Maritime Security and Threat Assessments

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ABSTRACT: Maritime security is still a challenge in international trade. In this case-study we analyze how the Norwegian Shipowners' Mutual War Risks Insurance Association (DNK) provides Norwegian maritime companies with regional assessments of threat-levels. Through a survey and a series of interviews, we study factors that affect the communication and perception of threats, in addition to how maritime companies make security decisions regarding operating in different areas. The study concludes that the DNK and maritime companies largely have a common assessment of threat levels. Though communication between DNK and its member companies has challenges, the members largely consider DNK threat assessments to be reliable. Security decisions in maritime companies typically involve multiple actors, considerations of economy versus security, and multiple sources of security intelligence information.

1 INTRODUCTION

Maritime transport, has for centuries, been a main factor contributing to international trade and economic development (Kristiansen 2005), and 90% of trade in goods and raw materials is done by maritime transport (Oltedal & Lützhöft 2018). However, maritime operations entail risks and threats, with potentially disasterous consquences in terms of the loss of human lives, the environment, and economic losses.

Until the early 2000's, the issue of maritime security was almost absent in the academic field (Germond 2015). However, following the terror attack on the World Trade Centre 9/11 2001, terror strikes directed at ships (USS Cole in 2001, French tanker Limburg in 2002) and an increase in maritime piracy, the issue gained increasing attention (Germond 2015). By maritime security, we refer to sabotage, acts of terror and crime in the maritime domain (Smith &

Brooks 2013). In particular, piracy has raised the issue onto the global agenda (Bueger 2014) due to its direct and disruptive effects on the freedom of navigation, maritime trade and international peace (Hasan & Hassan 2016). Though the Gulf of Aden has been an international focal point (Winn & Lewis 2017), piracy also occurs in other waters, such as, the Gulf of Guinea, Southeast China Sea, the Malakka Strait, and the Bay of Oman (Hasan & Hassan 2016, Mandanda & Ping 2016).

There is a growing body of literature on maritime security. Some focus on the effectiveness of international measures taken to combat piracy (Winn & Lewis 2017, Vespe et al 2015, Shortland & Vothknecht 2011). In addition, there are a series of studies on the root-causes of piracy, such as, unemployment, poverty, corruption, and others (Baniela & Rios 2012, Bueger 2015, Onuoha 2009, Fawcett 2010, Winn & Lewis 2017).

A rich body of literature on risk has evolved since the early 1960's (Slovic 2000). Risk and risk perception, have been studied in psychological terms as individual traits and responses, or as social and cultural phenomena (Renn 2008). There are studies on the nature of threats and risks, finding that humans respond more strongly to man-made than naturally occurring events (Sjøberg 2000). As most risks are not experienced directly, there is also increasing focus on risk-communication (Renn 2008) and how this provides a basis for decision-making (Slovic et al. 2000).

Here we study how the maritime industry seeks to reduce the security risks of maritime operations by including intelligence advice and assessments of threat-level as part of their risk management. We address this issue through a case-study. The Norwegian Shipowners' Mutual War Risks Insurance Association (DNK) provides its members with regional assessments of threat-levels based on international and regional intelligence sources. We have formulated a series of research topics. First, is there a common perception of regional threat-levels between DNK and its member companies? We address this by comparing DNK's regional assessments of threat-levels with ship companies own threat assessments. Second, what factors affect the member companies' perception of DNKs threat assessments? We focus on DNK's internal processes for formulating and communicating threat assessments and how these, in turn, are assessed by the member companies. Third, how are decisions taken by member companies regarding threat-levels? In particular, we address who participate in decision-making at the company level, whether there is a trade-off between economic and security concerns, and the companies' use of alternative sources of intelligence.

2 THEORY

All human activities entail some level of risk. To the extent that the production also poses a risk to public values (health, economy, environment), organizations are required to introduce measures to manage them (Reason 1997). In highly competitive markets – such as maritime transport – there is a constant pressure on companies to reduce costs and seek short-term gains (Rasmussen 1997, Batalden & Sydnes 2014). Under such conditions, safety management is frequently considered a cost to be weighed against production costs and economic returns (Smith and Brooks 2013). This dilemma has been discussed theoretically, inter alia, by Reason in the 'Unrocked boat' model (1997), in Rasmussen's 'Migration model' (1997) and by Hollnagel's ´Efficiency-Thoroughness Trade-Off´ (ETTO) model (2009). These models discuss organizational performance within economic and safety boundaries, while being subject to conflicting pressures. In the context of this study, the decisions to operate in regions with different threat-levels, constitute such a dilemma for the maritime industry. It is therefore important to understand how different factors filter in as companies make risk-based decisions on the information they have available on existing threat-levels.

