UiT
THE ARCTIC
UNIVERSITY
OF NORWAY

Faculty of Engineering Science and Technology

Learning Ahead of Crisis

A Study of Preparedness in the Arctic

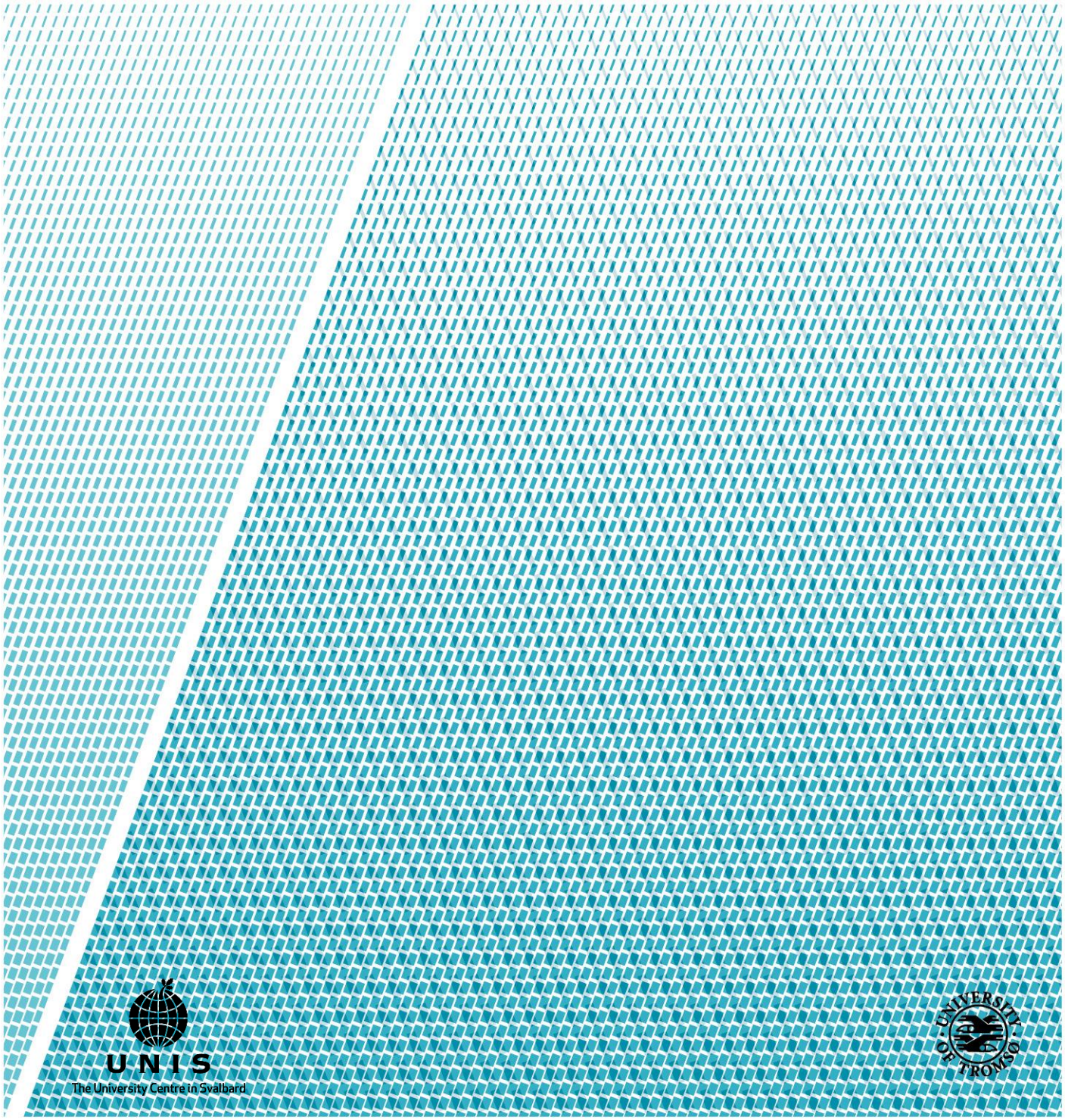
—

Jørgen Holst

Master's thesis Societal Safety – Safety end Emergency Preparedness in The High North

June 2019

Pages: 52 *Wordcount: 18 912*



Foreword

This thesis concludes my master's degree course in Societal Safety at the University of Tromsø and has been written in a joint venture with the University of Tromsø and the University Center in Svalbard. Five rewarding years in Tromsø comes to a worthy end, with the last semester partly spent in Longyear, Svalbard. In this time, I have been privileged to be acquainted with many extraordinary individuals in the bachelor's course, master's course, faculty and the university. The last twelve months have presented new and unique challenges for me, both academically and personally and it would have been an impossible journey without all the unique and extraordinary people around me.

I wish to salute and thank Peder Svane and Vetle Lars Wisløff Sandring for their friendship, loyalty and support through all my years at the university. A huge thanks goes to the search and rescue service operators at Lufttransport AS, the personnel at The Governor of Svalbard, and the rest of the immense preparedness community at Svalbard. Doing an impressive job keeping us all safe at 78° North! My counselor from the University of Tromsø, Reidar Staupe-Delgado has a lot of credit for this thesis making it to the finish line. Thank you for the advice, motivation and dedication in the process of writing this thesis. Thanks to the University Center in Svalbard and my co-counselor Bjørn Ivar Kruke, your help and advice have been helpful. At last I want to thank my family, friends and most important my partner for her relentless support, encouragement and patience throughout this process!

In loving memory of Geir Jakob Holst (1959 – 2019)

Somewhere in the Arctic, 31.05.2019

Jørgen Holst

Summary

The background for this thesis stems from the limited research into; and the challenges associated with development of preparedness in the Arctic. The main thesis question to answer is “How could social relations and cultivation of tacit knowledge improve preparedness in the Arctic?”. The thesis question is derived from the literature review and initial results of the pre-study of this thesis.

The theoretical framework for this thesis is springs out of acknowledged literature within the fields of preparedness and organizational learning. The literature chapter starts with discussing the current state of the fields, including ongoing debates, different perspectives and approaches. Following up with a presentation of Communities of Practice as a concept for building social relations through shared experience and common goals, before presenting an approach to management of tacit knowledge. Concluding with a condensation of the literature discussion resulting in the analytical approach for this thesis.

The thesis is performed as a qualitative case-study and sources its data from semi-structured interviews and participatory observation. The empirical findings are presented and analyzed thematically in relation to the underlying research questions. The findings suggest that preparedness organizations learn through both individuals, within the organization and that learning can be achieved between organizations as well. Other findings suggest that social relations and arenas like one could cultivate through Communities of practice, can be a potent asset for cultivation, harnessing, development and sharing of tacit knowledge. Through conscious management of tacit knowledge findings suggest that preparedness could be improved and developed even further.

In conclusion social relations and arenas can contribute to development of tacit knowledge, which in turn, through proper management can be deployed back to new and existing individuals within an organization. Through these processes the inherent preparedness can develop even further and be better suited to meet the complex challenges of tomorrow.

Table of content

1 Introduction

In the research field of preparedness and crisis-management both exercises and post-crisis learning play an important role. Both aspects are found in various adaptations of the preparedness phases, comprehensive emergency management, crisis management cycle and so on (Alexander, 2002; Kruke, 2015; Pursiainen, 2018). The increased complexity in the world around us, with its risks and potential for disaster, sets the stage for this thesis. If we imagine preparedness being complex, complicated and challenging at best, under relatively normal circumstances, we could imagine the increase in complexity and challenges, when performed under harsh arctic conditions.

The arctic region has been characterized as the modern ages last frontier (Dodds & Nuttall, 2016). With a few noble exceptions, like seal-hunting, mining and expeditions in the name of science (and fame), the arctic region has not been a center for notable activity in the modern age. With the change in climatic conditions and the introduction of new technology, the arctic region is yet again a thriving region regarding human activity (ibid.). Tourism, research, exploitation of natural resources, and new possibilities for naval logistics are some of the activities we see in the arctic region today (ibid.). With the current development and the future prognosis, it is reasonable to say that the arctic region is thriving and that we must expect that the level of activity will increase in the years to come.

With the current activity of today, and the expected increase of activity in the future, the need for preparedness in the arctic is crucial. What seems like regular day-to-day operations on the mainland of Europe, Asia or the Americas, could involve significantly higher risk, and potential for disaster when performed under arctic conditions, with scarce infrastructure and resources. Through the Arctic Search and Rescue Agreement, the arctic states have shined a light on the current situation, and the challenges surrounding preparedness in the arctic (Rottem, 2014).

With an expected increase in the need of efficient preparedness in the Arctic, it would be interesting to perform research into different branches of the field of preparedness, to shine a light on how preparedness could be increased further. In this thesis I aim to broaden our knowledge, through a study of learning in preparedness organizations in Longyear, Svalbard.

As a starting point for this thesis I examine relevant theories like Eriksson (2015) work with organizational learning in preparedness organizations. I reflect upon here work and use it as a starting point for my discussion regarding organizational learning in preparedness organizations, touching upon controversial topics like the debate on individual versus

organizational learning (Argyris & Schön, 1996; Eriksson, 2015); or if organizations are resistant to learning from crisis, or if post-crisis learning even is possible (Burgess, Fortune, & Peters, 1997; Smith & Elliott, 2007; Toft & Reynolds, 1997). Another dimension and approach could be preparedness as planning, where learning has a distinctive role for achieving and developing preparedness (Eriksson, 2015). As such making it a viable approach to explore further.

To achieve increased organizational learning in preparedness organizations one could introduce other theoretical approaches more related to the field of research on learning. I have chosen to deploy acknowledged theories involving Communities of Practice (Wenger, McDermott, & Snyder, 2002), where social relations and arenas are important factors for cultivation, development and sharing of knowledge between individuals and organizations. To increase the potential for organizational learning even further I have also deployed the SECI-model (Nonaka & Takeuchi, 1995), to describe and analyze how tacit knowledge could be cultivated, transformed and shared between individuals and organizations.

It is evident that within the current literature, there is an abundant focus on organizational learning within preparedness organizations. There is, however, a problem with the predominant focus over the last years on crisis prevention, causality and less than optimal approaches to post-crisis learning. Another challenge is the gap between operational preparedness capacities and preparedness planning. There is a gap in the current literature regarding social relations and management of tacit knowledge, and their potential and role for improving preparedness. The aim of this thesis is to explore and improve the research field of preparedness even further, towards an uncertain future, through broadened knowledge on the afore mentioned subjects I seek to contribute to the ongoing debate revolving organizational learning within preparedness organizations

1.1 Research Questions

In this subchapter I present the main thesis question, and the underlying research questions associated with it. I have organized it as a broader main thesis question, where I seek to broaden our knowledge about the role of social relations, cultivation of tacit knowledge for improved preparedness in rural Arctic areas.

Main thesis question:

How could social relations and cultivation of tacit knowledge improve preparedness in the Arctic?

The main thesis question is supported by three underlying research questions (RQ), designed to answer different dimensions of the main thesis question. I have organized them in a logical manner, where the first research question will be a stepping stone for the next, and so on.

RQ1:

How does learning occur in preparedness organizations?

To frame the components of the main thesis question, I first need to explore how learning occurs in preparedness organizations. Through this approach I develop a foundation for further exploration of social relations and tacit knowledge.

RQ2:

How can social relations contribute to learning in preparedness organizations?

When learning in preparedness organizations are examined, I can explore how social relations can contribute to said learning and how it can be an incubator for cultivation of tacit knowledge.

RQ3:

How can management of tacit knowledge affect organizational learning in a preparedness perspective?

At last I seek to answer how management of tacit knowledge affect and contribute to learning in a preparedness perspective. Through the three research questions I will get a robust stance for answering the main research question and conclude this thesis.

2 Context

While the phenomenon this study will investigate is organizational learning in preparedness organizations, the practical context of this study will be carried out in Longyearbyen, Svalbard. In this chapter and the following sub-chapters I will describe the geographical context at Svalbard and why I consider Svalbard and the preparedness community there to be a good foundation for research towards the afore mentioned phenomenon.

Svalbard is a Norwegian archipelago in the Arctic Ocean, situated north of mainland Europe about midway between continental Norway and the North Pole. Administratively, Svalbard is not part of any Norwegian county, but forms an unincorporated area administered by a governor appointed by the Norwegian government (Barr & Thuesen, 2019). As of 2016, Svalbard's population was 2,667, mostly situated in Longyearbyen (from here on: Longyear), the largest settlement on the archipelago and the seat of the governor (ibid.).

Figure 1: Location of Svalbard in dark green, mainland Norway in light green. "A map of Svalbard within Norway and Europe", 2016, by Rob984. (https://upload.wikimedia.org/wikipedia/commons/thumb/c/c3/Norway-Svalbard.svg/1070px-Norway-Svalbard.svg.png).

