How Do You Measure Green Culture in Shipping? The Search for a Tool Through Interviews with Swedish Seafarers

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ABSTRACT: Today, the shipping industry faces important environmental challenges to reduce the impact of sea transport to the marine environment. In order to enhance compliance and encourage safe and efficient maritime operations, the implementation of a safety culture in both shore organisation and on board ships has been advocated. Similarly, it can be argued that a conscious 'greening' of an organisation's culture may be necessary in order to meet legislative and societal demands, as well as embrace environmentally responsible values, beliefs and behaviours. The present pilot study describes the development and evaluation of a model designed to capture attitudes and perception among seafarers with regards to proactive environmental work in the shipping industry. The overall aim of the model is to enable measurement of the extent to which a 'green culture' is present within the shipping industry, and to identify factors that either facilitate or act as barriers to a green culture.

Evaluation of the model was done through qualitative individual and focus group interviews with, in all, 13 active Swedish seafarers during the autumn of 2014. The findings show that the model captures the sought after mechanisms fairly well and shows some promise. Future work is needed to further refine and test the model in a larger setting, in order to provide a robust picture of the seafarers' view on 'green' shipping.

1 INTRODUCTION

The purpose of the pilot study presented in this paper is to develop and evaluate a model for capturing attitudes and perception among seafarers that can uncover a possible presence of a 'green culture' within the shipping industry. The overall aim of the model is to be able to qualitatively measure to which extent a 'green culture' is present within the shipping industry, and to identify factors that either facilitate or act as barriers to a green culture.

The model has been developed in light of the increasing focus on and awareness of the impact on the environment from the maritime transport system.

Publicly, emphasis has been on the repeatedly occurring operational oil discharges from ships and offshore platforms posing a threat to the marine ecosystems (Ferraro et al. 2009). Other sources of pollution stemming from shipping activities and coming into the public eye during the last decade are greenhouse gas emissions (GHG), especially carbon dioxide (CO_2). There are estimations that during 2012 around 2.7 % of global CO_2 emission originated from all maritime activities (Smith et al. 2014). Further, there are rapid developments of international agreements to reduce the overall environmental impact from shipping. Illustrations in relation to GHG would be the Energy Efficiency Design Index (EEDI) and the Ship Energy Efficiency Management Plan (SEEMP) that have recently

entered into force and are under implementation in the shipping industry (Longva et al. 2010). In order to meet these new agreements, several operational measures have been introduced, for instance slow steaming (e.g. Cariou, 2011).

There are also self-governing mechanisms in place to reduce the environmental impact of shipping. For instance, several shipping companies have joined Clean Shipping Projects (CSP) that are based on a Clean Shipping Index (CSI) which was launched in the beginning of 2010 as a market based index for clean transports (Wuisan et al. 2012; Hjelle & Fridell 2012).

The measures that have been introduced so far, point primarily towards technical solutions. There is a lack of discourse on the human and organisational factors necessary in order to create an environmental or 'green' culture within a shipping company (Lai et al. 2011). Previous research on green shipping and environmental awareness in the maritime industry includes, for instance the investigations by Lai et al. (2011) and Lun et al. (2013) on measures taken in the direction of green shipping practices, and the link between financial and environmental performance. Giziakis & Christodoulou (2012) explore the awareness of maritime air emissions, focusing specifically on policies and attitudes in the Greek shipping industry. Another study focuses on human factors effects on operational oil spill, identifying attitudes and fatigue as primary factors (Saharuddin et al. 2012). Further, Harris et al. (2002) and Millard (2011) argue that key issues for sustainable progress in the greening of corporations include focus on human recourses. The gap between technical solutions, to address environmental issues, and focusing on those working in organisations may lead to unnecessary sub-optimisations and shortcomings.

2 THEORETICAL BASIS FOR THE METHOD

2.1 Towards a 'green' organisational culture

The interest for environmental issues has increased rapidly over recent decades. For the purpose of this study, emphasis is placed on the scientific literature concerning the role of work organisations, organisational culture and human resource management. Three types of management strategies can be discerned when addressing environmental issues within an organisation (Fernández et al. 2003): (i) compliance, (ii) control, and (iii) prevention.

Compliance, deriving from the standpoint of only fulfilling legislative demands, would be for an organisation to refrain from the initiative and from possible market advantages in times of increasing public environmental concerns (Russo & Fouts 1997; Fernández et al. 2003).

The control approach goes one step further, and usually involves specialised human workforce fighting pollution. Within the maritime industry, there are several monitoring and control activities, such as port state control, and air and satellite surveillance for detecting oil pollution. In an organisational setting, this approach has however been judged as both costly and insufficient as a tool

for initiating an environmental organisational culture (Russo & Fouts 1997).