'Risk' and 'threat' are key terms in this study. A threat is related to the '…intention and capability of an adversary to undertake actions that would be detrimental…' (Cox 2008: 1749) to e.g. crew, vessel and cargo. Introducing threat-levels implies a scale based on criteria that ranks the level of threat one is exposed to under given conditions. Risk management concerns introducing measures to reduce ones vulnerabilities and/or the consequences of a threat occurring. There are no universally acceptable criteria on which to evaluate risks (Psarros et al. 2009) or how the term is to be defined. Here we define risk broadly: 'Risk is a situation or event where something of human value (including humans themselves) is at stake and where the outcome is uncertain" (Rosa 1988: 28). It is common to distinguish between quantitative and qualitative risk approaches (Aven & Vinnem 2007). In this study, the focus is on the latter, as we concerned with how threats of security-related incidents are perceived and communicated between actors in the maritime industry, DNK and maritime companies in particular.

Perception is the cognitive process of how we make sense of objects and events in our physical and social world (Kaufmann & Kaufmann 2009). Perceptions of an incident, situation or activity that can lead to negative consequences is often referred to as risk perception (Renn 2008). Risk perceptions are established by individuals, groups or societies (Aven & Veland 2012) and depend on personal attributes, experiences, social processes, norms and collective assessments (Onggo 2017). As such, risk perception is not merely fact based (Renn 2008), but also related to expectations, ideas, hopes and fears, and emotions (Aven & Veland 2012). Consequently, risk perceptions may not correspond to reality (Slovic 2000) and may lead both to an overestimation of risk or risk denial (Sjöberg 2000).

The main topic here is to analyse DNK' and its member-companies' perceptions of threat-levels. One factor in that regard is how the actors communicate. The purpose of risk communication is to provide actors the information needed to make sound decisions that reflect the best available knowledge and their own preferences (Aven & Renn 2010). Most threats and risks are not experienced directly but through communication (Renn 2008). Good communication is about finding ways to communicate complex issues that entail uncertainty, in an effective and understandable manner (Slovic 2000).

The communication process itself is a relation between a source, a sender and a receiver; whereby the sender communicates a message, based on a source of information, which in turn is interpreted/decoded by the receiver before being acted upon (Renn 2008). It is critical for the sender of information to understand the cultural context of the receiver, the communication channels, the appropriate modes of communication, the competing sources of information, and such (Hallahan et al. 2007). Humans have selection strategies for information (Renn 2008), and information overload is an increasing problem as information is being disregarded or overlooked (Aven & Renn 2010). In this context, trust in both the quality, source and sender of information is important (Renn 2008). The

general model of risk communication has been developed further by Kasperson et al in their Social amplification of risk model (1988). Here focus is on how information is intensified or weakened as it is transmitted between individual or social actors (Kasperson et al. 1988). Information is filtered, decoded, transmitted and interpreted in different socio-cultural contexts and formal frameworks as it is passed between actors, and consequently being altered in the process (Kasperson et al. 1988, Renn 2008). For an actor, such as DNK, providing intelligence information and threat warnings, it is critical how their information and threat warnings are interpreted and acted upon by member companies. For the maritime companies it is critical whether they have trust in the information and threat assessments that are provided by DNK as a basis for decision-making.

3 METHODS AND DATA

This study is based on data from semi-structured interviews, document studies and a questionnaire retrieved from Norwegian ship-owners, their crewmembers, and DNK.

All interviews are anonymous both with respect to companies and individual informants, except for DNK. The interviews were conducted in February 2018. The companies and informants were selected based on the criteria of being a member of DNK, having vessels operating in international waters, and the informants having a central role in handling the security of their ships. All the companies operate large fleets of ships. Further, the companies were selected so that different ship segments were represented. The first author conducted all the interviews.