The archipelago features an Arctic climate with long, cold winters and short, cool summers, although with significantly higher temperatures than other areas around the same latitude because of the North Atlantic Current system (Barr & Thuesen, 2019). Still, the average summer temperature is considered low, with temperatures between four to six degrees Celsius, and January averaging temperatures between -16 to -12 degrees Celsius (ibid.). Svalbard is where cold polar air from the north, and mild, wet sea air from the south meet, creating low pressure fronts, dynamic weather and strong winds (ibid.). Glacial ice covers about 60% of the archipelago, about 30% is barren rock and approximately 10% is vegetated (ibid.).To understand why Svalbard can be viewed as a good starting point for research on the topic of preparedness, one could examine the map (figure 1) to get an idea of the conditions Svalbard is subject too. As the archipelago is so remote and subject to harsh climate conditions, errors and mistakes here may prove far more harmful than on the mainland.

This is also obvious in the preface for the overall contingency plan the local government in Longyearbyen "Preparedness is important in all contexts and in all parts of society. Perhaps even more important here in Longyearbyen, as in many contexts we become very alone and must manage ourselves over a long period of time" (Longyearbyen Lokalstyre, 2017).[1] These examples illustrate some of the challenges when it comes to preparedness in remote areas, hence the need for more research and better knowledge about elements relevant for preparedness under harsh conditions and limited resources.

2.1 Lufttransport Search and Rescue Service

Lufttransport AS provides search and rescue services and operates two Super Puma rescue helicopters for the Governor of Svalbard (Justis- og Beredskapsdepartementet, 2012).[2] The rescue helicopters have the capacity to pick up 18 distressed people within a radius of 120 nautical miles. Furthermore, the rescue helicopters are in a 24-hour emergency preparedness and constitute a significant resource for the Governor of Svalbard in rescue operations (Sysselmannen på Svalbard, 2016).[3] The search and rescue service are a vital component of the overall preparedness at the archipelago of Svalbard and will serve as key actor in this thesis.

2.2 The Governor of Svalbard

The Governor of Svalbard is the highest representative of the Norwegian Government on Svalbard and has overall responsibility for societal safety and security and preparedness on Svalbard as police officer and county governor (Sysselmannen på Svalbard, 2016). As police officer on Svalbard, it is the Governor that leads the local rescue center. The local rescue center in turn, is subject to the Main Rescue Centre in Northern Norway (Justis- og Beredskapsdepartementet, 2012). It is the same laws and regulations that lay the guidelines for police work on Svalbard as on the mainland. The police department consist of a chief police officer and twelve police officers; performing around the clock preparedness with at least two policemen on duty (Direktoratet for samfunnssikkerhet og beredskap, 2016). The Governor disposes two rescue helicopters operated by Lufttransport AS. The Service vessel M/S Polarsyssel is another important resource that is on standby nine months of the year. The Governor annually carries out several training sessions and collaboration exercises with

[1] Local government in Longyearbyen.
[2] Ministry of Justice and Public Security.
[3] The Governor of Svalbard

emergency agencies, helicopter crew, Red Cross and tour operators within rescue and coordination (Sysselmannen på Svalbard, 2016). The Governor of Svalbard's role for coordination and overall preparedness are vital factors for the various activities taking place in the region. Thus, making The Governor of Svalbard a key actor in this thesis.

2.3 Thesis Background

The project started in December 2017, during a feedback session of one of the subjects in the master course, that semester. Our professor noticed my interest in search and rescue in northern Norway and suggested that I should consider a master thesis within this field, with an arctic perspective. I was intrigued by the idea, and the thought of doing my master project at Svalbard, at 78 degrees north. After a preliminary meeting with Are Sydnes, I had a list of names and roles in the preparedness community at Svalbard, that I was strongly encouraged to contact, and discuss the possibilities for cooperation for my master project. Just in time before the start of my last year at the master's program, I had secured a cooperation with the search and rescue service at Svalbard, and the planning could start. In the middle of December 2018, I travelled to Longyearbyen to start the first field-study. where I met up with key actors in the preparedness community in Svalbard, conducted interviews, participated in a full-scale crisis exercise, observed the search and rescue service during both training and a live mission, and got the opportunity to gather a lot of interesting data for the master thesis.

3 Litterature

In this chapter I will go through and discuss relevant literature for this study. I will start with a short description of preparedness in general and follow through with a broader discussion about preparedness and organizational learning. Towards the end of the literature chapter I will present theory related to Communities of Practice and theory related to the harnessing of tacit knowledge. I will conclude the literature chapter with a synthetized analytical model, where I unite preparedness, Communities of Practice and tacit knowledge. This model will serve as my analytical tool later when I analyze my empirical findings and discuss the broader implications of the theories applied in the model.

3.1 Preparedness as a Process

When we examine preparedness as a process, one could employ Roux-Dufort (2007) perspective where crisis is perceived as long incubation periods, suddenly manifesting itself in a precipitating even. As such, suggesting that crises develop in phases and should be approached processual. There are several models that describes preparedness as a process, one of them is Alexander (2002) Comprehensive Emergency Management model (CEM). That divides the process in to four phases consisting of 1) mitigation; Comprises all actions designed to reduce the impact of future disasters. These can be divided into structural measures (engineering solutions to problems of safety) and non-structural measures, which include land-use planning, insurance, legislation and evacuation planning. 2) Preparedness; Refers to actions taken to reduce the impact of disasters when they are forecast or imminent. They include security measures, such as the excavation of vulnerable populations and sandbagging of river levees as floodwaters begin to rise (thus the planning of evacuation is a mitigation measure, whereas its execution is a form of preparedness). 3) Response; Refers to emergency actions taken during both the impact of disaster and the short-term aftermath. The principal emphasis is on saving and safeguarding human lives. Victims are rescued, and the immediate needs of survivors are attended to. 4) Recovery; Is the process of repairing damage, restoring services and reconstruction facilities after disaster has struck (ibid.).

Another approach is the Kruke's phase model that involves most of the key aspects of CEM as seen above, although differentiating at key parts,reduced to three phases; pre-crisis; acute crisis; post-crisis (Engen, Kruke, Lindøe, Olsen, Olsen & Pettersen, 2016). At first glance both models seem quite similar, and they are. Although, they differentiate at key parts. Whereas the CEM model is understood to view recovery, as recovery to the old pre-accident; normal situation¸

Kruke's phase model examines the post-crisis phase, as adaptation to the new normal situation, making it more in line with the complex work of modern-day preparedness.

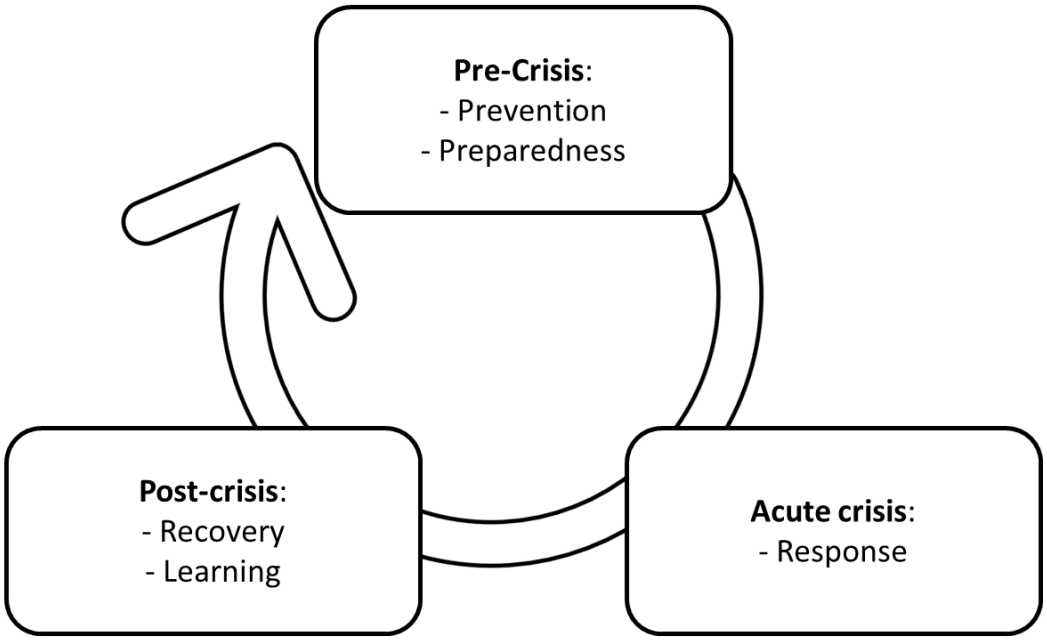


Figure 2: Kruke's phase model (Kruke, 2015).

When I set out to study learning in preparedness organizations, I will discuss both preparedness as both a process and a phenomenon and seek to relate it to organizational learning. In the following sub-chapters I will go through preparedness in relation to organizational learning, followed up by theories related to Communities of Practice and management of tacit knowledge.

3.2 Preparedness in Relation to Organizational Learning

In the literature we find different perspectives on preparedness. At one side we find a focus on activities, and a view of preparedness as activities undertaken before a crisis. On the other side we find an understanding of preparedness as an activity to foresee potential problems and to suggest possible solutions (Eriksson, 2015, p. 520). Eriksson goes a step further and introduces

a third approach, where one could see preparedness as planning, and that preparedness planning could be focused on planning as a learning process (ibid.). When it comes to learning in this context, scholars disagree about the level at which learning takes place. The concept of learning is multifaceted and is argued to be a conceptual minefield (Levy, 1994). In regards of preparedness (planning), learning could be grouped into three perspectives regarding; who learns; what is learned; and how to learn (Eriksson, 2015, p. 520). When arguing who learns; one perspective suggests that learning only can take place on the individual level, whereas other perspectives suggests that learning indeed can take place on the organizational level (Argyris & Schön, 1996), thus through the individuals in the organization (Argyris & Schön, 1996; Levy, 1994). As such, it would be interesting to explore how an organization could extend and broaden its learning potential, through preparedness planning and execution. Another dimension could be in which way organizations accumulate, refine and finally implements knowledge throughout the organization.

A major controversy in the field is the relationship between organizational and individual learning. Is organizational learning simply the sum of individuals who have learned (Eriksson, 2015, p. 520), or could it be viewed as something bigger? Learning may be viewed as an individual learning on their own, or an organization doing an operationally focused self-evaluation, (e.g. repeated attempt at the same problem with no variation of method and without ever questioning the goal), elsewhere referred to as single-loop learning (Argyris & Schön, 1978, 1996, 1997). For individuals to learn, there must be *something* for them to acquire or draw from direct or indirect experience. This something will be the *content* of what is being learned (e.g. the information and skills obtained through experiences and/or introduced knowledge). Examples on the content of learning could be; specific skills, specific behavior, how to understand and interpret situations, or the use of tools and equipment (Sommer & Njå, 2012, p. 221). While the debate regarding levels of learning goes on, it would nevertheless be valuable to broaden our perspective on the interaction between single- and double-loop learning, and how this applies when it comes to learning and obtaining critical skills, behavior and situational understanding in preparedness organizations.

Learning may also involve change at the strategic level, where individuals or organizations are able to reflect upon, question and modify goals, values, assumptions and policies, or what is often labelled double-loop learning (Argyris & Schön, 1978, 1996). While we have several schools concerned about organization learning, there is opposing scholars arguing that organizations are resistant to learning from crisis. Smith and Elliott (2007, p. 519) criticizes

research in the field of crisis management of being too focused on crisis causality, prevention, response, with limited consideration given to organizational learning from crisis. Birkland (2009, p. 148) warns about the risk of superstitious learning; learning without some sort of attempt to analyze the underlying problem. One could also view organizational learning in contrast to different phases of crisis, as Smith and Elliott (2007) puts it: learning *for, as* or *from* crisis. Where the idea is that opportunities for learning could manifest in each of the three stages of crisis like the pre-event 'crisis of management', the focal 'operational crisis' or the post 'crisis of legitimation. Eriksson (2015) approaches learning through the process of preparedness planning, and explores several pedagogical perspectives in that regard, with an emphasis on: what is to be learned? The controversies surrounding learning from crisis, and if organizations *can* learn from crisis at all is a valid question, that we as researches and the preparedness industry itself, should ask. I think; through controversial questions like this, the industry can evolve itself in order to meet the challenges of tomorrow.

Preparedness planning is about developing abilities to manage future crisis and creating learning throughout the organization. Because of this, the crisis management literature focuses on learning at the organizational level and in particular on preparedness activities, like exercises and risk analysis (ibid). What needs to be pointed out is that preparedness planning is more than just separate activities, it is about creating one preparedness process preferably connected to other processes in the organization. Eriksson (2015) argues that a learning process must be developed to suit the specific organization and its need.

We could also view preparedness as a phenomenon; being prepared or being in a state of preparedness. In the literature there is a somewhat exaggerated focus on planning, procedures and regulations, suggesting there is link between these factors and preparedness, and in some circumstances; like the political landscape and politicalized perspective on preparedness, one could go as far as claiming there is an equal sign between these factors and preparedness (Anderson, 2010; Staupe-Delgado, 2018). In other words, written plans, could be viewed as physical manifestation of preparedness, and sold off as a positivistic understanding of actual preparedness. In other words, planning and plans are not equal to effective and timely preparedness, it is just as critical that the organizations utilize learning, and manages to draw lessons from future accidents, as well as exercises and training.

