How to improve inter-organizational learning from safety investigations?

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A Qualitative Study at an European Safety Investigation Board

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ABSTRACT

The aim of this thesis is to identify characteristics on how safety facilitators can improve inter-organizational learning from safety investigations. The study is a response to the fact that the Dutch Safety Board questions the learning effects of its accident investigation reports, despite that these are freely accessible on the website, which assumes that other organizations can use and learn from these reports. Within the maritime sector, the sole release of information does not seem to enhance learning that leads to lower accident rates.

In the first chapter, results of a literature review are presented. These show that this domain is largely unexplored and therefore this research will add to the academic literature. However, the thesis also has practical implications as it identifies incentives. In the second chapter, the method is brought to light. In order to expose inter-organizational learning incentives, semi-structured interviews were conducted with eight employees within seven different maritime companies in the Netherlands. This aimed to reveal possibilities to disseminate safety investigation information to organizations not involved in an accident such that it enhances learning.

In the central section the thesis provides facilitators possible incentives to adopt in their communication of their safety investigations so as to lower the threshold concerning or enhance inter-organizational learning with the purpose of improving safety. Here, the thesis draws on academic sources and the previous literature review to reflect these incentives.

In the conclusion chapter, the thesis argues that the results are applicable for facilitating information in the maritime sector, and could probably also be used in other transportation domains. The main results in the thesis suggest that:

- The dissemination of information in the form of written reports should be continued.
- The reports should include an abstract and context, and preferably be bilingual, brief and positively formulated.
- The necessity of anonymity and to stimulate safety is to be supported.
- Safety investigations should concentrate on why things normally go wright. Therefore, the facilitator/investigator should conduct participative observation and frequently visit organizations to discuss safety (items).

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MOTIVE

The Dutch Safety Board (DSB) doubts the learning effects of his accident investigation reports. Their written reports, as the final result of their accident investigations (Overheid.nl, 2010, p. 33), include the description of the accident, analyses, conclusions and, if necessary, recommendations. The reports are published and freely accessible on the website of the Board (Overheid.nl, 2010, p. 36) and therefore in favor for everybody to read and use. This assumes that any organization is able to collect their (written) data and learn from it. However, still accidents, as for example in the maritime environment, like falling overboard, losing or injuring body parts or collisions (Onderzoeksraad voor Veiligheid, 2015a, 2015b, 2016a, 2016b) keep on happening.

This research started with the problem of the management team of the Dutch safety board that I came across. It was struggling with the inter-organizational effect of the so-called B-safety investigation reports within the maritime sector. Conventionally the focus of this safety board is on the learning by organizations that are directly involved in the incident. Other organizations could, however, benefit from this information too. For me this raised the question what would be needed to establish that broadening out. How could the dissemination of safety investigation information after an accident be facilitated such that the information triggers for learning in organizations that have not been involved themselves in the occurrence investigated? I discussed the necessity of such research with one of the board members. At the same time, the DSB implemented a working group that focused on the effects of reports in the aftermath of an investigation. Both announced to be curious about the results and stimulated the idea as a master student thesis subject.

INTRODUCTION

Since the beginning of the 20th century different committees have investigated accidents in the Netherlands. These investigations used to be carried out by different inspectorates, which were usually not independent. Investigators of the Maritime Court, the Inland Waterways Disaster Committee, the Civil Aviation Board, and the Railway Accidents Inquiry Board were all descendants from their ministries and therefore their independency can be questioned. The investigators of these boards were often the same ones as those who established the regulations in the first place and acted as a jurisprudential board (Vollenhoven, 2012, p. 144).

Sunday 4 October 1992 was a political turnaround within the Netherlands. An El Al Boeing cargo plane crashed in a residential area. In this accident 43 people were killed. At the fire scene people were walking in white suits, which was kept an unexplained phenomenon for the public. This caused fear with the general public as well as with the disaster relief personnel who have been on the scene these days, and it supported the desire to conduct independent investigations. Six and a half years after this disaster, a committee of inquiry was erected on the accident as both the government and the general public demanded the truth. This accident was the start towards a truly independent safety investigation board in the Netherlands, separated from a jurisprudential board. The Safety Board was founded on 1 February 2005 (Vollenhoven, 2012; Onderzoeksraad voor Veiligheid, n.d.). The aim of the DSB is the improvement of safety and especially in situations in which the safety of civilians is dependent on companies, organisations or the government (Onderzoeksraad voor Veiligheid, n.d.a).

On the one hand, according to art 41 (Overheid.nl, 2016), the Board has the authority to decide independently, without interference of others, whether an accident will be investigated. The Board is responsible for conducting independent safety investigations into the causes of incidents. The decision to start such an investigation is based on the Board's belief that the result will have a positive effect on a wider safety improvement. The Board looks for systematic safety shortcomings and announces the results to the general public and the parties involved.

On the other hand, international law forces the Board to investigate specific accidents. This originates from international covenants and European regulation in the transportation domains (Onderzoeksprotocol, n.d.b, p. 7), especially from organizations such as International Civil Aviation Organization (ICAO) and International Maritime Organization (IMO). A safety

investigation has to be conducted into every very serious marine casualty such as those that imply fatalities, a total loss of ships, or severe damage to the [marine] environment (Directive, 2009).

That organizations that are subject to a safety investigation will learn from an accident in their organization may be intuitively credible. However, do other organizations in the same branch, those that were not involved in the occurrence, also learn from the same accident? This is assumable for the rare events (Lampel et al, 2009), but for occurrences with a low attention profile it is unknown. These so-called colleague-organizations have free accessibility to information they can learn from (the investigation reports from the DSB), but do they? I was not able to find scientific literature so far that concentrate specifically on the extent to which third parties, or sister-organizations, are willing and capable of learning from accidents they were not directly involved in while the information was available.

Although the communication department of the Board is able to monitor how many times a report on the website is consulted or downloaded, it is not equipped to track persons or organizations specifically visiting this website of the Board. This data therefore does not provide a relation between a published report and the amount of learning from the report. This is not to say that there is no data at all. The available data, however, addresses the general public rather than professional organizations. A recent research revealed, for instance, that 59% (N=1000) of the general public in the Netherlands is familiar with the Board (Gesellschaft für Konsumforschung, 2016, pp. 10-11). If asked which authority is responsible for investigating disasters or incidents that caused a threat to the safety of civilians, 23% (N=1000) correctly answered DSB. Higher educated and older people seemed, however, more aware of the information that the board provides. Also, although four percent of the interviewees actively visited the website of the safety board (p. 16), more than half of them said they would probably not consult the website in the future (p. 24). This raises the question whether the general public is in favor of the Board's product, the reports; and if people are learning and willing to learn from this kind of written information.

This data, in other words, although addressing the general public and not the issue of learning by sister-organizations, is not very hopeful, obviously, for inter-organizational learning. The Board acknowledged this and started to explore the possibilities to improve the communication concerning the hand-over of safety investigation information to the 'outside world'. They did this with the aim to enhance learning for sister-organizations, organizations that belong to the same branch but that have not been involved in the investigated occurrence in particular. This research

attempts to support this initiative by consulting safety departments of different ship owners to discuss which facilitation incentives to apply to accomplish that inter-organizational learning effect.

The research question in this master thesis therefore reads as follows:

How should, in the aftermath of a maritime occurrence, the results of safety investigations by third parties (such as independent safety investigation authorities) be transfered so as to improve inter-organizational learning?

This thesis will provide insights from a domain that seems largely unexplored and therefore will add to the academic literature. Also, by identifying incentives for inter-organizational learning across organizations, the thesis can be used by facilitators in how to improve the communication of their safety investigation information so as to enhance inter-organizational learning and thus to improve safety across organizations.

To keep the research manageable, it has been decided to collect data to answer this question from the maritime sector in the Netherlands. Collecting data was done by means of interviews with safety managers of several Dutch maritime companies. The interviews focused on getting a better understanding in how an independent investigation organization can disseminate safety investigation information such that it facilitates the learning of organizations from accidents of other organizations.

The second chapter is a reflection of the literature review. The third chapter is a brief description of the methodology used to conduct this research. The fourth chapter represent the results, followed by the analysis chapter. The six and final chapters are the discussion and conclusions respectively. In the appendixes, additional information can be found. The first three appendices include the interview invitation, the informed consent and the interview guide. The final two appendices contain the in-depth results of the individual interviewees and how these have been coded into categories.

LITERATURE REVIEW

Following an occurrence, the Dutch Safety Board conducts safety investigations and the obtained information is put in writing and published on the website, freely accessible for everybody to read and learn from. This embodies the concepts "learning from incidents" (Drupsteen et al, 2013), "learning by sharing" (Nesheim & Gressgård, 2014; Nonaka & Takeuchi, 1995) and transmitting information through facilitation (Cagiltay et al, 2015) by a mediating party, in this case the DSB. From the perspective of the Board as an independent body, I will elaborate on these concepts separately in order to explain the dynamics how organizations can learn from each other when not involved in an accident and how a third party, or facilitator, can enhance this.

Learning from incidents and accidents

Different scholars support the necessity of safety investigations as these investigations can expose the causes that have lead to an incident or failure (Reason, 1990; Le Coze, 2008). Logically, if these causes are addressed effectively, the repetition of similar accidents can be prevented and/or diminished (Pidgeon & O'Leary, 2000; Lukic et al, 2010; Lindberg et al., 2010). At the same time, however, other studies conclude that, in spite of the efforts, there is evidence that organisations are still not able to reduce the number of incidents. Learning from occurrences, apparently, is not such an easy thing to realize.

Still much has been written about learning from incidents, accidents and experience (Choularton, 2001; Drupsteen et al, 2013; Hovden et al, 2011; Lindberg, 2010; Lukic et al, 2010; Størseth & Tinmannsvik, 2012), and also about sensemaking and investigation (Bakx et al, 2013; Dekker, 2014; Kletz, 2002; Pupulidy, 2015; Rae, 2016; Sanne, 2008). This research, however, aims to address the learning from other organizations' occurrences, while the literature available focuses mainly on first level awareness, meaning learning by organizations directly involved in an incident. Learning is (scientifically) defined as "the acquisition of knowledge or skills through study, experience, or being taught" (www.en.oxforddictionaries.com) or as "knowledge gained through reading and study" (www.ldceonline.com).

Lindberg (2010) was the first to put forward learning from experience (feedback) in safety science. Experience feedback she defined as "perceiving, interpreting and analyzing information and knowledge on accidents and incidents, including detection, description of the course of event, consequences and causes, and the subsequent dissemination and communication of this

information to all parties that could benefit from it." (Lindberg, 2010, p. 5). Experience feedback thus focuses on the learning process after an occurrence and the dissemination to all involved for cross-sectoral learning, i.e., when one organization learns from another. The concept of experience learning is therefore a possible means to be used by a facilitator. I will therefore come back to this later in this thesis.

Absorbing facts by reading is a less preferred method (Lindberg, 2010, pp. 15-16) than learning from personal experience as it is difficult, sometimes, to communicate the details of complex situations by written text. Also, knowledge captured in documents would need to be managed. Documents need to be stored, retrieved, read and adjusted (for the specifics of the own organization for instance).

Learning at the receiving end is closely related to being taught. "Teaching requires selecting a set of knowledge and creating a sequence of learning experiences through which students*, groups, or organizations* engage with that knowledge" [emphasis added] (Rae, 2016, p. 3). Teaching also means lecturing, instructing, or showing how to do a job or task, e.g. showing how to do the ropes, and assumes that the knowledge is available and that an individual, group or organization is told how to do something. Concerning the means of facilitators as discussed in this thesis, teaching is not considered within the scope of this thesis.

It seems, from the literature on learning, that there is not much specific knowledge to be found on how organizations can learn from events in other organizations. The incentives to learn from experiences of colleague organizations cannot, in other words, be derived from this literature, at least not from this literature alone. There is, however, a literature on organizational learning that may have more to this.

Organizational learning

> Although organizational learning occurs through individuals, it would be a mistake to conclude that organizational learning is nothing but the cumulative result of their members' learning. Organizations do not have brains, but they have cognitive systems and memories. As individuals develop their personalities, personal habits, and beliefs over time, organizations develop world views and ideologies. Members come and go, and leadership changes, but organizations' memories preserve certain behaviors, mental maps, norms, and values over time (Hedberg, 1981, p. 6).

Contrarily, there are scholars who state i.e. “even when we prepare a good report and circulate it widely, all too often it is read, filed and forgotten. Organizations have no memory. Only people have memories and after a few years they move on taking their memories with them” (Kletz, 2002, p. 5). Therfor, it is important to try to reveal the general scientifical thoughts about organizational learning.

Searching on *Web of Science* for articles and reviews with ‘organizational learning’ in the title within the domain of *Social Science* resulted in 829 English publications for the period 1965 to 2015. The subject concerning organizational learning obviously got more attention at the end of the eighties, beginning of the nineties (Figure 1). This shows that organizational learning is a young theory.

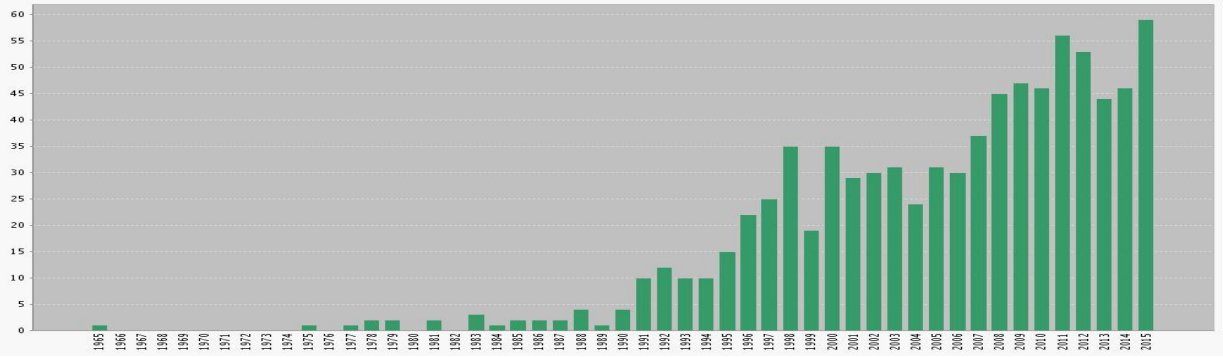

Figure 1: Publications 'organiz(s)ational learning' per year (retrieved November 20, 2016)

A clear definition of organizational learning has been elusive so far. There is a diversity of definitions that have been introduced by many different scholars. Argyris (1977, p. 113), for instance, defined organizational learning as “a process of detecting and correcting error”. Fiol and Lyles (1985) pitch organizational learning as “the process of improving actions through better knowledge and understanding” (Fiol & Lyles, 1985, p. 803) following “the knowledge, and associations between past actions, the effectiveness of those actions, and future actions.” (p. 811). They thus suggest that organizational learning refers to a change in someone’s knowledge that occurs as a function of experience. Garvin (1993, p. 80), furthermore, generally constructed “a learning organization [as] an organization skilled at creating, acquiring, and transferring knowledge, and at modifying its behavior to reflect new knowledge and insights.” A final example is Senge (1990, p. 6), "a continuous testing of experience and its transformation into knowledge available to whole organisation and relevant to their mission." What all these definitions share in common is that organizational learning is a sequential and dynamic process in which new information is

acquired, new knowledge is developed, and behaviors are accordingly modified (Huber 1991; Levitt & March 1988).

Learning does not have to be generated within the own organization, one can learn from other organizations as well. The benefit of this is that the organization does not need to be involved in an incident to be able to learn from it. Learning from other organizations is called inter-organizational learning. To gain this particular learning effect, knowledge must be spread between organizations so that the recipient organization can learn from the other organization (Argote & Epple, 1990; Huber, 1991; Levitt & March, 1988).

Inter-organizational learning

A common understanding of inter-organizational learning is that of an alliance between two or more organizations in the same industry (Levinson & Asahi, 1995; Larsson et al, 1998), a formal connection between organizations. In the situations studied in this thesis, concerning how facilitators could stimulate organizations to learn from occurrences in other organizations, such formal connection may not be self-evident. A formal bond, however, often does exist with the institute of the facilitator and which disseminates the investigation information. The insights gained in the context of organizational learning can thus also for this context perhaps be helpful. A common professional bond promotes, for instance, trust, effective communication, and mutual understanding (Scott, 2000, p. 94), in order to learn from the experiences and best practices of other organizations and to transfer knowledge about this. First, however, I elaborate on the connection between trust, communication and mutual understanding. Second, it is important to look at how knowledge itself can be transferred into something useful to function as a carrier of that knowledge.

Trust, communication and mutual understanding

A well-known condition that influences learning is a culture in which openness and trust are valued. If the aim is to learn from an event, there should be no blame for the actors involved and people need to feel comfortable to report what happened, the so-called 'just culture' (Dekker, 2014; Woods et al, 2010). Edmondson (2003) explains that a climate of openness can make people more willing to report and discuss errors, and learn more about the system in the process (Edmondson, 2003, p. 15). An absence of trust may lead to faulty reporting, lack of reporting, secrecy and less transparency (Hovden et al., 2011; Pidgeon & O'Leary, 2000). As Sanne (2008) stipulated, being ashamed for a situation or fearing blame or social sanctions can create reluctance to report and

therefore limits the information available to be learned from (Sanne, 2008, p. 1211). A lack of trust can come from political processes, power conflicts, anxiety and blame (Hovden et al., 2011; Perrow, 1999). Hovden et al. (2011) furthermore mention that it is necessary that incident investigations are independent and excluded from liability and blame questions. For the follow-up, a culture valuing openness and trust is also necessary and therefore reports following an investigation should be public. This reenforces openness, transparency and facilitation. In short, contexts where members trust each other (Levin & Cross, 2004, p. 1480), i.e., feel psychologically safe (Edmondson, 2003), tends to promote (inter-)organizational learning.