Table 1. List of informants and ship segments.

Company	Ship segment
DNK	Provider of threat assessment
Company A	Tank, Bulk
Company B	Roll on/Roll Off (Ro/Ro)
Company C	Liquefied Natural Gas Tank

The informants, shown in table 1, were asked to assess the threat level in five different waters known to have a heightened threat. In addition, the interviews were used to identify factors regarding ship segment, established security measures and internal decision-making in the company. Some additional question focused on voyage planning and the organizations focus on security. The interview with DNK focused on how the association communicates their threat assessments and how these were perceived by the member companies. All interviews were recorded and later transcribed. The first author coded the interviews to systemize the response for comparison with results from the questionnaire.

The questionnaire was developed following initial discussions with DNK and an experienced company security officer (CSO). Similar to the interview guide, the questionnaire addressed the main topics of perceptions of threat, communication, security, and decision-making in the organization. The questionnaire was developed using both a 5 point and a 7 point likert-scale, and was published on a secure web page in English. The questionnaire was sent to 262 respondents of which 39 replied (15 %), which was low but still gave some valuable insight.

It is not uncommon for shipowners to operate within several segments. Typically, companies can operate both in the dry and wet segment – tank and bulk. As seen in table 2, several of the respondents represented companies that operated ships in different segments.

Table 2. Respondents to questionnaire and ship segments.

Segment	Companies	Percentage	N
Bulk carriers	12	30.8	39
Tankers	19	48.7	39
Ro/Ro	3	7.7	39
Container	7	17.9	39
Offshore	13	33.3	39
Passenger	1	2.6	39
Other	9	23.1	39

The response from the questionnaire was analyzed using the statistical software SPSS. The analyzes mainly makes use of descriptive statistics but a one-way ANOVA test was conducted to assess whether there were differences in the respondents threat assessment of the different areas.

4 RESULTS

In this section, we present the results from the questionnaire, the interviews and the threat assessments provided by DNK. Information from the threat assessments of DNK is exempted from public disclosure, and is therefore referred to as reports from January, February, March or April in this paper.

4.1 *Perceived threat*

The informants were asked to assess the threat level in the areas DNK assessed in the time period January – April 2018. The participants answering the questionnaire assessed the threat level according to DNK's categorization; low (1), moderate (2), high (3) and critical (4). With a repeated measure ANOVA test with post-shock test and with a Bonferroni correction shows a difference between the *areas F (5.190) = 121.21, p> 0.000)*. The test also shows that Gulf of Guinea and Yemen is significantly different from Gulf of Aden, Libya and South East Asia.

Table 3 show that the participants experience the threat level in Gulf of Guinea to be relatively high, with a result of 2.69 and a standard deviation of 1.10. From the interviews, the companies evaluate the threat differently based on how far from shore their operations occur. Company A and C, which operate close to shore rate the threat level as high – similar to DNK, while company B rates the threat level as low as their vessels sail far off the coast. Though the threat

level varies in different areas of West Africa, Gulf of Guinea is an area that remains dangerous, according to DNK's informant. Events occur weekly, all type of vessels are targeted: "…*we are just waiting for one of our vessels to be hit, and we had a case this fall, but it went well.*" (Inf. DNK). A higher threat level close to shore is reflected in the reports from DNK, where the area of the Niger delta is rated as high.

Table 3. Comparison of threat assessments

| Threat areas | Interviews | | | Questionnaire | | DNK |
	A	B	C	Mean	SD	
Gulf of Aden	3	1	3	1.98	0.74	2
Gulf of Guinea	3	1	3	2.69	1.10	3
Yemen	3	1	-	2.46	1.34	2
Libya	-	-	-	1.90	1.46	2
South East Asia	1	-	-	1.62	0.59	2