The prevention approach is generally viewed as the most advanced option that opens for competitive advantage (Hart 1994; Sanderland 1994; Russo & Fouts 1997; Angel & Klassen 1999; Handfield et al. 2001). Here, an organisation aims to identify and deal with problems before they occur, i.e. creating what can be called a proactive or generative setting. However, implementing the prevention approach normally requires major changes, in business strategy (Cordano & Frieze 2000), as well as in the entire organisation and its culture. A successful 'green' culture is dependent on the capacity of the organisation, especially with regards to: continuous learning activities, empowerment, two-way communication, and on a solid commitment at all organisational levels (e.g. Fernández et al. 2003). In sum, when these aspects have become constituents of an organisation, a proactive environmentally concerned organisational culture emerges.

2.2 Analytical models for evaluating culture

An organisational culture should not be viewed as uniform. Rather it can exist of different subcultures that can be '*socially distributed*'. That is, sharing of cultural content that is not entirely uniform, which can be symbolised by some differentiations and fragmentations (Guldenmund 2010). Additionally, as a '*psychological distribution*' the culture content might be deeply rooted within some individuals, while other individuals only reach a superficial level (Guldenmund 2010). Hence, studies involving organisational 'safety' culture are also of interest. This is based on the view that there exist different subcultures in the same organisational culture (Guldenmund 2010).

A well-known tool for evaluating cultures is the analytical model developed by Westrum (2004; 2014), that was first developed for studying hidden events then later associated to human errors and accidents. The model was originally composed of three organisational categories:

– pathological organisations, described as power and conflict oriented and characterized by lack of cooperation, low information exchange and scapegoating;
– bureaucratic organisations, described as rule oriented, with narrow responsibility and strict information channels;
– generative organisations, characterised as performance oriented, making sure the right information reach the right people at the right time enabling proactive information sharing.

Reason (1997) and Hudson (2007) later advanced the model to encompass five levels, illustrating how an organisation can staircase its way towards improved safety culture. The five levels become: *pathological, reactive, calculative, proactive and generative*. Calculative might, in some studies, still be referred to as the bureaucratic level (e.g. Hjorth 2013). Within a maritime context, this analytical model has been used in several studies for evaluating safety culture (e.g. Hjorth 2013; Kongsvik et al. 2013).

3 METHOD

Stemming from the reasoning above, the primary aspects that we set out to evaluate are: (i) commitment, particularly towards the environment, at all levels in the organisation, (ii) learning activities relevant for environmental work, (iii) measures taken for personnel empowerment, and (iv) measures taken for two-way communication.

When searching for indicators for environmental commitment, probe questions concern individual and perceived organisational commitment on board and within the organisation as a whole. Indicators for learning activities relevant for the environmental work include questions about frequency and quality of training courses and meetings, and how these learning activities are conducted and followed up. Empowerment can be identified through questions about decision-making structures and time allocated for environmental critical actions and interventions. As regards two-way communication, questions must capture formal and informal channels and opportunities for reporting improvement proposals and non-conformities alike, as well as occurrence and quality of feedback.

In order to capture the aspects described above, a semi-structured interview guide was developed, structured around nine focus areas. The first four was used to extract the context i.e. personal background and working situation, ship's trade and cargo and shipping company information. The last five focus areas was intended to advance more into the queried area i.e. (i) overall safety and environmental protection, (ii) the ISM code, (iii) environmental commitment and personal experiences, (iv) general health and safety in relation to environmental protection and finally (v) environmental culture.

In the shipping industry both safety and environmental considerations are of importance, however safety is generally considered paramount followed by environmental issues. On such case can be illustrated with the fact that it is allowed to release oil into the water in an emergency situation. Therefore questions were arranged in such a manner that they commenced from a safety oriented standpoint and gradually moved to embrace environmental orientated issues. The following question illustrates the gradual movement towards environmental concerns:

Describe how familiarisation – introduction works out for newly employed seafarer... environmental protection?

The above question also shows the link to one of the four primary aspects, in this case environmentally relevant learning activities (ii).