Knowledge

The sixteenth century English philosopher Francis Bacon once said that knowledge is power. Knowledge allows organizations to stay competitive in a dynamic environment. "It is [however] very difficult to become knowledgeable in a passive way. Actively experiencing something is considerably more valuable than having it described" (Richardson, 1995, p. 18). So as to understand how knowledge can be used for improving the organization (for learning) it is important to take a closer look at knowledge and discern different forms of knowledge transformation.

Within the field of knowledge management (KM), two types of knowledge are recognized, explicit and tacit knowledge. Nonaka (1994) seems to be one of the first scholars who introduced and developed the distinction between the two different types of knowledge, being explicit and tacit, and proclaims that the interaction and relationship between the two types of knowledge are the basis for KM and the organizational learning theory. Within the same field of science, it is mentioned that knowledge is hierarchically related to information, data and wisdom, the so-called DIKW or knowledge pyramid. Wisdom is located at the top of this pyramid, knowledge, information, and data at the bottom (Ackoff, 1989, p. 3). There is, apparently, no wisdom without knowledge, no knowledge without information, and no information without data. From top to bottom the pyramid runs from tacit to explicit elements. Both aspects of knowledge and the knowledge pyramid, will be discussed here, as well as how the aspects and the knowledge pyramid are interacted (Zeleny, 1987; Ackoff, 1989: Rowley, 2006). (Figure 2).

Explicit knowledge, on the one hand, refers to codified knowledge such as can be found in documents and is considered to be objective and rational and can be put or transferred in words, sentences, numbers or formulas. It includes theoretical approaches, problem solving, instructions, manuals and databases. Explicit knowledge could thus relatively easy be transferred on paper. Explicit knowledge is dominant in the lowest part of the knowledge pyramid and in accordance

with data. Data is defined as symbols that represent properties of objects, events and their environment. Data is, in short, the product of observation. Definitions for data largely handle though, about what data lacks as data does not include meaning or value. Also, data is unorganized and unprocessed (Rowley, 2006, p. 171). Data is thus of no use until it is in a useable (i.e. relevant) form. Such data is called information after answering what, where, who and how, data gets meaning and can be interpreted.

Tacit knowledge, on the other hand, refers to non-codified and often personal or experience-based knowledge. It cannot be expressed like explicit knowledge because it is subjective, experience based and context specific. It includes cognitive skills such as beliefs, images, intuition and mental models as well as technical skills such as craft and know-how. One of the convincing examples of tacit knowledge is facial recognition. "We know a person's face, and can recognize it among a thousand, indeed a million. Yet we usually cannot tell how we recognize a face we know, so most of this cannot be put into words" (Polanyi, 1966, p. 4). Or, as Conklin (2016b) provided food for thought in his podcast, the difference between explicit and implicit knowledge is "the difference between the stuff you know and can talk about, and the stuff you know and can't talk about." Tacit knowledge is dominant in the highest part of the knowledge pyramid and in accordance with wisdom. Wisdom is the most abstract term in the pyramid and refers to thinking and acting upon knowledge. It is related to causes, why something is true, and to answering the how-to question (Ackoff, 1989). While data, information and knowledge relate to the past (they deal with what has been or what is known), wisdom deals with the future as it incorporates vision and design.

Lam (2000) deepens the explanation of tacit and explicit knowledge by stipulating that knowledge can be articulated explicitly or manifested implicitly (Lam, 2000, p. 490). She describes three

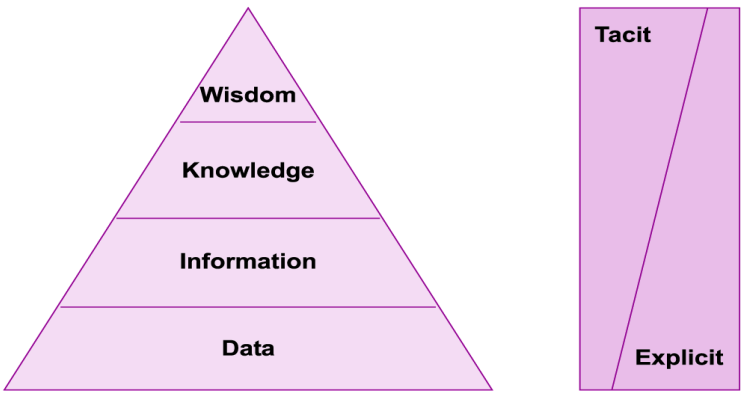

Figure 2: The relation DIKW model, and explicit and tacit knowledge (Rowley, 2006)

differences between tacit and explicit knowledge. First, tacit knowledge is intuitive and unarticulated and can only be communicated if the subject is known while explicit knowledge can be codified, stored and communicated even without knowing the subject. Second, explicit knowledge can be deducted or learned via study, while tacit knowledge is mastered by 'learning-on-the-job'. Finally, explicit knowledge can be gathered together and appropriated, while tacit knowledge is distributive, personal and contextual and therefore difficult to aggregate (Lam, 2000, p. 490). Botha et al (2008, pp. 22-23), however, points out that tacit and explicit knowledge should be seen as a spectrum rather than as definitive points. To understand the phenomenon of knowledge though, it is important to define these theoretical opposites points.

Although it is often mentioned by scholars that knowledge and information are used interchangeably, a clear distinction is also drawn: "Most people agree that data and information may exist outside humans, [while] knowledge can never be separated from the knower" (Stenmark, 2002, p. 4). Knowledge is as such presumed to be distilled 'truth', while information requires the human act of interpretation (Galliers & Newell, 2001, p. 611).

Transferring knowledge

As mentioned, there is no absolute distinction between the tacit and explicit elements of the pyramid. Tacit and explicit knowledge, as has been argued above, are inseparable. Their relationship can be compared to the analogy of an iceberg above and below the waterline: the exposed explicit knowledge is supported by the hidden tacit knowledge. Regardless, however, whether it concerns tacit or explicit knowledge, so as to create value in an organization, this knowledge must have the ability to be sharable. This learning by sharing can become the driver of (inter-)organizational learning.

Different authors stimulate in this to study the role of people in the steps of the organizational learning process, and their role in knowledge sharing and processing. Human involvement is mentioned by Størseth and Tinmannsvik (2012, p. 1979) as one of the conditions for organizational learning and they are supported by other scholars (Birkland, 2009, p. 152; Brizon & Wybo, 2009, p. 129; Dekker, 2014). In other words, organizations are not able to learn, it is the individual in an organization.

Nonaka and Tacheucki (1995) described a knowledge model to show the interaction between tacit and explicit knowledge in an organization (Figure 3). The exchange of implicit and explicit knowledge, according to this model, takes place in four different processes.

From \ To	*tacit*	*explicit*
tacit	**Socialization**	**Externalization**
explicit	**Internalization**	**Combination**

Figure 3: Four modes of knowledge conversion (Nonaka & Takeuchi, 1995, p. 62)

Socialization is the process of transforming tacit knowledge to acquire tacit knowledge through the interaction based on experience. This can be done in a formal and in an informal manner. Examples are observations, discussions and watching. Without some form of shared experience, it is difficult for people to establish this, at it needs to share each other's thinking processes (Nonaka, 1994, p. 19). Some knowledge or wisdom, high level in the knowledge pyramid, has to be available between the two parties to achieve socialization between those levels

The easiest form of knowledge conversion concerns the creation of new explicit knowledge from existing explicit knowledge, so-called combination. This is already in place in most organizations. Documents, databases, texts and information storages with existing information are reconfigured into new knowledge through the sorting, adding, re-categorizing, and re-contextualizing (Nonaka, 1994, p. 19).

The last two conversions involve the conversion of tacit to explicit knowledge and vice versa. These conversion modes capture the idea that tacit and explicit knowledge are complementary and can expand over time through a process of mutual interaction. The conversion of tacit knowledge into explicit knowledge is called externalization, which is the transformation of what is in somebody's mind into documentation or databases, or in any other tangible form. The conversion of explicit knowledge into tacit knowledge is called internalization, i.e. when knowledge from documents, simulators and participation is absorbed into their own mental models (Nonaka, 1994, p. 19).

In sum, Nonaka's modes of knowledge conversion include:

- Tacit-to-tacit (socialization) – individuals acquire knowledge from each other or others through

dialogue and observation; discussion and watching.

- Tacit-to-explicit (externalization) – the articulation of knowledge into tangible form through stimulation and documentation; attention and reading.
- Explicit-to-explicit (combination) – combining different forms of explicit knowledge, such as that in documents or databases; text and information storage
- Explicit-to-tacit (internalization) – learning by doing, where individuals internalize knowledge into their own mental models from documents; simulator, participation.

Nonaka's knowledge conversion modes are of interest within the scope of this thesis. It shows the different means available to transfer explicit and tacit knowledge and also to transfer between explicit and tacit knowledge. This could be of help for a facilitator, who disseminates safety information with the purpose of stimulating cross-organizational learning from occurrences as it can enable this facilitator to manoeuvre back and forth through the knowledge pyramid. Knowing this, makes it understandable what the maximum knowledge level available is for the facilitator to transfer to a sister-organization. The lower the facilitator is 'stuck' on a level in the pyramid, the more explicit knowledge and the less tacit knowledge is available. Therefore, it is relatively easy in terms of time and effort to investigate an occurrence based on data, as law and regulations, then try to understand the working environment with the result how an occurrence could happen. For an investigator, it is more difficult to reach tacit knowledge and make it understandable afterwards. The next chapter will concentrate on the potential means that can be used within the different conversions by a facilitator so as to facilitate the transfer of information – such as safety information – about or from one organization to another.

Acting as a facilitator in the transfer of knowledge

Inter-organizational learning has raised the question about how to transmit knowledge between the respective organizations. Most organizations don't have the time or skills to examine all the available evidence first hand. Organizations have thus a hard time to create knowledge on their own. Taking into account the distinction between explicit and implicit knowledge as well as the DIKW pyramid, there are different ways to transfer information from or about one organization to another, or to facilitate this information flow.

Although the model of Nonaka is helpful in categorizing different kinds of knowledge transfer, it does not make clear what exactly can carry knowledge from one organization to another (in the case of an aftermath of an investigation phase for instance). Anyhow, whether knowledge is shared

by speech or by written report(s), it has to be converted from an internal, mental understanding, into some external transferrable matter and changed back again, to an internal state of understanding of the information after receipt by the other organization. A facilitator could facilitate this process. The view of the relationship between knowledge and facilitation can then be visualized in a simple flow diagram:

Internalization, bottom-up in the knowledge pyramid, concerns finding relations between the elements of the received data, followed by putting it to practice. In KM science, much is documented about the different means or processes available to establish this (Ackoff, 1989; Ichijo et al, 2000; Nesheim & Gressgård, 2014; Nonaka, 1994). If "knowledge is a mix of contextual information, values, experience, and rules" (Rowley, 2006, p. 73) internalization, for instance, can be improved by dialogue, discussions and experience sharing with peers or with groups of people with the same goal. Assumably, this has the potential for disagreement and conflict, but in the end, this exchanging of knowledge is necessary to scrutinize existing premises and to make sense of experiences in new ways. In contrast, how to externalize knowledge, the top-down process in the DIKW pyramid that runs from wisdom to knowledge to information is not clearly described in the literature. For the facilitator, it is of interest to have incentives available which in turn will speed up the externalization process of the receiver, the sister-organization.

At least one issue is discussed in the literature about this top-down knowledge transfer, "we always know more than we can say, and we will always say more than we can write down" (Snowden, 1999, p. 4). Snowden proclaims with this that, putting wisdom or knowledge into saying or writing results in a loss. Externalization, in other words, results in a loss of content and context. Storytelling is a useful tool to counter this even though this also cannot fully compensate. "Good stories, told well, lead students towards fresh insights and deep understanding" (Rae, 2016, p. 9). Bakx et al. plea therefore, that storytelling is a powerful way to share 'knowledge' with others (Bakx et al., 2013, p. 390). Another useful means to transfer tacit to explicit and thus transferable knowledge, is the use of metaphors. "A metaphor is one of the most important tools for trying to comprehend [at least] partially what cannot be comprehended totally: our feelings, aesthetic experiences, moral practices, and spiritual awareness" (Lakoff & Johnsson, 1980, p. 194). "If a picture is worth 1,000 words, a metaphor is worth 1,000 pictures! For … a metaphor provides a conceptual framework

for thinking about something" (Shuell, 1990, p. 102). By using metaphors and reflecting with other practitioners, there is thus a good chance that knowledge will increase.

The other two knowledge conversion forms, combination and socialization, do not seem to be relevant for facilitators concerning learning from safety information of other organizations. Combination looks like the lowest form of learning, from data to data, from explicit to explicit. However, absorbing data and making sense of it means learning, and is considered a dynamic process. Such process implies within the model of Nonaka, transforming explicit to tacit, vice versa, and possibly also tacit to tacit knowledge conversion. So actually, combination requires also an amount of tacit knowledge. Concluding that learning appears to involve all the other knowledge conversions too, being socialization, externalization and internalization. Therefore, combination cannot be introduced as an example of learning, and concludes that publishing a written safety investigation report on a freely accessible website is considered learning as long there is an incentive involved. A facilitator should be looking for such incentives continuously to enhance learning.

The fourth mode of knowledge conversion, socialization, takes much effort of an investigator. Tacit knowledge can, for instance, be acquired through shared experience such as when people in the maritime sector learn via traditional apprenticeship where apprentices learn the tacit knowledge needed through hands-on experience, rather than from written manuals or other documents. The closest way to establish a similar process as investigator (or facilitator) is to spend time on the work floor during participative observation (Dewalt & Dewalt, 2002) so as to build a (limited) hands-on experience and to be able to discuss or observe the activities. As this takes much time, socialization is a conversion method which is difficult to accomplish for an investigator or facilitator. In turn it means that they are stuck at a specific level in the pyramid, a probably missing a part in the internalization process. This level is the determining factor to start the externalization phase.

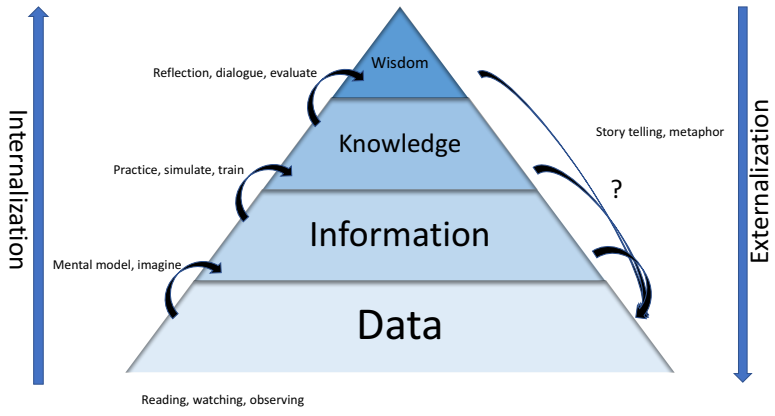

Figure 4: The relation DIKW model and mutual conversion

The simple flow diagram representing the relationship between knowledge and facilitation is at own interpretation modified into the model as visualized in figure 5. The model shows three actors and the flow of the data between these actors. The three actors are the accident involved organization, the facilitator and/or investigator, and the organization that has not been involved in the accident. The facilitator collects and receives data from the organization involved in the accident, after which he uses the different means of internalization such as sensemaking to transform this into information. This can be done by imagination and mental modelling as seen in figure 4., it is assumable Therefore that the facilitator's experience is of importance. The more relevant the experience, the better the data can be transformed into information, and thus the higher the facilitator can "climb" the pyramid.

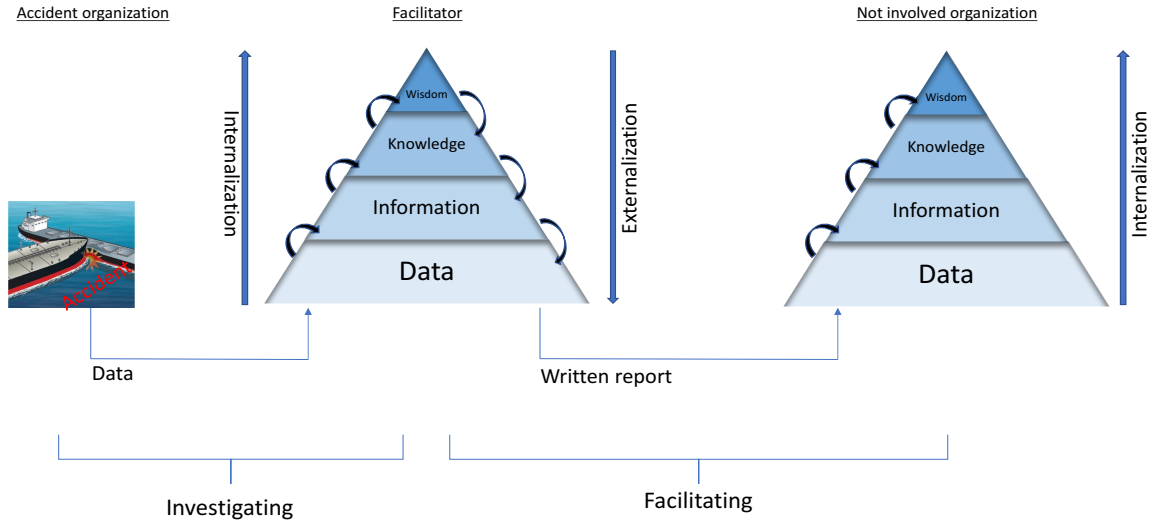

Figure 5: The relation DIKW model, mutual conversion, investigation and facilitating

After internalization, the facilitator has to go through the externalization process, which means that the facilitator has to modify his internalized knowledge such, by "descending" again in the knowledge pyramid, that relevant information can become available for other organizations This is the start of the facilitating process. In this stage factors that can incentivize sister-organizations to learn from this data, have to be implemented for easier consideration of the internalization process.