Although Yemen is associated with the Gulf of Aden, the results indicate that the shipping companies experience a higher threat level in Yemen with a threat level between *moderate* and *high,* scoring on average of 2.46. It should be noted that the standard deviation is 1.34 which expresses a relatively large variation in the participants perception. Gulf of Aden is perceived as moderate with an average of 1.98 and a smaller standard deviation of 0.74. From the interviews, it seems that the owners assess the threat level based on which shipping segment they operate within. Company B operates vessels with high freeboard, and thus feel less threatened. The companies operating vessels with lower freeboard, such as tankers and bulkers, consider the area to pose a high threat level. Company B argues that private maritime security companies have exaggerated the threat level, and therefore boosted the maritime security industry, and expresses the importance of using some common sense and at the same time being vigilant during voyages in the Indian Ocean. According to DNK, the threat outside Somalia is mostly linked to piracy. After many years of standstill, DNK experienced that piracy activity began to pick up in 2017 due to the withdraw of the military forces in these waters. It has also been discovered that *"vessels have been attacked 300 nautical miles from shore, and that is far offshore"* (Inf. DNK). DNK's threat assessment consider the threat level for piracy in Gulf of Aden to be moderate. For Yemen, Company A rated the threat level as high while Company B rated it as low. The two companies assess the influence of the armed religious-political Houthi movement very differently. DNK report that the threat in Yemen is related to rebellion and terrorism, where they assess the threat as moderate. The area is of great concern for DNK, since the rebels have turned against merchant vessels earlier; *"the danger of a merchant vessel being hit is increasing, because Houthis,…in Yemen, are under strong pressure, which means that in a desperate situation they may strike at a merchant vessel"* (Inf. DNK).

The respondents perceive the threat level in Libya as moderate with a score at 1.90 and with a standard deviation of 1.46. The situation in Libya is characterized by conflicts within the country, which indirectly affect the maritime industry. DNK set the threat level for this area to moderate. Onwards, the forecast stated a reduced threat level and remained so

in February. In March and April, the threat level was reported moderate with a stable forecast. According to the shipping companies (A-C), the conditions in the Libya are of a military nature. It is described as a very complex picture, where there is a lot of development among both the terrorist organization ISIS and refugees.

For South East Asia, the results show a threat level between low and moderate, scoring an average of 1.62 with a standard deviation of 0.59. Shipping company A consider the threat level in South East Asia to be low, but unstable. There seems to be a similar perception among the other shipping companies. Shipping company B seldom sail in these waters, but does not consider the area critical for them. Nor Shipping Company C did assess this area. DNK graded the threat level to moderate but their forecast indicates some uncertainty in the development.

The perceived threat by the companies are congruent with the assessments in the reports of DNK with some variations. From the interviews, there are larger discrepancies compared to the reports of DNK. This seems to be based on, *inter alia*, voyage pattern and vessel segment.

4.2 Norwegian shipping companies´ assessments of DNK's threat products

The second research question addresses factors that influence the Norwegian shipowners assessment of DNK's threat assessments.

Table 4 Norwegian shipping companies assessment of DNK threat products on a 7 point likert-scale

	Mean	SD	N
Reliable	5.10	0.85	39
Decision basis	5.08	0.93	39
Update picture	5.05	0.92	39
Unclear terms	1.79	1.11	39
Unclear models	1.64	1.14	39
Sufficient information	4.69	1.04	39

In order to assess how the member companies experienced the threat assessment to DNK, questions formulated directly related to the threat assessments. The questions were measured on a 7 point Likert-scale ranging from *never* to *always*. According to table 4, the member companies experience the threat assessments as reliable, scoring 5.10 with a standard deviation (SD) of 0.85. The threat assessment provides a good decision basis, scoring 5.08 (SD of 0.93) and provide an updated picture, scoring 5.05 (SD of 0.92). Furthermore, respondents experience DNK to present understandable threat assessments, as respondents have scored low on whether DNK uses unclear models, scoring 1.64 with SD of 1.14, and low on unclear terms, scoring 1.79 with SD of 1.11. The respondents find that the threat assessments from DNK provides sufficient information, scoring 4.69 with SD of 1.04.

According to shipping company A's informant, DNK *"... has quickly become one of the world's best at threat assessments, using increased resources at the security section or emergency department."* (Inf. A). The

threat assessments use the same terminology as in the military intelligence, a terminology known to several of the informants. The informant from shipping company A added that DNK is very consistent in the design and uses the color index to categorize the threat level. The intelligence information may vary.