There is a growing body of evidence that organizations are resistant to learning from crisis (Burgess et al., 1997; Smith & Elliott, 2007; Toft & Reynolds, 1997). To date, the study of crisis management has focused upon crisis causality, prevention, response and turnaround with

limited consideration given to organizational learning from crisis (Smith & Elliott, 2007). Despite contrary evidence, an underlying assumption of many studies is that organizational learning tends to follow a crisis (Smith & Elliott, 2007, p. 519). If we view preparedness and learning together, one could argue that preparedness is about developing abilities and capabilities in both organizations and individuals in those organizations, to enhance their ability to respond to future crises (Eriksson, 2015, p. 520). Preparedness and learning could and should be tightly coupled, without proper learning in hindsight of a crisis, would the following casualties and damages be for nothing? Through implementation of learning in the preparedness process, it is reasonable to assume that one would be better suited to meet the next crisis than the last.

To increase the potential for organizational learning, both before, during and after a crisis I would argue that one must look to more informal and unstructured approaches, arenas and processes. Theories around Communities of Practice could be a good foundation for capturing and harnessing knowledge (and tacit knowledge) for constructive use and development in the future. In the next subchapter I will discuss communities of practice and their role for constructive organizational learning, considering how preparedness functions as a relational (interpersonal) phenomenon.

3.3 Tacit Knowledge and Preparedness Capacity as a Relational Phenomenon

In this subchapter I will discuss literature related management of tacit knowledge in relation to preparedness capacity. I will utilize literature from the topics of Communities of Practice and tacit knowledge management, based on Wenger et al. (2002) practical model for development of Communities of Practice. Further on I set out to link the aforementioned to Nonaka and Takeuchi (1995) model for harnessing and distributing tacit knowledge. With the purpose of synthesizing an analytical framework suited for analyzing the yield of my empirical results during this study.

Individual knowledge could be viewed as a true conviction of the perceived reality (Krogh, Lillejord, Nonaka, & Ichijo, 2001, pp. 20-21). One could go further on to view knowledge as a construct of reality, rather than a universal or abstract truth. If we break down knowledge to more concrete parts, one could see knowledge as *explicit* or *tacit* (ibid.). For example, an engineer would display their knowledge about designs in the form of a blueprint and detailed descriptions, making their knowledge explicit. Other dimensions of knowledge are tied to our

senses, skills, dexterity, individual perception, physical experiences and intuition. Tasks like interpretation of complex data or performing search and rescue operations under harsh conditions, requires knowledge that is not necessarily available in manuals and handbooks, and hardly could be performed by an untrained novice (ibid.). To acknowledge the value of tacit knowledge and manage it, is one of the core challenges in organizations that relies on knowledge development. The arenas for development of tacit knowledge is found in interpersonal relationships, between individuals that share a common desire to develop knowledge within their respective fields, making tacit knowledge a powerful tool for innovation (ibid.). To lay the grounds for efficient development of knowledge could be challenging. Hence, it is important to facilitate these interpersonal arenas, to achieve knowledge development. An approach to this could be Communities of Practice, that through common arenas suitable for development of interpersonal relationships, could facilitate to the development of tacit knowledge.

3.3.1 Development of Communities of Practice

A Community of Practice can take many forms, and can be as diverse as the situations that produce them (e.g. long-lived vs. short-lived, collocated vs- distributed, ad-hoc vs. intentional, and so on), however, they all share a unique combination of three fundamental elements: a *domain* of *knowledge*, which defines a set of issues; a *community* of *people* who care about this *domain*; and the *shared practice* that they are developing to be effective in their domain (Wenger et al., 2002, pp. 26-27). These terms constitute what the authors label the *structured model for developing Communities of Practice,* which will be elaborated on in the following:

Domain: The work of negotiating a shared domain is critical to community development. A community must ask itself: What topics and issues do we really care about? How is this domain connected to the organization's strategy? What is in it for us? What are the open questions and the leading edge of our domain? are we ready to take some leadership in promoting and developing our domain? What kind of influence do we want to have? (Wenger et al., 2002). Addressing these types of questions will help a community develop a shared understanding of its domain, find its legitimacy in the organization, and engage the passion of its members. When it comes to preparedness (both planning and execution), the domain aspect is important. It sets boundaries, formative values and gives guidance. Through reflections like the questions above, both individuals and organizations could take the firsts steps towards developing a Communities of Practice, to broaden and develop their own knowledge further.

Community: The community element needs attention, organization, and nurturing: What roles are people going to play? How often will the community meet, and how will members connect on an ongoing basis? What kinds of activities will generate energy and develop trust? How can the community balance the needs of various segments of members? How will members deal with conflict? How will newcomers be introduced into the community? (Wenger et al., 2002). Addressing these types of questions will enable the community to find its specific ways to operate, to build relationships, and to grow. Mutual trust, continuity and adaptability is all important factors when it comes to preparedness, and especially search and rescue operations. When these factors are addressed and implemented, the Communities of Practice could start serving as an incubator for knowledge development.

Practice: Any community with sustained interactions in a domain will develop some kind of practice over time. Nevertheless, a community can become proactive in taking charge of the development of practice. What knowledge to share, develop, document? What kinds of learning activities to organize? How should the knowledge repository be organized to reflect the practice of members and be easily accessible? When should processes be standardized and when are differences appropriate? Where are sources of knowledge and benchmarks outside the community? (Wenger et al., 2002). These are the kinds of questions that will help a community intentionally become an effective knowledge resource to its members and to other constituencies that may benefit from its expertise. Practice could be viewed as one of the most important parts of Communities of Practice, this is where the knowledge starts, and where it could develop further. Through interactions between individuals and organizations, knowledge can be cultivated and nurtured. Here tacit knowledge could take the leap from the individuals mind, over to other individuals and hopefully into the organizations itself, making the knowledge available for all personnel that could benefit from it, and possibly develop it even further.

To summarize one could view Communities of Practice as framework, foundation or an incubator for development of knowledge. Depending on the desired goals of these endeavors, Communities of Practice could also be helpful tool for harnessing and capturing knowledge, both explicit and tacit, although tacit being more challenging. Nevertheless, tacit knowledge could serve as a powerful tool for broadened understanding and development of knowledge. In relation to the field of preparedness one could argue that knowledge in general, and tacit knowledge especially, both are important for development of efficient and timely preparedness.

As this study sets out to explore learning and preparedness, I will utilize theory related to management of tacit knowledge and pursue this topic in the next subchapter.

3.3.2 Management of Tacit Knowledge

As with Krogh et al. (2001) view on knowledge and Communities of Practice, Nonaka and Takeuchi (1995) also have a viewpoint of tacit knowledge opposed to explicit knowledge and describes a process of alternating between the two of them in their model. Tacit knowledge is personal, context specific, and subjective; whereas explicit knowledge is codified, systematic, formal, and easy to communicate, as we will examine in Figure 2 illustrating the SECI-model (Nonaka & Takeuchi, 1995).

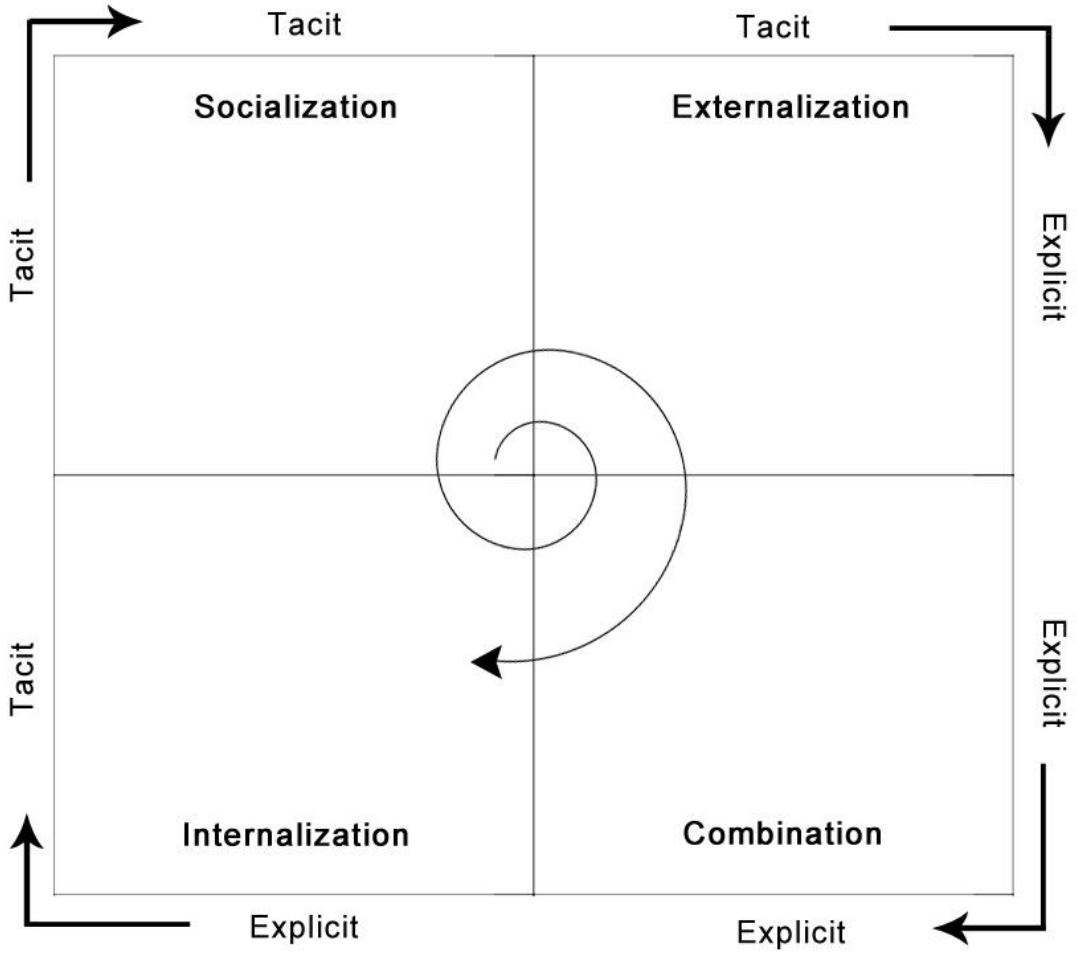


Figure 3: "SECI model developed by Nonaka & Takeuchi (1995)", 2012, by Ibmgroup. (https://upload.wikimedia.org/wikipedia/commons/a/af/SECI_Model.jpg).

The tacit knowledge of key personnel within the organization can be made explicit by processes of socialization (tacit-to-tacit), i.e. acquiring the tacit knowledge of others through interaction for example through meetings or shared experiences (ibid.). This could be seen in relation to Communities of Practice, and the importance of social arenas for exchange of knowledge and

cultivation of both explicit and tacit knowledge. Building up under the argument that Communities of Practice could be utilized as an incubator or facilitator for development and management of tacit knowledge. As we have seen in the previous chapters, learning is a vital part of preparedness, and increased utilization of tacit knowledge for the purpose of creating knowledge and further learning, must be viewed as an asset in any preparedness organization.

In the next step, the acquired knowledge is articulated and created in a corresponding process of externalization (tacit-to-explicit) i.e. blueprints, images, written documents (ibid.). When a functioning Communities of Practice is effective, the tacit knowledge that has been amassed and shared through socialization, could be codified, formalized and finally be distributed to relevant actors, throughout the organization or even between organizations. Combination (explicit-to-explicit) refers to the ability of individuals or organizations to cross-reference multiple bodies of explicit knowledge and to connect them to a coherent whole. Examples of this could be collection of explicit knowledge either inside or outside the organization and combined or edited to form new knowledge (ibid.). In this phase knowledge and experience from different actors have the potential to *melt* together across organizational or traditional vocational barriers, making it possible to achieve even greater knowledge than one individual or organization would do by itself. For preparedness actors in isolated rural areas, the possibility to interact and share knowledge must be viewed as more than just luxury, it is a vital factor for meeting new threats and reducing the likelihood of unwanted incidents. The knowledge can then be incorporated into new products and processes for later internalization (explicit-to-tacit), i.e. embodying externalized knowledge in employees and/or applying it in practice (ibid.). For a preparedness organization it is vital to share and distribute knowledge that could reduce the likelihood of risks and unwanted incidents, the process of externalization is a critical part to achieve that goal. The four processes of the SECI-model are continuously iterated as knowledge generation proceeds, illustrated by the spiraling arrow in the center of the model (ibid.). There is a corresponding difference in knowledge content in which tacit knowledge not necessarily needs to be expressed verbally but can be transferred by watching someone doing or demonstrating a task. Externalized knowledge, on the other hand, is expressed by word and preferably in standardized formats such as reports and handbooks.

To summarize, management of tacit knowledge could be viewed as a key asset when it comes to increasing knowledge in an organization. It seems like it would be even more critical for preparedness organizations, to increase their knowledge, in order to meet new and complex risks in a best possible manner. In other words, management of tacit knowledge is a vital asset

for effective preparedness. Further on Communities of Practice could be an effective facilitator for releasing and harnessing tacit knowledge, both from individuals but also across organizations and different branches.

3.4 Analytical Approach

In the previous sub-chapters I have discussed literature and theories related to preparedness, learning, knowledge, Communities of Practice and management of tacit knowledge. In this sub-chapter I will seek to bind all these perspectives together, resulting in the analytical approach for this thesis.