This information is then transferred to the sister-organization, which uses the internalization process to make the data usable as information, and climb further into the pyramid. The facilitator is key to support the internalization process of organizations. Therefore, this thesis can bring about

incentives to promote this. Focusing on the different possible modes of knowledge conversion and the before mentioned means can enhance these processes, the facilitator can enhance learning with sister-organizations by using storytelling, metaphors, clarify context, dialogue and/or discussion.

Own experience within the maritime sector and the safety board

Working as a safety investigator within the maritime sector I experience the classic safety model, also reperesented as the Old View thinking (Dekker, 2014) or the First Story (Woods et al, 2010, p. 7) within the different organizations. This safety view suggests that work can be analyzed and prescribed, and therefore work-as-done should correspond, in this view, with work-as-planned. Mostly the human is seen as the problem. This has to be solved by focusing on and removing the "rotten apple" (Dekker, 2014, p. 3), as there is resignation or imprisonment. In this perspective, investigations are often based on why things go wrong. As such, they aim to find the assumed root-cause(s) so that the particular occurrence will not happen again. What this approach in fact does, however, is that it aims to re-establish the work-as-planned, regardless the reasons that may have existed to do the work at it was done.

In an Old View environment, management points fingers at or blames people. This creates an hinderance for the exposure of incentives as discovered from the literature review. As long employees can be reprimanded for their actions in the Old View world, incentives as trust or open communication will not be found in such an organization. For a safety investigation, it is of importance to have an open communication to kind of waft the necessary information to build context. The board enforces this thought by telling the interviewees that their provided information is kept available solely for the board, and not allowed to be used in criminal law, disciplinary action law or civil law proceudres (Onderzoeksraad, n.d.b., p. 16).

As result of the safety investigation, the board will construct a draft, and all parties involved in the accident are consulted and requested to comment on this draft. The draft consists of a context and an analysis of causes. The consulted parties are allowed only to comment on the facts or in case the content is not clear, and normally have four weeks to react, the so-called right of access period. After this deadline, the board retains his right to accept the comments. If a comment is ignored an explanation will be supplemented in the final report. Finally, the report will be prepared for publication. Beforehand, the involved parties are informed and receive a hardcopy of the report. All reports are also published on the board website and accessible to the public (Onderzoeksraad, n.d.b., p. 16). Additionally, an English written report is included in case more nationalities are involved in the accident.

METHODOLOGY

This chapter describes the research process in this thesis. The starting point of my research is that not much is known about my research subject of interest. As mentioned before, many of the documents that concentrate on learning from incidents, accidents and experience focus mainly on first level awareness. This means that these documents primarily regard the learning of those parties that are directly involved in an occurrence. Facilitating or providing safety investigation information as a critical step in the process of (inter-organizational) learning has not been found within the safety science community, at least not as a specific topic.

An exploratory, qualitative method was therefore used, also because a quantitative approach would be of limited value for the complex and dynamic arena as the maritime sector. It was judged, therefore, that a contextual in-depth sense was necessary as a basis for the interpretation of the subjective experiences of the individuals as representatives of the organization studied here.

An interpretative world view is developed in this thesis because the interpretations of the results are not straight forward. They can thus differ from one person to another. This, however, does not mean that this research is useless. After all the interpretations can well be used as starting points for a discussion about how to facilitate learning in the martime domain from occurrences in sister-orgs.

Data collection

Several data collection methods were employed to allow different perspectives to ensure greater data validity (Thomas, 2013, p. 146). At first, the organization manual and the distribution of the safety investigation reports of the DSB were studied, next to international safety branch bodies to discover the way in which safety investigation information is generally disseminated by investigating authorities.

Secondly, eight semi-structured interviews have been conducted with participants using a semi-structured protocol.

Participants

It is important, for this research especially, to interview the right people. In this case, it was important to interview those who are in positions able to tell something about not only the

dissemination process of safety information, but also about whether this information provides triggers for learning in sister-organizations, i.e., in other branch organizations. Respondents have thus been sought with a background in the operational field as opposed to the supposedly theoretically trained managers who may answer more 'by the book'. This information I can find elsewhere.

Specifically, those people have been approached that have the authority to suggest modifying rules, to filter information and who are responsible for intra-organizational distribution of safety information. In other words, those people who normally should act as the link between safety investigation information and the work floor of their organization assumably. As a minimum, the interviewees had to be familiar with the Dutch safety investigation board, as the only body in the Netherlands assigned to conduct independent safety investigations that have no link whatsoever with jurisprudential processes or investigations. If they are not, it is assumable that they put attention on blaming and not in the position to learn from accidents indirectly.

I used the DSB's maritime distribution list, a collection of all the DSB's contacts in the maritime sector gathered in the last two years, as basis for getting in touch with these employees. They were the ones who voluntary came forward to take part in this research. All the organizations on the mentioned list received a copy of the Report Occurrences Shipping (ROS), a semi-annually report describing briefly the occurrences of the last half year concerning Dutch vessels and crewmembers and those occurrence that took place in Dutch coastal waters. This list of contacts is filled with roughly 200 names, whom I sent an invitation (see appendix A). Based on the replies I formed a pool of interviewees. Initially there were not enough positive responses, so I resent a reminder. The final result was the total number of eight interviews with nine participants who were all involved within the safety and/or quality department at (middle) management level of seven ship-owning companies. Based on the list of 200 potential interviewees, I was disappointed initially with nine available respondents. However, the number of interviews was limited, I decided to continue my research using interviews anyway. Based on the theory about data saturation (Francis et al, 2010; Baker & Edwards, 2012), there was a possibility that the results may not be representative for the maritime sector.

The interviewees had different backgrounds. Most of them had practical, sailing experience, one started fulfilling the office job immediately after receiving an education degree. In the thought of Nonaka (see theoretical section in chapter 2), this background differentiation can be of influence

on the conversing of information. For instance, if office employees do not have work floor experience, ample tacit knowledge is available, and efficient internalization is hampered. Therefore, it was of interest to discover and discuss incentives to enhance the conversion process.

Semi-structured interviews

After writing the literature review and formulating the research question, I started to build an interview protocol. I decided to do semi-structured interviews. This would allow me to have a conversation with the interviewees in such a way that it appreciates their perspectives concerning the topic of research (i.e., it allows them to bring up different emerging topics) and the freedom to use follow-up questions if necessary.

The questions focused on how learning effectively can be facilitated in favour of organizations not involved in an accident. Focus was on the incentives already in place, but also new incentives were searched for. All in all, the interviews were directed on how and why people in branch organizations could be elicited by safety investigation information. Reading the literature, I was drawn towards exploring the contextual issues of (social) aspects, such as transmitting knowledge and information. Are there aspects available that can be used by a safety investigation board to stimulate the urge to learn from others? Qualitative research allows me to do that under the design frame of an interview.

The interviews were gradually built up from the introduction of the interviewee towards a deeper understanding of safety and the way safety was discussed at the work floor. Ideas emerging from the answers were discussed or led to other questions. The interviews were not restricted to a specific order of questioning. These interviews were recorded and were no longer than 90 minutes. And finally, after each of the interviews the participants were given the opportunity to reflect on and provide responses. Interviewees were given the possibility to give a last response after receiving their transcribed version of the interview.

The interview questions were sent beforehand to the interviewees personally by email after commitment to participate in this research. Having the questions available at forehand, would give them the possibility to discuss the questions within their own organizations.

Data Analysis

The literature review revealed a storyboard (figure 6) which brought emerged ideas or themes together. Initially, the research question *Which incentives to use in safety investigation information will*

improve learning from others? was formulated. This started a search within safety science for documents containing learning, organizational learning and inter-organizational learning. In here, the assumptions were that it was possible to learn from others and and safety investigations lead to learning, and would be verified during the interview. The literature studied, as mentioned before, however, mainly concentrated on safety investigations and on learning from incidents, accidents and experience focusing on first level awareness, meaning that the literature focuses mainly on the learning of parties that are directly involved in an occurrence. Learning evolved my curiosity about knowledge, what it is and how it can be transferred between bodies. It became clear that continue searching within the safety science area would limit what is there to unreveal about knowledge. So as to find the necessary literature I commenced to the snowball-effect; reading and collecting literature found on Web of Science that elaborated about (inter-) organizational learning and knowledge management. And from there incentives where found as answer to the research question. Obviously, I left the possibility open to introduce incentives from the interviews. Finally, the research question was formulated as *How to improve inter-organizational learning from safety investigations?*

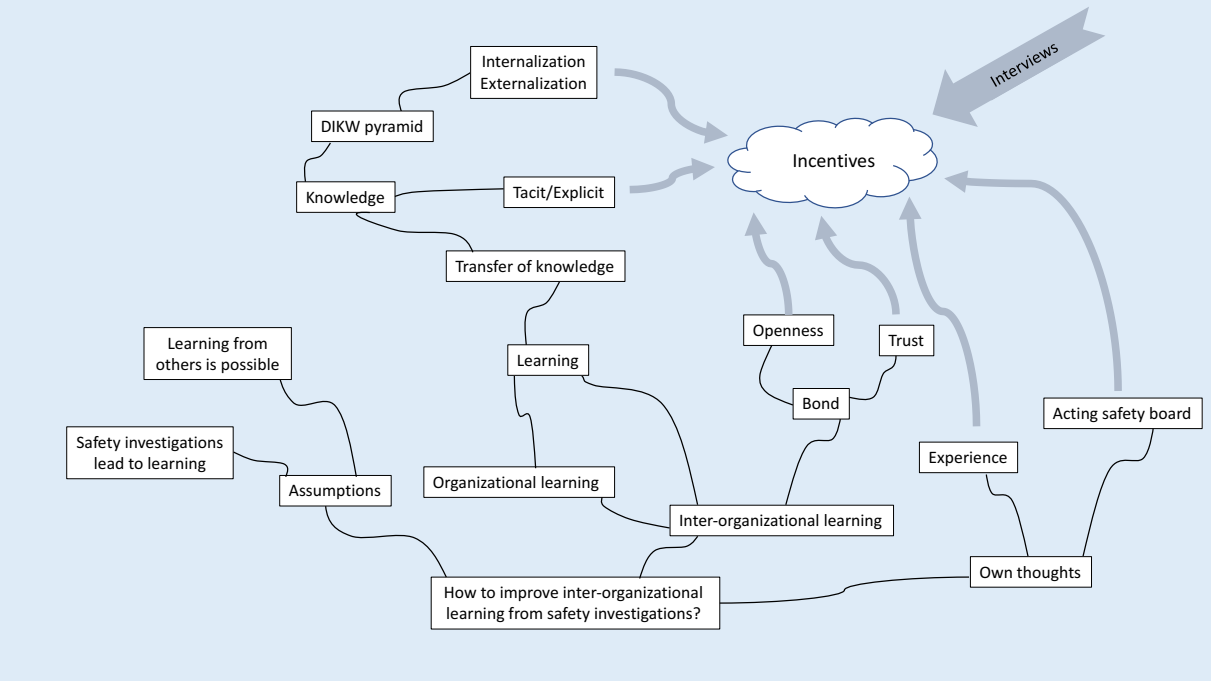

Figure 6: The storyboard

The questions used for the interviews focused partly on the belief and possibility of inter-organziational learning anyway, on the presence of inter-organziational learning nowadays and how (safety) learning was interpreted. This could be compared to my assumptions, represented by the

left part of figure 6. Other questions focused on the dissemination of safety investigation information nowadays and why these got attention and how it was disseminated witin the organization. This covered the right part of figure 6. The third block of questions generated to provoke other potential incentives to be used by a facilitator as seen by the interviewees.

The data collected were recorded and transcribed. The data was then manually coded, themes were identified and relationships were determined in order to present the main findings. Since there is no specific scientific literature available on inter-organizational learning in the maritime domain, this was an exploratory study aimed at uncovering incentives to be used for safety investigation information facilitation. Therefore, I expected the data during the analysis process to become clearer along the way as the research progressed. The more I immersed in the data, the more the context and the case became clearer. Due to the relatively small data set I used MS Excel and MS Word software; I identified themes from the interview data, and coded initially using the comments function in the MS Word. Due to the small number of interviewees, all aspects or factors were considered of importance and therefor documented and collected independently when mentioned by these different individuals. I then transferred to MS Excel so as to verify the coding and categorization of the data.

Eventually this led to a set of categories that emerged from the data set, which I processed in the analysis. I then had discussions with my colleagues at the DSB concerning these research results. I especially tried to find out whether how the maritime world looked at the board was in line with the thoughts of my colleagues. This whole process let to the identification of fifteen major themes. Seven of them concerned incentives about written reports specifically; eight themes addressed other facilitating incentives.

A number of possible limitations to the study's set up have been identified. First, qualitative research generally has to do with the subjective view of the researcher of what is important. This can cause an area of conflict with replicating the study, as a result of a lack of standards in interpretation. Another limitation could possibly be the influence of my manager who had a direct interest in the outcome of the research. Maintaining objectivity on his part was crucial. This issue has been addressed to him at the start of the research and we both have monitored this during the research period.

Ethics

The interviewees will basically respond to the DSB's safety investigation information, which is freely accessible online. Therefore, I do not expect ethical issues regarding the safety board using this data.

Concerning the participants, their responses will be held in confidence. Initially, only I as the researcher involved in this study and those responsible for research oversight, my supervisor and assessor as representatives of the Lund University Human Factor and Systems Safety, will have access to any information that could identify the participants. This is to prevent any tension about commercial sensitivity or reputation damage. There is a possibility that the data will be shared with other researchers, for instance so that they can check the accuracy of my conclusions, but I will only do so if I am confident that confidentiality of the participant is protected.

The responses of the individual participant have been numbered. The code that links that number to the participant's name will be stored separately from the rest of participant's data. When any result from this study is published, I will do so in a way that the organization cannot be identified unless specific permission is received.

In the appendix of the study, the informed consent form (ICF) and the interview questions can be found. I sent the ICF beforehand of the interview, and handed it out just minutes before the interview so as to discuss it shortly face-to-face with the informants. In the ICF I address several ethical issues of my research such as the permission to audio-tape the interview, uncomfortable questions, transcripts and member checks, the possibility to alter the final transcript, the handling of the interview information afterwards, and voluntary participation. I pointed out furthermore that, because of the anonymity in this research, participation will not affect the relationship with the safety board and that the participant or organization will not benefit from being in this research. Finally, I did point out that this study is designed to learn more about the mechanics of success concerning the facilitation of safety information in order to enhance inter-organizational learning. Participation in the research may hence potentially have a long-term leverage.

EMPIRICAL SECTION

This chapter describes the results of the semi-structured interviews. The interviews focused on getting a better understanding in how an independent investigation organization can disseminate safety investigation information such that it facilitates the learning of organizations from accidents of other organizations. The interviews furthermore helped to map the situation in the companies as they are currently processing this information.

All seven companies participating in the research appeared to have a similar structure consisting of a CEO level, a middle management level and a work floor level. The work floor level includes those who operate and maintain the ships, the so-called sharp end.

General findings

All interviewees mentioned that the employees on the working level all communicate via the ship captain. "At sea, the ship's captain is at the top of the hierarchy pyramid. In our reporting system, the captain is the relay between the ship crew and the company" (Interviewee 5). Another commonality concerns the different nationalities that are usually on board the ships, which include Asian (Indonesians and Filipinos), Russian, Ukrainian, Polish and Dutch people at all levels on board. "As an organization, you have to be aware and take into account the different cultures" (Interviewee 7) All interviewees emphasized that this complicates the distribution and communication of safety information to the ships. I will eleborate on this later.

The interviewees were asked for several aspects regarding the distribution and communication of safety investigation information concerning an accident in a colleague-organization. These aspects include the remembrance of that and whether were incentives could be identified that provoked their organization to (re)act upon this accident in the other organization. Another question was how the safety investigation information is usually distributed from the office to their ships and on board their ships. The question whether they think it is possible that organizations can learn from accidents in other organizations concluded the interview.

Factors that stimulate the noticing of the availability of safety information about occurrences in sister-organizations

It became clear that large accidents that had been in the news, such as Piper Alpha, Costa Concordia, or the Herald of Free Enterprise, were remembered. This was initially caused by the

public and/or media reaction in the aftermath of an accident. Another reason concerned the impact on the shipping branch itself. One of the respondents mentioned that the Costa Concordia disaster has left its mark within the cruise shipping environment, like building an own training center and a modified design to ensure the same bridge on every cruise ship (Interviewee 7).

Accidents that result in the modification or imposing of over-all regulations were also remembered according to the interviewees. Being curious about the reaction of European Maritime Safety Agency (EMSA) after implementing regulations and an organization failed to follow these regulations, appeared to be a key driver. EMSA is a European authority helping to enforce the legislation formulated by the European Committee.

The interviewees had, however, difficulties to reproduce the moment the before mentioned major accidents had happened and what was learned from them. Asking the same question related to other, more minor accidents had the same result.

Safety learning – what does it constitute and is learning from sister-organizations possible?
The interviewees concluded that defining safety learning was a difficult question. All agreed, however, that safety learning had to do with being transparent and sharing information of bad experiences or accidents to learn from it. Adjusting attitude was for most of the respondents equal to a culture change. Most of the interviewees argued that safety learning was part of being compliant to the safety management system (SMS). This SMS, according to them, assures a safe interaction with the hostile or dangerous working environment; sticking or adjusting to the SMS keeps you safe. Partly, because this SMS describes the process concerning incident reporting method and the actions to be taken to enhance learning and prevent incidents from happening again.