"… There is, of course, a degree of uncertainty sometimes, because intelligence environments are after all intelligence environments, they have not been present. They are based on rumors and reports, and information they can obtain. So that there will always be some uncertainty with intelligence information " (Inf. A).

For DNK, the first priority while preparing the threat assessment is to discover which area has the greatest potential for unwanted events and what the problem is: *"…thus we define a prioritized intelligence need."* (Inf. DNK). DNK uses at least two different companies as information providers when making threat assessments. This is compared to their general understanding of the area. DNK ranks the threat level as low, moderate, high or critical. This are the same categories as both The North Atlantic Treaty Organization (NATO), the Norwegian Police Security Service and the Norwegian Intelligence Service uses. All distributed threat assessments explain the ranking categories. To ensure a common understanding of terminology, DNK also invites their members to meetings. Still, several members are unable to distinguish the difference between threat and risk (Inf. DNK). DNK experience that the members mix the terms. DNK is in no position to provide risk assessments, the shipping companies must do it themselves; *"… they own the risk, and they can choose to take the risk, while the threat bit or intelligence is decision support."*

It is challenging to ensure that the correct stakeholders receive the information from DNK, as the information must go through several stages.

As a conclusion from the questions posed regarding DNK's threat products, it may indicate that the respondents experience the assessments as very credible. It can be commented that not all questions score equally high on the table, but that the threat assessments are perceived as reliable.

4.3 Decision-making and security

This section addresses who participate in decision-making, how the relationship between economy and security affects decisions, and whether multiple intelligence sources are used.

4.3.1 Decisions to sail in threat areas

The decision to enter threat areas differs between the shipping companies. Table 5 shows that among the responders to the questionnaire, the captain had the decisive power in 13 of the 39 companies (33.3%), while the CSO had the decisive power in 9 companies (23.1%). Company Executive Officers had decisive power in 13 companies (33.3%). In one company (2.6%), the chartering department had the decisive power and in three companies (7.7%), the chartering department had the decisive power to operate in threat areas.

Table 5. Decisions to enter threat areas.

Captain	Chartering Department	Company Security Officer	Operation Department	Senior Management
13	1	9	3	13

According to shipping company C, the threat picture must be approached differently from the other shipowners, as the company has stationed facilities in the same location for up to 20 years. First, an assessment is done by the CSO when a project is awarded them. Then the captain evaluates if the sailing route involves a high risk. In contrast, shipping company B operates with fixed routes globally – and thereby doesn't find it necessary to discuss the route. If the threat picture were to change, a risk assessment is conducted and the decision is made either by the CSO or a person in a higher position in the company. According to shipping company A, decisions are based on the informants consulting: *"… depending om how dangerous it is, how high we want to lift it, but it can be entirely up to the board and owner. So I have quarterly updates of the board on the security situation…"*(Inf. A).

4.3.2 The use of multiple intelligence services

The results from the questionnaire, shown in figure 1, indicates that most shipping companies uses several intelligence services. Most respondents said they either often (33.3%), very often (25.6%) or always (20.5%) used several intelligence services.
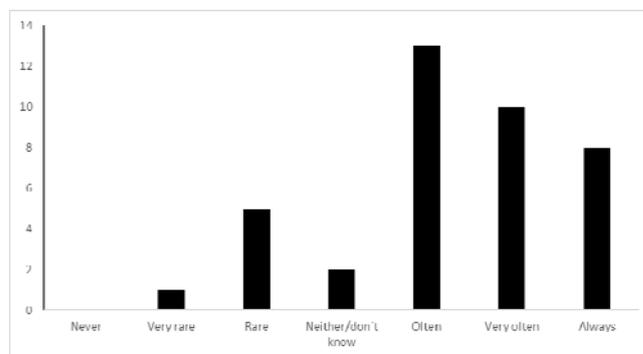

Figure 1. The use of multiple intelligence services.

None of the participants answered *never* on the use of several intelligence services. On the other side of the scale, some participant meant that they rare (12.82%) or very rare (2.56%) used several intelligence services, and some participants did not know/or neither (5.13%). As it emerges from the interviews, it seems natural to use several intelligence services to assess the threat level in an area. According to shipping company A, they used at least two or three sources of information in order to compare their answers. The informant from shipping company B told that they collected information from multiple sources from EU, US and others. Shipping company C followed the same approach.

