change. If the change agents know their stakeholders and employees, they can tailor the implementation to suit the different personalities in the organization. The organizational politics can be tricky to navigate, and therefore it is an important skill to have. Negotiation skills during the planning and allocation of resources are one side of the organizational politics that affects the change management process. The paradox of change is that change can be temporary. The process can be time consuming and resource heavy, and the product might have to change to adapt even further. The change agents should be aware that change is a continuous cycle.

Resistance to change

Resistance to change is a disputed subject with research indicating it stems from individual workers, and other research stating it stems from the context of change (Burnes, 2015, 2017). This article takes the approach that resistance stems from context of change. The context of change takes the approach of the issue lying in the planning and organizational tools used. Resistance can be limited through widespread involvement and participation. This is an approach that stems from the research done around Organizational development.

The theory of cognitive dissonance takes the approach of breaking down the resistance into two forces: attitude and behavior (Burnes, 2015; Festinger, 1962). The attitude of a person or workforce can be interpreted as the internal thoughts and values. The behaviors are the actual actions that takes place. If there are differences between the attitude and the behavior, there will be frustration and reluctance (Hinojosa, Gardner, Walker, Cogliser, & Gullifor, 2017). If an organization seeks to implement a new way of doing tasks, it affects their behavior. This means that there will be an unbalance with their used way of doing the tasks. To strike a balance, there has to be a change in attitude. The stakeholders and employees must see the need to change, or understand the need to change, themselves. The resistance increases with the amount of change. Less incremental changes will be met with less resistance. Larger scale change will need systems of involvement, that promotes change in attitudes. The change in attitude is called cognitive restructuring (Burnes, 2015).

The depth of intervention is a theoretical model that looks at correlation between involvement and psychological impact of change (Burnes, 2015). A bigger psychological impact will require more time and resources to implement. The participants should have a space where they can reflect on both the behavior and attitude needed to incorporate the change. A study spanning over 60 years found that participation increases acceptance, readiness and support for a change project (Burnes, 2015).

The next theory s called the psychological contract (Burnes, 2015). There are two opposing forces in an organization, the expectations of the employees and the expectations of the employer (Briner & Conway, 2005). Some examples of what the employee expects are a salary, steady workhours, and promotion opportunities (Burnes, 2015). The employer might expect a commitment from the workers, effort in their work and loyalty to the company. Resistance and conflict arise when there is a shift in balance between the two. An example

16

could be that the employer sets new production targets, without increasing hours or salary. This might cause conflict since the balance is now changed, and the employees are not compensated for the increased effort.

Dispositional resistance takes personality factors into account, and relates resistance to relationship with change agents (Burnes, 2015; Oreg, Michel, & By, 2013). The personality factors are: Routine-seeking; emotional reaction to imposed change; cognitive rigidity; and short-term focus. The change agents can limit resistance by promoting a steady relationship with the affected personnel.

Jones and Recardo created four questions to increase understanding about change, and limiting the resistance (2013, p. 3):

- "how will the change affect me personally?"
- "What will I need to do to make the change work and successfully perform in the changed environment"
- "How much of my time will the change work take?"
- "Where will I get more resources to implement the changes and operate my group with minimal disruption?"

Summary and theoretical framework

In the table below there is a summary of the literature review. The thesis compares the findings from the data collection with the theoretical framework. The two change models were chosen for their varying specificity. ADKAR has a more general approach to change than the USAID model. In the other columns there are categorized keywords about best practices and challenges with implementing change.

ADKAR	USAID	Best practice	Challenges
Awarness	Establish a vision Involve senior leadership Develop a change management plan	Communication, scope, strategy, Change agents, sponsors of change	Broad scope, lack of strategy, reluctant management, resources
Desire/knowledge	Engage stakeholders Communicate at all levels	Two-way communication, involve affected personell, create oppourtunity for feedback	Time consuing, creating communication channels, create desire
Ability	Create infrastructure to support adoption	Focus on learning, monitor the behaviours, accept slow progress	Lack of motivation, setbacks, negative feedback, cost
Reinforcement	Measure progress	KPI's, Milestones, reassessments	Sustaining the change

Table 1: Theoretical Framework for the research

Research method

General introduction

The scientific method is a specific way of gathering and creating knowledge (Frankfort-Nachmias, Nachmias, & DeWard, 2015). The method is a normative framework, it sets the rules for researchers to follow.

Methodology is important to show not only the results of the new knowledge, but also how the researcher arrived at the conclusion (Frankfort-Nachmias et al., 2015). This gives other researchers the ability to delve deeper into the subject, and potentially recreate the study. The recreation of a study is called replication and is an integral process in the research field. A recreation of research where the results are different, decreases the reliability and validity of the research.

The validity of a research paper assesses if it measures what it claims (Frankfort-Nachmias et al., 2015; Ghauri & Grønhaug, 2010). The results are not valid if the method of collecting data does not correspond with the type of study. The tools must match the type of work. Reliability is how accurate the data is. If the data is consistent with retesting, the reliability increases. Research that is hard to replicate or has different outcomes when retesting, have a low reliability. Reliability and validity are two terms that promotes constructive criticism. Constructive criticism is an important part of the scientific method, as it always challenges and promotes further research.

To have suitable methodology for a thesis, there must be an underlying knowledge about the topic. The focus should be on how to address a problem. This knowledge will help steer the research towards a suitable research method. It is important to focus on gathering reliable data from a representative sample.

Research design

The research design is explorative. Explorative research is about gathering knowledge about a unknown phenomenon or uncovering something new (Sanders, Cogin, & Bainbridge, 2013). Unit of analysis is concerning what is to be studied (Frankfort-Nachmias et al., 2015). The unit can range from studying individuals to a population of a country. The unit of analysis in this study is managers working in shipping companies undergoing digital changes.