As examples on the broader perspective on preparedness we have seen several models and approaches. Like comprehensive emergency management (Alexander, 2002) and Kruke's phase-model, comprising three continuous phases from *pre-crisis,* via *acute-crisis* to *post-crisis,* where Kruke (2015) goes a step further when it comes to learning in relation to preparedness; stressing the fact that one does not restore back to the previous *normal* situation, but rather *learn* from the crisis and establish a *new normal* situation.

Further on we have seen a discussion on literature regarding preparedness in relation to organizational learning, showing us two branches in relation to individual versus organizational learning; is both possible, or does learning only occur at the individual level? In my discussion I argue that it would be valuable to broaden our perspective on the interaction between single- and double-loop learning (e.g. individual vs, organizational). The other branch revolves around the question; can organizations learn from crisis? Where opposing scholars argue for and against. In my discussion I argue that controversial questions like this is important to push us as researchers, and the industry itself forward, and force us to evolve with the ever-evolving world around us. Further on I argue that preparedness and learning could and should be tightly coupled, and that it is reasonable to assume that one through implementation of learning would be better suited to meet the next crisis.

To increase the potential for organizational learning in all three phases of crisis I propose that one must look to more informal and unstructured approaches, arenas and processes. Hence my focus on the theories surrounding Communities of Practice (Wenger et al., 2002) and management of tacit knowledge (Krogh et al., 2001; Nonaka & Takeuchi, 1995). In this construct, I view Communities of Practice as an incubator or facilitator, to expose, harness, share and finally implement knowledge to a greater body of individuals or organizations.

For this process to happen it is vital that there are a Domain setting the framework and limits for the Communities of Practice to evolve in (Wenger et al., 2002). In this thesis I would argue that the domain are the preparedness challenges presented by the harsh environment and conditions in the Arctic region. In the domain, we would need a Community of actors with a common goal of increasing their mutual knowledge (ibid.), that would be the preparedness actors (individuals and organizations) at Svalbard, that interacts with each other in a constructive way sharing Practice (ibid.). Through this process a Community of Practice would form and evolve, laying the groundwork for exposing and harnessing tacit knowledge.

Management of tacit knowledge is a key part of this thesis and could be done through the steps of Nonaka & Takeuchi's SECI model, describing how tacit knowledge could be cultivated between individuals and within and between organizations. Through the processes of Socialization, where tacit knowledge is shared between individuals, Externalization where knowledge is made explicit, through physical manifestation, via the process of Combination where knowledge can be integrated, and finally implemented to new individuals through the process of Internalization.

In this thesis the afore mentioned perspectives serve the purpose of bridging the field of preparedness with learning. Through literature and theory, I have drawn a path between the two different fields and shined a light on different perspectives and approaches. To analyze learning in preparedness organizations, I have narrowed down to this analytical approach. The combined theories provide a robust framework for further analyze of the empirical findings from my research in Svalbard. Further on, my analytical approach will set the framing for my discussion later in the thesis.

The aim and ambition of the analysis to follow is to contribute with new knowledge on the relationship between learning and preparedness, and more specifically how relational capacities and management of tacit knowledge could be an asset for improved preparedness. In this way the thesis critically engages with the work of Eriksson et al., Argyris & Schön, Smith & Elliot and many more, by building on their research into the field of learning in preparedness organizations, while drawing on the works of Wenger et al. and Nonaka et al. where I seek to elevate the role of (management of) tacit knowledge within the Communities of Practice. While the previous discussions regarding learning and preparedness have resulted in an analytical framework, we will now take a deeper look at the methodological approach for this study.

4 Method

In this chapter I will elaborate on the methodological approach for the project. In the following sub-chapters I will discuss relevant research designs, collection of data, and lastly ethical reflections in relation to this thesis.

4.1 Research Design

The social science inquiries are about how one should collect information about a social phenomenon and how to analyze this information so it can provide insight into social conditions and processes (Johannessen, Christoffersen, & Tufte, 2011). In the following chapter I will explain the process and the choices I have made through the process. All interviews were conducted in Norwegian, and it is important to stress that all quotes used in this thesis is translated from Norwegian to English. In translation theory, there are two main schools of thought, the word-for-word approach of instrumental translation, and the sense-for-sense approach of hermeneutic translation (Venuti, Gouanvic, & Simon, 1991). Venuti et al. (1991) argues that the hermeneutic model is to be preferred over its instrumental counterpart as it offers a more sophisticated account of translation that is not only comprehensive but also ethical (ibid.). As such, I have utilized the hermeneutic approach of sense-for-sense since it conveys the best approach for translation from Norwegian to English, rather than instrumental translation, where I would risk to loose much of the original meaning in the interviews.

4.1.1 Case Design

Through my research design I have decided to perform this thesis as a case study. The research approach is used within multiple disciplines and contains a study of one or several cases over time, through detailed and extensive data collection (Andersen, 1997; Yin, 2014). In this case, I have studied preparedness organizations at Svalbard, to illustrate how organizational learning in preparedness organizations could take place, and how Communities of Practice within and among those organizations could be a source for organizational learning, and utilization of tacit knowledge. The design was chosen in relation to the main thesis question and the purpose of this study. Through the case study approach, I could narrow the focus to the specific case and draw conclusions on the research questions; and was as such given the opportunity to illustrate specific topics in an analytical setting (Andersen, 1997; Yin, 2014). The following inquiry is of a qualitative nature, which implies a preoccupation with studying a phenomenon, to earn new knowledge and a better understanding about the phenomenon at hand.

In social science it is a goal to integrate theory and empirical findings. This is achieved in this thesis, with the case study being theoretically interpretive, where general insight and theory is used to explain the case that is being studied (Andersen, 1997, p. 70). The theory has not been based on a single theory or model, but rather been constructed by employing and combining elements from various theories (Blaikie, 2010, p. 155). Since the aim of the study is to contribute to research, the theoretical framework has been shaped on established academic literature on preparedness, organizational learning including sub-topics like Communities of Practice and management of tacit knowledge; with the aim of contributing to the field of research and broadened understanding of said topics.

4.2 Data Collection

The material for this study is based on observation of preparedness actors in the field and exercise Polar Night (Øvelse Mørketid), accompanied with interviews conducted with both operational preparedness actors and administrative employees of various preparedness actors. To strengthen the empirical foundation, I have gathered data through semi-structured interviews and participatory observations. In support of constructing the research design and interview guide, I have utilized several documents involving preparedness and risk analyses on Svalbard. Although they have not served in an empirical fashion, they have been useful to develop a timely and relevant research design. In the following sub-chapters I will elaborate on the processes of data collection, design of the interview guide, and lastly analysis and presentation of data. First, I want to give a review of the decisions regarding selection of informants.

4.2.1 Informants

Informants where recruited through the snowball-approach. Researchers at the University of Tromsø, with in-depth knowledge about the preparedness community at Svalbard, recommended potential partners for the thesis. I contacted some of the preparedness actors in Longyear and presented my project. Through this initial contact, I got contact details to other potential informants in Longyear. Within my first trip to Longyear, I had informants from most of the actors and organizations in the preparedness community at Svalbard. In table 1, I have sorted the informants by their respective organizations, represented with Lufttransport Svalbard in red; that performs

Table 1: Informants index

Informants sorted by organization			
SAR	S1	GoS	P1
	S2		P2
	S3		P3
	S4		

search- and rescue services (SAR) on behalf of The Governor of Svalbard (GoS) in blue. To ensure the informants privacy I only refer to them by the informant codes as listed in table 1.

4.2.2 Participatory Observation

This study aims to understand how organizational learning can unfold in preparedness organizations, and how tacit knowledge could be harnessed, refined and redeployed back to new and existing individuals in the organizations; illustrated by the preparedness community on Svalbard. While I have some operative experience, there is a limited turnover to the world of civil emergency management. As such, it was very helpful for me to be able to observe how the actors worked together. I was fortunate enough to be able to participate in a real rescue mission with the search and rescue service and a police officer; witness a training session from the helicopter; and was invited as an observer during the collaboration exercise Polar Night. This helped me to better understand the context these actors where working in, and thus better understand and interpret the information from the informants. Observation can furthermore provide valuable information in the form of information that may be difficult for informants to express during an interview and give answers to silent truths or conditions one takes for granted (Johannessen et al., 2011). One example of this I observed, was how different some actors would communicate with other actors that they knew well versus actors they did not have same familiarity with. As I got to observe both a real mission, as well as training I was also able to observe differences in communication, cooperation and how the actors focused and improvised. While most of the informant's default mindset was "train as you fight" there where will always be some nuanced differences between training and the real world.

In addition to these observations I would argue that I exercised some form of participatory observation in relation to the interviews. We usually met some time in advance of the scheduled interview, and in many cases got a tour around the office or workplace before the interview. While waiting for the informants to be ready for the interview which, I got the opportunity to observe them during work, performing daily routine and tasks around me. There was also time for casual small talk before and after the interviews which gave me the opportunity to ask more informal questions and take part in discussions. I saw this as valuable for interpretation and analyze of my research data, later in the process. It is debatable that the informants were unaffected by my presence as an outsider in an otherwise tight knit community, and thus affecting the credibility of my data collection. The various actors I observed were very aware that I was there to perform research and what phenomenon I was researching. Since the purpose of the observation of the actors were to give me a better understanding of what they do to

achieve organizational learning, and how they do it, this could be viewed as a weakness, but I would also argue that it gave me the opportunity to ask questions to reproduce a more accurate and correct picture of the topics previously discussed, and as such contributing to increase the reliability of the project.

4.2.3 Semi-structured Interviews

Interview is a valid approach to gain insight into a complex phenomenon, and a common starting point for data collection for research designs based in case studies (Yin, 2014). It is in the interest of the thesis to have informants who sit with first-hand knowledge of the phenomenon inquired. According to Johannessen et al. (2011), to arrive at the experiences and perceptions of the preparedness actors, one must talk, interact, listen and ask questions. Through qualitative interviews, I was given the opportunity to interact with the informants at their workplace, giving me a perspective on their work environment, challenges and opportunities. This puts me as a researcher, in a better position to interpret the answers, reflections and perceptions offered by the informants (ibid.).

I chose to employ semi-structured interviews as they have an overall guide or theme, that forms the basis for the interview (Johannessen et al., 2011). As such, making it easier to conduct somewhat similar interviews, while at the same time easing the analysis work afterwards. In addition, semi-structured interviews offer flexibility, as the order of questions and topics can vary, which in turn opens for a more informal and less rigid setting around the interview. This makes the situation more natural and it is easier for the informant to speak freely (ibid.). Since semi-structured interviews are flexible in nature, they can vary from informant to informant, this can pose challenges in the analysis process where one must look for a pattern in the data material, to create an understanding of what is examined (ibid.). A key question related to conducting interviews is whether to record the interview or not (Yin, 2014). To ensure best possible reproduction of the raw data I recorded the interviews. The informants where informed in advance about privacy regulations and their right to privacy, and unhindered withdrawal from the thesis, while participating in this study. Recordings where managed and handled in accordance with Norwegian regulations on privacy, and quality assured through dialogue with NSD. [4]

4.2.4 Interview Guide

An interview guide could be designed as a list of topics and general questions that are to be asked during an interview, where the theme should be relevant in relation to the research

[4] Norwegian Centre for Research Data

questions and the theme the study aims to answer (Johannessen et al., 2011). How an interview guide is designed, can contribute to avoiding an interview effect during the interview, that is, the informant is affected by it being an interview, which in turn affects the information the informant is sharing (ibid.). By being attentive to the order of the questions one can facilitate an open and trusting relationship between informant and interviewer, which in turn leads to receiving honest and sincere answers (ibid.). During the interviews I always opened with simple question such as asking the informants to elaborate on their background, education and work experience. Then, the questions went over to be more related to topics like preparedness, organization, and exercise Polar Night. In accordance with the guidelines of Johannessen et al. (2011), the interview guide was divided into main topics that are in accordance with the theoretical framework for this thesis. The thematization of the interview questions was chosen to give both the informants and me as a researcher a better grasp of the topics the interviews where meant to cover. This also proved to be helpful later in the analysis work as it helped to facilitate, thematization and structuring of the data gathered. At the end of each interview I would ask if the informants had something they saw fit to add, or if there where something from the interview that needed explanation.

While the informants were notified ahead of time about the topics of the interview I did not share the interview guide in advance. As the preparedness actors on Svalbard is part of a very tightly knit community and often meet and speak to each other daily, I thought of the possibility of them discussing the interview questions, that could possibly alter the information. I did however share the interview guide with them; together with a letter where I presented the thesis and me as a researcher; for them to go through it for as long as they needed before the interview started. The interviewees were informed about the research ethical rights and was explained their right to anonymity and confidentiality, as well as the informants right to withdraw their consent and participation in the thesis at any time. This way the informants also had the opportunity to examine the questions and make an informed decision if they wanted to participate in the thesis, or if there were any questions they did not wish to answer. When organizing the interviews in this manor, the informants have some time to reflect upon the interview questions, themes and possible implications of their participation or the information they volunteer. As such, I as a researcher must consider the possibility for answers being altered or adjusted by the informant. In an effort to ensure the integrity of the data I interviewed several informants within several organizations and performed participatory observation at the workplace and in theater.