In order to envisage the qualitative analysis sequence, step-by-step, the developed model has been separated into three levels (see figure 1). The model was designed parallel to the process of collecting and transcribing data. The first level (i) is related to the transcribed data, which during the analysis needs to be categorised into the four primary aspects of Commitment, Learning, Empowerment and Communication (CLEC). This is done manually by colour-coding the transcripts into four different

colours representing expressed views and statements, i.e. 'things' that are observable in the data and made by the respondents in relation to each one of the aspects defining CLEC. Then, the transcribed text is individually clustered, and coded, to represent individual quotes that exemplify any of the aspects of Commitment, Learning, Empowerment and Communication, which is outlined at level (i).
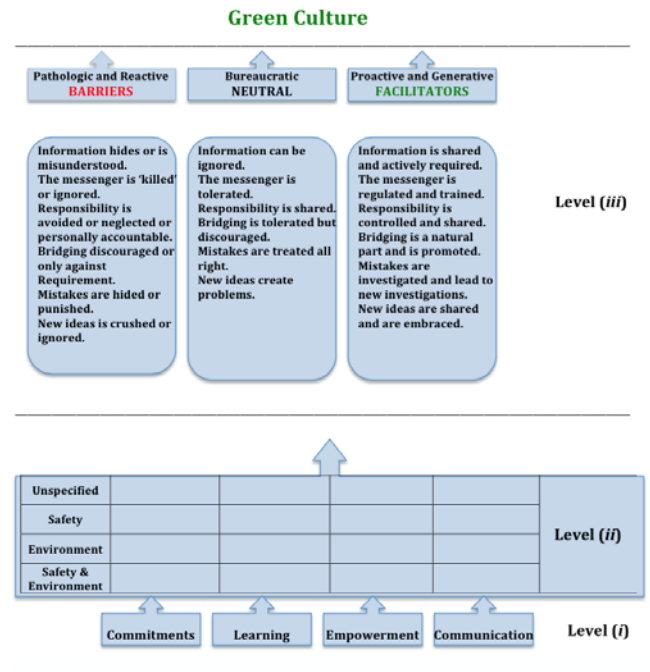

Figure 1. Exhibiting the analysis model (CLEC-model) composed of three levels. Level (iii) based on Westrum (2004; 2014), Reason (1997) and Hudson (2007).

Secondly, at level (ii) the individual quotes identified at level (i) are once again analysed by searching the quote for key elements such as specific words or meaning. Based on this analysis the quotes are then related to one of four categories; (i) safety & environment, (ii) environment, (iii) safety and lastly (iv) unspecified. To exemplify the analytic process, the following four quotes serves as illustrations: one quote might relate to both safety and environmental issues e.g. '*hydraulic oil-leakage*' or it might relate to environmental issues e.g. '*paper dishes in the galley*' or it might relate to safety e.g. '*hardhat on*'. However, the quotes might also be categorised into the category unspecified since the quotes do not seem to add or fit into either safety or environment, it might instead have a negative effect e.g. 'the only thing that counts is money, money, money'. Nevertheless at level (ii) it might still be difficult to identify the underlying mechanisms that affect the 'greening' of culture.

The last level (iii) relates to the mechanisms or common aspects that can be found regarding *barriers*, *neutral* and lastly *facilitation* links towards environmental issues. At this level the analytical model developed by Westrum (2004; 2014), and further advanced by Reason (1997) and Hudson (2007) was incorporated into this analysis model to categories '*environmental*' culture into an already existing and well-known '*safety*' culture framework. The adjustment, being that the concept was basically reversed back to Westrum's (2004; 2014) original idea with three categorises although using the added

typology from Reason (1997) and Hudson (2007). The outcome of this is the combined categories of pathologic/reactive that explains '*barriers*' the category of bureaucratic becomes '*neutral*' and finally the categories of proactive/generative become '*facilitator*' of the greening of culture.

At this level the purpose of the analysis is to strive to find a causal link by using the typology at level (iii). To illustrate in relation to quotes in regard to a particular term e.g. *information* of any kind; it can either be hidden or misunderstood which could create a *barrier*, or it can be ignored which might not affect anything giving a *neutral* impression or lastly it can be shared and actively required which *facilitate* the greening of culture. This analysis is conducted by trying to understand the underlying mechanisms related to separate or grouped quotes giving knowledge on how, and way the respondent expresses a certain view.

4 EVALUATION OF THE METHOD

For the purpose of data completeness when testing and evaluating the tool, a combination of focus group interviews and individual interviews was used (Lambert and Loiselle 2008). This combination of data collection methods allowed us to elicit rich, detailed information on the topic of green culture. Participants were selected, on a voluntary basis, from two separate three day courses held at Kalmar Maritime Academy, Linnaeus University; Proficiency in Medical Care, and a course in Electronic Chart Display and Information System (ECDIS) – Automatic Identification System (AIS). All interviews were held in Swedish and translation of quotes was made by the authors of this paper.

4.1 Focus group interviews

The group dynamics and interaction that occur in focus group interviews are a vital part of the model, using the communication between research participants to generate data. Instead of a researcher asking individuals to respond to a series of questions in turn, the participants are encouraged to, in their own vocabulary, ask each other questions, narrate anecdotes, and comment on each others' experiences and points of view (Krueger and Casey 2009). Focus group interviews are particularly useful when wanting to explore participants' knowledge and experiences, probing not only what people think but how they think and why they think that way (Kitzinger 1995).