The two types of research methods are qualitative and quantitative (Frankfort-Nachmias et al., 2015; Ghauri & Grønhaug, 2010; Sanders et al., 2013). The two methods have different approaches to reaching their conclusions. In quantitative data the researcher gathers data that can be used in a statistical analysis. This method is used to see if results are different than expected. The benefits if this method is that the research can be replicated using the same methods and datasets. In qualitative research, the data is about social phenomenon. This can be experiences, observations or gathering knowledge about a subject. The data will not be subjected to a statistical analysis. In qualitative research the conclusions are reach by comparing themes from the data collected about a subject.

Table 7.1 The difference in emphasis in qualitative versus quantitative methods

Qualitative methods	Quantitative methods
• Emphasis on understanding	• Emphasis on testing and verfication
• Focus on understanding from respondent's/informant's point of view	• Focus on facts and reasons for social events
• Interpretation and rational approach	• Logical and critical approach
• Observations and measurements in natural settings	• Controlled measurement
• Subjective 'insider view' and closeness to data	• Objective 'outsider view' distant from data
• Explorative orientation	• Hypothetical-deductive; focus on hypothesis testing
• Process oriented	• Result oriented
• Holistic perspective	• Particularistic and analytical
• Generalization by comparison of properties and contexts of individual organism	• Generalization by population membership

Table 2: The difference in emphasis in qualitative versus quantitative methods (Ghauri & Grønhaug, 2010, p. 97)

Sampling

The sampling method used is non-probability sampling. Non-probability sampling is when the participants are picked from the population (Frankfort-Nachmias et al., 2015). The reason for this choice is because the data collection was gathered from participants that have the relevant knowledge. More specifically the method of sampling was convivence sampling, where the sample size is determined by willing participators. There were also some instances of snowballing. This term is describing when one participant informs or invites other participants to partake in the research.

Refined research questions

RQ 1:

What are the best practices of implementing digital change in shipping companies?

RQ 2:

What are the challenges facing shipping companies that seeks to implement digitalization?

A qualitative approach was chosen to answer these questions. They are about processes in shipping companies, and the qualitative approach is useful to gather the current knowledge (Frankfort-Nachmias et al., 2015).

Population and sample

The population for the research is people affected by digital change in the maritime industry. People affected by digital change can be managers, sailors, onshore staff, or other connections to the shipping companies. The thesis has a sample consisting of managers working in the maritime industry. They were chosen because of their knowledge of digitalization, project management and the processes of change in the industry. The participants were contacted through e-mail with a short description of the research. The information they received were about the topic and some of the questions form the interview guide.

Data collection method

In qualitative research the interview is the most common data collection method (Denzin & Lincoln, 2018; Frankfort-Nachmias et al., 2015; Miles, Huberman, & Saldaña, 2014). The interview is a method to create knowledge from personal experiences and observations (Denzin & Lincoln, 2018).

The qualitative interview brings flexibility to the interview (Taylor, Bogdan, & DeVault, 2015). It is a method to extract personal information or opinions from the participants. It is a useful tool to gather data that can be subjective and based on personalized experience.

The research interview can be used to uncover knowledge that leads to further questioning (Taylor et al., 2015). During the interview new information can be used to gather further knowledge and new questions to ask participants. The goal of the interview should be to gather data that brings new perspectives to the subject. The interview should be prepared with questions that encourages involvement from participants; questions that focuses the interview around the relevant subjects; and questions that provoke contrasting answers (Denzin & Lincoln, 2018).

Criticism of this method is that the subjective data that is collected can be unprecise (Denzin & Lincoln, 2018). The data is reliant on the participants to share correct information. When researching practices, the participants might present a different reality based on what they think is right, not what is being done. Trust between the data collector and the participants is important. This trust builds interpersonal connections, that can make the data collection more efficiently and precise.

Context is another important factor (Denzin & Lincoln, 2018; Taylor et al., 2015). The participants build knowledge and context through years of experience in their field. This context might not be understood buy the data collector and misrepresented in the research. When collection is based on language it is important to be aware of these potential problems. There should be a clear explanation of concepts and phenomena being explained.

Relatively structured interviews are usually used in surveys. This method allows the researchers to possibly quantify the answers (Järvinen & Mik-Meyer, 2020). The structure of

the interview is setup in a way that answers should always relate to the specific questions. In contrast the relatively unstructured interview has no script other than an opening question. This type of data collection is called "narrative interviewing" and is used to collect data about personal experiences.

Descriptions

In the qualitative interview the goal is to gather the participants specific descriptions, and not abstract reflections on the subject (Denzin & Lincoln, 2018). Good interview questions demand specific answers that do not require interpretations of the answers. The questions should focus on the "how" not "why". The difference between these two approaches is that the "how" questions elicit answers that relates to specific actions or phenomena. In contrast, the "why" questions can result in answers that are based on assumptions and abstract concepts.

Three motivating factors (Frankfort-Nachmias et al., 2015):	How interviewers should introduce themselves (Frankfort-Nachmias et al., 2015):	Principles of the interview process (Frankfort-Nachmias et al., 2015):
The interview should be pleasant and satisfying	Introduce who you are and who you represent	Follow the interview guide, but allow for probing questions
Participants mus see the study as being worthwhile	Tell participants the purpose of the research	The participants should feel comfortable with sharing their knowledge
Overcome the barriers of interviewing	Tell them how they were chosen	Phrase the questions from the interview guide the same with each participant
	Adapt the approach to the situation	The questions should be presented in a pace that makes in clear and understandable to the participants
	Create a rapport with the participants	The order of the questions should follow the prepared guide
		The participant should be asked every question in the guide
		Clarify and repeat questions that are misinterpreted

Table 3: Principles of interviewing (Frankfort-Nachmias et al., 2015, pp. 220-221)

Qualitative interview

In this thesis the semi-structured interview was used as a data collection method. This method is a balance between the relatively structured interview and the relatively unstructured interview (Frankfort-Nachmias et al., 2015; Ghauri & Grønhaug, 2010). The method allows flexibility during the data collection. The interviewer becomes more active in this method, rather than just observing and collecting the data. If the participant's answer elicits further questioning the interviewer can ask further questions outside the prepared interview guide.