The interviewees also pointed out also that there is a theoretical and a practical side to learning, the latter of which, they said, refers to experience, a skill that develops over time. An experienced engineer, for instance, can tell you when an engine is not running properly by the noise that it makes. This is a gift or a skill that cannot be taught at school but develops through experience, often handed over during on-the-job training or indirectly from other organizations (Argote & Epple, 1990; Huber, 1991; Levitt & March, 1988). Some respondents mentioned that visiting the ships themselves would be important for facilitators for experiencing how a particular job is done onboard (Interviewee 6).

The interviewees agreed that it was possible to learn from colleague-organizations, also when the information is provided by a third party in the role of facilitator like the Dutch Safety Board that makes safety information about accidents in one particular organization available for others. One of respondents was insulted even, and could not belief that I asked the question (Interviewee 8).

Facilitating incentives

This research is looking for how the dissemination of safety information can be made available to other organizations by a facilitator (such as the DSB), so as to enhance inter-organizational learning. One of the issues that have been discussed directly with the interviewees is whether the safety information itself can contain incentives (or inhibitors) for learning. Different incentives from example accidents have been discussed with the interviewees, after which, the interviewees themselves were given the opportunity to bring in the incentives that, to their opinion, would enhance inter-organizational learning.

Bilingual reports

A request to facilitate reports not only in the own native language but also in English could enhance learning according to two of the respondents. Because most of the ship crews contain multiple nationalities, English is the commonly spoken language on board. Reports in English would therefore enhance learning for a broader community (Interviewees 1 and 7). Also, it would decrease the time spent by other crew members or staff with translating the reports, as mentioned by one of the interviewees.

Brief report – summary, visualization, clear language and title

Crew members do not have too much time to spend on reading a report. Also, it will lose their attention and with that the possibility to learn. Ideally, reports are thus lean and mean, or at least, as one of the interviewees explained: "Easy readable report, so it can be read during a watch period" (Interviewee 3). Half of the interviewees suggested in this regard to including a summary on one of the first pages, and to use clear language. The report title they also thought important as a title can increase or decrease somebody's curiosity and with that the willingness to start reading. Stories, to conclude with, could be better understood, according to the interviewees, when they were supported visually, such as with pictures or drawings. A related incentive mentioned by one of the respondents was a fully visualized report, such as an animation. Another incentive in the visualization domain that was mentioned was the related content presenter in video sites such as

YouTube. For example, when somebody watches a video on a particular accident on YouTube, suggestions of other videos with related content will appear on the same site, which often makes that looking at one safety related video leads to the viewing of many others. As such was it seen as a modern initiator of broadening one's view on safety perception. One other respondent explained that the organization is involved in e-learning by computer based training (CBT) including real life examples of accidents anonymously online, called Videotel. The website is shown onboard to learn from different situations and especially from incidents (Interviewee 1).

Two reports, one for the office, one for the ship crew

One of the interviewees explained preferring two different reports in one package. One report destined for the management in the office, and one in English language earmarked for the crews on board (Interviewee 3). That way, time could be saved by office employees for other, perhaps more important, activities than filtering the message in the report and modifying this to useable fragments to read on board. The interviewee reasoned that the safety investigator has the correct knowledge about what happened and therefore the only person to write about it; so, why not at the same time a second report ready to send to the ships?

Blaming, carrots and sticks, statistical comparison

Changing attitudes by using carrots and sticks, and by the implementation of regulations was in favor of almost all the interviewees. Change and thus learning, according to them, is only possible by punishment, reward and law. This was expressed as 'sailor of the month' using a medallion or putting a picture on the wall on board the ship. Another example was using a red card as a warning, and after receiving two or three red cards an employee was fired. For other respondents, it was important to show their (safety) statistics compared to other companies by implementing statistics, and reporting not only accidents but also incidents. That way companies felt stimulated to continue their (good) work concerning their safety perception, or adjust their view on safety improvement in case the statistics did not show progression.

Anonymity

Two interviewees were convinced it was of the companies' interest that reporting should not lead to blaming, because this would decrease the motivation to report incidents. Because of this, they considered that the safety information should be anonymized. Anonymity, non-reputability, is important also because the rivals in the branch may otherwise undermine your position in the

competing maritime sector by displaying you as an unsafe company. This issue was mentioned by all the interviewees during the interview.

Similarities in context / contextual similarities

Three interviewees recognized that similarities in procedures, type of ship and material usage function as incentives for organizations to focus on the incident and to reflect on the own organization. Recognition of such contextual issues, the working environment, the actors involved, as well as the presence of mutual relations between organizations, were all considered key to whether safety investigation information was considered valuable. An example given was an incident with a not properly working winch that lowered life rafts that was identical to the winch used in the own company. The technical incident triggered the company, as sister-organization, to take a closer look of their own winches (Interviewee 8). Another case included a fatal accident when conducting operations that were equal to own operations in relation to enclosed spaces (Interviewee 4). Enclosed spaces have to be treated as dangerous environments due to atmospheric hazards. These affect air quality and present immediate hazards to health or life. Acceptable atmospheric conditions must be verified before entry, and must be monitored continuously while the space is occupied. The oxygen concentration, the presence of toxic gases, and flammable material are the three conditions that must be monitored (Interviewee 4).

Personal aspects

One defining factor for absorbing information about accidents appeared to be related directly to the motivation and interest of the individual, in this case the interviewees who are all, as this is important to note here, safety or quality managers. As they mentioned, pursuing safety is their mission to focus on. While for the other personnel of the organization the final product or outcome as result of a customer request is the mission.

Another factor that was mentioned was whether the accident got attention via media and/or formal announcements. Personal involvement in accidents was reported as another motivational factor. One interviewee mentioned, for instance, that the loss of one of his classmates on board a ship during the nautical college course due to using uncertified, electrical tools made such an impression at that moment, that nowadays it motivates him to focus continuously on the certification process on board the ships and is stipulated during audits (Interviewee 2).

Social impact

One of the respondents proposed to show the personal impact of an accident as an incentive for learning from accidents of sister-organizations (Interviewee 1). Losing a husband or father will have an impact on the financial and social life of a family. This information can be used to emotionally connect to the reader. Discussing this potential incentive resulted into an ethical dialogue. The other respondents experienced ethical objections concerning this incentive. They argued that it did not feel good to show somebody's grief and resembled an employee making a mistake purposely which can be harder to accept by the relatives.

Active learning approach in reports

One of the interviewees preferred provoking the reader by questioning: "Could this happen to you too?" By asking this question repeatedly during the unfolding of the context step by step, the interviewee was convinced that the reader could be *lured* into the incident. This in a sense is a possibility to convince that the same thing could happen to the organization resulting into an incident. This being said, luring could, according the same respondent however, result in an evasive reaction such as that will not happen here, perhaps even more when the report is written in a very negative manner.

Positive stories

Unfortunately, when a safety investigation report is available, it often tends to emphasise the negative outcome, an incident or accident. The focus of safety investigation reports should therefore, according to the respondents, not be on wrong stories only, but also on the good ones . Publishing reports about positive outcomes, why did something work the way it was planned? Interviewee 5 mentioned that organizations do not want to be related to bad things, actions or incidents, but rather compliant to positive stories. This idea is supported by for example Conklin (2016c) who mentioned: "We know that we are better when we talk about success."

Speed of dissemination of safety information

Interviewees thought that, when aiming for the best learning effect, it would be important to have the investigation information announced as soon as possible after an accident. Reasons for this were the frequent swapping of crew members, which may cause the dwindling of attention for an accident over time resulting into forgetting the occurrence. Also, as long as it is unknown if the current environment is safe enough to fulfill the task unrest among the organization and ship crew members may occur.

Timing and focus authorities

When authorities, like an inspectorate such as IMO or EMSA, have announced to exercise supervision on a sister-organization concerning specific items, the community is monitoring the outcome of that supervision. One of the interviewees mentioned an example in which the IMO focused on controlling the enclosed space entry. This is a space on board the ship, which is initially unhealthy for a person to enter, and a safety procedure has to be followed in order to do so. As accidents still happen in this space, other organizations were curious about the reaction of the IMO and monitored how they would deal with an incident like that.

Another example was when accidents happen in a slow period, silly season, when no incidents are expected or supposed to happen. So, a single occurrence draws attention which results into a lower threshold concerning inter-organizational learning. Also, the consideration concerning the period of release of specific safety investigation information about season related activities can be in favor of inter-organizational learning.

Facilitation by meetings and workshops

Another incentive brought up by two interviewees was organizing meetings and workshops in which the results of safety investigations and incidents are discussed. To make this structural, however, it should be organized centrally, by a facilitator for example. This way of facilitating thus needs an organization or authority that is willing to take the initiative to arrange.

Trusting capability of investigators and credibility of the facilitator

Considered important by the interviewees was also whether they felt trust in the external party regarding the way in which they conduct investigations and come to their final results. Trust in the investigator's capability, in other words, can facilitate learning from sister-organizations according to them.[1] The use of correct terms by the investigators can help here, as that suggests that the investigator understands the sector. Highlighting relevant perspectives of an occurrence, which are recognizable for those in the sector, will help in this also as it makes an investigation more complete. Organizations are motivated to learn from such information compared to incomplete information, according the respondents.

[1] Often the results of external safety investigation reports are compared to the own safety investigation results. Despite the different investigation methods, the result of every method should more or less be the same, according the interviewees.

The final incentive to mention is the credibility of a facilitator, especially when this authority is also the safety investigation institute. The respondents argued that information facilitated by the investigation board is formulated after a thorough investigation and therefore it was generally considered of a high standard. Sometimes, however, the information was not correct, but most of the time they thought the investigation board advocated the 'truth'.

The urge for written reports

Interviewees argued that it is important to continue to use written reports as information transfer. Although most ships have internet capabilities, transferring information in written reports will take less bandwidth and megabytes, and with that less money and time, compared to, for instance, movies or other media distribution. Written reports are considered by the interviewees as the only less time consuming means of information transfer to enhance learning when on board the ship.

Inhibitors and facilitators of inter-organizational learning in the on-board processing of safety information

Safety management system

About the way, the safety information is moving within the companies, the respondents described that the company is sending safety related information, including the information about occurrences in other organizations, to the ship. According to the interviewees, the distribution of safety information about occurrences in other organizations from their respective staffs to the ships all run according to what has been laid down in their safety management systems (SMS). Within the scope of this study there was no room to really check this. The respondents were convinced that there were no discrepancies present. One interviewee explained that the company had established a workgroup of sailors to close the gap between the office management and ship crews. In this way, the company has a tool to influence the (right) connection concerning the translation of information in favor of the multi-lingual crews, and the distribution of this information. Due to frequent communication between this workgroup and the captain the interviewee continued, the latter is more motivated and stimulated to use different tools or means to get safety information transferred to the crew.

Safety meetings

All the respondents explained that, in accordance with SMS, on board the ships mandatory safety meetings are organized. The as-planned description is as follows. The safety meetings are fixed and take place, depending which company's SMS is involved, every two or four weeks. During these meetings, safety is a fixed agenda item. This item gives space to the different subjects, like (potential) incidents on board or received safety investigation information concerning other organizations, and are discussed. The participants consist at least of the second officer as the safety officer and chairman, the second engineer officer and one of the sailors. All companies, except one, received feedback of these meetings. This feedback denotes the date, times, participants and issues discussed during the meeting and are reported to the office via the captain.

Within one company senior management conferences were arranged among the ships in the fleet annually. This allowed face-to-face communication between the company staff and the ship officers, during which cross-level safety items can be discussed. Another two respondents told that their company established telephone communication with the captains monthly, and that the safety officer and chief engineers met semi-annually.

Transparency of on-board processing, attitude, culture

All interviewees, who don't work on board the ships themselves, mentioned that it is difficult to determine the way safety information distribution is really handled on board the ships, the so-called work-as-done (WAD). The best way to get an idea about this dynamic process on board, they say, is to visit the ship and observe. The second-best way to find this out is to study the mandatory safety meeting and drill feedbacks, and incident reports from a ship. Sometimes, drill feedbacks and reports showed the same text over and over again, like the ship safety officer and/or the captain had 'cutted-and-pasted' the answers from earlier reports (Interviewee 2). Such handling of safety information, the respondents argued, is reason to be suspicious about the integrity of handling safety information on board as this suggests that safety is not considered an important item on board or an issue to take seriously. On the other hand, a few interviewees questioned the necessity to know how safety information was distributed on board when discussing learning from sister-organizations. They did not want to undermine the captain's position, who is responsible for the procedures on board. Others argued that the distribution of safety information on board, inter- or intra-organization, has much to do with the safety attitude on board the ships and that changing attitudes will not happen or will at least be a very slow process. One interviewee wondered how to

get a better understanding of intrinsic motivation. This asked whether and how a process could be installed that could change that intrinsic motivation.

Multi-national, -lingual and -cultural crews

Three respondents believed that the different nationalities in a crew hampered the distribution of safety information on board. First, the mother tongue is obviously the best way to absorb information and learn. If the language used for distribution of information is not the crew member's first language, it is assumable that not all the information is understood and therefore learning is hampered. A second way in which the different nationalities may hamper the distribution of safety information may have to do with the different backgrounds or cultures that are not all safety minded as believed correct in the Western culture. Interviewee 2 gave an example that it became clear during a holiday in Indonesia; people were standing on top of a house skeleton building a roof throwing tiles while wearing flip-flops and no falling arrest harness. Other examples concern assertiveness and loyalty. European and Asian crew are believed as opposed to Indonesian or Filipino crews to question the staff. This attitude was exposed during the different staff visits on board, or during meetings and conferences organized ashore. This questioning keeps the officers on their toes, initiates and holds the momentum of safety thinking. Russians and Ukraine crew members, on the other hand, are assumed to use other incentives based on cultural backgrounds. It's all about their [crew memebers] thoughts. You could be talking for hours why things go wrong and everybody agrees. Finally, everybody get back on the ship and they continu working without adjustments (Interviewee 1). This remark suggests that information disseminated by a facilitator from, in this case, a Western European culture, not automatically results in learning by the receiving people from another culture. As different backgrounds and values means as much different views on life and working environment. This can hamper inter-organizational learning as interpreted by the facilitator.

Options for inter-organizational learning in the future

Despite the many hampering inter-organizational learning factors mentioned here, the respondents were positive about the possibilities to learn from other organizations in general in the future. The biggest concern they mentioned are the different nationalities and with that the different cultures on board. Because from these different cultures come different safety perspectives resulting into different safety attitudes. Some cultures are assumed to serve in favor of the company's needs (Interviewee 6). Others, on the other hand, are generally regarded to show less loyalty to the ship companies and act upon the organization with the highest salary (Interviewee 4).

ANALYSIS

This chapter is dedicated to the analysis and aimed to discuss the possible incentives that facilitators could use to improve (inter-organizational) learning from safety investigations. The first part focuses on incentives in line with the incentives found in the literature review. Followed by additional incentives filtered from the interviews.

Remarkably, as mentioned, all the interviewees had difficulties to recall when major accidents had happened and what was learned from them. Focusing on minor accidents had the same outcome. It seemed that the moment of implementing measures after an accident investigation to prevent it from happening again, is directly related to the moment to start forgetting the accident. This is in line with the human behavior after an accident has their world disrupted. The way they thought things were, is not the way it seems to be, and the world is scarier place which needs to be returned to normal. So, they need to have an explanation (Conklin, 2016a). When it is understood, measures can be put in place, and people continue living their life.

Possible incentives to be used

Context matters

An aspect that was emphasized by the interviewees is that contextual similarities would cause organizations to have a closer look at the safety information of a particular occurrence. What is meant here is that when the organizations show similarities, or when they recognize that this particular occurrence could easily happen in the own organization, that people in other organizations, according to the interviewees, would be more eager to pick up information about this occurrence. Context, in other words, is important, something that also followed from the literature: especially tacit knowledge is, according to Lam (2009) "distributive, personal and contextual." To transfer tacit knowledge requires, therefore, the issuance of context, something that, especially in written reports, is very difficult. Nonaka, for instance pointed out that externalization (the process in which tacit knowledge is converted into explicit knowledge like written reports) always leads to a loss of context. On the other hand, according to Nonaka can re-contextualization, which happens during an investigation in which data first is converted into tacit knowledge and then back again into explicit knowledge, also lead to new knowledge and insights. More needs to be learned about these processes therefore, which brings me to the topics for further research.

Trust of investigator/facilitator, mutual understanding and participative observation to gain

Also, considered important for the facilitation of sister-organizational learning, according to the research results, is trust. It is imaginable communication is necessary for the facilitation process in order to enhance learning. "High levels of trust are key to effective communication" (Dodgson, 1993, p. 78) as trust "improves the quality of dialogue and discussions . . . [which,] *facilitates the sharing of . . . knowledge*" (Ichijo et al, 2000, p. 200, [emphasis added]. When the facilitator of the information is not trusted within the branch, initially there is a tension on externalization, questioning if the facilitator able to enhance learning. An effective facilitator role thus implies an effective relationship between the facilitator and the organization that an investigation authority wants to reach out to.

It is therefore important to build trust in the relationships. One option to establish this is to perform safety investigations from the perspective of participative observation. The observer walks around on the work floor to get an idea about the sharp end environment. Participative observation is therefore a way to establish an environment of trust in favor of the investigator and/or facilitator.

> Accident prevention . . . is also realized when readers make[s] sense of the information presented and convert the narrative and contextual information into meaning or significance based on their own suite of experience . . . To achieve this goal there must be a shared level of trust between the individual reader and the information-conveyance method and/or process that created it. (Pupulidy, 2015, p. 134).