Two focus group interviews were held (n=9), six men and three women. The age-span varied from 29 up to 51, the average age was 40 years. The two focus groups included three masters, three chief officers, and three second officers. Together, the participants represented passenger ships, Ro-Ro ships, offshore service vessels (OSV) and offshore rigs. In addition, experiences from earlier assignments were regularly referred to during the discussions.

The two focus groups were moderated by the same moderator with extensive knowledge of the

features surrounding the shipping industry, but not directly involved in studying the concept of green cultures. Thus, the moderator had the advantage of being able to instill a sense of mutual respect within the groups and communicate in a shared vocabulary but still be emotionally detached from the topic of the study (Krueger and Casey 2009). The first author of this paper acted as listener and observer.

Each focus group interview lasted for approximately two hours and was video and audio-recorded for transcript and analysis.

4.2 Individual interviews

Individual interview is a frequently used data collection method and is typically chosen to gather comprehensive accounts of attitudes, views, and knowledge regarding a given topic (Kvale 1997). The knowledge process in an interview is an interactive process between interviewer and interviewee. Hence, it is important to check continuously that the informant accepts the interpretation of what have been said. Four individual interviews were held, using the same thematic interview guide as the focus group interviews, but allowing for flexibility to probe for details or further discuss issues. Additional questions were asked and answers probed on an individual basis during the interviews.

Four interviews were held with respondents of which all were men currently working as chief officers. The overall age structure varied from 35 up to 44 years of age, average age of the participants was 38. The respondents worked on passenger ships, Ro-Ro ships, and offshore service vessels (OSV). Also here, experience from earlier assignments was regularly referred to. The interviews lasted for approximately two hours and were audio-recorded for transcript and analysis.

4.3 Evaluation of the semi structured guide

Both the individually interviewed and those participated in focus groups concluded with the anonymous answering of a structured questionnaire to assess if discussions based on the semi-structured guide captured the most important aspects of: (i) shipping-related environmental attitudes, (ii) commitment, (iii) expertice, (iv) communications, and (v) the participants' own participation in environmental activities. From the perspective of the respondents the results showed, on the whole, a high level precision. There were no major differences between those respondents participating in focus group against those participating in individual interviews (see figure 1).

1. The discussions in its entirety captured the most important aspects of shipping-related environmental attitudes.

2. The discussions captured the most important aspects of environmental commitment.

3. The discussions captured the most important aspects of environmental expertise.

4. The discussions captured the most important aspects of their own participation in environmental activities.

5. The discussions captured the most important aspects of environmentally -related communications.

6. In the time available, I had occasion to express what I wanted to say

Figure 2. Results from the structured questionnaires answered after two focus groups (n=9) and individual interviews (n=4). Rating values indicated with ✗ and ✓ from in total 13 participants. Median values are given using a 10-grade scale.

One additional question was if the respondent, in the time available, had the opportunity to express what they wanted to say (vi). Also here the overall response was high (see figure 2). The results also show that, to a large extent, the respondents felt that they could speak their mind and that they learnt from the experience pointing towards the usefulness of face-to-face group meetings for creating common awareness and knowledge transfer. However one comment from the respondents gave usable response for improvement:

'One interesting question might be how much time that assigns on environmental work on board and not just add up on-top on ordinary duties.'

4.4 Analysis of data to verify the method

It was, at this stage, possible to take some 'individual' quotes and advance them through the model with the purpose of evaluating the functioning of the three levels (i-iii) of the analysis tool. However, it must be emphasised that, at this stage, it was not possible, during the available time to draw substantial conclusion regarding to the maturity of perceived 'green' culture from the obtained data. This was not the intention of this study since it would have required a comprehensive analysis of the entire data.

Displaying quotes acting as 'facilitator' (A) and other quotes acting as 'barrier' (B) for each one of the

categories Commitment, Learning, Empowerment and Communication, by giving a 'thick description', suggests the functioning of the CLEC-model.