4.2.5 Analysis and Presentation of Data

A qualitative approach to a research study can amount to large amounts of information (Johannessen et al., 2011). Combined with the choice of conducting semi-structured interviews, can pose challenges in the analysis process in relation to sorting and getting an overview of essential and relevant data (ibid.). As such, it can be argued that the purpose of the data analysis in this thesis is both to organize the interpret the data material (ibid.). Yin (2014) stress that in case studies this phase of the research process is a critical aspect of the research process, while being one of the least-developed aspects. In line with one of the proposed strategies for Yin (2014), I decided to let the research questions be the analytical strategy that points out the overall direction for analyzing and summarizing the data in this study. These research questions formed the basis for the design of the theory chapter, as well as the interview guide, and it was therefore logical to follow this structure also in the analysis.

The analysis process for this research study has followed what Yin (2014) explains as a circle involving "your original research questions, the data, your defensive actions and interpretations of the data and your ability to state some findings and draws as conclusions" (Yin, 2014, p. 136). The analysis would start already the same night after a long day of data collection on Svalbard, where I daily would write a field diary with key notes, my thoughts, reflections and new questions for the next day. In between field trips to Svalbard I would transcribe and anonymize the interviews and attempt to see the data I collected in a larger setting, rather than just day for day. I would then write down interesting topics I felt had not been explored thoroughly enough, to consider investigating on the next trip to Svalbard. In the data I found both common features and similarities across the informants and organizations, though with varying perspectives. When the interviews were transcribed, I made schematic reviews where I categorized what the various informants said about different topics, narrowing the data down to recurring themes. This is called data reduction and data display (Mehmetoglu, 2004). "Data reduction is to reduce the amount of data without losing important information. It happens by encoding and segmenting the data" (Mehmetoglu, 2004, p. 100). Data display, on the other hand, is about showing how the researcher have organized and summarized the data (ibid.). Finally, I sorted the data thematically to prepare the data for further analysis.

The analysis process was based on data from interviews of both operational actors and administrative staff, as well as observations. I chose to summarize the presentation of these data in thematic sections related to the research questions. This means that there is a similar structure

to both the theory and the empirical chapter, and thus facilitates the structuring of the discussion, and makes it easier for the reader to keep track of my research process.

4.3 Research ethical issues and methodological assessments

A qualitative research project can be evaluated based on the degree of validity and reliability (Johannessen et al., 2011). In addition, a research project should consider research ethical issues (ibid.). In the following sub-chapter, I will elaborate on how I ensured the ethical standard of this thesis.

4.3.1 Research ethical issues

In scientific research, ethical considerations may indicate that one avoids to research topics where it is difficult, if not impossible, to carry out an ethically justifiably program (Johannessen et al., 2011). To carry out an ethically justifiable study, one must make some reflections and reservations. In the role as a researcher it is my task to be aware of the situation I put my informants in. I ask the informants to provide information he or she has of their working day, which could be difficult for the informant. They should be honest when speaking with me, but at the same time be loyal to their employer. As such, it is very important that those who sign up as informants are referred to as anonymous sources. To comply with the principle of anonymity, I have not obtained any information that is of a sensitive nature, or violates the informants right to privacy, e.g. data that provides information about the informant as a person. In addition, all interviews where anonymized during transcription, where all references to them as individuals is removed. This stands out as especially important in a small community like Svalbard and provides some extra challenges. As there are so few people involved in the preparedness community on Svalbard; it is still likely that other people from said community would be able to identify them. I will therefore simply refer to them as informants and their corresponding informant codes.

As a researcher I must also be aware that during interviews I can put the informants in a difficult position. Some questions may indicate that the informant does not know what to answer because the truth may put the informant in a difficult position, and that the informant rather wishes to give an answer that is more socially accepted. It is therefore my duty as a researcher to reflect on this in advance of the interview and do my best to avoid this kind of situations. This can be done through the design of the interview guide, and through my own behavior during the interview. In addition, I must be objective in relation to the data that I get access to. This can be achieved through being factual and impartial. I must not let my own perceptions or feelings

dominate and characterize the interpretation of the data; If I as a researcher can be objective both in the form of my behavior towards the informants, as well as objective in relation to the data, I will be able to achieve credibility in relation to the findings I make in my study.

4.3.2 Validity

Validity as an evaluation criterion involves several operationalizations. Intern validity, which is also called credibility by qualitative studies, poses questions about whether one investigates what one is aiming to investigate, and in which degree the findings reflects the purpose of the investigation (Johannessen et al., 2011). To strengthen the credibility of this study, I have been consistent in the selection of data for the study. As the informants I interviewed and the preparedness actors I observed work with each other daily, and exercise Polar Night by and large was a collaboration exercise, I feel that the data these informants provided, largely reflects the aims of the study. To ensure that the use of central terms is correct, the informants were also asked about what they include in various aspects and terms, and after the interviews asked the informants of whether they want to add anything or if anything was unclear. By looking at a phenomenon from different perspectives, one is better suited to avoid partial and subjective findings (Johannessen et al., 2011; Yin, 2014).

Triangulation assumes that if two or more sources converge on the same conclusion, the data is more credible, or in other words: if different data collection methods produce the same findings with the same research subjects, the findings may be judged valid (Tracy, 2010, p. 843). In contrast to this Tracy (2010) argues that triangulation, like aspects of reliability and validity does not necessarily indicate quality in interpretive research. Despite this, multiple sources, methods and theoretical lenses is still considered valuable by many researchers from various fields (ibid.). As such, I have chosen to not employ extended triangulation while gathering data. In my data gathering process, other data collection methods apart from interviews and observation, where considered to give little useful data. The documents used for support in the initial process of data gathering, would not shed light on the phenomenon under investigation, but rather helped frame it and give guidance for important aspects surrounding the field of preparedness in the Arctic, thus leaving me with two different methods for data gathering, and just partial triangulation.

External validity, or transferability, says something about the degree to which the study's results can be transferred to similar phenomenon's, settings, situations and contexts (Mehmetoglu, 2004). A disadvantage with a qualitative case design is that it is precisely for the purpose to contribute with a detailed insight into one case, and that it can therefore be challenging to

generalize. Yin (2014) emphasizes that it is still possible to generalize with case studies, but that it is an analytical generalization. Analytical generalization suggests that the purpose of the study is to expand and generalize theories, rather than possibly a phenomenon that can be transferred to populations (ibid.). While this study attempts to give some generalizations for the potential of social relations and how it could support cultivation of tacit knowledge, the main objective is to give a detailed insight into a social context, which in turns allow me to discuss how these factors contribute to learning among preparedness actors. With this said, I would argue that the broadened knowledge about these topics, will be transferable to other contexts as well, e.g. developed countries with scarce resources, remote communities in other regions or other regions with different climatic challenges. In addition, the findings and analysis within the topics of Communities of Practice and management of tacit knowledge, would be possible to generalize upon, and be transferable to other fields of research. To improve the transferability of qualitative studies, it is important to establish good descriptions, interventions, interpretations and explanations that can be used in other contexts (Mehmetoglu, 2004). To ensure transferability, I have contributed with rich descriptions of the empirical basis. In this way, the reader can make up his or her own opinions and interpretations, and therefore, to a greater extent, the findings become a result of the research and not of the subjective presentations to me as a researcher.

4.3.3 Reliability

Reliability, or consistency, is linked to the selection of the data, the collection and the reorganization of the data (Johannessen et al., 2011). As qualitative study collection is often less structured, this assessment is not as important in qualitative studies at is in more quantitative studies (ibid.). To ensure reliability for this study I have recorded the interviews, to ensure accurate and correct reproduction of information from the informants. Additionally, I have been working structurally throughout the whole process of gathering, management and analysis of the data, to systematize the data that has emerged; which has been included in the method chapter as descriptions of the context in which the project has been carried out in. In sum, these factors increase the reliability of the study; since the reader themselves is in a better position to see how the researcher has arrived at the conclusions he makes (ibid.). Although there are several other quality indicators in qualitative research then employed in this thesis, I have chosen to go for an extended approach to validity and reliability as quality indicators for this thesis. My reasoning for this decision is the choice of qualitative research design, the case studied and the data gathering methods that I have utilized in this thesis.

5 Empirical Findings

In this chapter I will present and analyze empirical findings. The chapter will be structured according to a thematic analysis of the empirical data, where I through several steps of coding, have systematized data adhering to recurring themes throughout the dataset. Each subchapter will be introduced with a citation or short description of the phenomena at hand, followed by a brief discussion about its implications in relation to my analytical model. I set out to enlighten the recurring themes, in relation to their corresponding research question, and ultimately end up with a coherent analyzation of the empirical data.

During my first research trip to Svalbard, I was invited to participate in a large-scale crisis exercise (Exercise Polar Night), where dozens of actors across the preparedness community (and local society at large), came together in a joint exercise, aimed at drilling procedures and routines, coordination and cooperation, new crisis management systems, and exposing improvement potentials across the various organizations. I and my colleague where allowed to interview several of the members of the exercise planning group, senior staff from the local government, the Governor of Svalbard and various preparedness organizations. These interviews were conducted both before, during and after the exercise, and they complemented our observations and impressions as observers in the joint exercise.

5.1 How can Organizational Learning Contribute to Existing Preparedness Structures?

In this subchapter I set out to bridge organizational learning with preparedness structures in emergency preparedness organizations. I draw on relevant empirical findings to illustrate and exemplify how both the topics could and should be viewed together, to broaden our view on learning and preparedness. I will utilize quotes that illustrates relevant points for the analysis, the quotes will be referenced to the respective informant code[5] and year.[6] I have chosen this approach to ensure the informants privacy when participating in this thesis.

[5] See table 1 in chapter 4.2.1 Informants
[6] Time of interview

5.1.1 Environment for Learning

In this subchapter I will focus on empirical findings related to the theme: *environment for learning*, I will present empirical findings in the form of observations, citations and follow up with a brief discussion. This will be the main template for the following sub-chapters under the analysis chapter.

The competence and knowledge requirements required for performing effective search and rescue (SAR) in the arctic is immense, one of the operators describes it like:

> "When you start flying SAR, you already have enough competence to be a part of a SAR crew. Still, you must go through context specific training for the area, because of the challenging environment we operate in, like polar nights, night-vision-flying and so on".
>
> (S1, 2018)

After initial training, for operations in the Svalbard region, crew members still have to participate in continuation training with regular intervals. To ensure continuous improvement and learning for future operations, we have several systems and approaches; like deviation management, debriefing, lessons learned and so on (S1). After every mission, training or live, we log the flight (describing flight patterns, what, where and when) in a data log system. In addition, we have a debriefing session, where we talk through the mission, and try to identify lessons learned if applicable (S1, S2). This complements the deviation management system e.g. broken equipment or violated SOP,[7] and is an effort to identify what went well, and what did not go so well. The lessons learned is supposed to cover new knowledge that could be useful for the current crew members, as well as new crew members joining the organization in the future.

[7] Standard operating procedure

When training for real emergencies the only approach, is a realistic approach; like one of the operators put it:

> "We exclusively exercise and perform training with the equipment and resources we would have at hand, in a real emergency".
>
> (S2, 2019)

Another dimension of organizational learning is exercises, and the importance of 'realistic' exercises, especially in a preparedness context. As an example, the informant describes regular full-scale exercises they participate in, in the Svalbard region. In the example, the Norwegian Coast Guard (NGC), is only participating as exercise markers. Although the NGC obviously is a preparedness actor in the Arctic, they have an enormous area to cover, causing them not to be available as a standing force at Svalbard (S1). This could be compared to the idiom 'train as you fight', where one would train with the same equipment and resources one has during 'peacetime' as one would utilize during a crisis. With realistic training, under realistic conditions the preparedness actors at Svalbard builds up knowledge and experience that are transferable to future emergencies. The implication of this being robust preparedness capacities, and room for development based in experiences and knowledge achieved before, during and after exercises.

The example above illustrates an important aspect of realistic and efficient preparedness. Through realistic and adequate training and exercise, the preparedness organizations build realistic capacities. Since the NGC is not a stationary preparedness resource in Longyear, they do not involve them as a standing resource while exercising. Although, in the spirit of Communities of Practice, they involve the NGC in exercises as a resource and sparring partner, and it also facilitates as a platform for building and maintaining professional relationships between the NGC and the broader preparedness community in Longyear. In relation to the analytical framework the afore mentioned analysis illustrates how organizational learning could be an asset for building preparedness. This fits well within the pre-crisis phase in Kruke's phase-model and could be viewed as a necessity for building preparedness capacities like Eriksson (2015) points out when discussing preparedness planning as activities. As an endnote this analysis shows that preparedness organizations are able to *learn* from past incidents, in contrast to Smith and Elliott (2007) assumptions regarding learning from crisis. With that said, there will always be room for improvement when it comes to both learning and preparedness for the foreseeable future.

5.1.2 Training, Exercise and Mindset

In this sub-chapter I delve into empirical findings related to the recurring theme of *training, exercise and mindset* and discuss it in relation to learning. As with the previous chapter, paragraphs will also here be introduced with a citation that sets the stage and grasps the essence of the following paragraph to be discussed.