4.3.3 The relationship between security and economy

The response from the participants, shown in figure 2, indicate that there is an experienced conflict

between security and economy while operating in threat areas with 53.85 % of the participants answering in the range *often* to *always.* In contrast, 38.46% of the participants answered in the range from *rarely* to *never* occurred conflicts between security and economy, while 7.60 % was uncertain or none of the options matched.

It appears from the interviews that there is a great focus on security during voyages. All the informants were familiar with Best Management Practices for Protection against Somalia Based Piracy (BMP4), which was widely used during voyages in threat areas. The informant from shipping company A announced that they related to BMP4 in all security contexts, worldwide. Shipping company B have carried out several of BMP4's recommended measures, as well as local adjustments based on the ship's shipment. They also operated with their own guidelines for different areas, which were periodically revised. According to shipping company C, they operated with a continuous monitoring of the whole world.
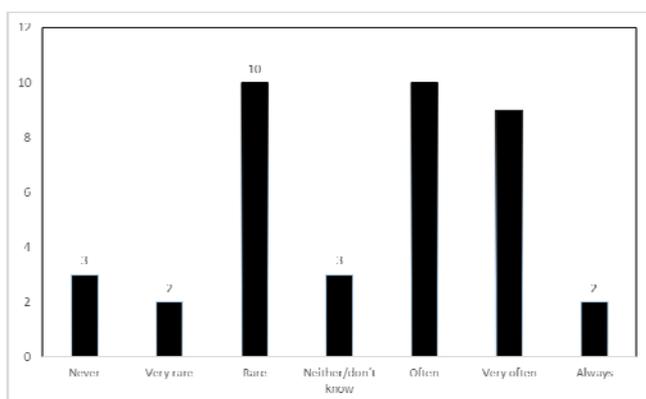

Figure 2. Conflict between security and economy.

4.3.4 *Summarizing the results*

The findings indicate that decisions are made by different positions in the shipping companies. Either a CSO, CEO or captain makes the decisive decision. Furthermore, the results show that it is common to assess the threat level in an area on the basis of several (intelligence) sources. Finally, it seems like there is a great focus on security, but it's not uncommon for conflicts to arise between economy and security during voyages in threat exposed areas.

5 DISCUSSION

This section presents highlights from the results and discusses the findings in relation to the research questions and theory presented above. The first research topic to be addressed was empirical in nature, in investigating the correspondence between the threat-assessments provided by DNK and those by its member-companies. Table 3 illustrated the different threat assessments provided by the questionnaire, informants and DNK threat assessments. The questionnaire and DNK threat assessments corresponded to a relatively high degree. However, there were variations in absolute terms and

in standard deviations between regions. The informant data (companies A-C) provide an illustration of this variance.

When providing threat assessments DNK first identifies a need for intelligence information. They will gather relevant information from one or more sources. DNK will then focus on specific aspects of the threat based on the information provided (Renn 2008). As such, DNK amplifies certain aspects and perceptions of the threat identified when communicating further to the member-companies (Kasperson et al. 1988). DNK threat assessments are based on a 4-level scale in line with NATO and Norwegian intelligence services and are presented in color code. As such, they are based on well-known and trusted formats. A priority for DNK is to establish clear terminology and open lines of communication with decision-makers in the maritime companies (Inf. DNK).

This brings us to the question of how companies perceive DNK risk assessments. We use companies A-C to illustrate this issue. Throughout it was clear how Company B considered the regional level of threat as lower then companies A and C and DNK. In some cases, it is clear that Company B asses the threats as low due to the barriers they have established (sailing-routes, vessel-types and -operations, high freeboard, training personnel, monitoring tools). We then move from a general threat-level for an area as provided by DNK, to a more specific risk-assessment for the individual Company B and its vessel. Consequently, DNK (threat) and Company B (risk) are assessing different phenomena. This reflects the challenge in establishing a common terminology when communicating threats or risk (Hallahan et al. 2007). On the other hand, Informant B also demonstrates a level of distrust to maritime security companies, in that they boost threats to sell their products (Aden). He/she also believes that vessels from certain flag states (Yemen) or vessel types (Southeast Asia) are not under threat (INF B). This reflects on both the importance of trust in communication (Renn 2008) and whether DNK as an intelligence provider amplifies threats/risk (Kasperson et al. 1988) beyond what Company B perceives to be the 'reality' (Slovic 2000). Another aspect could also be that this is a case of risk denial (Sjöberg 2000). The data here does not allow us to conclude on this, however it highlights the challenges in communicating threats and risks. Companies A and C on the other hand, in most cases considered the threat-levels as higher than DNK in the regions where they operated (table 3). Company A responded by establishing barriers such as armed guards or escort (Aden and Guinea), while Company C choose to monitor and assess the situation closely. This demonstrates how shipping companies may perceive threat-levels differently, when facing the same situation (Renn 2008, Sjöberg 2000). Also, that there will be deviances among companies receiving the same threat-assessments from DNK.