The data collection followed an interview guide. The goal of the interview guide was to keep the interview focused around extracting relevant data for the research problem.

Semi-structured interview

The semi structured interview can be divided into three main parts: Opening segment, middle segment and concluding segment (Galletta, 2013).

The opening segment should introduce the purpose of the research and how they can bring insight to the topic (Galletta, 2013). A consent form should be signed so the participants are fully aware of their rights and has insight on how the data will be handled. The recording of the interview should start when the first question is being asked. The opening questions should be broad in order to motivate the participants to share data from their ow experiences, but not broad enough for the answers to stray away from the research question. Probing questions are a method to keep the focus around the research topic. Probing questions are not in the interview guide, but they are questions that can help participants bring more context to the answers.

The middle section are questions with more specificity towards the research topic (Galletta, 2013). These questions should be designed to explore the research topic. During the opening segment, participants might have shared answers that needs further exploring. The interviewer can use probing questions to extract more specific data about the phenomena. As the interview progresses the trust between the participant and researcher should build up. That is why the open-ended questions are used to establish the base level of trust. The interview should be aware of how too specific questions can hinder participants in sharing valuable data from their own experience.

The concluding segment is about questions that are not yet fully explored or new questions about some of the presented data (Galletta, 2013). Questions that are more grounded in established theory can also be asked in the concluding segment. The closing statement is about connecting the two previous segments by probing for context, clarification, or depth. It should be clear that the interview is in the ending process and should close out with giving the participants the opportunity to share their final points about the subject.

Interview guide:

1. What is your job title, and what is you experience in digital maritime projects?
2. How would you define digital projects in the context of the maritime industry?
3. "What is your experience with monitoring and managing the implementation of digital projects?
4. "What is the role of the management during the implementation phase in digital projects?"
5. "In your experience, what are some traits of successful implementation in digital projects?"?
6. "In your experience, what are some traits of unsuccessful implementation in digital projects?"
7. "What about upper management, can their attitude towards the project affect the implementation process?"
8. "What about employees, how does their attitude towards the change affect the outcome of the project?
9. "What can the management do to decrease resistance to change from employees?"
10. "What is the purpose of a risk analysis in relation to the implementation phase in digital projects"?
    a. "Do you have examples of risks in digital maritime projects"?
11. "What were the methods used in order to measure progress in the projects?"
12. "During the implementation, how well do these measures work as indicators of progress"?
13. "What are the future challenges when moving towards digital transformation?"
14. Is there something else you would like to add, or do you have any questions?

Transcriptions

The interviews were recorded and transcribed after completion. During the interviews, I took notes of answers that needed further context for the transcriptions. Data collection can be impacted by the tone of voice, sarcasm, or humor. These are elements that are not easily translated into plain text. So, it was important for the data analysis that these instances were noted.

Data analysis method

Qualitative data analysis can be broken down into three processes (Järvinen & Mik-Meyer, 2020, p. 7): Categorization of data, narrowing down of data and presentation of data sequences.

Categorization of data is to create a system in the data collected (Järvinen & Mik-Meyer, 2020; Miles et al., 2014). The narrowing down of data is done through data condensation (Järvinen & Mik-Meyer, 2020). Through data collection, the participants answers might be too long. Data condensation is a method of condensing the long answers into codes, themes and summaries (Miles et al., 2014).

In this thesis the data was categorized through a coding process. This is a method to extract themes from the answers that can be compared with data from other participants (Miles et al., 2014). It breaks down the answers into chunks and is a multi-cycle process. The type of coding used in this thesis is descriptive coding. Descriptive coding is used to condense longer answers into different topics. These topics are then used to compare with data collected from other participants.

The second cycle of coding is pattern codes (Miles et al., 2014). This builds on the first cycle, where the findings are compared and categorized with more precise themes. Pattern coding have three important functions:

1. Data condensation
2. Starting the analysis process
3. Ability to compare findings and relationships

In my analysis I categorized the findings from each question and broke them down into codes. This allowed the answers to be compared and shortening down the answers. The codes were revisited, and the themes were created. These themes were categorized based on the two research questions in the thesis. The first category were findings about best practices, and the second category were challenges with implementing digitalization.

Ethical considerations

Ethical considerations in qualitative research, and more specifically data collection through interviews, surrounds anonymity and informed consent (Frankfort-Nachmias et al., 2015). Informed consent is important because the participants must know what they partake in. They also have a right to uphold their anonymity. The data was collected without revealing any personal information about the participants that can lead to them being identified.

The research was audio recorded and the data was collected from participants working in the industry. It is important that the research upholds a high privacy standard and follows the guidelines from NSD.

The people partaking in the research shared information that were classified. Therefore, it is important that the audio files and transcriptions are dealt with respect and caution. This was done by limiting the access to the files and deleting recordings after the transcriptions have been anonymized.

Another ethical aspect is that the findings of the thesis are reflecting what the participants answered during the interviews. A misrepresentation of the data weakens the reliability and validity of the research.