Safety thinking paradox, New View versus Old View, and participative observation to hinder

Next to my own experience I observed also during the interviews, the persistence of the paradox between the new and classic safety model, the Old View (Dekker, 2014). This Old View respresents the thought that work can be analyzed and prescribed, and therefore work-as-done should correspond with work-as-planned. Investigations are aimed to find the root-cause(s) so that the particular occurrence will not happen again and that way the safe world re-established. Old View investigations therefore tend to have a negative commutation that it, however, still very present in many safety sectors.

Interviewees suggested, for instance, to use blaming and shaming such as nominating an employee of the month, and to address inter-organizational statistical incident comparison in the safety

investigation reports as incentives. Such incentives can be seen as elements of the classic view on safety, which sees human error as the root cause of incidents. Recommendations in this view often concern the attitudes of people that, according to this view, have to be changed by means of quick fixes such as more regulation and technology (Dekker, 2014, p. 191).

The herefore mentioned quick fixes are in fact false. That is at least what follows from the new safety model (Dekker, 2014). Human error is in this model not the answer or conclusion of a safety investigation but the starting point of a safety investigation as human error, according to this view, has to be seen as a symptom. The safety thinking paradox is created when employees are stimulated to report incidents and accidents but that reprimand will follow after negligence or criminal steps. As long as this paradox holds, facilitating safety learning will be hampered. "It [Old View] has been tried for decades, without noticeable effect. Safety improvement comes from abandoning the idea . . . that people are the major threat to otherwise safe systems" (Dekker, 2014, p. 2).

The safety thinking paradox was also stipulated by interviewees in the discussion of two different types of safety investigation reports, one for the office managers and one for the ship crew. This enhances the gap between the operational level and managerial level, or the so-called sharp-end and blunt-end within an organization. Because not the own organization, but the facilitator takes the initiative to decide what is of importance for the sharp-end and with that pushing the focus of the organization in a direction which is possibly not correct.

Hollnagel et al (2013), as alternative of the herefore mentioned re-establishing work-as-planned by asking why things go wrong, argues to ask why things go wright, and then try to ensure that it happens again. Practically, this means that safety can be improved by meeting the operational people on the work floor, and try to understand that operational environment. For an investigator, this action can be embodied by conducting participative observation. Some respondents mentioned that visiting the ships would be important for facilitators for experiencing how a particular job is done onboard. Apparently, they find this important as this would help them to build context, which could benefit the investigation in favour of learning. Participative observation is a process that can enable researchers to learn about the activities of the people under study in the natural setting through observing and participating in those activities (Dewalt & Dewalt, 2002, p. 260). "He [participative observer] enters into conversation with some or all of the participants in these situations and discovers their interpretations of the events he has observed" (Becker, 1958, p. 652).

Requirements for written reports as communication of information

Despite the availability of contemporary means, all interviewees preferred, from a practical point of view, written reports. Due to limited information technology capabilities on board written reports are preferable within a shipping company to transmit (safety) information to the ship. Written reports, they argue, can perpetuate the accident; a report prevents the data loss of an accident. At the same time, it is questionable though, if reports are indeed a good means to transfer knowledge, based on the perception that not organziations but people have memories and when they leave at the same time take their memories with them. (Kletz, 2002, p. 5).

Written reports contain explicit knowledge. So, as to distribute qualitatively sound reports, the facilitator/investigator then has to take care that the processes that Nonaka called internalization and externalization (i.e., the conversion from data to tacit knowledge and then back from this tacit knowledge to an explicit report) proceed well. However, one difficulty in this conversion process is, according to Snowden (1999), that people know more than they can write. Converting tacit knowledge into written reports therefore results into a loss of meaning, a loss of content and in a loss of context. The facilitator needs to consider the focus of a safety investigation, and with that the (specific) internalization process resulting into a (specific) content and context of the externalization side.

One issue that follows from the interviews is the importance of time saving incentives, i.e. the need for brief, reports in a clear language so that these can be read during one watch cycle. The need for time these saving incentives is supported by different scholars such as Lindberg (Lindberg et al, 2010, p. 719), "a major reason for failure of dissemination may be that investigation reports are too long and not written in a sufficiently accessible language." Bilingual reports are furthermore necessary in favor of inter-organizational learning, so that reports don't have to be translated anymore as the crewmembers within the organization and same branch come from different countries.

Speed of dissemination

Fast accessibility of safety investigation reports shortly after an accident, this research points out, is also considered important. Following an accident, people want to know as soon as possible what is going on and if they are still safe, or which measures to implement to become safe again. However, effective accident prevention requires a thorough investigation. Safety investigators therefore focus on the underlying, often much less evident causes of an accident (Choularton,

2001). Scholars even concluded that summary reports emerging from investigations by shipping companies result into unreliable data with respect to indirect causes concerning an accident. Having the report quickly available can be counterproductive therefore for the quality of the safety information in the report. Companies should therefore not expect, that safety investigation information becomes available in a short period of time. Optionally as brought up by some interviewees, the facilitator could consider to bring speed in the process over thoroughness or work with intermediate reports. Another option is to follow the interest or focus of authorities, which give direction to safety investigation information so as to speed up the investigation process, and thus the dissemination of the investigation results. IMO and EASA, for example, proclaim topics to concentrate on, which are usable as a launching pad to predetermine the focus of the investigation.

Anonymity vs confidentiality

Trust was mentioned by the respondents in a similar manner as one of the main reasons responsible for being able to facilitate inter-organizational learning as it enables organizations to report occurrence without having to fear losing their face or being blamed. This results into an environment of inter-organizational learning according to Edmondson (2003). During the interviews, it became clear that losing face and/or mutual blaming hampers the organizations' economical goals. Anonymity was the solution abetted by the majority of the interviewees to steer towards a just culture.

Contrarily, as Dekker (2014) stipulates, anonymous reports are not the same as confidential reports. With anonymous occurrence reporting there is no possibility to ask for additional information because the contact details of the sender are unknown. This is not the case with confidential reporting as then these details are known by the safety or quality manager (Dekker, 2014, p. 20). This argues for an investigator or facilitator to work with confidential reports while protecting the anonymity of the reporter of the occurrence for the rest of the sector.

DISCUSSION

This section aims to discuss topics for further research concerning inter-organizational learning in the maritime sector facilitated by a third party. Topics mentioned here are the limits, trustand credibility of the facilitator, the diversity of organizations, and culture differences. The section finishes with the limitations of this thesis and my own reflections.

Topics for further research

Limits of the facilitator

The scope of this thesis was about the facilitation process and what incentives could enhance (inter-) organizational learning. This by focusing on the externalization side of the DIKW pyramid of the facilitator to support the internalization process of the sister-organziations. The internalization level of the facilitator is the determining factor to start the externalization phase. This in turn means that when the facilitator is stuck at a specific level in the pyramid, and probably missing a part in the internalization process, the externalization process is limited. It is of interest to conduct further research to discover latent limits of the facilitator which can potentially hamper the learning process.

Trust in the and credibility of investigator/facilitator

This, however, is just one means to establish trust. More research is necessary to study the connection between trust and the facilitation of inter-organizational learning by the dissemination of safety information.

Also mentioned was the credibility of a facilitator, especially when this authority is also the safety investigation institute. Generally, the credibility of the authority is considered quite good. Even though the information provided is not always correct, still the credibility remains of high standard. This raises the questions whether the credibility is attached to the safety investigation authority, by the facilitator, or by a mix of the two. How this works, however, and how a facilitator can establish this credibility, is still a topic of study.

Different organizations - different recommendations

As a facilitator, the question could be raised on how the various types of recommendations from safety accident investigations fit with expected (safety) maturity levels of organizations and will be

accepted. The facilitator provides the whole branch at this time with the same safety investigation information and not organizations individually It seems reasonable though, to expect that organizations with less developed safety posture should not be approached in the same way as those with more mature mindset. Not much is known, however, whether this is indeed the case and whether this would improve the effectiveness of safety reports. More research is herefore necessary on this terrain.

Addressing culture differences

To achieve the goal of reducing the manning cost, shipping companies worldwide employ crews from countries where labour costs are low. The world merchant fleet is therefore for a large part manned by multicultural and multilingual crews. The results of the Baltic International Maritime Council & International chamber of Shipping Manpower Report (BIMCO/ISF) (n.d.) for the year 2015 confirm that the largest seafarer supply countries are China, Indonesia, Philippines, Ukraine and the Russian Federation. This multicultural aspect is in line with results of this thesis. A large body of the interviewees reported that cultural differences hamper the learning from safety information, and thus also the learning from occurrences at sister-organizations. Also here, more research is necessary.

Limitations of research

I encountered during this thesis some limitations that have to be kept in mind when reading through the results. First, the choice of a small group of informants may affect the reliability of the data. I was disappointed about the limited positive reactions to my invitation to participate in this safety research, expecting that organizations would be interested in a subject like safety. This interest was expressed by most of the interviewees after the interview.

I observed that most of the interviewees were hesitating to start the interview till I clarified that my research was not interwoven with my job as investigator, as information provided being used for investigations. Probably, this was a relief which resulted in a relaxed and open conversation. It made me aware that probably a personal invitation would have resulted in more volunteers.

However, the question remains if this number of interviewees can represent the maritime sector. After my research, I can confirm that the number of rspondents was enough. This is based on repetitive answers. Especially, these on questions about safety learning and content of the safety investigation reports, and to a lesser extent about the triggers. The answers were that unambiguous

that they could be grouped relatively easy. For me, this research was explorative in nature and thus a starting point for other research.

Second, about the way, the safety information is moving within the companies, the respondents described that the company is sending safety related information, including the information about occurrences in other organizations, to the ship. According to the interviewees, the distribution of safety information about occurrences in other organizations from their respective staffs to the ships all run according to what has been laid down in their safety management systems (SMS). Within the scope of this study was no room to really check this, but the respondents described at least no discrepancies. This is no surprise in itself, because the respondents are in control of or closely related to this part of the safety concept within their company.

Studying one level only during this research was initiated not only due to limited time available for this study, but also because this level was the relay between the information facilitated and the rest of the organization. Future studies could for a better understanding be directed at the understanding of safety learning at different hierarchical levels. It could, for instance, reveal a possible gap between the sharp end and the blunt end understanding of safety learning and with that the difference how safety is achieved and understood.

Third, I discovered during the research that, due to the different cultures participating within the maritime sector, it may be of interest to conduct a study for further development of culture in facilitating information, as anthropology in safety science.

Finally, replicating the study may be hindered due to the lack of standardization as a criticism of qualitative research is that is it often affected by an unsystematically view and the researcher's interpretation about what is important. However, this thesis intends to give further direction and initiates discussions around the effect of facilitating information within the safety arena to learn from, and not only within the maritime sector but also within other (transportation) sectors.

Final reflections

These last two years were an intensive and at the same time very interesting period compared to previous study moments. It was intensive because it absorbed much of my (social) time which reflected on my family; I adjusted my planning many times and finally threw it out of the window. This had also to do with the interesting (safety) topics, which crossed my path during my research.

I was eager and lured into reading as much as possible. Unfortunately, I had to frame my thinking and reading based on the research question.

Also interesting were the interviews and discussions with the interviewees. All of them were intrigued by the questions that sounded simple initially but ended up with mind provoking ideas and thoughts. It hit me that an investigation board, at least in the Netherlands, did not maintain discussions like that on regular base. During this research, I started conversations with safety representatives of different companies and was even invited for a few meetings. At the same time, I argued for participative observation and conducted this way of investigation three times the last year. This resulted in a mutual understanding and respect that was a way of accepting safety investigation information by the organization involved in an accident itself, but also other organizations.

This thesis broadened my thinking of safety and instigated the interest of supporting companies in approaching safety. Learning others by still learning by myself. (Inter-organizational) learning from facilitated safety information is not compulsory, but neither is survival!

CONCLUSION

Based on the results of the semi-structured interviews the conclusion is that incentives exist that facilitators can use in the aftermath of a maritime occurrence. These incentives regard the dissemination of safety investigation information such that it improves or causes a lower threshold for inter-organizational learning. The results have both theoretical and pragmatic implications.

This thesis provides isights from a domain that seems largely unexplored and therefore will add to the academic literature. Also, by identifying incentives for inter-organizational learning across organizations, the thesis can be used by facilitators in how to improve the communication of their safety investigation information so as to enhance inter-organizational learning and thus to improve safety across organizations.

Learning has been argued to be important in accident prevention (Dekker, 2014; Lindberg et al, 2010; Weick & Sutcliffe, 2007). Safety investigation boards struggle, however, with how to disseminate their products – safety information about occurrences – such that it facilitates inter-organizational learning. In this research, some pragmatic incentives have been mentioned, such as the wish to continue the dissemination of written reports, only to be accompanied by other contemporary means. These reports should, above all, include an abstract and context, and should, to facilitate and stimulate the reading of these reports, be bilingual, brief and positively formulated. Also, is it assumable that, due to the different cultures within the different (sister-) organizations, different ways of information facilitation are required. Considered important furthermore, is to ensure anonymity, which could, for instance, be protected by an umbrella-organization that stimulates safety meetings and workshops. The latter can also be provided by the facilitator itself.

Organizations face similar but different issues. They fear commercial threats after having been the victim of an accident as this may damage their reputation, which may cause a less open attitude about safety issues. This could perhaps be counteracted by using a positive approach. This can be acted upon by investigating why things normally go right and make it happen again to improve safety. Other examples are the herefore mentioned anonymity and provider of safety meetings, and participative observation by the investigator, or visiting organizations to discuss safety (items).

Other ingredients to facilitate the use of safety information by sister-organizations have been mentioned in this research. One more important aspect brought to the fore though was the

credibility of an investigation board. Especially as what independent national investigation authorities publish is often be considered as true, this brings a responsibility for the authority to be credible. Only then will the authority gain and maintain trust. One example through which credibility can be gained is to apply participative observations during the investigation so that the investigator can learn from the organization how the work is done in a very natural way. At the same time, participative observation can counter the safety paradox which exist between Old and New View of safety thinking.

REFERENCES

Ackoff, R.L. (1989). From Data to Wisdom. *Journal of Applied Systems Analysis* (16), 3-9.

Argote, L., & Epple, D. (1990). Learning curves in manufacturing. *Science, 247*, 920–924.

Argyris, C. (1977). Organizational learning and management information systems. *Accounting, Organizations and Society, 2*(2), 113-123.

Baker, S. E, & Edwards, R. (2012). How many qualitative interviews is enough?: Expert voices and early career reflections on sampling and cases in qualitative research. *National Centre for Research Methods.*

Bakx, G. C. H., Opstal, J. v., & Bijlsma, T. (2013). Storytelling: a lifesaving tool. *Militair Spectator, 182*(9), 388-397.

Becker, H. S. (1958). Problems of Interference and Proof in Participant Observation. *American Sociological Review, 23*(6), 652-660.

Baltic International Maritime Council & International chamber of Shipping Manpower Report. (n.d.). *Manpower Update, The global supply and demand for seafarers in 2015, Executive Summary.*

Birkland, T. A. (2009). Disasters, Lessons Learned, and Fantasy Documents. *Journal of Contingencies and Crisis Management, 17*(3), 146-156.

Botha, A., Kourie, D., & Snyman, R. (2008). *Coping with Continuous Change in the Business Environment, Knowledge Management and Knowledge Management Technology*. Oxford: Chandice Publishing Ltd.

Brizon, A., & Wybo, J.-L. (2009). The life cycle of weak signals related to safety. *Int. J. Emergency Management, 6*(2), 117-135.

Cagiltay, K., Bichelmeyer, B., & Kaplan Akilli, G. (2015). Working with multicultural virtual teams: critical factors for facilitation, satisfaction and success. *Smart Learning Environments, 2*(1).

Conklin, T. (Producer). (2016a, April 20). *Pre-Accident Investigation Podcast: Safety Moment – Luck Has Nothing To Do With Safety*, [Audio podcast]

Conklin, T. (Producer). (2016b, April 27). *Pre-Accident Investigation Podcast: Safety Moment - Tacit V Explicit Knowledge: Battle Royal!*, [Audio podcast].

Conklin, T. (Producer). (2016c, December 7). *Pre-Accident Investigation Podcast: Success is BEST when Shared!*, [Audio podcast].

Choularton, R. (2001). Complex learning: organizational learning from disasters. *Safety Science, 39*, 61-70.

Dekker, S.W.A. (2014). *The Field Guide to Understanding 'Human Error'*. Burlington, VT: Ashgate Publishing Company.

Dekker, S.W.A. (2015). *Safety Differently: Human Factors for a New Era* (Second ed.). Boca Raton, FL: CRC Press Taylor & Francis Group.

Dewalt, K.M. & Dewalt, B.R. (2002). *Participant observation: a guide for fieldworkers.* Walnut Creek, CA: AltaMira Press.

Directive 2009/18/EC of the European Parliament and of the Council, (2009).

Dodgson, M. (1993). Learning, Trust and Technological Collaboration. *Human Relations, 46*(1), 77-95.

Drupsteen, L., Groeneweg, J., & Zwetsloot, G. I. J. M. (2013). Critical Steps in Learning From Incidents: Using Learning Potential in the Process From Reporting an Incident to Accident Prevention. *International Journal of Occupational Safety and Ergonomics, 19*(1), 63-77.

Edmondson, A. C. (2003). Psychological Safety, Trust and Learning in Organizations: A Group-level Lens.

Fiol, C. M., & Lyle, M. A. (1985). Organizational Learning. *The Academy of Management Review, 10*(4), 803-813.

Francis, J., Johnston, M., Robertson, C., Glidewell, L., Entwistle, V., Eccles, M. P. & Grimshaw, J. M. (2010). What is an adequate sample size? Operationalising data saturation for theory-based interview studies. *Psychology & Health, 25*(10), 1229-1245.