Competence, knowledge and regulations will only get you so far when performing SAR mindset is equally important, like one of the operators points out:

> "When we go to work every day, it is not enough to just adhere to rules, regulations and checklists. You have to do it with a certain mindset!"
>
> (S1, 2018)

During one of my visits to Svalbard and the SAR-service, the informants explained their mindset and approach to effective training, to stay current within the various SAR-disciplines. Within the SAR-service we have a comprehensive exercise and training regime. It is paramount that all operators are up to date, or 'current' at all times (S1, S2). It involves theoretical training and various mission-specific training (e.g. hoist operations from ships or mountainsides, avalanche SAR, cooperation with the NCG, police and so on). By default, they undertake training (missions) at least six days a week, and training is only postponed or halted, if a live mission occurs (although, live missions are good training as well). All operators in the crews are subject to a checklist, that keeps track on their current certification status for various flight- and mission-specific prerequisite skills. Different skills or tasks must be certified within different time-intervals (e.g. once a year, twice a year, and so on). To keep track and maintain an overview of the operators, they use color-coded checkboxes; green = certified, yellow = certification soon due, red = certification needed before next rotation (S1).

The various task, responsibilities and assignments the SAR service is subject to, demands a rigorous and at the same time efficient training and exercise regime. While performing complex operations (often under extreme weather conditions), it is paramount that every single operator has the best possible foundation to perform. Most of the requirements and regulations regarding flight operations are given from national and international authorities, and other minor procedures are developed and revised at lower levels. Still, these systems can not cover every single aspect of training and learning. To harness more knowledge, they utilize a system for 'catching' and managing tacit knowledge from the operators into a structured system, in the form of lessons learned, and 'lessons we think others would benefit from learning' (S1). This

approach could be viewed as an extension of the role of tacit knowledge, within Communities of Practice, and could it could be a driving factor for the evolution of organizational learning.

Even though most days are regular days, one can never get to comfortable. Or as one of the informants puts it:

> "There is no such thing as: *that is never going to happen*"
>
> (S1, 2018)

When talking about the job as a SAR-operator, one of the informants described a 'regular' day at the SAR-service; the day starts eight in the morning, briefing nine, training-flight ten to about eleven, debrief of the training-flight, lunch around twelve. Remainder of the workday involves miscellaneous tasks and various paperwork. After four in the afternoon, the crew is still in preparedness, and must be available for missions within sixty minutes from initial scramble (S1).

The informant stresses the importance of a good safety-culture in the organization. It is important to voice your concerns, if you are not comfortable with the situation, procedure or plan (S2). It is equally important that all operators manage to both give and receive constructive feedback or advice. To achieve the necessary safety-culture, there are several elements to consider. First, it is important to not allow a 'backstabber' or 'rotten apple' culture manifest, through good human factors, CRM[8] and training, we aspire to build up and develop both the individual, crew and the whole organization to adhere to certain principles, like giving and receiving constructive criticism (S1). There are several systems in place to handle an manage risk and ensuring safety of operations. It is a mix of systems and regimes that stems from European and national rules and regulations regarding air operations, but also 'homebrewed' systems, that has been developed because one saw the need for them, to ensure the highest standards of operation. The informants complement with explaining their approach to SOP: We have standard operating procedures (SOP) for basically everything we do, and situations we could encounter during operations. It is important to stress that SOP's are more like a guideline, that allows the operators to improvise within certain boundaries, but always with safety as the highest priority (S1, S2).

[8] Company Resource Management

As we have seen in the analysis above, training and exercise can result in organizational learning in several forms. When relating this analysis to the analytical framework, we also here can see a relation to the Pre-Crisis phase in Kruke's phase-model, and maybe some aspects relevant for the Acute-crisis phase as well. Training and exercise regimes are important components for building preparedness capacities and preparing for future incidents (Eriksson, 2015). The empirical findings suggest that both single-loop and double-loop learning is taking place within the organization and that it is a contributing factor to the high preparedness they achieve; and their ability to solve their missions in a safe manor.

5.2 How can Social Arenas Contribute to Preparedness?

During my field trips to Longyear I have witnessed several forms of Communities of Practice; some informal, some formal. Within the informal arenas, members of the different 'communities' meet sporadically in both social and professional settings. Regarding the more formalized Communities of Practice, there seems to be an abundance throughout the preparedness community at Svalbard. There are several formal councils, workgroups and project groups concerned with coordination, knowledge sharing, preparedness planning and so on. Here we will examine the recurring theme of social arenas and how they can contribute to preparedness.

When talking about the organization and preparedness on Svalbard, an informant from The Governor of Svalbard compares it to how its organized on the mainland, where you necessarily would not know every member of the regional preparedness council personally, versus Svalbard where they meet regularly and often in other settings, with other 'hats' on (project management for an exercise, preparedness council, local rescue management, and last in the photo-club), than on the mainland. This is viewed as a strength (and probably a requirement) on Svalbard, because of the scarce infrastructure and limited resources. The Governor of Svalbard is the whole state apparatus on Svalbard and covers all government functions there. Hence the need for arenas for cooperation and knowledge-sharing. Another perspective could be a comparison between the mainland and Svalbard, where most regions at the mainland have several municipalities they must interact with, versus Svalbard where they only have one municipality (Local government in Longyearbyen).

When talking about cooperation in relation to preparedness, the informant describes it like this:

> "Svalbard is an Eldorado for preparedness"
>
> (P1, 2019)

Leading up to an explanation about exercises with other actors on Svalbard. Last week we had an exercise with Hurtigruten[9] that is a private actor at Svalbard. We followed their guides (mountaineer guides responsible for tourist groups in the field), observing and giving feedback during their safety and security training. We also coordinated with the SAR-service, and arranged a visit there for the guides, so they can get to know the SAR-service, and the helicopter. This is a good example on how cooperation and more formal Communities of Practice could take place, the coordination part with the SAR-service is especially good example on how the more informal ties, built up within the Communities of Practice is useful for increasing the effect of preparedness training. We cooperate in all areas where we find it useful for preparedness at Svalbard, at the exercise in December (Polar Night), we for example had a joint project management group consisting of members from the different actors participating in the exercise, we have local rescue management, preparedness council and so on. This serves as a good example on Communities of Practice and illuminates the potential for tacit knowledge with the implications that follows of accumulating and managing it.

To develop social arenas for exchange of knowledge, coordination plays an important role. One of the informants states it bluntly:

> "Believe it or not, not everybody talks with each other"
>
> (P1, 2019)

The Governor of Svalbard has a responsibility to get actors to talk together and get to know each other. It could be everything from communications, terminology, and understand each other's organizations. "Not all actors communicate and talk with each other, it is one of our responsibilities to facilitate for communication between the actors and get them to know each other better" (P1). One example could be an exercise we attended earlier, where two actors in the same building, had not coordinated their preparedness plans, resulting in the two actors being unaware of each other's plans and go-to-actions in case of an emergency; "That is

[9] Norwegian coastal cruise operator.

unfortunate. When we ask one of the actors what their neighbors do if something happens, they reply ‘we do not know’; there is clearly a potential for improvement here, where more actors could get better to see the big picture” (P1). This serves as an example on the importance of efficient and timely cooperation and coordination. If we relate it to Wenger et al. (2002) approach to Communities of Practice, this clearly is a key component in the *community* part of their steps for cultivation Communities of Practice. Where The Governor of Svalbard through their coordinating role brings actors together across the (preparedness) community in Longyear and Svalbard as a whole. Through Communities of Practice it is possible to build robust foundations and a framework for coordination and cooperation, putting the involved actors in position to release and utilize the potential for learning and increased preparedness.

The following citation gives a good account of the necessary cooperation needed when an emergency strike. To achieve this kind of involvement and constructive use of the whole organization effective Communities of Practice would serve as a great asset:

> “At The Governor of Svalbard, it is not the police department that responds to a crisis, it is the whole office of The Governor of Svalbard, if necessary our cleaners operate our public phone in a crisis. Everybody has a place and a role in our preparedness organization. All hands on deck, literally means all hands on deck”.
>
> (P1, 2019)

When we talk about exercises and cooperation around exercises, the informants stress the importance of realistic training, “we train as we fight”. This mindset seems to be inherent in the preparedness community at Svalbard:

> “I think cooperation facilitates solutions and flexibility. Good cooperation opens up for thinking outside the box and improvise when suitable, that in itself, is a vote of confidence”.
>
> (P1, 2018)

To acquire and maintain a good environment for cooperation, it is paramount to establish relations between the different actors. We must know each other at the personal level, to build up and develop cooperation on a ‘daily’ basis. Like me as a preparedness planer, must know my counterpart at the local government. Through good relations at the planning level, ideally

the plans are good enough, for the operators on the ground to utilize the plans and cooperate onsite to solve the emergency or crisis (P1, P2).

5.2.1 Coffee and preparedness

The informants stress the importance of the informal ties between the people in general, and different actors in the (preparedness) community at Svalbard (P1, P2, S1, S2). There are several venues where actors meet in an informal, though social, setting. Informal chats and conversations over a cup of hot coffee at the local café Fruene[10] localized in the center of Longyear is described as an example on a social arena where actors meet (S1). Although the conversations hardly consider specific topics related to preparedness, they are important 'melting-pots' for building and developing the social ties among the actors. Another aspect is the short span between operators from SAR and the police, they interact daily through their work (and periodically on abovementioned Fruene, and other social arenas during their off-time). Most of the operators in 'both camps' know each other well both professionally and personally (S1, P1, P2).

Coffee seems to be an important catalyst for informal social arenas in Longyear. As one of the informants puts it: "our coffee machine is the most popular one in all of Longyear" (S1), implying that 'everyone' in the preparedness community at Svalbard, pops in regularly for some hot coffee and a chat at the lunch room in the SAR hangar. During one of my visits to the SAR hanger I got to witness the informal meetings unfold, when a police officer from The Governor of Svalbard popped in, for a coffee and an informal request for a minor search and rescue mission. The officer had seen a post on Facebook, describing that a local resident of Longyear had lost their dog pack during dogsledding. Prompting the SAR service if they could do a sweep of the nearby areas by helicopter in an effort to locate the missing dog pack[11] (P3). I was invited to tag along to observe the crew 'in theater', and see how a mission unfolds from pre-flight planning, search and rescue effort, to final debriefing after the end of the mission. We were unable to locate the dog pack, but they were localized by search parties on the ground later on.

The anecdote above serves as an example on how the informal social arenas translates into preparedness action. It could be difficult to imagine something like this happening outside the established 'chain-of-command' in more urban areas of mainland Norway. Since the social ties are so imbedded in everyday life at Svalbard, a minor Facebook post could be enough to trigger

[10] Famous café in Longyear
[11] Disclaimer: the search for the missing dog pack, was possible to combine with a mandatory training flight for the SAR crew, and thus taken on.

a preparedness effort. Coffee and chats in informal settings could seem arbitrary when discussing learning and preparedness, but they serve an important purpose in the development and nurturing of Communities of Practice among the preparedness actors at Svalbard.

5.3 Cultivation and Management of Tacit Knowledge

In this subchapter I will analyze empirical findings related to cultivation and management of tacit knowledge. I seek to illustrate how the preparedness organizations approach this form of learning and knowledge-making; and relate this to Nonaka and Takeuchi (1995) SECI-model.

It takes time to develop and maintain competence and knowledge, that in time can become tacit knowledge. Here the informant puts it bluntly:

> "When you start in the search and rescue on Svalbard, you either last a year or a lifetime".
>
> (S1, 2019)

The phrase above could be viewed as a harsh statement, but it conceals an important fact. Most operators in the search and rescue service has several years, and often decades behind them in the service. Operators that for some or another reason does not stay in the service for several years, usually quit the service after only a few years (S1, S2). The long service time for many of the operators leads to massive cumulation of knowledge, competence and expertise (S1, S2, S3, P1, P2). The same goes for police officers at The Governor of Svalbard, that in most cases have several years of experience before being considered for a fixed term at Svalbard (P1, P2). It would therefore be rational and positive to harness and systematize the hard-earned knowledge and put it to use in the organization as a whole, and for new operators that start in the service in the future.

To make use of tacit knowledge, one has to harness it and manage it, like the example given from one of the informants here:

> "If you think: 'this was clever', and your colleagues should know this, you put it into lessons learned, that is aggregated into a database containing accumulated knowledge in the organization. This is organizational learning, that allows for transfer of knowledge to existing and new crew members"
>
> (S1, 2018)

To reduce risk and increase our ability to handle upcoming situations, we talk and walk through different scenarios, perform risk analysis and assessments, and reflect on unexpected events (S2). This prepares our operators on handling a sortie of expected and upcoming situations, as well as making them robust enough to be prepared to handle unexpected events. These activities include all personnel at the SAR base, crew, administration, the whole organization must be committed to safe performance and safe operations (S1, S2). The following quote illustrates how the SAR-service cultivate and manage tacit knowledge through *externalization* (tacit-to-explicit).