Findings

In this chapter the results from the data collection and data analysis will be presented. The findings from the data analysis are summarized in the table below:

Digitalization	Management	Measure progress	Resistance
Efficiency	Change agents	KPI	Experience
Transformational	Balance	Milestones	Fear
Processes	Strategy	Transformational map	Insecurity
Organizational Strucuture	Top-down	KEI	Unnecessary change
	Attitude	Traditional	Involuntary
	Traditional		
	Industry Experience		
	Safety Focus		

Barriers	Motivating factors	Future challenges	
Staying Operational	Regulations	Uncertainty	
Culture	Decarbonization	Taking risks	
Data Quality	Banks	Competency	
Network Connectivity		Technology	
Manager - User mismatch			
Tech leading change			
Transperancy			
Silos			
Costs			
Ship life-cycle			

Figure 2: Results from Data Analysis

Definition of digitalization

The participants all had a similar definition of digitalization. Several of them described it as a process of doing something smarter and simpler by utilizing digital tools. This could be gathering data about performance and having data driven decisions. Some of the participants went more in depth and explained that there is a difference between digitization, digitalization, and digital transformation. As one participant explained:

"*Digitalization is a step towards digital transformation*"

Best practices

<center>Top-down management</center>

Some of the participants emphasized the importance of top-down management. They identified that the management must lead the change and set the parameters. As one participant explained:

"What we have seen is that is does not help if you only have a great new tool. Success of implementation is dependent on the management having a clear mandate of how they are going implement it"

<center>Attitude</center>

Participants explained the importance of management being sponsors of change. That they have a positive attitude and are engaged in the effort. Attitude will spread throughout the hierarchy, and they need to be aware of their ability to affect their employees. Also, it was important to monitor the attitudes of employees, and put in measures to motivate the change.

"You have to have change agents in all levels of the company, there is no use if only the upper management focus on digitalization. It has to spread throughout the company."

Some of the participant mentioned that good management will attract the best change agents. Change agents can impact the capability and willingness to change. The scope and ability to see the long-term goals was also brought up as an important factor.

"In order to get the benefits of such initiatives or digitalization projects, there has to be someone who really believes in it and sees the long-term effects."

The participants mentioned that the management must be able to garner attention, understanding, and be decisive in their actions towards digitalization.

<center>Strategy</center>

The participants highlighted the need for a clear strategy. The strategy gives clear guidance and can be used to communicate the goals and milestones. One participant explained that they use a "masterplan", which is an overview of the different processes of a large-scale

digitalization project. This benefits them by having an understanding of the best practice early in the process and can be used to review the progress of the implementation.

Other participants said that there needs to be a clear overview that breaks down the bigger goals into smaller activities that are understandable. Also having a plan for how to implement and use the new solutions was important.

The use of business cases was also mentioned. One participant explained:

"You have to start with business cases and use cases. Then step by step implement it."

Another participant said that it is important for the management to know what the end goal is and how they will achieve it.

"The shipowner has the ability to buy a newbuild with an abundance of technological sensors. The challenge is to find out what data he can actually use"

One participant mentioned the use of transformational maps. A strategic tool towards digital transformation.

"You might have a strategic goal that spans to 2030 or 2040. Leading up to the end goal, there are a lot of different processes that needs to be done. It can be ship management, newbuilding, digital solutions, control centers and centralization. These processes are compared, and you get an overview of what is achievable and what is lacking."

Progress

When asked about how they measure progress in the implementation phase, several of the participants answered that they used Key Performance Indicators (KPI). Other methods were goals, milestones, and Key Enabling Initiatives (KEI). One participant explained that the difference between KEI and KPI, is that KEI can be used to measure qualitative progress. The issue of using existing KPI's was that they could be somewhat traditional, and not properly measure the benefits of digitalization initiatives.

One participant said that the two common performance measurements in ship owning companies are off-hire and budget. These are important factors, but he felt that it did not measure the performance of the smaller activities during the year. Also, it was hard to indicate

the success of digital implementation because the effects might be beneficial in the longer run.

"How can you begin working on digitalization initiatives to get good off hire results? There is a lack of connection between the two."

A number of the participants mentioned that the traditional KPI's will still be good to use, but there has to be a new approach to how they are achieved.

Resistance to change

The participants shared that there are a lot of people in the ship owning companies who are not prone to the thought of changing their processes. Some of the issues mentioned were uncertainty, threats, fear, and lack of understanding. The issue of uncertainty, threats and fear were linked to workers worrying about their tasks being digitalized and become obsolete,

One of the candidates mentioned an example of a digital initiative in his previous workplace.

"There was an initiative for raising digital awareness and skills in the company. There were different courses that the employees could take on different digital subjects. This was met with a mixed response. The courses were voluntary, which meant that the people who were not interested could opt out of the courses. The company was left with wondering who they should focus on, and what the actual benefits from the initiative was."

Limiting resistance to change

One of the participants said that it is important that there are incentives for changing their way of working. This could garner interest and ensure that it is integrated into their way of working. It is also important to have openness and be willing to explore and being positive towards change.

Another participant said that it is important to involve the users early in the process.

"If you are digitalizing a ship, it is important to know the attributes and functions onboard. That is why it is important to involve the crew early in the process. They have valuable information, and it can help with the attitudes. Being included makes it easier to accept change."

The participant also shared the importance that the people who are being digitalized understands the purpose of why it is being done.

Most of the participants explained that digitalization should have a purpose. It should not add unnecessary new tasks or hinder the current processes. The people who will be using the systems will be more accepting if it makes their tasks more efficient.

"It is important that the employees understands that digitalization is making their work easier. If that understanding is there, then it will be easier for them to accept. It is important that digitalization is not the goal, but rather a method to achieve the goals. Do not digitalize just to digitalize."

The participants said that the attitudes of the middle management should be consistent with the goals of upper management. Their attitude can affect how seriously their employees takes the initiative.

"Why will they use time on it if their middle manager is disagreeing with the prioritization?"

Challenges with implementing digital change

One of the issues with implementing new digital processes is to do it while operations are running. One of the participants stated that this is making it difficult to implement changes while keeping the operational capabilities.

"It is difficult to do a proper digitalization initiative in ship owning companies. They have to always be operational, and currently they do not have the capacity to initiate and properly develop digitalization initiatives."

Some participants highlighted the issue of letting the technology lead the change. While it was important to go through with pilots and test out the technology, one participant said that there the process should start with visioning the final product.

The participants raised issues with the current culture and company structure. The ship owning companies usually have onshore workers with backgrounds from working on ships or other technical experience. This could become an issue with implementing changes. The explanation was that they are set in their ways of doing thing, and their knowledge is based on their experiences. So, they might not be motivated to develop new skills or methods in order to implement digital initiatives.