Galliers, R. D., & Newell, S. (2001). *Back to the Future: From Knowledge Management to Data Management.* Paper presented at the Global Co-Operation in the New Millennium, The 9th European Conference on Information Systems Bled Slovenia.

Garvin, D. A. (1993). Building a Learning Organization. *Harvard Business Review.*

Gesellschaft für Konsumforschung. (2016). *Naamsbekendheid Onderzoeksraad voor Veiligheid* (350499).

Hedberg, B. (1981) How organizations learn and unlearn? In P. C. Nystrom & W. H. Starbuck (Eds.), *Handbook of organizational design* (pp. 8-27). London: Oxford University Press.

Hollnagel, E., Wears, R. L., & Braithwaite, J. (2015). From Safety I to Safety II: A White Paper. *The Resilient Health Care Net.*

Hovden, J., Størseth, F., & Tinmannsvik, R. K. (2011). Multilevel learning from accidents – Case studies in transport. *Safety Science, 49*(1), 98-105.

Huber, G. P. (1991). Organizational Learning: The Contributing Processes and the Literatures. *Organization Science, 2*(1), 88-115.

Ichijo, K., Krogh, G. v., & Nonaka, I. (2000). Knowledge enablers. In J. R. G. von Krogh, D. Kleine (Ed.), *Knowing in Firms: Understanding, Managing and Measuring Knowledge* (pp. 173-203). London: Sage Publications.

Kletz, T. A. (2002). Accident investigation - missed opportunities. *Institution of Chemical Engineers, 80*(B), 3-8.

Lakoff, G. & Johnson, M. (1980). *Metaphors we live by.* Chicago, IL: University of Chicago Press.

Lam, A. (2000). Tacit Knowledge, Organizational Learning and Societal Institutions: An Integrated Framework. *Organization Studies, 21*(3), 487-513.

Lampel, J., Shamsie, J., & Shapira, Z. (2009). Experiencing the Improbable: Rare Events and Organizational Learning. *Organization Science, 20*(5), 835-845.

Larsson, R., Bengtsson, L., Henriksson, K., & Sparks, J. (1998). The Interorganizational Dilemma: Collective knowledge development strategic alliance. *Organization Science, 9*(3), 285-305.

Le Coze, J. (2008). Disasters and organisations: From lessons learnt to theorising. *Safety Science, 46*(1), 132-149.

Levin, D. Z., & Cross, R. (2004). The Strength of Weak Ties You Can Trust: The Mediating Role of Trust in Effective Knowledge Transfer. *Management Science, 50*(11), 1477-1490.

Levinson, N. S., & Asahi, M. (1995). Cross-National Alliances and Interorganizational Learning. *Organizational Dynamics, 24*(2), 50-63.

Levitt, B., & March, J. G. (1988). Organizational Learning. *Annual Review of Sociology, 14*, 319-340.

Lindberg, A.-K. (2010). *Learing from accidents - Experience feedback in practice.* (PhD), Royal Institute of Technology, Stockholm.

Lindberg, A.-K., Hansson, S. O., & Rollenhagen, C. (2010). Learning from accidents – What more do we need to know? *Safety Science, 48*(6), 714-721.

Longman Dictionary of Contemporary English (n.d.) retrieved December 11, 2016, http://www.ldoconline.com.

Lukic, D., Margaryan, A., & Littlejohn, A. (2010). How organisations learn from safety incidents: a multifaceted problem. *Journal of Workplace Learning, 22*(7), 428-450.

Nesheim, T., & Gressgård, L. J. (2014). Knowledge sharing in a complex organization: Antecedents and safety effects. *Safety Science, 62*, 28-36.

Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science, 5*(1) 14–37.

Nonaka, I. & Takeuchi, H. (1995), *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*, Oxford University Press, New York, NY.

Onderzoeksraad voor Veiligheid. (2015a). *Shipping Occurrences Report November 2014 till May 2015*. Retrieved 20 November 2016 from https://onderzoeksraad.nl/en/onderzoek/2138/shipping-occurrences-report-november-2014-till-may-2015.

Onderzoeksraad voor Veiligheid. (2015b). *Shipping Occurrences Report May – October 2015*. Retrieved 20 November 2016 from https://onderzoeksraad.nl/nl/onderzoek/2188/rapportage-ongevallen-scheepvaart-mei-oktober-2015.

Onderzoeksraad voor Veiligheid. (2016a). *Report Occurrences Shipping November 2015 – May 2016*. Retrieved 20 November 2016 from https://onderzoeksraad.nl/nl/onderzoek/2236 /rapportage-ongevallen-scheepvaart-november-2015-april-2016.

Onderzoeksraad voor Veiligheid. (2016b). *Report Occurrences Shipping May – November 2016*. Retrieved 20 November 2016 from https://onderzoeksraad.nl/en/onderzoek/2298 /shipping-occurrences-report-may-october-2016.

Onderzoeksraad voor Veiligheid. (n.d.a). *Onderzoeksprotocol*, Retrieved 23 November 2016 from https://www.onderzoeksraad.nl/en/over-de-raad/history-of-the-board.

Onderzoeksraad voor Veiligheid. (n.d.b). *Onderzoeksprotocol*, Retrieved 23 November 2016 from https://onderzoeksraad.nluploads/fm/over-de-raad/OVV onderzoeksprotocol web_ definitief_met_links.pdf.

Overheid.nl. (2010). *Wet- en regelgeving: Rijkswet Onderzoeksraad voor veiligheid*, Retrieved 13 December 2016 from http://www.wetten.overheid.nl/BWBR0017613/2010-10-10.nl.

Overheid.nl. (2016). *Wet- en regelgeving: Rijkswet Onderzoeksraad voor veiligheid*, Retrieved 13 December 2016 from http://wetten.overheid.nl/BWBR0017613/2010-10-10# Hoofdstuk5_Paragraaf 2.

Oxford Dictionary of English (n.d.), Retrieved 11 December, 2016, http://www.en.oxford dictionaries.com.

Perrow, C. (1999). *Normal Accidents: Living with High Risk Technologies*. Princeton, NJ: Princeton University Press.

Pidgeon, N., & O'Leary, M. (2000). Man-made disasters: why technology and organizations (sometimes) fail. *Safety Science, 34*(1-3), 15-30.

Polanyi, M. (1966). *The Tacit Dimension*. Chicago, IL: University of Chicago Press.

Pupulidy, I. A. (2015). *The transformation of accident investigation: From finding cause to sensemaking.* (PhD), Tilburg University.

Rae, A. (2016). Tales of Disaster: the role of accident storytelling in safety teaching. *Cogn Tech Work, 18*, 1-10.

Reason, J. (1990). Latent errors and systems disasters *Human Error* (pp. 173-216). New York, NY: Cambridge University Press.

Richardson, B. (1995). Learning contexts and roles for the learning organization leader. *The Learning Organization, 2*(1), 15-33.

Rowley, J. (2006). The wisdom hierarchy: representations of the DIKW hierarchy. *Journal of Information and Communication Science, 33*(2), 163-180.

Sanne, J. M. (2008). Incident reporting or storytelling? Competing schemes in a safety-critical and hazardous work setting. *Safety Science, 46*(8), 1205-1222.

Scott, J. E. (2000). Facilitating Interorganizational Learning with Information Technology. *Journal of Management Information Systems, 17*(2), 81-113.

Senge, P. M. (1990). *The Fifth Discipline: The art and practice of the learning organization*: Currency Doubleday.

Shuell, T. J. (1990). Teaching and learning as problem solving. *Theory Into Practice, 29*(2), 102-108.

Snowden, D. (1999). *Complex acts of Knowing: Paradox and Descriptive Self Awareness*. Third European Conference on Knowledge Management.

Stenmark, D. (2002). *Information vs. Knowledge: The Role of intranets in Knowledge Management*. Paper presented at the Proceedings of the 35th Hawaii International Conference on System Sciences, Hawaii.

Størseth, F., & Tinmannsvik, R. K. (2012). The critical re-action: Learning from accidents. *Safety Science, 50*(10), 1977-1982.

Thomas, G. (2013). *How to do your research project: a guide for students in education and applied social sciences* (J. Seaman Ed. 2nd ed.). London: SAGE Publications Ltd.

Vollenhoven, P. v. (2012). *Hier onveilig? Onmogelijk!* Amsterdam: Uitgeverij Balans.

Weick, K. E., & Sutcliffe, K. M. (2007). *Managing the unexpected: resilient performance in an age of uncertainty* (2nd ed.). San Francisco, CA: Jossey-Bass, c2007.

Woods, D. D., Dekker, S. W. A., Cook, R., Johannesen, L., & Sarter, N. (2010). *Behind Human Error* (second ed.). Farnham: Ashgate Publishing Limited.

Zeleny, M. (1987). Management Support Systems: Towards Integrated Knowledge Management. *Human Systems Management, 7*(1), 59-70.

Appendix A: Invitation

Uitnodiging voor deelname aan een interview
Onderzoek naar veiligheidsmotivering

LUND UNIVERSITY

Wie ben ik?
Ik ben werkzaam bij de Onderzoeksraad voor Veiligheid. Mijn passie voor veiligheid heeft mij vorig jaar doen besluiten de masteropleiding “Human Factors & System Safety” te gaan volgen in Lund, Zweden. Deze opleiding wordt afgesloten met een scriptie.

Waarom dit interview?
Mijn thesis gaat over de uiteindelijke informatie die beschikbaar is aan het einde van een veiligheidsonderzoek. Deze informatie wordt zo verwerkt in rapporten en beschikbaar gesteld, met het doel voorvallen in de toekomst te voorkomen. Dit impliceert dat de beschikbaar gestelde informatie tot veiligheidsverbetering leidt. En dit niet alleen voor organisaties die betrokken zijn geweest bij een voorval, maar vooral ook voor de ‘collega-organisaties’. Wordt inter-organisatorische veiligheidsmotivatie inderdaad geïnitieerd door die informatie?

Doel van dit interview?
Dit interview tracht te achterhalen aan welke factoren de informatie dient te voldoen, wil een andere organisatie daarvan leren. Hoe kan informatie op de juiste manier gedeeld worden? Hoe leert uw organisatie daarvan? Kan een onderzoeksinstantie hier rekening mee houden, en hoe?

Wie zoek ik?
- U dient bekend te zijn met de website van de Onderzoeksraad voor Veiligheid.
- U heeft een veiligheidsfunctie binnen uw organisatie.
- U dient beschikbaar te zijn in de maand september of oktober.
- U bent bereid uw veiligheidsperspectief te delen en daar een open dialoog over te voeren.

Wanneer vindt het interview plaats?
Het interview zal in de periode september of oktober 2016 plaatsvinden. Het zal gemiddeld 60 minuten duren en kan tot 90 minuten uitlopen.

Hoe meldt u zich aan?
Mail voor zaterdag 13 augustus naar mfs15aro@student.lu.se. Vermeld dan uw naam, uw functie en het telefoonnummer waarop ik u tijdens kantooruren kan bereiken. Als u meer informatie wilt, kunt mailen naar dit adres. Ik neem dan zo spoedig mogelijk contact met u op.

About MSc Human Factors & System Safety

This MSc is to expand knowledge and practical skills for the safety challenges of the twenty-first century. Its program offers the latest thinking in the new view of human factors, accountability, accident models, and resilience engineering. The understanding of accidents, risk and safety is changing. We no longer see human error as cause, but as a symptom. We recognize the exciting possibilities of systems thinking for accident analysis and organizational improvement. We are shifting from reliability to resilience and the enhancement of adaptive capacity. We look for new relation- ships between stakeholders to create forms of accountability that do not harm safety.

André Roskam | mfs15aro@student.lu.se | (+31)6 30 11 32 67

Appendix B: The informed consent

Appendix B consists of the informed consent form written in English. The interviewer explained the context before the interview itself in Dutch language as the primary language. Before commencing the interview this form was signed and collected by the interviewer.

Consent for Participation in a Research Project
Lund University, Human Factors and Systems Safety

"Improving safety investigation information facilitation in order to enhance inter-organizational learning."
(André) K. Roskam

I am a student at the University of Lund, in the Department of Human Factors and Systems Safety. I am planning to conduct a research study, which I invite you to take part in. This form has important information about the reason for doing this study, what I will ask you to do if you decide to be in this study, and the way we will use your information if you choose to be in the study.

Purpose:

You are being asked to participate in a study about inter-organizational learning and the way how this can be affecting safety investigation information distribution. I hope to learn from this study which aspects are involved when inter-organizational learning takes place, more specifically when and how an organization learns from another organization that has been subject of a safety investigation. Finally, what I hope to get out of this study is some insights how these aspects can be used to communicate and formulate safety investigation information that supports inter-organizational learning?

Procedures:

Participation in this study will involve an interview. I anticipate that your involvement will require one session of maximum 1.5 hours, and the meeting location will be determined to your preference. You will be asked questions regarding how you perceive (inter-organizational) learning generally, whether this improves organizational safety and which aspects, in your opinion, have to be involved to pursue this inter-organizational learning.

I would like to audio-record this interview to make sure that I review accurately all the information you provide. I will transcribe the interview of which a copy will be provided to you. You have the right to review and edit the transcript. The recordings will be kept in my home office in a locked cabinet and then digitally in a password-locked and encrypted computer and this will only be used by me. The information will be stored for five years after completion of the research for research transparency reasons and subsequently destroyed.

I may quote your remarks in presentations or articles resulting from this work. I will process the data in such a way that it is not traced back to you as the informant in order to respect your privacy, unless you specifically request that you be identified by your true name.

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Agreement to Participate:
I have read this form and the research study has been explained to me. I have been given the opportunity to ask questions and my questions have been answered. If I have additional questions, I have been told whom to contact. I agree to participate in the research study described above and I have been given a copy of this consent form.

_____
Participant's Name (printed)

_____ _____
Participant's Signature Date

Appendix C: The interview guide

Appendix C consists of the interview guide used in the thesis, to reveal the empirical results. The guide is written in English; however, the interviews were conducted in Dutch as the interviewer and interviewees primary language.

Background:

- Briefly describe your work, tasks and responsibilities.
- How does the organigram look like?
- How long does your organization exist?
- What is the experience of your organization?

Incident follow-up:

- Can you remember a particular occurrence, incident or accident involving a colleague (organization)?
- What was YOUR organization's reaction?
- Did your organization learn from this occurrence and how?

Safety inter-organizational learning incentives:

- What were incentives for your organization to learn from the previous mentioned occurrence?
- What other incentives could have increased the urge to learn from this incident in the colleague organization?
- If the safety board would follow the results of this study, would your organization then be more inclined to learn from incidents in other organizations? Why?

General ideas:

- Does your organization learn from the safety investigation information concerning an accident in a colleague organization?
- Is this comparable to learning from other organizations
- How is the static safety investigation information distributed within the organization?
- How is this static distributed information distributed dynamically within the organization?
- Is it possible to learn from other organizations to your opinion? How?

Is there anything to add regarding the topic of learning from safety reports on incidents in colleague organizations that has not had sufficient attention during this interview?

Appendix D: The interview results

Appendix D is a summarizing of the answers from the interviewees. After performing eight semi-structured interviews with nine employees from eight different ship-owner companies the following results are provided. Each chapter starts with a short introduction to the interviewee.

D1. Interviewee 1

D.1.1 Introduction to the interviewee

Interviewee 1 graduated from nautical college and sailed onboard starting as third officer and finished as captain during the last four years of sailing. He was asked to fulfill the billet of safety environment affairs manager within the same ship-owner company, followed by quality and human resource manager and roughly three years as manager competence and training. At the moment, he is a Health, Safety and Environment (HSE) manager. He is responsible for the internal auditing, creating policy and conducting accident investigations, including monitoring the recommendations.

D1.2 Introduction to company

The company has 21 chemical and product tankers. Most of these ships are sailing under Norwegian flag, four under Singapore flag. All crew members have Filipino nationality. The company has a direction level, management and ships.

D1.3 Results interviewing person 1

Categories	**Interviewee 1**
Remembrance of an accident involving a colleague-organization	• Receiving information from oil and chemical party • Receiving information from P&I club • Receiving information by newsletter • Bomariner, ten years ago • Accidents concerning palmoil • Accidents seen on Youtube
Reaction to this accident	• Can happen to us too • Checking procedures • Safety campaign with posters • Dividing information in newsletters based on similarity with own company

How did you learn from this occurrence?	• Trying to change culture and thinking of crew members • Only attention when big accident happens • Did not learn because of other priorities • Asking how did it happen and can this happen to us too
Definition of (safety) learning	• Reading what is written • Explain and demonstrate • Changing culture on the long run • Eliminating raid pace • Taking care of different cultures
The incentives to learn from mentioned occurrence	• The volume of the accident • Relation with own experience • Relation with own interest • Issues which have attention and are discussed (ECDIS, IMO regulation) • Receiving more and fast information of accident • Based on public opinion • A sudden accident in slow period
What other incentives can you think of to increase the urge of learning?	• Connecting using ship-owners society • Easy access to information • Money • Inter-organizational communication • Visualization (DVD's on board, movies, slightly shocking pictures, AIS on Youtube) • Investigation reports in English language • Summary • Title of report • Recommendations (not always necessary)
Is it possible that your organization can learn from other organizations?	• Yes, due to reporting culture within the oil and chemical branch

	• Yes, due to information distribution within the branch
How is static safety information distribution conducted?	• Distribution from office to management on board • Safety meeting IAW SMS on board
How is the dynamic safety information distribution conducted?	• Ship dependent due to culture difference on board (young Filipines act differently compared to older colleagues) • Difficult to determine, only based on ship visits on board and received investigation reports
Remarks	• Nice conversation also because looking at safety in a different way • Normally no time to think or talk about safety due to time constraints. One of the reasons is the growth of the company from 13 to 21 ships in three years

D2. Interviewee 2

D.2.1 Introduction to the interviewee

Interviewee 2 has been working in de maritime industry for almost twenty years and has sailed on board ships concerning maritime transport as first officer. The last ten years are spent in an office. At the moment, the interviewee is the Quality, Health, Safety, Security and Environment (QHSSE) manager within the company that started in 2013, and busy with writing and implementing a safety management system (SMS). Interviewee acted one year as instructor at a maritime school.