When tacit knowledge is harnessed, it is equally important that it is managed in a constructive way and made available for others, like described by one of the informants:

> "Even if an employee does not work here anymore, we still have a lot of their knowledge 'saved' in our knowledge database, that could be utilized by existing and new employees".
>
> (S1, 2018)

When it comes to organizational learning, the informants from the search and rescue service has several approaches and perspectives. The informants stress the importance of involvement and participation from 'all the individuals' in the organization, and especially in the crew. To achieve organizational learning, it all starts with the individuals, and that there is an environment for learning (S1, S2, S3, S4). To illustrate, the informants explains the factors associated with effective mission planning; where it is important that 'everybody' participates, making suggestions or contributing with knowledge from their respective areas of expertise (e.g. rescue swimmer, technicians, doctor, pilots). In the process of mission planning, regular hierarchy is put aside, transforming into a relatively flat structure, where all the different 'roles' in the crew has a say (and is expected to volunteer suggestions and comments in respect of their different areas of expertise). This indicates that there is a proactive focus on participation from all the individuals in the organization, that in turn makes up the foundation for a thriving environment for learning. This form of organizing the crew could be viewed as a small Communities of Practice within the organization and shows how tacit knowledge could be drawn out of each individual. This also serves as a good example on *socialization* (tacit-to-tacit) from Nonaka and Takeuchi (1995) SECI-model, where tacit knowledge is made explicit through interaction between the crew members and the organization.

The following citation puts the spotlight on an important nuance of learning; do one learn to solve repeating problems, or for the skill to improvise in an emergency? One of the informants puts it like this:

> "A helicopter pilot flying the same trip back and forth to an oilrig for 1000 hours of flight experience, I would argue has one hour of flight experience, a thousand times. Whereas here the flights are so varied, so you get lots of varied experience every time you fly"
>
> (S1, 2019)

When we see organizational learning as a system, continuous logs and 'incident databases' is used as examples. These systems represent a new dimension when it comes to organizational learning, where tacit knowledge is accumulated and refined into a set of lessons learned, or knowledge that others should have, that can be distributed throughout the organization systematically, or as a mere tool for learning when new personnel joins the organization. This suggests that capturing and management of tacit knowledge pose as an effective and powerful asset, when it comes to broadened organizational learning. Through the internal and external Communities of Practice, the SAR-service cultivate and acquire tacit knowledge; that is systematized via databases, logs and so on. When a new operator joins the organization, tacit knowledge can be withdrawn from the database and be put to use with the new operator, thus making it possible for the new operator to learn of past events and not necessarily need to experience them firsthand. This serves as an example in *Internalization* (explicit-to-tacit) from Nonaka and Takeuchi (1995) SECI-model, where explicit knowledge within the organization is incorporated into a new product or process for later internalization, or into a new operator in this case.

Like in the SAR-service, 'new' employees in the police department at The Governor of Svalbard, has several years of experience before they are eligible to apply and be hired for a position at Svalbard, so all personnel have a robust foundation of knowledge and competence before they come north (P1). Thus, there is a challenge with the fixed term practice, that only allows a police officer to work at Svalbard for a maximum of six years. Because of this challenge they know work with a revision of the preparedness plans, including best practices, action cards and so on (P1, P2, P3). "We do this work for our successors, not four ourselves"; we try to embody so much knowledge and experience as possible in the preparedness plans, at the same time we must make it generic enough for new colleagues to grasp it without us being

here to explain everything (P1). This also serves as a good illustration of *internalization* (explicit-to-tacit) from the SECI-model. As such, the harnessing and management of tacit knowledge is a key factor to increase the organizations effective preparedness (P1).

After studying the preparedness community for several years, one thing seems clear; safety always comes first. Through effective approaches to learning, new employees get the tools necessary to perform a safe job:

> "How ready are you to work independent shifts, after a couple of months of introduction and local training? When does the inexperienced become experienced? My thought is: when it is safe!".
>
> (P1, 2019)

When new employees come up here to work in the police department, we have a mentor program, where new colleagues follow a senior officer to meet all actors, get acquainted with the local area of Longyear, and the local culture. The mentor takes the new colleague through a checklist and makes sure the new colleague is certified to work independent shifts. This serves as another example in *externalization* (tacit-to-tacit) from the SECI-model. No one starting to work here has less than ten years of experience from policework on the mainland. Everybody has a lot of experience and competence with them from their previous work. The most important thing is to get a grasp of the local environment and combine the new knowledge with previous knowledge (P1, P2).

As we have seen in the preceding paragraphs, both the SAR-service and the police department under The Governor of Svalbard has systems in place and initiatives going for cultivation and management of tacit knowledge. Also, both organizations extract a lot of the accumulated tacit knowledge through several Communities of Practice both internal and external. If we view the differences we see a larger focus on the organization as a whole at the SAR-service (e.g. all individuals contribute knowledge to the organizations, that in turn formalizes it and distribute it back throughout the organization), versus an orientation towards individuals at The Governor of Svalbard e.g. focus on implementing tacit knowledge from the organization, back to individuals: in this case new officers starting to work at Svalbard.

6 Discussion

In this chapter I will reflect upon and generalize relevant empirical findings from the analysis chapter. Further on I will discuss the theoretical implications that follows of the findings and how this could affect future theory within the realm of learning in preparedness organizations. In the first subchapter I will discuss preparedness in relation to learning from different perspectives, going from preparedness as a process and planning before going into the debate about individual and organizational learning. In this way I will seek to tie preparedness and learning closer together, laying the groundwork for the further discussion in the following subchapters.

6.1 Preparedness and Learning

As we have seen in the literature chapter, preparedness is a multi-faceted term and can represent a sortie of disciplines and sub-disciplines. My aim in this thesis is to build on recognized research and theory within the field of preparedness and end up with new knowledge and insight that could propel the field of preparedness even further. Through models like Kruke (2015) phase model we get a representation of preparedness as three phases in a continuous process. The model set itself apart from similar models, with its focus on the *new normal* one arrives at after handling a crisis. In previous research we have seen an exaggerated focus on post-crisis learning (Anderson, 2010; Staupe-Delgado, 2018); even controversies and critical questions if such learning is even possible (Burgess et al., 1997; Smith & Elliott, 2007; Toft & Reynolds, 1997). As we have seen in the analysis, learning is absolutely possible in all phases of crisis, and especially noteworthy; ahead of crisis as a part of the pre-crisis phase. I argue that learning could and should be on the agenda in all phases of crisis, and that pre-crisis learning have stood in the shadows of post-crisis learning for too long. With pre-crisis learning; one could engage in preparedness *activities*, that develops preparedness *capacities* in accordance with, that will put any preparedness actor better suited to encounter and handle a crisis.

Another aspect touched upon in the literature and recurring as implications during the analysis is the debate revolving *who learns?* Where there have been heated debates about the level of learning (e.g. individual or organizational) going as far as claiming that only individuals are able to learn, and through a more nuanced perspective suggesting that organizations indeed are able to learn, thus through the individuals in the organization (Argyris & Schön, 1996; Levy, 1994).

When it comes to individual learning, there has to be *content* for the individual to acquire or draw from direct or indirect experience (Sommer & Njå, 2012). Examples on the content of learning could be, skills, behavior or how to understand or interpret (new) situations. When viewing learning solely from the individual's perspective, one could argue that learning occurs among individuals in the preparedness organizations at Svalbard. The analysis shows several examples of individual learning, within all the examples on content of learning. On the other hand, the individuals learn both from their own experiences, to and from each other and from other's experiences. These observations pave the ground for organizational learning rooted in individuals and intra-organizational learning, within and throughout the organization itself, back to new individuals.

As we have seen in the analysis, it is definitively room for both individual and organizational learning in preparedness organizations. In relation to the ongoing debate about who learns, I would argue that learning is possible as both individual and organizational through individuals, but also internally in the organizations as well. The dive into the formalization of tacit knowledge, that will be discussed in detail in a later subchapter, shows that intra-organizational learning is possible, and it is reasonable to view it as an asset for improved pre-crisis learning. To answer Eriksson (2015) rhetorical question; if organizational learning could be viewed as something bigger than the sum of individuals who have learned, the preceding analysis and the topics discussed above indicates that it indeed is possible. As such, this analysis fits well with initial assumptions that learning can contribute to preparedness; and that organizational learning is possible both through individuals and within and between organizations as well. Although the focus lies on pre-crisis learning, one could view hard earned lessons-learned during training and exercise, as a miniature display of post-crisis learning. Even though a crisis never occurred; there is a probability that lessons-learned stems from some form of unwanted or unexpected incident. As such making organizational learning or the potential for it applicable in both pre-crisis and post-crisis phases.

6.2 Learning Through Social Relations

In this subchapter I will discuss learning through social relations and arenas. As we have seen previously throughout the thesis, preparedness and development of preparedness capacities can be difficult in rural areas with challenging presets and conditions. In the analysis we have seen several examples on how learning can be achieved through social relations and arenas. Under Wenger et al. (2002) theoretical approach of Communities of Practice, we have seen that it must

be several factors in place to cultivate and nurture Communities of Practice; like a *Domain*, that we in the analysis have seen represented through shared preparedness challenges in a challenging Arctic environment. Within the domain it needs to form a *Community* of (preparedness) actors, with a common goal in increasing their mutual knowledge, to broaden and develop their preparedness capacities; like the various preparedness organizations found at Svalbard. Finally, the actors must interact with each other in a constructive way, sharing their practice; like in exercise Polar Night, or at the various social arenas where preparedness actors meet and socialize in the community in Longyear, and at Svalbard as a whole.

If we view Communities of Practice in relation to preparedness as a whole, I would argue that Communities of Practice could be utilized as a potent factor for building preparedness capacities. In one way one could view Communities of Practice, if applied specifically for preparedness organizations, as a preparedness activity; in the sense of Communities of Practice potential for increasing timely and relevant knowledge within the topic at hand. To develop and later nurture arenas like Communities of Practice, one must take the social aspect into account. Through social arenas ranging from formal meeting places like workgroups, meetings or conferences; via semi-formal settings like exercises or cooperative training; to the more informal arenas like cafes, coffee-machines or just random meetings at the street or in the city center; it will be a potential for practice sharing, and development of new timely knowledge that could serve useful in the future.

If we should draw some lessons from the analysis regarding Communities of Practice between preparedness actors, I would stress the positive effect these semi-formal and informal social arenas have for cultivation of present knowledge and development of new improved knowledge. Viewed in relation to the preparedness process and learning, this is a powerful asset and should be given more consideration in conventional approaches to development of preparedness.

In the Arctic, preparedness actors in a way are ‘forced’ to cooperate and develop Communities of Practice. The harsh conditions and scarce resources make it an essential necessity, to achieve the most out of the preparedness work in the region. I would argue that the abundance of resources e.g. personnel, equipment, infrastructure and so on, widespread government agencies and redundant systems preparedness is founded on that we find in mainland Norway; compared to Svalbard, makes the preparedness work at the mainland more achievable without necessarily such deep cooperation as we have seen in Longyear.

I would argue that these lessons from the Arctic region is relevant for preparedness organizations in other regions and could add a dimension to preparedness work at for example the mainland of Norway, or in other countries or regions with a high focus on preparedness. Cultivation and development of Communities of Practice could be achieved at a low cost and yield tremendous rewards when it comes to develop and improve existing preparedness structures and capabilities.

Another important aspect when it comes to Communities of Practice is its potential for being an incubator for cultivation and harnessing of tacit knowledge. In the analysis we saw several examples on Communities of Practice, like the planning of exercise Polar Night, preparedness councils, rescue management and so on. These *communities* bring different actors together and lays the groundwork for sharing and developing *practice*. Within these forums and communities, tacit knowledge is cultivated en masse, harnessed, developed and adjusted to the different organizations and their needs, before its finally distributed throughout the various organizations. Illustrating initial assumptions that Communities of Practice can be incubators for cultivation and management of tacit knowledge.

6.3 Social Relations and Cultivation of Tacit Knowledge

In this subchapter I will discuss how tacit knowledge could be cultivated from social relations and arenas, to contribute to preparedness structures and capacities. With this effort I seek to contribute to the existing literature on Communities of Practice and management of tacit knowledge, through a reconceptualization where I bring the two fields of research closer together and illustrate a new approach to management of tacit knowledge based on Nonaka and Takeuchi (1995) SECI-model.

Through a shared *domain*, *community* and *practice* a group of individuals or organizations could develop a Community of Practice (Wenger et al., 2002). As we have seen with the preparedness actors at Svalbard, they are part of the same *domain*, through shared challenges like harsh climate, scarce resources, low population and scattered settlements and activity. Within this domain, *communities* have formed. In this context the communities consist of preparedness actors at Svalbard, participating and cooperating within the realm of preparedness. Within the communities, *practice* is cultivated, tweaked, honed and shared.

In the context of this thesis, we could go a step further when it comes to practice and see how tacit knowledge fits in. In the original paradigm, tacit knowledge is a small component among

many, when it comes to shared practice (as it probably should be, in generalized models meant to apply to a wide variety of organizations). In hindsight of my analysis, I would argue that tacit knowledge is significantly more important and vital, for development of preparedness (and preparedness organizations). If we factor in the harsh conditions and scarce resources represented in the Arctic region, it become even more evident.

With limited resources and few if any realistic options for imminent support from the mainland, in case of an emergency or disaster the picture paints itself. One must look for alternative ways to improve and hone preparedness capacities. As we have seen in the analysis, all the different variations of cultivation and management of tacit knowledge is present within the preparedness organizations at Svalbard. This fact builds up under my argument, that both cultivation and management of tacit knowledge could be a vital asset for improvement of preparedness capacities.