One participant specified that there must be and understanding that it is not just another IT project. They must take charge and integrate new digital processes, for it to be successful.

Cyber security was also mentioned as a potential barrier. Some of the participants explained the technical issues of keeping the data untampered. While one participant said that cyber security is also challenging in the sense of misunderstanding and lack of knowledge.

"There are some who are terrified of cyber security."

When it came to data and data collection, one of the current issues was the quality of the data. There was a lack of standardization and consistency. One of the participants used planned maintenance as an example. There is a lot of data to be collected in regards with scheduling and performance. Currently this type of data is not centralized, which decreases the quality and the contents of the datasets.

Another technical barrier is the networks that is connecting the ships to onshore locations. Currently many vessels are not equipped to have a steady connection.

"Bad connectivity is an issue. It is usually only the most expensive offshore vessels or modernized deep sea shipping companies that have good connectivity and sensors onboard."

Mismatch

One participant mentioned the challenge of balancing what top management finds important, and what the people performing the tasks finds important.

33

Another participant had a similar answer where he mentioned that there was little focus on the users. There was not enough focus on how this gains value for the people who will use it, they mainly focus on data collection and digitalization.

The barrier of different prioritization was mentioned by several participants. The disconnect between the onshore departments and people working on the vessels. Also, some participants explained that the organizational culture might not reward digital initiatives.

"One part of the challenge was the lack of credibility to the people fronting and implementing digital solutions. They were met with questions about why they had not done it before, rather than motivated to do further initiatives."

Some of the participants mentioned the issue of quantifying the benefits of digitalization. Many of the steps towards digitalization were more qualitative, and not valued by the upper management. Some of the candidates mentioned that the different departments work in silos. There is a lack of integrated collaboration. Also, that the seafarers are not often in contact with the main offices onshore.

One common barrier with the candidates is the lack of standardization. The rules that govern the newbuilds are not putting enough pressure to develop digital solutions. More specifically, one participant mentioned that the lack is in data sharing among the components.

The participants mentioned that the lack of transparency in the industry can be a challenge. One participant explained that some shipping companies are lacking transparency on how they operate internally. There is no communication or collaboration between the departments. Another issue is the reluctance to share data, even though this could benefit the ship owning companies.

Early Stage:

One participant said that the industry is in the early stages of digitalizing, and there is a lack of successful implementation that can be used as best practice.

Another issue mentioned by several participants, was that the industry is very capital intensive. The base models of ships are expensive, and there are not many incentives to go beyond the standards in regard to digital technology. The ship owners seek return on investments, and might not focus on the longer perspectives, as these might not pay out as quickly.

"The challenge in shipping is the short horizon on the costs. Most shipowners have an aim to bringing in returns on investment after one year. They are not interested in prolonging their returns. And this is one aspect that slows the development."

Life Cycle:

The participants also mentioned, in addition to the capital-intensive investments, the life cycles of the ships. They are planned to operate for 20-30 years. The long lifespan lowered the capacity to change the technology onboard the vessels. One of the participants explained that there are risks being too far ahead. Shipping companies that invest substantially more in digital components, might not be able to stay competitive on rates.

Reactive vs Proactive:

One participant said that the industry is more reactive than proactive. They are waiting to respond to changes in the market, rather than staying ahead of the curve. This is because of the risks involved in not getting a return on their investments.

"There are risks involved when implementing new technologies. And that leads to shipowners being averse to try new things, in the event that it might not pay out."

Another issue raised was that increasing the costs of the ships, can lead to the shipowners seeking higher rates. This lowers their competitive abilities. One participant raised the issue of outdated charterparties and contracts. The charterparties could be used as a tool to put pressure on the shipowners to modernize their fleet beyond regulations.

Status

The participants said that the status of the industry regarding digitalization is in early stages. One participant said that it currently takes a shipowner days to collect and analyze performance data. Some participants said that there is desire to do more digitalization efforts, but there is a lack of ability to do so.

"There are a lot of companies that have done progress in their way of thinking digitalization. But they have not reached the point where they can discard the old processes. I believe there are many departments working both with old processes and new ones."

There are some shipowners who are progressive when it comes to digitalization. These were characterized as either smaller companies where a manager has bigger influence, or large companies with resources to carry out pilots or large projects. Some participants explained that these companies have good maintenance systems, procurement systems and queuing systems. The Norwegian cluster was mentioned as a group of companies who are forward thinking about technology and data.

Some of the participants said that the industry is good at taking big risks regarding innovations. One explained that ambitious goals and projects drive the industry forward. But these projects are capital intensive, so it limits the pool of shipowners willing to take on the risks.

Motivating factors to digitalize

Decarbonization and regulation

When asked about what drives the digitalization, all the participants mentioned decarbonization and regulations. Regulations from IMO and EU accelerates the need to digitalize. The participants explained how the goal of the shipowner is impacted by the regulations. The shipowner's goal is to earn income, but they must comply with the regulations set by IMO or other regulatory bodies.

"The industry is known to evolve rapidly as long as the incentives are present. This could be either financial incentives or regulatory incentives. And the increasing pressure to lower emissions will probably result in a more modern fleet".

36

Participants explained that the banks are now giving shipowners incentives to focus on decarbonization. Banks can control the terms of loans and give better options to shipowners who are focusing on decarbonization.

The participants explained that the decarbonization accelerates digitalization. To lower emissions and collect data; they can use sensors, databases, network, digital platforms, and onshore control systems. To use digitalization to increase sustainability, they need the incentives from banks, regulatory bodies, flag states and classification societies. As one participant said:

"I do not think that digitalization is the goal for shipowners focusing on decarbonization. But I do think digitalization is an important enabler to reach the decarbonization goals."

Some of the participants also mentioned charterers and suppliers as motivating factors. The charterers could, like the banks, demand a greener profile in their contracts or charterparties. And the suppliers are interested in the performance of their component, and they can be built with sensors installed. One participant gave an example of how the airline engine manufacturers operate.