D.2.2 Introduction to company

The company is in possession of four modern ships which are managed by an external party for global maritime transport. The ships were self-designed in cooperation with a ship building company. The fleet will be extended with two other ships. The crew members have the Ukraine and Filipino nationality. The company is small and has one management level only.

D.2.3 Results interviewing person 2

Categories	**Interviewee 2**
Remembrance of an accident involving a colleague-organization	• Hatch cover crane accidents which happened regularly
Reaction to this accident	• Not much, monitoring the results by the inspectorate and ports state control
How did you learn from this occurrence?	• Not much, it confirmed the feeling that hatch cover cranes create a dangerous working environment • I conducted a scan on board and the results will be implemented
Definition of (safety) learning	• Using incidents and near-misses to change thinking and attitude of crew members step by step • Visiting the ships, listen to and advise crew members and return to make sure they understood • Motivation, teaching and testing
The incentives to learn from mentioned occurrence	• Own interested which started at nautical college when one of his peers died during an accident on board with a welding machine. This was truly striking • Hobbyhorse or tic, due to own experience
What other incentives can you think of to increase the urge of learning?	• Observe actively on board ships • Distinguished technical investigation and anonymized personnel impact • Give victims possibility to tell their story • Focusing on themes • Clear language • Visualization using pictures or movies in line with 'seconds from disaster' or 'air crash investigation'

	• Statistics
Is it possible that your organization can learn from other organizations?	• Organizations are not willing to distribute incident information causing record damage • No, there is no communication with other companies • Only by reading investigation reports
How is static safety information distribution conducted?	• Up and down the organization IAW SMS • Safety committee on board • Safety observation cards once a month to meet performance criteria
How is the dynamic safety information distribution conducted?	• Not clear, but during holiday observing Indonesian people work makes me understand that sailing on board a high safety standard ship and presence of books which are difficult to read or not understandable, makes life difficult • Planning to place an IPad onboard with a sailor version; hopefully will this increase safety attitude
Remarks	• Interesting conversation with somebody from the safety world and that keeps me thinking • Conventional crew members who are sailing for 20 or 30 years are now confronted with regulations. Most of the time these are demanded by the customers. It is my responsibility to close that gap between regulations and how to deal with it practically. That is an ongoing process • Investigation reports are considered true

D3. Interviewee 3

D.3.1 Introduction to the interviewee

Interviewee 3 is the Quality, Health, Safety and Environment (QHSE) manager within the company, and principally advising an supporting line management to preform safely.

D.3.2 Introduction to company

The seventy years old family company is in possession of ten ships and specialized in heavy-lift tasks, moving big objects. The company has a direction level with staff department, a management level and employee level on board of the ships.

D.3.3 Results interviewing person 3

Categories	**Interviewee 3**
Remembrance of an accident involving a colleague-organization	• No
Reaction to this accident	• Not applicable, but normally information is received from oil and gas industry clustered by theme. If comparison is available, then it will be communicated within the company on board of the ships
How did you learn from this occurrence?	• Left to the crew members on board by distributing information and follow SMS communication line (safety committee, crew members will take precautions)
Definition of (safety) learning	• Sharing investigation reports • Transparency concerning good and bad things • Training and explaining why we do things • Attitude is the condition for the safety perspective on board • Safety thinking is busy with management system, risk assessments, reporting, etc
The incentives to learn from mentioned occurrence	• Information from oil and gas industry

What other incentives can you think of to increase the urge of learning?	• Clear description of accident • Anonymous • Cartoons • Pictures • Make it possible that people can relive the accident within context • Not a lot of pages in a report • Easy language • Correct terminology • Complete package from the one who wrote the report in such a way that it can be distributed directly • Statistics involving the company itself to find out her status in comparison to other companies
Is it possible that your organization can learn from other organizations?	• Organizations are not willing to distribute incident information due to competition and causing record damage • Only possibility is something like IMCA, that collects information, makes it anonymous and distributes it again within the branch • Or as KVNR using a database; at the end did it not work either; reporting was necessary, and the companies which reported everything were seen as unsafe while they were the safest • KNVR should act and be used as discussion platform • As long as blame culture continue to exist, there will not be voluntary incident reporting

How is static safety information distribution conducted?	• Safety committee on board with feedback reporting
How is the dynamic safety information distribution conducted?	• Monthly discussion with captains • Semi-annual discussion with safety officers and chief engineers
Remarks	• Interesting conversation with somebody from the safety world and that keeps me thinking • Conventional, older crew members who are sailing for years is not used to the way of safety thinking as the younger generation. Older crew members are from the era skipper next to God. Having internal discussion how to get control of people to look at safety all the same • Companies keep list of the number of PSC visits to use as competition means with customers

D4. Interviewee 4

D.4.1 Introduction to the interviewee

Interviewee 4 is the Health, Safety, Environment and Quality (HSEQ) manager and with the members of the department responsible for safety and quality to keep the ships safe and are able to continue sailing. This means certified for ISM and ISPS. Every year all ships are visited IAW audit schedule.

D.4.2 Introduction to company

The more than hundred years old family company is in possession of 66 ships. It is certified for ISO 9001; some ships are ISO 14001 certified if the customer requires. The company has a direction level with staff department, a management level and employee level on board of the ships; manned by about 1900 people. Next, there are a little more than hundred ships which are managed by a captain-owner. These captain-owners are responsible for their own safety and quality, the cargo load is arranged by the company.

D.4.3 Results interviewing person 4

Categories	**Interviewee 4**
Remembrance of an accident involving a colleague-organization	• Lady Irina, enclosed space entry • Snap back zones on board, breaking of ropes
Reaction to this accident	• Accident communicated with ships of company by using Fleet News • Fleet News also distributed on board the ships of captain-owners, also to show company safety thinking • Share information on an independent intranet • One-on-one recommendations were taken over • New procedure implemented on board, audit for follow-up, sanctions if not implemented or followed • Direction level shows attention for other accidents and reports
How did you learn from this occurrence?	• Could happen on board of own ships too; be prepared and compare the incident with own situation on board • Marked snap back zones, which created fake safety feeling, were replaced by one marking 'danger zone' when entering the mooring deck
Definition of (safety) learning	• Recognizing dangerous situations before becoming an accident • Attitude change based on procedures that find the origin in accidents
The incentives to learn from mentioned occurrence	• Comparable accident on board comparable ships

	• In line with own focus on incidents within the company • In line with the focus of the branch • Comparable with same procedures • Company was under observation by inspectorate, which caused a motivation to proof customers and authorities otherwise. So, keeping track of all possible risks of other accident investigation reports was in line with SMS to monitor own company risks
What other incentives can you think of to increase the urge of learning?	• Use KVNR as communication platform • More attention for smaller accidents that are more important than big accidents • Not only accidents but all incidents • Transparency and openness • General database with all reported incidents owned by one to find causes • Anonymous
Is it possible that your organization can learn from other organizations?	• This is possible but difficult. My company is divided into 'island culture'; an incident can hurt the whole company and not only one department • Yes, but 'what is in it for me?' We are getting better, also as competitors, because accidents will not make us better performing within the branch • At the moment, this does not work because after every accident the inspectorate jumps on the situation which forces companies to act upon expectations and cost a lot of money

How is static safety information distribution conducted?	• IAW SMS, from office to ship and discussed in safety meeting
How is the dynamic safety information distribution conducted?	• Not really only when on board for an audit • The way incident reports are closed based on incomplete information or copy-paste from other reports, gives an idea • Compared to a few years ago, the lower ranks on board are assertive enough to question staff members; so, people are growing concerning safety thinking • Crew members of ships with Dutch or Eastern crew are questioning staff members on board indicating that something positive happens concerning safety thinking and attitude. This is something different on ships with Ukraine or Russia crew (are not loyal either) • This difference in attitude is also observable during the different yearly officer meetings with staff • Motivation of personnel
Remarks	• People will not learn, examples as holding a fire door open day and night; people in the office used to sail too and they are (also) blind for some risks or dangers in working environment • Russian crew members are always available and cheap • Russians do not trust the government; I am Polish too and recognize that attitude • Showing personal interest creates a bonding to get closer to a person and understand him

	• Paris MOU international ranking vs national inspections and safety improvement with older ships and willing crew members; inspections are not directly related to safety

D5. Interviewee 5

C.5.1 Introduction to the interviewee

Interviewee 5 is responsible for the cooperate Health, Safety, Environment and Quality (HSEQ). The interviewee has fulfilled many jobs within the company and therefore very familiar with the working environment. The interviewee is responsible for elevating the less performing companies and boost their cooperation to enhance learning between those companies.

D.5.2 Introduction to company

The company established 118 years ago. Originally, a maritime company and over the years the company has extended by recruiting and establishing other companies. At the moment, the company has about 3200 employees and seven departments. The company has a direction level with staff department, a middle management level and employee level on board of the ships. So, generally there are three levels, some companies have four levels.

D.5.3 Results interviewing person 5

Categories	**Interviewee 5**
Remembrance of an accident involving a colleague-organization	• Yes, many times • Small messages via IMCA, offshore branch • Incident in Germany, a crane in contact with electric railway cable
Reaction to this accident	• High potential messages are shared • Safety bulletin or safety alert • Direction level hesitates to inform and share information; proud or code of honor

	• If investigation is conducted by third party, company will not do the same; company waits for results of that investigation
How did you learn from this occurrence?	• Compared with own situation
Definition of (safety) learning	• Getting better by using the positive and negative experience • Sharing, even if it influences your position on the market as happens within the oil and gas branch
The incentives to learn from mentioned occurrence	• Anonymous • Comparable situation or activities
What other incentives can you think of to increase the urge of learning?	• Title of investigation (report) • Context • Summary including keywords • Which third party conducted investigation? Safety board is seen as a trustworthy party • Easy accessible online
Is it possible that your organization can learn from other organizations?	• Yes, is possible • Within maritime branch difficult; has to do with culture (Dutch, Russian, Ukraine, Asian) • Within oil and gas branch even competitors receive results of safety investigations • Proud is in the way; dirty washing is laundered at home • Independent reporting is not possible on board; everything goes via captain or first officer • Safety mature companies can even learn from safety investigation reports concerning aviation accidents

How is static safety information distribution conducted?	• Safety alert and fleet news • SMS • Safety meeting
How is the dynamic safety information distribution conducted?	• Difficult to find out; the company gives the captain the key of a twenty-million-euro ship and request him to establish contact frequently • Difficult; one-on-one with ratings preferred but the company does not want to undermine the captain
Remarks	• Less safety performing companies measured by the number of reported incidents, undesired actions on working floor and results of baseline measurement • Safety mature companies have more and dedicated resources to read reports and learn from it • If results of own report are not the same as third party report it depends on team construction, not the investigation method; every method should lead to the same conclusion • Internet on board of ships makes communication easier, though contact is still going via captain or first officer • Office members have to sail on board a ship to encounter the situation

D6. Interviewee 6

D.6.1 Introduction to the interviewee

Interviewee 6 has been working in the department of Health, Quality, Safety and Environment (HQSE). Before, the interviewee worked for the Navy followed as marine lead auditor concerning ISO standardization and finally as auditor at Lloyds Register.

D.6.2 Introduction to company

The twenty-year-old company started as container company. About four years ago, general purpose ships were included. Since 2011 crew tender vessels have been co-opted. The company has a direction level with staff department, a management level with the heads of department and the working level. Shortly, the company arranges everything except the freighting.

D.6.3 Results interviewing person 6

Categories	**Interviewee 6**
Remembrance of an accident involving a colleague-organization	• Yes, not by name • Flinterstar • Enclose space entry • Sinking of car carrier near Rotterdam • Fishership guardship collision • Man over board while unleashing containers on Humber river
Reaction to this accident	• Waiting for results of investigation • Not much, due to limited information • Attention by IMO, MAIB and other third parties • Recognizable circumstances concerning, crew, ship or company otherwise no attention, although very interesting • Inform ships and stimulate to do something with it
How did you learn from this occurrence?	• Only when report is published • Not much time to read, but you can mention the report and hopefully crew members are going to read it
Definition of (safety) learning	• Using experience to change to prevent things from happening again
The incentives to learn from mentioned occurrence	• Other parties are interested, so something is going on • Recognizable situations

	• Can happen to us too
What other incentives can you think of to increase the urge of learning?	• Easy readable report; so it can be read during a watch period • Depending on the different types of people. There are people who can read and remember, there are people who do not read; perhaps use pictures • Some persons have to be convinced with arguments, some people just follow orders • Report written in simple or approachable language • Question reader; could this happen to you? Questions in the report itself. • Financially • Detention • Regulations to force to think about implementation • Observe the occurrence from different angels, also the small incidents
Is it possible that your organization can learn from other organizations?	• Slow process du to frequently changing crew, only three times a year conducting a visit on board, hopefully both captains will discuss during handover • The business is reactive, as long as it going well there is no issue • No, there is no time left due to the many regulations to think about own company • There is no openness; if no investigation is conducted the company is happy; to prevent naming and shaming; Wagenborg safety culture investigation is good to learn from, but is killing for the investigated company

	• Only when all crew members are able to report an incident; now not possible due to no access of internet by crew
How is static safety information distribution conducted?	• Via internet • During visits on board • Safety meeting • Uploading in internet system including summary
How is the dynamic safety information distribution conducted?	• Supporting decisions of the captain although against commercial requests; also to prevent that the captain will not return to work for company; from there safety culture is built • Personnel contact by telephone to discuss items to make captain personally interested before distributing • Asking during visit what the office is doing good and not so good; dyslectic personnel on board do not read reports • Results of working group sailors; usage of a beam with traffic light colors to question crew members about safety on board
Remarks	• It is not about the investigating party, it is about the content of the report • For the company, it is easier to transfer written reports instead of movies due to the many Mb's • Report in depth is of more value; experience with a third-party investigation was not positive • Safety culture investigation was the start of a workgroup sailors to improve performance

D7. Interviewee 7

D.7.1 Introduction to the interviewee

Interviewee 7 is director fleet operations Europe and primary the representative for the company, and therefore maintaining contacts with inspectorate, police, defence, coast guard and other authorities. The interviewee makes it possible that the ships are certified and can sail. the Health, Safety, Environment and Quality (HSEQ) manager and with the members of the department responsible for safety and quality to keep the ships safe and are qble to continue sailing. This means certified for ISM and ISPS. Every year all ships are visited IAW audit schedule.

D.7.2 Introduction to company

The company is established in 1873 and is part of a cooperation of nine companies worldwide, and possesses fourteen ships. Two years ago, the companied grouped together with three other companies within the cooperation. This group employs about seventy thousand persons and possesses thirty-nine ships sailing under Dutch, Bahama, Bermuda and English flags. The offices are all positioned in America. The company has a CEO level, brand presidents with senior executive vice-presidents level, senior vice-presidents level, management level and finally the workfloor.

D.7.3 Results interviewing person 7

Categories	**Interviewee 7**
Remembrance of an accident involving a colleague-organization	• Falling rescue craft killing two people at a sister company
Reaction to this accident	• Checking own rescue craft construction • Two fast rescue crafts temporarily non-active
How did you learn from this occurrence?	• Checking construction • Finding root cause
Definition of (safety) learning	• Find a root cause to an incident • Easy when technical failure • Something else when human failure; spit deeper to find a cause • Question remains if procedures are good enough; unknown if not followed

	• Culture change; starts with the introduction when recruited for company
The incentives to learn from mentioned occurrence	• Publicity • Can happen in our company too, the ships are al built at the same building company • Information quickly available, small branch/world • Same procedures • Same SMS within company and on board
What other incentives can you think of to increase the urge of learning?	• More incidents collected in one report • Make it clear that reporting does not have to lead to blame and shame • Report title • Thoroughness of report, especially the human factor • Investigators have to have credits from the maritime sector; they need to know what they are talking about • According to my experience, the content is correct
Is it possible that your organization can learn from other organizations?	• Yes, because our branch is very transparent • Further outside the branch via the international institute CLIA • On the other side, CEO's do not want to see an accident as Costa Concordia in their company. This has changed the whole branch concerning training and ship building • Depending how open to this method
How is static safety information distribution conducted?	• Senior management conferences • Communication between ship and shore always via captain

	• Toolbox discussions
How is the dynamic safety information distribution conducted?	• During coffeebreak 'pikheet' • I have an informal meeting during upcoming lunch
Remarks	• The nationality on board is decided by the expectations of customers; i.e. Dutch flagged ship with Dutch officers decides image of company • We always liked to read the verdicts of the maritime board of justice; this was the only source of information; nowadays there is more media available; also because the board did not understand the context

D8. Interviewees 8a and 8b

D.8.1 Introduction to the interviewees

Interviewee 8a is the Quality, Health, Safety and Environment (HQSE) officer.

Interviewee 8b is the corporate QHSE manager, maintaining the helicopter view, and fulfilling this job since November 2015.

D.8.2 Introduction to company

The company is established in the fifties, sixties. Mainly, it is operating abroad in possession of eight ships. Roughly 80 persons are employed, including office and on board. A recent reorganization changed from local only to world-wide only. The company is working with four levels, the board, senior management, middle managers and finally the working floor; and local operations managers abroad at every location.