4.5 Environmental commitment at all organisational levels

The capturing of commitment to the environment can be illustrated by this quote, expressed during the interview, by a chief officer working on an offshore service vessel along the US coast:

'…these types of ships were you all the time need to be in the lead and keep up a good reputation, then you, we have them, all the systems up-to-date …'

During the interview, the respondent showed positive attitude to his work, and came across as being proud of being a chief officer on such an advanced vessel. The mentioning of the need for all the systems to be up-to-date is interpreted here as covering both safety and environmental issues. The need to be in the lead and maintain a good corporate reputation seemed to be a shared view among those working at the office and those working on board. One reason for this might be the external pressure on the ship and the company, when working with clients on US waters where they enforce a strict legal system that might push or force a high level of commitment; this may be supported by another quote expressed during the interview:

'…we do have everything in place, even in regard to oil, due to US so all things are in place, as they should be. If we have a bunker operation, or if we have a situation where the client wants to fill up diesel in their generators, standing on deck or compressors or whatever it may be, so, then we have a checklist, we have everything in place precisely because we don't dare to have it in any other way.'

Going further and trying to capture the central part expressed by the respondent by conducting a level (iii) analysis. There seemed to be a need to share information that might also involve the acquiring of information, both for safety and environmental issues in order to be up-to-date and in the lead. This suggests that a proactive culture, or even generative which might act as a facilitator for 'greening' of an organisational culture.

Offering another view, a chief officer on a Ro-Ro vessel, expressed a more doubtful stance towards his company's environmental commitment:

'Yes, we pretend to be 14000-certified yet still use paper dishes in the galley at evenings, it doesn't match up.'

The respondent, who is trained to conduct internal audits of the company's Environmental Management System (EMS), here expresses commitment towards improvements. For instance, he applied twice to become an internal auditor. He did however feel that the company does not always match his own commitment. The respondent gave even more illustrative consequences in regard to the company's environmental commitment in a supporting quote:

'We are an ISO 14000 company, it is still the case that we cheat, there are of course, we have partners who have broken the contract with us because we do not meet the requirements that we ourselves have promoted ourselves with.'

Conducting a level (iii) analysis, it appears that the responsibility to follow and continually improve environmental work seemed to be avoided or maybe even neglected. This may indicate a lack of commitment barrier in relation to environmental work, despite the shipping company being certified according to an EMS-system (ISO 14001) that has as a prerequisite, nurturing of environmental commitment.

4.6 Environmental relevant learning activities

As regards learning activities, a chief officer working on an offshore service vessel, described during an individual interview, the environmental learning activities on board as follows:

'Yes, all of us on-board shall do such, Seagull [trademark] CBT-courses such computer based, specifically on ISO 14001…'

Apparently, this company expects all personnel to attend familiarisation courses on the environmental management systems (EMS). The respondent also emphasised the importance of the company's EMS (ISO 14001):

'… everyone on board needs to do, all maritime crew members must go through the ISO 14001 course.'

In this case the course was given by the means of Computer Based Training (CBT), a common feature in the shipping industry. Analysing this in relation to level (iii) it seems that there is a requirement to acquire information and keep up-to-date with new knowledge and information. However, learning in itself might not provide support for 'good' environmental work, although this respondent also gave the impression of a well-implemented management system, which might indicate that, this 'learning' function as facilitator to 'green' the organisational culture.

Officers working on ships operated by companies with a different approach to learning gave information on that they were not familiar with training in regard to Environmental Management System (EMS). In one specific case the company and ship was also ISO 14001 certified. The respondent working as chief officer with extensive experience, presently on a Ro-Ro ship in north European trade, indicated a stronger environmental commitment on a personal level, as was illustrated with some supporting quotes:

'I would say that I think a little about the environment as well, I like to use my bike, and now I haven't had a car for two years…'

'…me and my partner spend time talking and she is on the same…, so it becomes a natural part, and then it's with washing and such things, using the clothes a couple of times you can hang them up and we have no fabric softener…'

The respondent also emphasised onboard environmental training, such as exercisers in relation to Ship Oil Pollution Emergency Plan, (SOPEP) which was under his responsibility. However, when it comes to the company's EMS (ISO 14001) there appears to be a lack of information about requirement for the onboard crew to conduct relevant learning, even at management level. Looking at a level (iii) analysis, it seems that the organisation ignores to establish relevant requirement on learning in relation to the implemented EMS and it also seems that the organisation hides or ignores to provide information on such things as available learning in relation to relevant environmental management systems. In this respect, the consequences might vary between neutral or barriers for relevant environmental learning at an organisational level.

4.7 Measures taken for empowerment

When it comes to empowerment, it was difficult to find 'good' examples, however one respondent, a chief officer, pointed once again to management support systems such as a combined quality and environment system that the respondent positively expressed backing for during the interview. In this case the work descriptions in the Quality Assurance (QA) system were stated to clearly describe different areas or response at different organisational levels in the company both onboard and at the head office. The shipping company had a single 'open' computer-based platform, merging the two management systems for quality and environment into one Management System that the respondent referred to as the QA-system.