"The engine manufacturers have full control over their engines, as they are leased to the airlines. This allows them to have more control over the technology and include new developments that provides more data."

Future Challenges

Competency

Several of the participant said that there is a lack of competency to efficiently implement ad benefit from digitalization

"The technology is there, but we are not very well practiced in using it. An example to explain my experience is: If you give me the best carpenter toolbox there is, it will not make me a better carpenter."

One participant said that the ship owners talk about digitalization, but they do not include it enough in their newbuilds. They seek to be cost efficient, and if it is not required, they will not do it.

One of the participants had the opposite view of the situation. The technology is lacking in order to move towards digital transformation. Some of the participants said that there has to be a change in the structure of the organizations. There are a lot of processes and factors that will have to be in place to extract the most value from a digitalization initiative. The participants also mentioned the issue of uncertainty of what the industry will look like in 5-10 years. A lot of the current digital initiatives are early in implementation.

Discussion

The discussion chapter compares the findings with the presented literature. The findings about best practices are compared with the change management models. In this thesis the two models are the ADKAR model and the change management model from USAID. Further the data collected about barriers are broken down and compared with change management theory. The last part of the discussion is comparing digitalization theory with the findings about digitalization in the maritime industry.

Best practices of implementing change

From the findings the participants highlighted the importance of top-down management, strategy, attitude, milestones, KPI's, communication and involvement.

These findings will be compared with the steps in the change models of ADKAR and USAID model of change.

Establish a vision/awareness

The change process should start with the process of envisioning the end goal (Dawson & Andriopoulos, 2017; Hiatt, 2006; USAID, 2015). During this process, the management creates the scope for the project. From the findings it was clear that many of the participants emphasized the importance of meaning behind the change. The people who identify the need to change, must start with what it wants to achieve.

Involve senior leadership:

The senior leadership are important sponsors of change (Harrington, 2018; USAID, 2015). They have knowledge about how to navigate the politics and culture of the organization. Senior leadership can allocate resources and time to the project to ensure best implementation practices (Cummings & Worley, 2015). The participants mentioned that the upper management should have a top-down approach to the change initiative. The top-down leadership is to keep the change within the predetermined scope. Some of the participants said that they are important to keep resistance limited and act as sponsors of change.

Develop a change management plan

The change management plan is a tool for the implementation activities (McArdle & Hanson, 2006). The plan is a detailed strategy of what the different stages during implementation are. The findings suggests that there must be a plan of action for the implementation. The participants had varying answers about what a change management plan should look like. They mentioned strategic plans, transformational maps, and milestones.

Engage stakeholders & communicate at all levels / Desire

Communicating the change is argued to be an important stage of the change management process (Dawson & Andriopoulos, 2017; McArdle & Hanson, 2006). Communication is a method of garnering interest and understanding of the change. Participants said that the resistance often comes from fear of the unknown, not understanding the change, and uncertainty. These findings relate to the theory about resistance to change. Resistance occurs when there is a discrepancy between how the behavior and attitude (Burnes, 2015). Cummings and Worley describe three strategies of overcoming resistance to change (2015):

1.   Empathy and support

2.   Communication

3.   Participation and involvement

The participants raised similar solutions to the issue of resistance. They mentioned involvement in the planning from the people who will be affected by the change, and to create activities that promotes participation in the change process. A discrepancy from the theory came from two participants who argued that these activities might not have the desired effect. Activities that are not mandatory allow disinterest people to not attend, and not solving the issue of resistance.

Measure progress/reinforcement

Measuring the progress is an integral part of any project (Project Management, 2017). The most common method is to use Key Performing Indicators. KPI's break down the overall goal into measurable processes. The findings suggests that this is an important step, but the preferred method is varied. Some of the participants said that KPI's that measure the overall performance of the company are still relevant. Some participants said that digitalization projects affect the activities of how they are achieved. The findings also highlight other ways of measuring progress. The findings suggests that KPI's have a weakness in measuring qualitative activities. While important, they are harder to quantify into direct measurable benefits.

Challenges to digitalization in shipping companies:

There is a lack of theory on challenges with implementing digital change in shipping companies. This part of the discussion compares the findings of challenges, with existing theory on maritime operations and general theory on change management challenges.

Culture

Many of the participants mentioned the issue of the culture in the industry. Management in the ship owning companies do not have the digital competencies necessary to be a sponsor of change. Digital masters are companies that are successful in the digitalization processes (Westerman et al., 2014). Digital masters are measured on two factors: Digital capability and leadership capability. Digital capability measures the technological knowledge of a company. Leadership capability measures the ability of the management to implement the change.

They identify digital masters as leaders with a strong top-down leadership when deciding to digitalize. The findings suggest that there is a lack of digital masters in the maritime industry. Many of the participants expressed that the industry is in the early stages of increasing their digital competencies. The findings also suggests that there is a difference between the segments and their digital efforts. Some participants mentioned shipping companies withing the offshore industry as the most technological advanced.

41

Willingness

There needs to be a willingness to change. And the findings suggest that many of the actors in the industry lacks the willingness. As one participant mentioned, the companies are reactive instead of proactive. Proactive companies can stay ahead of the changes and capture the benefits of being an early adopter.

There a risk tied to being an early adopter. One participant mentioned the issue of being too far ahead. Transporting goods on ships is the cheapest way of transporting large amounts of cargo (Stopford, 2009). The ship owner's goal is to keep costs down to have the highest revenue. The participants mentioned the costs of building a ship, and the increased cost of installing extra digital components. Therefore, it was mentioned that being too far ahead is not necessarily beneficial. This shipowner risks higher shipbuilding costs and might have to charge higher rates or operate on lower margins. This weakens the ship owner's competitive position. Another issue raised by the participants, is that the shipowners bind their financial investments to the ship. A ship is expected to have a life cycle of 20-25 years, which decreases the ability to modernize the fleet (Stopford, 2009).