D.8.3 Results interviewing persons 8a and 8b

Categories	**Interviewees 8a and 8b**
Remembrance of an accident involving a colleague-organization	• Recent fatal accident on board ISV [Infield Support Vessel] in Brasil; received by coincidence from colleague

	• Incidents mentioned in the ROS • Incidents from a joint venture with Australian company • Paper gCaptain
Reaction to this accident	• Acknowledgment by own company, no reaction only that something like that can happen and should not happen within own company • Informal meeting with operational level; no communication with higher levels
How did you learn from this occurrence?	• We did not learn, we acknowledged the information
Definition of (safety) learning	• Using PDCA-circle, producing reports, improving to become safer as organization or more efficient • Learning from mistakes • Improving performance is recognized by decreasing numbers, better numbers • Content personnel • Awareness, leaders as example • Innovation, as other part of learning • Attitude change • Intrinsic motivation
The incentives to learn from mentioned occurrence	• Same tasks conducted by ships • Recognize similarities • Not mature enough to recognize other triggers
What other incentives can you think of to increase the urge of learning?	• Continuously interaction with people • Being part of what we are • Accountabilities as interpreted by judges • Not only focus on wrong issues which causes safety to decrease; focus on other

	methods to deal with issues to prevent negative outcomes • Reports written by experts of a safety investigation board • Report title • Pictures with challenging captions • Sometimes only context is necessary, translation is done within company itself • Summary • Free of subjectivity or suggestions • Different perspectives
Is it possible that your organization can learn from other organizations?	• No, name and blame; if an inspectorate is visiting not everything is told • Yes, informal meetings world-wide
How is static safety information distribution conducted?	• Safety flash • Uploading information in manage resource management accessible on board; no feedback received • SMS explains also feedback to office • Monthly reports are sent to senior management level
How is the dynamic safety information distribution conducted?	• Difficult to determine; the office inform the ships and that's it • There are ships which report executed drills as perfect; that is suspicious • Depends on the different cultures on board; Dutch crew is trusted in comparison to Asian crew concerning focus on safety
Remarks	• Company is not yet mature concerning giving attention to different incidents and announcing these internally

	• Abroad the company has to contract local sailors • Different cultures need different approaches • Written reports are the easiest way to distribute information

Appendix E: The interview results separated into categories

Appendix E is a gathering of the results provided from appendix C into categories.

E.1 Remembrance of an accident involving a colleague-organization

The first category is related to the remembrance of an accident involving a colleague-organization.

Interviewee	Answers
1	• Receiving information from oil and chemical party • Receiving information from P&I club • Receiving information by newsletter • Bomariner, ten years ago • Accidents concerning palmoil • Accidents seen on Youtube
2	• Hatch cover crane accidents which happened regularly
3	• No
4	• Lady Irina, enclosed space entry • Snap back zones on board, breaking of ropes
5	• Yes, many times • Small messages via IMCA, offshore branch • Incident in Germany, a crane in contact with electric railway cable
6	• Yes, not by name • Flinterstar • Enclose space entry • Sinking of car carrier near Rotterdam • Fishership guardship collision • Man over board while unleashing containers on Humber river
7	• Falling rescue craft killing two people at a sister company
8	• Recent fatal accident on board ISV [Infield Support Vessel] in Brasil; received by coincidence from colleague • Incidents mentioned in the ROS • Incidents from a joint venture with Australian company • Paper gCaptain

E.2 Reaction to this accident involving a colleague-organization by organization.

The second category is related to the reaction to the mentioned accident.

Interviewee	Answers
1	• Can happen to us too • Checking procedures • Safety campaign with posters • Dividing information in newsletters based on similarity with own company
2	• Not much, monitoring the results by the inspectorate and ports state control
3	• Not applicable, but normally information is received from oil and gas industry clustered by theme. If comparison is available, then it will be communicated within the company on board of the ships
4	• Accident communicated with ships of company by using Fleet News • Fleet News also distributed on board the ships of captain-owners, also to show company safety thinking • Share information on an independent intranet • One-on-one recommendations were taken over • New procedure implemented on board, audit for follow-up, sanctions if not implemented or followed • Direction level shows attention for other accidents and reports
5	• High potential messages are shared • Safety bulletin or safety alert • Direction level hesitates to inform and share information; proud or code of honor • If investigation is conducted by third party, company will not do the same; company waits for results of that investigation
6	• Waiting for results of investigation • Not much, due to limited information • Attention by IMO, MAIB and other third parties • Recognizable circumstances concerning, crew, ship or company otherwise no attention, although very interesting • Inform ships and stimulate to do something with it

7	• Checking own rescue craft construction • Two fast rescue crafts temporarily non-active
8	• Acknowledgment by own company, no reaction only that something like that can happen and should not happen within own company • Informal meeting with operational level; no communication with higher levels

E.3 Learning from this occurrence.

The third category is related to the way the organization learned from this previous occurrence.

Interviewee	**Answers**
1	• Trying to change culture and thinking of crew members • Only attention when big accident happens • Did not learn because of other priorities • Asking how did it happen and can this happen to us too
2	• Not much, it confirmed the feeling that hatch cover cranes create a dangerous working environment • I conducted a scan on board and the results will be implemented
3	• Left to the crew members on board by distributing information and follow SMS communication line (safety committee, crew members will take precautions)
4	• Could happen on board of own ships too; be prepared and compare the incident with own situation on board • Marked snap back zones, which created fake safety feeling, were replaced by one marking 'danger zone' when entering the mooring deck
5	• Compared with own situation
6	• Only when report is published • Not much time to read, but you can mention the report and hopefully crew members are going to read it
7	• Checking construction • Finding root cause
8	• We did not learn, we acknowledged the information

E.4 Definition of (safety) learning.

The fourth category is related to the way the organization defines (safety) learning.

Interviewee	Answers
1	• Reading what is written • Explain and demonstrate • Changing culture on the long run • Eliminating raid pace • Taking care of different cultures
2	• Using incidents and near-misses to change thinking and attitude of crew members step by step • Visiting the ships, listen to and advise crew members and return to make sure they understood • Motivation, teaching and testing
3	• Sharing investigation reports • Transparency concerning good and bad things • Training and explaining why we do things • Attitude is the condition for the safety perspective on board • Safety thinking is busy with management system, risk assessments, reporting, etc
4	• Recognizing dangerous situations before becoming an accident • Attitude change based on procedures that find the origin in accidents
5	• Getting better by using the positive and negative experience • Sharing, even if it influences your position on the market as happens within the oil and gas branch
6	• Using experience to change to prevent things from happening again
7	• Find a root cause to an incident • Easy when technical failure • Something else when human failure; spit deeper to find a cause • Question remains if procedures are good enough; unknown if not followed • Culture change; starts with the introduction when recruited for company

8	• Using PDCA-circle, producing reports, improving to become safer as organization or more efficient • Learning from mistakes • Improving performance is recognized by decreasing numbers, better numbers • Content personnel • Awareness, leaders as example • Innovation, as other part of learning • Attitude change • Intrinsic motivation

E.5 Incentives to learn from this occurrence.

The fifth category is related to the incentives recognized to learn from this occurrence.

Interviewee	**Answers**
1	• The volume of the accident • Relation with own experience • Relation with own interest • Issues which have attention and are discussed (ECDIS, IMO regulation) • Receiving more and fast information of accident • Based on public opinion • A sudden accident in slow period
2	• Own interested which started at nautical college when one of his peers died during an accident on board with a welding machine. This was truly striking • Hobbyhorse or tic, due to own experience
3	• Information from oil and gas industry
4	• Comparable accident on board comparable ships • In line with own focus on incidents within the company • In line with the focus of the branch • Comparable with same procedures

	• Company was under observation by inspectorate, which caused a motivation to proof customers and authorities otherwise. So, keeping track of all possible risks of other accident investigation reports was in line with SMS to monitor own company risks
5	• Anonymous • Comparable situation or activities
6	• Other parties are interested, so something is going on • Recognizable situations • Can happen to us too
7	• Publicity • Can happen in our company too, the ships are al built at the same building company • Information quickly available, small branch/world • Same procedures • Same SMS within company and on board
8	• Same tasks conducted by ships • Recognize similarities • Not mature enough to recognize other triggers

E.6 Other possible incentives.

The sixth category is related to other possible incentives generally available to enhance learning.

Interviewee	**Answers**
1	• Connecting using ship-owners society • Easy access to information • Money • Inter-organizational communication • Visualization (DVD's on board, movies, slightly shocking pictures, AIS on Youtube) • Investigation reports in English language • Summary • Title of report • Recommendations (not always necessary)

2	• Observe actively on board ships • Distinguished technical investigation and anonymized personnel impact • Give victims possibility to tell their story • Focusing on themes • Clear language • Visualization using pictures or movies in line with 'seconds from disaster' or 'air crash investigation' • Statistics
3	• Clear description of accident • Anonymous • Cartoons • Pictures • Make it possible that people can relive the accident within context • Not a lot of pages in a report • Easy language • Correct terminology • Complete package from the one who wrote the report in such a way that it can be distributed directly • Statistics involving the company itself to find out her status in comparison to other companies
4	• Use KVNR as communication platform • More attention for smaller accidents that are more important than big accidents • Not only accidents but all incidents • Transparency and openness • General database with all reported incidents owned by one to find causes • Anonymous
5	• Title of investigation (report) • Context • Summary including keywords

	• Which third party conducted investigation? Safety board is seen as a trustworthy party • Easy accessible online
6	• Easy readable report; so, it can be read during a watch period • Depending on the different types of people. There are people who can read and remember, there are people who do not read; perhaps use pictures • Some persons have to be convinced with arguments, some people just follow orders • Report written in simple or approachable language • Question reader; could this happen to you? Questions in the report itself. • Financially • Detention • Regulations to force to think about implementation • Observe the occurrence from different angels, also the small incidents
7	• More incidents collected in one report • Make it clear that reporting does not have to lead to blame and shame • Report title • Thoroughness of report, especially the human factor • Investigators have to have credits from the maritime sector; they need to know what they are talking about • According to my experience, the content is correct
8	• Continuously interaction with people • Being part of what we are • Accountabilities as interpreted by judges • Not only focus on wrong issues which causes safety to decrease; focus on other methods to deal with issues to prevent negative outcomes • Reports written by experts of an safety investigation board • Report title • Pictures with challenging captions

	• Sometimes only context is necessary, translation is done within company itself • Summary • Free of subjectivity or suggestions • Different perspectives

E.7 Possibility to learn from other organizations.

The seventh category is related to the belief that learning from other organizations is possible.

Interviewee	**Answers**
1	• Yes, due to reporting culture within the oil and chemical branch • Yes, due to information distribution within the branch
2	• Organizations are not willing to distribute incident information causing record damage • No, there is no communication with other companies • Only by reading investigation reports
3	• Organizations are not willing to distribute incident information due to competition and causing record damage • Only possibility is something like IMCA, that collects information, makes it anonymous and distributes it again within the branch • Or as KVNR using a database; at the end did it not work either; reporting was necessary, and the companies which reported everything were seen as unsafe while they were the safest • KNVR should act and be used as discussion platform • As long as blame culture continue to exist, there will not be voluntary incident reporting
4	• This is possible but difficult. My company is divided into 'island culture'; an incident can hurt the whole company and not only one department • Yes, but 'what is in it for me?' We are getting better, also as competitors, because accidents will not make us better performing within the branch

	• At the moment, this does not work because after every accident the inspectorate jumps on the situation which forces companies to act upon expectations and cost a lot of money
5	• Yes, is possible • Within maritime branch difficult; has to do with culture (Dutch, Russian, Ukraine, Asian) • Within oil and gas branch even competitors receive results of safety investigations • Proud is in the way; dirty washing is laundered at home • Independent reporting is not possible on board; everything goes via captain or first officer • Safety mature companies can even learn from safety investigation reports concerning aviation accidents
6	• Slow process du to frequently changing crew, only three times a year conducting a visit on board, hopefully both captains will discuss during handover • The business is reactive, as long as it going well there is no issue • No, there is no time left due to the many regulations to think about own company • There is no openness; if no investigation is conducted the company is happy; to prevent naming and shaming; Wagenborg safety culture investigation is good to learn from, but is killing for the investigated company • Only when all crew members are able to report an incident; now not possible due to no access of internet by crew
7	• Yes, because our branch is very transparent • Further outside the branch via the international institute CLIA • On the other side, CEO's do not want to see an accident as Costa Concordia in their company. This has changed the whole branch concerning training and ship building • Depending how open to this method

8	• No, name and blame; if an inspectorate is visiting not everything is told • Yes, informal meetings world-wide

E.8 Static safety information distribution.

The eighth category is related to the way the safety information distribution is conducted statically.

Interviewee	**Answers**
1	• Distribution from office to management on board • Safety meeting IAW SMS on board
2	• Up and down the organization IAW SMS • Safety committee on board • Safety observation cards once a month to meet performance criteria
3	• Safety committee on board with feedback reporting • Monthly discussion with captains • Semi-annual discussion with safety officers and chief engineers
4	• IAW SMS, from office to ship and discussed in safety meeting
5	• Safety alert and fleet news • SMS • Safety meeting
6	• Via internet • During visits on board • Safety meeting • Uploading in internet system including summary
7	• Senior management conferences • Communication between ship and shore always via captain • Toolbox discussions
8	• Safety flash • Uploading information in manage resource management accessible on board; no feedback received • SMS explains also feedback to office • Monthly reports are sent to senior management level

E.9 Dynamic safety information distribution.

The ninth category is related to the way the dynamic safety information distribution is conducted.

Interviewee	Answers
1	• Ship dependent due to culture difference on board (young Filipines act differently compared to older colleagues) • Difficult to determine, only based on ship visits on board and received investigation reports
2	• Not clear, but during holiday observing Indonesian people work makes me understand that sailing on board a high safety standard ship and presence of books which are difficult to read or not understandable, makes life difficult • Planning to place an IPad onboard with a sailor version; hopefully will this increase safety attitude
3	• Not clear, but during holiday observing Indonesian people work makes me understand that sailing on board a high safety standard ship and presence of books which are difficult to read or not understandable, makes life difficult • Planning to place an IPad onboard with a sailor version; hopefully will this increase safety attitude
4	• Not really only when on board for an audit • The way incident reports are closed based on incomplete information or copy-paste from other reports, gives an idea • Compared to a few years ago, the lower ranks on board are assertive enough to question staff members; so, people are growing concerning safety thinking • Crew members of ships with Dutch or Eastern crew are questioning staff members on board indicating that something positive happens concerning safety thinking and attitude. This is something different on ships with Ukraine or Russia crew (are not loyal either) • This difference in attitude is also observable during the different yearly officer meetings with staff • Motivation of personnel

5	• Difficult to find out; the company gives the captain the key of a twenty-million-euro ship and request him to establish contact frequently • Difficult; one-on-one with ratings preferred but the company does not want to undermine the captain
6	• Supporting decisions of the captain although against commercial requests; also to prevent that the captain will not return to work for company; from there safety culture is built • Personnel contact by telephone to discuss items to make captain personally interested before distributing • Asking during visit what the office is doing good and not so good; dyslectic personnel on board do not read reports • Results of working group sailors; usage of a beam with traffic light colors to question crew members about safety on board
7	• During coffeebreak 'pikheet' • I have an informal meeting during upcoming lunch
8	• Difficult to determine; the office inform the ships and that's it • There are ships which report executed drills as perfect; that is suspicious • Depends on the different cultures on board; Dutch crew is trusted in comparison to Asian crew concerning focus on safety

E.10 Remarks.

The tenth category is related to the remarks which did not fit in the previous categories.

Interviewee	**Answers**
1	• Nice conversation also because looking at safety in a different way • Normally no time to think or talk about safety due to time constraints. One of the reasons is the growth of the company from 13 to 21 ships in three years
2	• Interesting conversation with somebody from the safety world and that keeps me thinking • Conventional crew members who are sailing for 20 or 30 years are now confronted with regulations. Most of the time these are

	demanded by the customers. It is my responsibility to close that gap between regulations and how to deal with it practically. That is an ongoing process • Investigation reports are considered true
3	• Interesting conversation with somebody from the safety world and that keeps me thinking • Conventional, older crew members who are sailing for years is not used to the way of safety thinking as the younger generation. Older crew members are from the era skipper next to God. Having internal discussion how to get control of people to look at safety all the same • Companies keep list of the number of PSC visits to use as competition means with customers
4	• People will not learn, examples as holding a fire door open day and night; people in the office used to sail too and they are (also) blind for some risks or dangers in working environment • Russian crew members are always available and cheap • Russians do not trust the government; I am Polish too and recognize that attitude • Showing personal interest creates a bonding to get closer to a person and understand him • Paris MOU international ranking vs national inspections and safety improvement with older ships and willing crew members; inspections are not directly related to safety
5	• Less safety performing companies measured by the number of reported incidents, undesired actions on working floor and results of baseline measurement • Safety mature companies have more and dedicated resources to read reports and learn from it • If results of own report are not the same as third party report it depends on team construction, not the investigation method; every method should lead to the same conclusion • Internet on board of ships makes communication easier, though contact is still going via captain or first officer

	• Office members have to sail on board a ship to encounter the situation
6	• It is not about the investigating party, it is about the content of the report • For the company, it is easier to transfer written reports instead of movies due to the many Mb's • Report in depth is of more value; experience with a third-party investigation was not positive • Safety culture investigation was the start of a workgroup sailors to improve performance
7	• The nationality on board is decided by the expectations of customers; i.e. Dutch flagged ship with Dutch officers decides image of company • We always liked to read the verdicts of the maritime board of justice; this was the only source of information; nowadays there is more media available; also, because the board did not understand the context
8	• Company is not yet mature concerning giving attention to different incidents and announcing these internally • Abroad the company has to contract local sailors • Different cultures need different approaches • Written reports are the easiest way to distribute information


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