'Sometimes, it is of course a bit too much, it is obvious, but on the other hand, we do have some support, if you want to use money in any way to improve safety or the environment or anything you can ever use the QA-system and looking for, because everything, it's all about motivating yourself…'

An additional question during the interview focused on the respondents' feeling of an autonomous status onboard the ship in relation to the head office, the direct reply was:

'We have that! It's not like working for a large well-established [shipping company] like I came from before I started in [this company].'

Using the above quotes to visualise measures taken for empowerment, it indicates, on a level (iii) analysis, a focus on sharing of information in a context of well known procedures with established corresponding responsibilities on staff in a autonomous oriented structure, which in turn might facilitate a greening of the organisational culture.

However, it seemed that most of the data related to empowerment reflected a different situation and maybe this quote from another respondent, a ship's master commanding a large Ro-Ro ship in north Atlantic trade, echoes this clearly:

'…I've been over 20 years in one shipping company so it was a bit shocking to come to a management company and a new shipping company that is also controlled from

the top and they have [the owner] basically, but this management company wants to check everything you do, then I can't sign off from an expenses at 100 SEK but I drive around with 500 million and 20 human lives, but I can't sign off on 100 SEK'

This was stated very emotionally during a rather frustrated passage of one focus group's conversation. The respondent continued to reflect on the present situation from an historical perspective and stated:

'…but in the old days it was in fact an employed master and he was the owner's extended arm on the ship and the owner trusted the master…'

The same master also elaborated around environmental issues in regards to hydraulic hoses that usually need to be replaced regularly because of wear and tear causing multiple leakages:

'…then it's the fault of the ship and it's even so if it is us who might have proposed long ago that we must replace x number of hoses but then it's too expensive and they [the company] don't want it, but if you don't change the hose [the ship] becomes laid-up…'

Conducting a level (iii) analysis, these quotes illustrate the master's perception of not having suitable responsibility on the right organizational level instead it is a focus on accountability. This might result in a general demotivating factor on the ship's master, deterring, *barrier*, the master from taking that extra step to improve what needs to be improved on board e.g. order or forcefully argue for new hydraulic hoses or implement a maintenance programme, all together it might affect the 'greening' of culture.

4.8 *Measures taken for two-way communications*

Lastly, looking into communication aspects there seemed to exist elements of an open communication environment only among a limited number of respondents, though this quote comes from one of these exceptions, an officer on a large Ro-Ro vessel in worldwide trade. This is illustrated by one part of a larger quote:

'Now, we have had one of those responsible for recruitment, he has been out now, going with us, [I] have spoken to him, [he] was interviewing, what we thought, asked a bit, how we liked it and so on. He got some input, not only going through the captain and so on, but also asking people.'

The respondent continued to describe the open communication access to everybody in the company and that there is almost an absence of a communication hierarchy. During the focus group discussion, the respondent returned several times to the ease of access to people working in the shore organisation, whenever the crew has something to ask or discuss. This was stated to also actively being supported by the company. Open communication ought to have a positive bearing on both safety and environmental behaviour. Looking at a level (iii) analysis, means of openly and actively requiring information, could be seen as facilitating a 'greening' of the culture.

To illuminate what can be said to be the direct opposite, another communication situation, involving both safety and environmental concerns, will act as illustration. An accident had occurred i.e. hydraulic leakage on the ramp that resulted in spillage of oil into the water of a port. There were a lot of involved organisations besides the ship i.e. fire brigade, port authority and the coast guard. The aftermath report that also contained proposals for further improvement, e.g. changing hydraulic hoses, was sent to the head office. The author of the report, who was interviewed, holds the position of chief officer on a Ro-Ro ship:

'We sent in the report to the company, since then we haven't, the company hasn't, well, what they have done with the report, I don't know.'

The story serves as an example of a broken two-way communication situation that might hinder the development of a successful green culture. The respondent believed that the crew on board had handled the situation well. The accident was apparently caused, by wear and tear of the hydraulic hoses. This was a fact that the crew previously had pointed out to the technical office ashore. Here, analysing at level (iii), it seems an ignored information loop i.e. the messenger have been ignored, which might has served as a barrier. In this case it even seemed to be one mechanism, among others, creating a feeling of 'so what' or distrust. The communication situation was so infected that the crew told the office that they record their telephone conversations:

'…if we phone the office, we tell them that we record the conversation…'.

5 DISCUSSION

5.1 *Methodological considerations*

The purpose of this pilot study was to develop and evaluate a qualitative model for capturing attitudes and perception among seafarers that can measure the extent to which there may exist a possible presence of a 'green culture' within the shipping industry. Moreover, to identify factors that either facilitate or act as barriers to a possible green culture. The test and evaluation of the model is based on a limited number of individual and focus group interviews. However, the purpose with this study was not to draw any general conclusions on the greening of the culture.