In the analysis we saw several systems and approaches to cultivation and management of tacit knowledge, where an approach or system would fit better with certain parts of Nonaka and Takeuchi (1995) SECI-model. With this in mind it is important to highlight, that the SECI-model is an adequate model when it comes to illustrating the different forms tacit knowledge could take, and how it could be transformed to other forms. The four different phases mainly explain different ways of management and sharing of such. I would argue that a conscious approach towards cultivation of Communities of Practice between preparedness actors, would lay a good foundation for cultivation and harnessing of tacit knowledge. In the next phase, the tacit knowledge must be processed within the organization and made ready for distribution back to other and new individuals in the organization. Social relations and arenas can contribute to both cultivation of tacit knowledge as well as preparedness. With effective use of tacit knowledge accumulated in the organization, the potential for increased preparedness is imminent. Or in other words; With this approach the organizations can increase their current knowledge and in addition increase the potential for new (timely and relevant) knowledge. By combining the different forms of tacit knowledge from the SECI-model, and utilize it among the individuals, within (and between) the organizations; proactive learning that supports preparedness and develops preparedness capacities is achievable.

7 Conclusion

In this chapter I will present my conclusions for this thesis. I will start with answering the research questions one through three; to cover the different parts of this thesis, leading to an answer to the main thesis question: *How could social relations and cultivation of tacit knowledge improve preparedness in the Arctic?*

Through the research of this thesis we have seen that learning in preparedness organizations can take different shapes and turns. Through cooperative mindset, safety culture and proactive organizations, learning occur both at the individual and organizational level. We also see a focus towards learning from past mistakes and incidents, through reporting regimes and systems. Both individual and organizational learning is achievable, and we have seen examples on how organizational learning happens both through individuals and within and between the organizations themselves. In relation to the literature the results of this thesis support the stance of organizations being able to learn (in both pre- and post-crisis phases).

In this thesis we have seen that Communities of Practice can contribute to learning in preparedness organizations in several ways. The initial capability of contributing to learning is seen with the formation of the *communities* where actors from the whole preparedness community is represented. This arena opens for sharing of information and knowledge that can prove useful across the different organizations and among the individual members as well. This shared *practice* opens for new ways to view the existing knowledge, that opens for new ideas, knowledge and practice in the future. The other aspect of Communities of Practice role for learning in preparedness organizations, is its role as an incubator for tacit knowledge, that could be cultivated, harnessed and managed for future use. In the literature we see few studies focusing on this aspect of Communities of Practice. This thesis goes a long way to contribute to new knowledge around this aspect of Communities of Practice.

As the discussion has shown us, management of tacit knowledge could be a potent asset for organizational learning. When seen in relation to the preparedness perspective (and as a preparedness capability), tacit knowledge can contribute to achieve preparedness. When tacit knowledge is made explicit it is possible to systematize and develop before distributing it back to new or existing individuals within the organizations. In areas with scarce resources and harsh climatic challenges, it is imminent to have an effective preparedness apparatus, that make use of all the resources available. Through combining Communities of Practice with a conscious

approach to management of tacit knowledge, the organizations and individuals indeed can increase their preparedness and solve their missions in a safe manor in the future.

In conclusion; Lack of resources, scattered population and harsh climatic conditions makes preparedness a challenging endeavor in the Arctic. As such, one must utilize every asset available to develop and increase preparedness even further. Through social relations and arenas, individuals and organizations that share a common goal in increased preparedness; could meet and share their cumulative knowledge and experience. These Communities of Practice could in turn serve as incubators for cultivation, harnessing, honing and systematization of tacit knowledge. Through management of tacit knowledge, both new and existing individuals can achieve knowledge without having to experience a situation first hand, increasing their ability to encounter a situation or incident better prepared than without this knowledge. The combination of the four phases of tacit knowledge and the existing Communities of Practice, makes up a positive circle of knowledge accumulation, sharing, processing and re-sharing, and as such improve the overall preparedness and the underlying preparedness capabilities in the Arctic.

7.1 Policy Recommendations

For increased preparedness in the future, I would recommend organizations and leaders to consider developing and employing Communities of Practice, in a manor suited for the various organizations. Through these social arenas tacit knowledge can thrive and be harnessed, and if managed properly, contribute to effective organizational learning contributing to preparedness. One could imagine there is just as many approaches to this as there are organizations, and it is probably true. Based on my research on Svalbard, seeing the various organizations utilize both social arenas and management of tacit knowledge, it is my firm belief that all organizations have a potential for succeeding with the same, if they develop arenas and management strategies suited for their respective organization.

Recommendations summarized:

- Identify the current situation of the preparedness within the organization.
- Develop social arenas, where knowledge can be developed, tweaked and shared.
- Build systems to harness the tacit knowledge present within the organization.
- Develop a system for management and refinement of tacit knowledge, with intent on distributing it back to new and existing individuals in the organization

7.2 Limitations

While this thesis has aimed to broaden our knowledge around social relations and their role for learning in preparedness organizations, the thesis has its limitations. As a qualitative research project performed as a case study, I have had to prioritize and scale the project in an effective manner. This has affected the methods for data gathering, where I have chosen to not utilize document analysis for data gathering purposes, but rater only as support for the development of the thesis. Among other things affected we find, number of informants, research trips frequency and the scope of this thesis.

As the research fields of preparedness and organizational learning are immense, I have chosen to narrow down to the topics treated in this thesis; how social relations and management of tacit knowledge can contribute to learning in preparedness organizations. I therefore limit my research to concentrate on selected approaches to development and management of preparedness and put it in relation to social relations and arenas, where I have chosen Wenger et al. (2002) approach to Communities of Practice; and Nonaka and Takeuchi (1995) approach

to management of tacit knowledge to explore how these fields can enable each other and contribute to preparedness.

7.3 Further Research

The process of writing this master's thesis has been long and dynamic. In hindsight of this thesis, I have reflected upon how this thesis could be an asset for future research; and how future research could propel the field of learning within preparedness organizations even further.

For future research into social relations and tacit knowledge, it could be interesting to explore other branches, where risk, time pressure and demands in regards of uptime, delivery and so on is critical, like with various providers of critical infrastructure e.g. information technology infrastructure, financial services, logistics, energy production and so on.

It is reasonable to assume that findings from the study of the preparedness community on Svalbard, could be customized and deployed in other organizations with positive effect. It could be interesting to pursue this perspective, through implementing findings from this thesis, into a new organization, and see which effects it would have on overall preparedness.

In a method perspective I would encourage recruiting more informants from a wider selection of organizations within the branch studied, to achieve an even better understanding of the phenomenon. I would also recommend an increased focus on document analysis as a data gathering method, with the perspectives it could add to the research.

8 References

Alexander, D. (2002). *Principles of emergency planning and management*. Edinburgh: Terra Publishing.

Andersen, S. S. (1997). *Case-studier og generalisering : Forskningsstrategi og design*. Bergen: Fagbokforlaget.

Anderson, B. (2010). Preemption, precaution, preparedness: Anticipatory action and future geographies. *Progress in Human Geography, 34*(6), 777-798. doi: 10.1177/0309132510362600

Argyris, C., & Schön, D. A. (1978). *Organizational learning: A theory of action perspective*. Reading, Massachusetts: Addison-Wesley.

Argyris, C., & Schön, D. A. (1996). *Organizational learning ii: Theory, method, and practice* (Addison-wesley series on organizational development). Reading, Massachusetts: Addison-Wesley.

Argyris, C., & Schön, D. A. (1997). Organizational learning: A theory of action perspective. *Revista Espanola de Investigaciones Sociologicas,* (77-78), 345-348.

Barr, S., & Thuesen, N. P. (2019). Svalbard. In *Store Norske Leksikon*. Retrieved 12.04.19 from https://snl.no/Svalbard

Birkland, T. A. (2009). Disasters, lessons learned, and fantasy documents. *Journal of Contingencies and Crisis Management, 17*(3), 146-156. doi: 10.1111/j.1468-5973.2009.00575.x

Blaikie, N. (2010). *Designing social research : The logic of anticipation* (2nd ed.). Cambridge: Polity Press.

Burgess, T. F., Fortune, J., & Peters, G. (1997). Learning from failure - the systems approach. 543. doi: 10.2307/3010516

Direktoratet for samfunnssikkerhet og beredskap. (2016). *Skredulykken i longyearbyen 19. Desember 2015* (Evaluering av håndtering, beredskap og forebygging). Erik Tanche Nilssen AS, Skien: Direktoratet for samfunnssikkerhet og beredskap (DSB).

Dodds, K., & Nuttall, M. (2016). *The scramble for the poles : The geopolitics of the arctic and antarctic*. Cambridge: Polity Press.

Engen, O. A., Kruke, B. I., Lindøe, P., Olsen, K. H., Olsen, O. E., & Pettersen, K. A. (2016). *Perspektiver på samfunnssikkerhet*. Oslo: Cappelen Damm akademisk.

Eriksson, K. (2015). Framework for crisis preparedness planning: Four required areas for developing a learning process. *Journal of Emergency Management, 13*(6), 519-531. doi: 10.5055/jem.2015.0261

Ibmgroup. (2012*). Seci model developed by nonaka & takeuchi (1995)*. Retrieved 07.01.18 from https://upload.wikimedia.org/wikipedia/commons/a/af/SECI_Model.jpg

Johannessen, A., Christoffersen, L., & Tufte, P. A. (2011). *Forskningsmetode for økonomisk-administrative fag* (3. ed.). Oslo: Abstrakt forlag.

Justis- og Beredskapsdepartementet. (2012). Samfunnssikkerhet. Retrieved 07.12.18 from https://www.regjeringen.no/contentassets/bc5cbb3720b14709a6bda1a175dc0f12/no/pdfs/stm201120120029000dddpdfs.pdf

Krogh, G. v., Lillejord, S., Nonaka, I., & Ichijo, K. (2001). *Slik skapes kunnskap: Hvordan frigjøre taus kunnskap og inspirere til nytenkning i organisasjoner*. Oslo: NKS forlag.

Kruke, B. I. (2015). *Planning for crisis response: The case of the population contribution.. I: Safety and reliability of complex engineered systems*: CRC Press.

Levy, J. S. (1994). Learning and foreign policy: Sweeping a conceptual minefield. *International Organization, 48*(02), 279. doi: 10.1017/S0020818300028198

Longyearbyen Lokalstyre. (2017). Overordnet beredskapsplan. Retrieved 03.12.2018 from https://img6.custompublish.com/getfile.php/3901374.2046.ssqnjjmntiuwsp/Overordnet+beredskapsplan+for+Longyearbyen+lokalstyre+2017.pdf?return=www.lokalstyre.no

Mehmetoglu, M. (2004). *Kvalitativ metode for merkantile fag*. Bergen: Fagbokforlaget.

Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company : How japanese companies create the dynamics of innovation*. New York: Oxford University Press.

Pursiainen, C. (2018). *The crisis management cycle*. London, England: Routledge.

Rob984. (2016). *A map of svalbard within norway and europe*. Retrieved 17.12.18 from https://upload.wikimedia.org/wikipedia/commons/thumb/c/c3/Norway-Svalbard.svg/1070px-Norway-Svalbard.svg.png

Rottem, S. V. (2014). The arctic council and the search and rescue agreement: The case of norway. *50*(3), 284-292. doi: 10.1017/S0032247413000363

Roux-Dufort, C. (2007). Is crisis management (only) a management of exceptions? Journal of Contingencies and Crisis Management, 15(2), 105-114. doi: 10.1111/j.1468-5973.2007.00507.x

Smith, D., & Elliott, D. (2007). Exploring the barriers to learning from crisis: Organizational learning and crisis. *Management Learning, 38*(5), 519-538. doi: 10.1177/1350507607083205

Sommer, M., & Njå, O. (2012). Dominant learning processes in emergency response organizations: A case study of a joint rescue coordination centre. *Journal of Contingencies and Crisis Management, 20*(4), 219-230. doi: 10.1111/1468-5973.12003

Staupe-Delgado, R. (2018). *Preparedness for slow-onset disasters: From contingency planning to proactive disaster response*. Stavanger: University of Stavanger.

Sysselmannen på Svalbard. (2016). Risk and vulnerabilty analysis 2016. Retrieved 03.12.18 from https://www.sysselmannen.no/globalassets/sysselmannen-dokument/skjemaer/ros-analyse-svalbard-2016.pdf

Toft, B., & Reynolds, S. (1997). *Learning from disasters : A management approach* (2nd ed.). Leicester: Perpetuity Press.

Tracy, S. J. (2010). Qualitative quality: Eight "big-tent" criteria for excellent qualitative research. *Qualitative Inquiry, 16*(10), 837-851. doi: 10.1177/1077800410383121

Venuti, L., Gouanvic, J.-M., & Simon, S. (1991). Genealogies of translation theory: Schleiermacher. *TTR : traduction, terminologie, rédaction, 4*(2), 125-150. doi: 10.7202/037096ar

Wenger, E., McDermott, R., & Snyder, W. M. (2002). *Cultivating communities of practice : A guide to managing knowledge*. Boston: Harvard Business School Press.

Yin, R. K. (2014). *Case study research : Design and methods* (5th ed.). Los Angeles, California: SAGE.