Notably, despite these disparities, all Companies consider DNK threat assessments to be reliable. The data from the questionnaire (table 4) illustrates that on reliability, a basis for decision-making and providing an updated threat-picture, the scores ranged from 5.10-5.05 on the 7-point Likert scale. On whether the DNK threat-assessment provides

sufficient information, the score was somewhat lover (4.69). On questions whether DNK threat assessments had unclear terminology (1.79) or models (1.64), the scores were low. Overall, this demonstrates a high level of satisfaction with DNK threat assessments. This is also confirmed by the three Company informants (A-C) interviewed in this study. In particular Informant A stated that DNK '… quickly has become one of the worlds´ best on threat assessments…'. The somewhat lower score on whether DNK provides sufficient information, will be discussed further under the issue of sources of intelligence information.

A final issue to be addressed in this study is how decisions are made by companies, based on threat assessments. We saw in the data that there are a variety of roles involved in making security related decisions regarding sailing in an area: Captain, CSO, CEO, chartering department and operations department. Notable, when measuring degree of involvement in decision-making the CSO ranked highest (5.67/7), and the Captain lowest (4.23/7). However, in terms of the final decision to enter an area, the captain most frequently had the final say along with the CEO (both 33%). This is likely to inter alia reflect the threat-level, or changes therein, of the given area in question. As noted by Inf B, if there are changes in the level of threat in an area, a new risk-assessment will be conducted and the decision be lifted to higher levels in the company. It also reflects on DNK's concern regarding the role of the CSO and reaching the right people in the member companies, when communicating threat-levels. If not the threat-assessments may become subject to a chain of sender-reciever relations affecting how the assessemtn is perceived and applied in decision-making (Kasperson et al. 1988).

Striking the balance between threats, risks and economic benefit is a main issue within risk management (Reason 1997, Rasmussen 1997, Hollnagel 2009). In this study, we also find this dilemma. Our questionnaire data demonstrate that 53.85% experience a conflict between security and economy while operating in threat areas. This reflects the highly competitive maritime industry where many companies feel forced to operate at the margins (Rasmussen 1997). There is little doubt that this affects the decisions being made on whether to enter areas with elevated threat-levels.

Finally, we investigated to what extent maritime companies use multiple sources of security information when making decisions. This was clearly confirmed by the questionnaire data and by informants. 79.4% in the questionnaire either `often´, `very often´ or `always´ made use of several intelligence services. In summary, shipping companies, in general involve a range of company actors on making security decisions regarding operating in areas with elevated threat-levels, with the final decision pending on the actual threat situation. The economy versus security dilemma is experienced by a majority of respondents interviewed. Finally decision are commonly based on multiple sources of intelligence services.

6 CONCLUSION

This study demonstrate that numerous factors affect communication between DNK at the member companies, and how the latter make decisions based on, among other sources of input, DNK threat assessments. Perception, communication, economic-security dilemmas, the specific characteristics of vessels and operations, and internal decision-making processes all have an influence. However, DNKs threat assessments provide important inputs to companies when they are to make decisions for individual vessels regarding risks of conducting operations in an area. If the companies do not have an adequate understanding of the nature (piracy, terror) or level (low-critical) of the threat, they will not be in a position to establish adequate security measures (monitoring, armed guards), or to consider whether or not to operate in the area. This is also reflected in that the companies in this study, overall consider DNK threat assessments as important and reliable as a source of information for making security decisions.

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