There is a possibility during interviews that the respondents might offer answers and reflections that put them and/or the companies they represent in a good or bad light. This has been considered, and the study has strived for a critical approach in the analysis of the empirical data. The study is further limited by its clear Swedish focus with the boundaries set by prevailing national and regional regulations and conditions. Furthermore, since many of the major legislative instruments are set and enforced on a global arena, and that several respondents worked on other flags than Swedish, the results may be relevant also outside Sweden.

5.2 General discussion and suggestions for future work

This pilot study presents the CLEC-model as an analysis model that seems to be able to capture the sought-after mechanisms; barriers and facilitators of 'green' culture, which has been illustrated in point 4.5 to 4.8 (see figure 3).
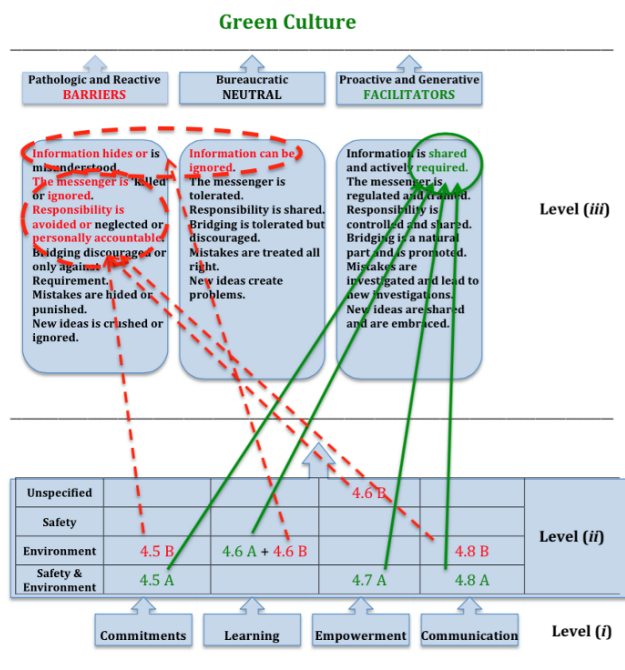

Figure 3. Illustrating the functioning of the CLEC-model based on quotes during testing of the model.

This paper, does further suggest that the first level (i) of analysis is robust i.e. the division of the data into the four aspects of Commitments, Learning, Empowerment and Communication appears effective.

In order to reach maturity of the date it is necessary to expand this pilot study to include more interviews. For instance, there were no respondents representing the technical or catering departments. It is also desirable to include more respondents from the liquid bulk segment, working on oil and chemical tankers

In order to properly reflect an organisational culture it is also vital to acquire data from those working in the shore-based part of the organisation such as technical, economical and management staff.

One limitation of the model might be that it is based on commitment, learning, empowerment and communication as input factors, however it is possible that other factors might also provide input at level (i). One such factor might be environmental deterring enforcement practices. It is possible to consider this in future studies, although, in this pilot study it was not considered. Strengths of the model seem to be the high level of systematisation making it easy to reproduce. It also seems to be possible to measure safety-oriented quotes against environ-mental-oriented quotes in the same milieu, i.e. cluster at level (ii) and then identify gaps at level (iii).

6 CONCLUSION

A model that can measure green culture in a shipping company has been developed and tested. The CLEC-model has its scientific basis within theory coming from work organisations, organisational culture, and human resource management. Concepts have also been used from the scientific field of safety culture.

This pilot study, as it was designed, has further provided some suggestions as to which factors might act as barriers and *facilitators* to the creation of a green culture. Based on the limited empiric data used to evaluate the model, the facilitators were related to: sharing of information and also actively requiring information. One *neutral* factor was found: ignored information. Regarding *barriers* to a 'green' culture it was possible to identify factors such as: ignored messenger, hided information, avoided responsibility, and a focus on accountability, supporting previous research in this area. Further work is needed, using the developed model, to approach the concept of an '*environmental*' culture in the shipping industry. The contribution of this paper only provides the groundwork of what might be a viable tool to be further developed.

REFERENCES

Angell, L. C., & Klassen, R. D., (1999). Integrating Environmental Issues into the Mainstream: An Agenda for Research in Operations Management', Journal of Operations and Production Management, 11(3): 63–76.

Cariou, P. (2011). Is slow steaming a sustainable means of reducing CO2 emissions from container shipping? Trans-portation Research Part D: Transport and Environment, 16(3), 260-264.

Cordano, M., & Frieze, I. H., (2000). Pollution Reduction Preferences of U.S. Environmental Managers: Applying Ajzen's Theory of Planned Behavior', Academy of Management Journal, 43(4): 627–41.