Operational

The shipping companies have either inhouse ship operations departments, or it is outsourced to a third party (Stopford, 2009). The findings suggests that companies with their own operations department have larger control over the activities. One common issue with the two types of company structures, is the challenges of implementing digital change while keeping the operations running.

Other industries

The findings suggests that shipping companies can gather knowledge about processes from other industries. Participants said that the knowledge can be used as an inspiration, but comparing the different industries is not feasible. Many of the participants mentioned the aviation industry as an example of inspiration. Maritime protocols were long and tedious, whereas the aviation industry have more efficient protocols.

Motivation for digitalization

Pathak identified external forces and internal forces as two factors that can drive change (2010). According to the findings, shipping companies are mostly driven by external forces. Many if the participants mentioned regulation and banks as the main driving forces. International Maritime Organization is an agency created by the United Nations (Dickie, 2014; Stopford, 2009). Shipowners are governed by the regulations, and the findings suggests that these regulations are the motivators for digitalization. Participants mentioned that digitalization can be used to reach decarbonization goals.

Future

The findings suggests that the main challenge facing the future digitalization initiatives is lack of digital competency. Most of the participants said that the industry does not have the digital knowledge required for larger transformational projects. This was contested by one participant who said the technology is lacking for transformational projects.

This study contributes to increase the knowledge about digital change practices in shipping companies. Findings regarding change management processes are supported by established theory. Challenges with implementing digital change processes in the maritime industry is not supported by established theory.

There are some studies about change management in the maritime industry. Verzbolovskis and Ballesio created six questions for management seeking to implement change in the marine and offshore industries (2013). The theme of these questions is aligned with the findings.

1. Are the relevant documents updated?
2. Are affected personnel notified of pending change?
3. Are affected personnel in all crews trained on the change?
4. Are controls for identified hazards addressed according to implementation plan?
5. Change execution verified to change owner's satisfaction?
6. Implementation plan followed and completed?

The overall themes in the industry of issues regarding digital capabilities and leadership capabilities, is supported by theory such as Westerman, Bonnet and McAfee (Westerman et al., 2014). However, there is a lack of research done on managing digital change in the maritime industry. One important finding is that shipping companies are mainly focusing on operating according to regulation. The main motivator for digital solutions is larger goals like decarbonization or increasing efficiency in operations.

Limitations and suggestion to further research.

The first limitation of this study is sample size. There were nine participants who contributed to this research. The research could benefit from gathering data about people being affected from the change. This study gathered data from the managerial perspective, and the research could benefit from gathering data from the other perspective.

The next limitation is that the study gathered data from people working in Norwegian companies. It would benefit the study to have a broader sample of knowledge. The interviews were in Norwegian and codes and themes were translated to English.

The last limitation is the lack of existing theory on digitalization in the maritime industry. The discussion about maritime digitalization is based on the findings from the limited sample.

Future research can take a case study approach to a digitalization project, to increase the knowledge about the processes. Another suggestion is to do further research on gathering knowledge from the industry about change and digitalization, to contribute to the theory on the subject.

Conclusion

The thesis explores change management and digitalization in shipping companies. The data is from the managers perspective. The first research question of the thesis was:

What are the best practices of implementing digital change in shipping companies?

The findings of this thesis suggest that the best practice of implementing digital change is a clear strategy; top-down management; change agents and sponsors of change; clear communication channels; inclusion of the people undergoing change; and facilitate for activities that sustains the change. These findings are agreeing with established theory in change management and change models. These are all steps that can keep the change within the scope and involve people to limit resistance.

The second research question was:

What are the challenges facing shipping companies that seeks to implement digitalization?

The findings suggests that the challenges in shipping companies are lack of digital competencies; lack of leadership capabilities; cost focused industry; long life cycle of ships; competitive market; industry in early stages of digitalization; and implementing change while staying operational. The shipping companies must also adhere to regulations, where digitalization can be a tool to reduce emissions.

The thesis contributes with knowledge about digitalization in shipping companies and challenges with implementation. The implications from the thesis are that the maritime industry is conservative and early in their digital development. Changing processes in the shipping companies are difficult due to the need to keep being operational. Another discovery is that the maritime industry lacks digital competencies and technology to do transformational changes. Another finding of this thesis is that regulations and decarbonizations are the drivers of digitalization. The findings of this thesis suggests that regulations of lowering emissions drives digitalization and puts pressure on the shipping companies.

Reference list

Baca, C. (2005). *Project manager's spotlight on change managementChange management*.

Beer, M. (2021). Reflections: Towards a Normative and Actionable Theory of Planned Organizational Change and Development. *Journal of Change Management, 21*(1), 14-29. doi:10.1080/14697017.2021.1861699

Briner, R. B., & Conway, N. (2005). *Understanding Psychological Contracts at Work: A Critical Evaluation of Theory and Research*. Oxford: Oxford: Oxford University Press.

Burnes, B. (2015). Understanding Resistance to Change – Building on Coch and French. *Journal of Change Management, 15*(2), 92–116. doi:10.1080/14697017.2014.969755

Burnes, B. (2017). *Managing change* (Seventh edition ed.). Harlow, England; New York: Pearson.

Cummings, T. G., & Worley, C. G. (2015). *Organization development & change* (10th ed. ed.). Australia: Cengage Learning.

Dawson, P., & Andriopoulos, C. (2017). *Managing change, creativity & innovation* (3rd ed. ed.): SAGE Publications Ltd.

Denzin, N. K., & Lincoln, Y. S. (2018). *The SAGE handbook of qualitative research* (5th ed. ed.). Los Angeles, Calif: Sage.

Dickie, J. W. (2014). *Reeds 21st century ship management*. London: Adlard Coles Nautical.

Drewry. (2019). *Ship Operating Costs Annual Review and Forecast* Retrieved from

Festinger, L. (1962). Cognitive dissonance. *Scientific American, 207*(4), 93-106.