Fernández, E., Junquera, B., & Ordiz, M., (2003). Organizational culture and human resources in the environmental issue: a review of the literature. The International Journal of Human Resource Management, 14(4), pp.634–656.

Ferraro, G., et al., (2009). Long term monitoring of oil spills in European seas. International Journal of Remote Sensing, 30(3), pp.627–645.

Giziakis, C., & Christodoulou, A., (2012). Environmental awareness and practice concerning maritime air emissions: the case of the Greek shipping industry. Maritime Policy & Management, 39(3), 353-368.

Guldenmund, F. W., (2010). (Mis)understanding Safety Culture and Its Relationship to Safety Management. Risk analysis?: an official publication of the Society for Risk Analysis, 30(10), pp.1466–80.

Handfield, et al., (2001). Integrating Environmental Concerns into the Design Process: The Gap between Theory and Practice, IEEE Transactions on Engineering Management, 18(2), 189–208.

Harris, C., Lloyd, C., & Crane, A., (2002). The greening of organizational culture: Management views on the depth, degree and diffusion of change, Journal of Organizational Change Management, 15(3), pp.214 – 234.

Hart, S. L., (1995). A Natural Resource-Based View of the Firm, Academy of Management Review, 20(4), 986–1014.

Hjelle, H. M., & Fridell, E., (2012). When is Short Sea Shipping Environmentally Competitive?, Environmental Health - Emerging Issues and Practice, Prof. Jacques Oosthuizen (Ed.), ISBN: 978-953-307- 854-0.

Hjorth, F., (2013). Safety Culture in the Baltic Sea: A study of Maritime Safety, Safety Culture and Working Conditions Aboard Vessels, Marine Navigation and Safety of Sea Transportation: STCW, Maritime Education and Training (MET), Human Resources and Crew Manning, Maritime Policy, Logistics and Economic Matters Weintrit, Adam & Neumann, Tomasz (Ed.), (pp. 233-241), Leiden: CRC Press.

Hudson, P., (2007). Implementing a safety culture in a major multi-national. Safety Science, 45(6), pp.697–722.

Kongsvik, T. O., Storkersen, K. V., & Antonsen, S., (2013). The relationship between regulation, safety management systems and safety culture in the maritime industry. Safety, Reliability and Risk Analysis: Beyond the Horizon, 467.

Kitzinger, J. (1995). Qualitative Research: Introducing focus groups. British Medical Journal, 311(7000), 299.

Krueger, R., & Casey, M. (2009). Focus groups: a practical guide for applied research. Thousand Oaks, CA: Sage Publications.

Kvale, S. (1997). Interviews: an introduction to qualitative research interviewing. Thousand Oaks: Sage.

Lai, K. H., et al., (2011). Green shipping practices in the shipping industry: Conceptualization, adoption, and implications. Resources, Conservation and Recycling, 55(6), pp.631–638.

Lambert, S., & Loiselle, C. (2008). Combining individual interviews and focus groups to enhance data richness. Journal of Advanced Nursing, 62(2), 228-237.

Longva, T., et al., (2010). Determining a required energy efficiency design index level for new ships based on a cost-effectiveness criterion. Maritime Policy & Management, 37(2), pp.129–143.

Lun, Y. H. V., et al., (2013). Green shipping practices and firm performance. Maritime Policy & Management, 41(2), pp.134–148.

Millard, D., (2011). Management learning and the greening of SMEs: Moving beyond problem-solving, Zeitschrift für Personalforschung, 25(2), pp. 178-195.

Reason, J. (1997). Managing the Risks of Organizational Accidents. London: Ashgate.?

Russo, M. V., & Fouts, P. A., (1997). 'A Resource-Based Perspective on Corporate Environmental Performance and Profitability', Academy of Management Journal, 40: 534–59.

Saharuddin, A., Osnin, A. & Balaji, R., (2012). Human Factors as Causes for Shipboard Oil Pollution Violations. International jurnal on Marine Navigation and Safety of Sea Transport, 6(1), pp.93–99.

Sanderlands, G., (1994) '3M Find Brass in Muck', Management Decision, 32(5), 63–4.

Smith, T. W. P. et al., (2014). Third IMO GHG Study 2014, International Maritime Organization (IMO) London.

Westrum, R., 2004. A typology of organisational cultures. Quality & safety in health care, 13(2), pp. ii22–i27.

Westrum, R., (2014). The study of information flow: A personal journey. Safety Science, 67, pp.58–63.

Wuisan, L., et al., (2012). Greening international shipping through private governance: A case study of the Clean Shipping Project. Marine Policy, 36(1), pp.165–173.