Frankfort-Nachmias, C., Nachmias, D., & DeWard, J. (2015). *Research methods in the social sciences* (8th ed. ed.). New York, NY: Worth publishers.

Freeman, R. E. (2010). *Strategic management: A stakeholder approach*: Cambridge university press.

Galletta, A. (2013). *Mastering the semi-structured interview and beyond: From research design to analysis and publication* (Vol. 18): NYU press.

Ghauri, P. N., & Grønhaug, K. (2010). *Research methods in business studies* (4th ed. ed.). Harlow: Financial Times Prentice Hall.

Harrington, H. J. (2018). *Innovative Change Management (ICM): Preparing Your Organization for the New Innovative Culture*. Milton: Milton: Productivity Press.

Hiatt, J. (2006). *ADKAR: a model for change in business, government, and our community*:
Prosci.

Hinojosa, A. S., Gardner, W. L., Walker, H. J., Cogliser, C., & Gullifor, D. (2017). A Review
of Cognitive Dissonance Theory in Management Research: Opportunities for Further
Development. *Journal of management, 43*(1), 170-199.
doi:10.1177/0149206316668236

Jones, D. J., & Recardo, R. J. (2013). *Leading and Implementing Business Change
Management: Making Change Stick in the Contemporary Organization*. London:
London: Routledge.

Järvinen, M., & Mik-Meyer, N. (2020). *Qualitative analysis : eight approaches for the social
sciences*. Los Angeles: SAGE.

McArdle, G., & Hanson, C. (2006). *Eight Step Change Model*(1st edition. ed., Vol. issue 0608
(August 2006)).

Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis : a methods
sourcebook* (3rd ed. ed.). Los Angeles: Sage.

Oreg, S., Michel, A., & By, R. T. (2013). *The Psychology of Organizational Change: Viewing
Change from the Employee's Perspective*. New York: New York: Cambridge
University Press.

Pathak, H. (2010). *Organisational change*(1st edition. ed.).

Project Management, I. (2017). *A guide to the project management body of knowledge :
(PMBOK guide)* (6. utg. ed.). Newtown Square, Pennsylvania, USA: Project
Management Institute.

Sanders, K., Cogin, J. A., & Bainbridge, H. T. (2013). *Research methods for human resource
management*: Routledge.

Stopford, M. (2009). *Maritime economics* (3rd ed. ed.). London: Routledge.

Stopford, M. (2016). *Smart Shipping & the 4th Sea Transport Revolution* Retrieved from
http://mlecs.com/English/Lectures.asp?DoDownload=Content/Media-GL/GL1/GL1-Paper.pdf

Taylor, S. J., Bogdan, R., & DeVault, M. (2015). *Introduction to Qualitative Research
Methods: A Guidebook and Resource* (4 ed.). Hoboken: Hoboken: John Wiley &
Sons, Incorporated.

USAID. (2015). Retrieved from
https://www.usaid.gov/sites/default/files/documents/1868/597saj.pdf

47

Verzbolovskis, M., & Ballesio, J. (2013). Management of Change for the Marine and
    Offshore Industries. In: American Society of Mechanical Engineers Digital Collection.

Westerman, G., Bonnet, D., & McAfee, A. (2014). *Leading digital : turning technology into*
    business transformation. Boston, Mass: Harvard Business Review Press.

Appendices

Appendix A: Interview guide

1. What is your job title, and what is you experience in digital maritime projects?
2. How would you define digital projects in the context of the maritime industry?
3. "What is your experience with monitoring and managing the implementation of digital projects?
4. "What is the role of the management during the implementation phase in digital projects?"
5. "In your experience, what are some traits of successful implementation in digital projects?"?
6. "In your experience, what are some traits of unsuccessful implementation in digital projects?"
7. "What about upper management, can their attitude towards the project affect the implementation process?"
8. "What about employees, how does their attitude towards the change affect the outcome of the project?
9. "What can the management do to decrease resistance to change from employees?"
10. "What is the purpose of a risk analysis in relation to the implementation phase in digital projects"?
    a. "Do you have examples of risks in digital maritime projects"?
11. "What were the methods used in order to measure progress in the projects?"
12. "During the implementation, how well do these measures work as indicators of progress"?
13. "What are the future challenges when moving towards digital transformation?"
14. Is there something else you would like to add, or do you have any questions?

Appendix B: NSD APPROVED APPLICATION FORM

NSD NORSK SENTER FOR FORSKNINGSDATA

NSD sin vurdering

Prosjekttittel

Change Management in Maritime Projects

Referansenummer

530964

Registrert

25.02.2021 av Ola Kalland Dyregrov - 231180@student.usn.no

Behandlingsansvarlig institusjon

Universitetet i Sørøst-Norge / Fakultet for teknologi, naturvitenskap og maritime fag / Institutt for maritime operasjoner

Prosjektansvarlig (vitenskapelig ansatt/veileder eller stipendiat)

Marius Imset , Marius.Imset@usn.no, tlf: 31009320

Type prosjekt

Studentprosjekt, masterstudium

Kontaktinformasjon, student

Ola Dyregrov , oladyregrov@gmail.com, tlf: 90873887

Prosjektperiode

01.01.2021 - 15.05.2021

Status

09.03.2021 - Vurdert

Vurdering (1)

09.03.2021 - Vurdert

Det er vår vurdering at behandlingen av personopplysninger i prosjektet vil være i samsvar med personvernlovgivningen så fremt den gjennomføres i tråd med det som er dokumentert i meldeskjemaet med vedlegg den 09.03.2021, samt i meldingsdialogen mellom innmelder og NSD. Behandlingen kan starte.

DEL PROSJEKTET MED PROSJEKTANSVARLIG
Det er obligatorisk for studenter å dele meldeskjemaet med prosjektansvarlig (veileder). Det gjøres ved å trykke på "Del prosjekt" i øvre venstre hjørne av meldeskjemaet.

MELD VESENTLIGE ENDRINGER