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Evaluation of Maritime Safety Policy Instruments

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Abstract

This paper analyzes the effectiveness of the current maritime safety policy system as a whole. It offers an overview of different kinds of policy instruments that are used to enhance maritime safety and the criteria for effective policy instruments. It provides a criticism and goes through the weak points of the current maritime safety policy system, and finally, the system is analyzed in the light of the criteria for effective policy. The paper is based on literary sources, mainly on articles published in academic journals. The conclusion of the article is that the development of individual policies will not greatly improve the current level of maritime safety, and more fundamental changes are needed in the governance of maritime safety.

Key words: Maritime Safety, Policy Instruments, Governance, Evaluation

1 Introduction

Accidents at sea and increasing volumes of maritime traffic, especially the transportation of dangerous cargoes, have given rise to a growing awareness of the safety of maritime traffic. International maritime safety regulation has a long history. Regulation is continuously revised and developed further in numerous maritime safety related issues by several actors. Instead of looking at individual policies, it is sometimes important to think about the system as a whole and its foundations. Do the current maritime safety policies achieve the goals they are meant to achieve, are they effective, and is there a need for change?

This paper presents the criteria for effective policy instruments, and it evaluates the current maritime safety policy system as a whole in the light of those criteria. The paper includes a short description and a critique of the maritime safety policy system. The paper is mainly a literature review on the effectiveness of maritime safety policy. The structure of the paper is as follows. Firstly, the criteria for effective policy instruments and a tool for evaluation of maritime policy instruments (Formal Safety Assessment FSA) are presented. Secondly, regulatory bodies of maritime safety and preventive maritime safety policy instruments are reviewed. Next, the article discusses a critique and weak points of the system. Finally, the maritime safety policy system is evaluated against the criteria for effective policy in the light of the critique of a system, and the findings of the study are discussed in the end.

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2 Effectiveness of Policy Instruments

Policy instruments are often grouped into three categories: regulatory instruments (jurisdiction and law based decrees, restrictions, licences etc.), economic instruments (taxes, subsidies, fees etc.) and information-based guidance (information, voluntary education, certification, awards etc.). Policy instruments can be viewed from the perspective of the interests that they aim to protect: private goods (e.g. the competitiveness of companies) or public goods, which the market would otherwise neglect (e.g. the maintenance of safety and security in the shipping industry and protection of the environment from the harmful effects of shipping). Policy instruments can be either preventive measures (e.g. regulation on the construction of ships or vessel traffic services), or sanctions (e.g. criminal responsibility) and consequences (e.g. financial liability). Both preventive measures and consequences can be either private (e.g. insurance) or administrative measures (e.g. prohibitions) (see Figure 1). All the instruments are not necessarily based on jurisdiction. Private actors can also act in co-operation and promote maritime safety related goals, for example in P&I Clubs (Protection & Indemnity Clubs). (Kuronen and Tapaninen 2009)

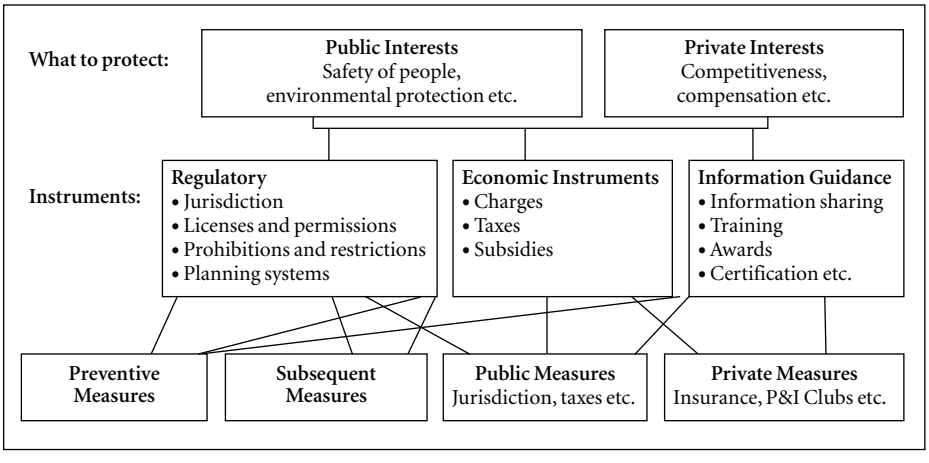

Figure 1. Policy instruments

Public interests are not usually included in the prices of normal market transactions. To protect these interests, the society controls private actors through a range of policies. In many cases, there is a constant conflict between private economic interests and public interests. Resources are limited and must be deployed where they are most likely to have the greatest positive impact. (Greiner et al. 2000)

Vieira et al. (2007) have developed a system for assessing transport policy instruments where the set of policies are evaluated against certain criteria and in relation to each other. Greiner et al. (2000) have also used very similar criteria for transport policy evaluation. Below, we have amalgamated criteria for the effective policy from these two articles.

- *Effectiveness* refers to the potential improvement in the thing that an effort is made to change. It relates to whether an instrument is appropriate and technically suitable for achieving a goal. (Greiner et al. 2000; Vieira et al. 2007)
- *Economic efficiency* relates to effectiveness in terms of implementation costs of an instrument and the economic efficiency of an instrument in a collective sense, assessing the total benefits of the associated change in risk minimizing against its total costs. (Greiner et al. 2000; Vieira et al. 2007)
- *Acceptability* refers to the stakeholders' level of agreement on a new policy instrument, and to the political and community acceptability of an instrument. Acceptability is a necessary condition for the durability of the policy. (Greiner et al. 2000; Vieira et al. 2007)
- *Enforcement* indicates how effectively a policy instrument can be implemented. Some instruments can be difficult to implement, even though they would probably be effective. Vieira et al. (2007) present the following types of barriers for implementation: legal and institutional (legal or regulatory conflicts, legal powers are spread through various institutions or organizations), resource or financial (lack of financial or physical resources to implement an instrument), political and cultural (some groups oppose policy) and technological (e.g. lack of suitable technology). (Greiner et al. 2000; Vieira et al. 2007)
- *Lateral effects* refer to possible spill over effects of an instrument into other sectors (e.g. a reduction in air emissions can improve the health of people, which decreases health care expenses). (Vieira et al. 2007)
- *Incentive and innovation* effects relate to the question of whether an instrument encourages experimentation and change and provides an ongoing incentive for improvement. (Greiner et al. 2000)

Huppes and Simonis (2009) distinguish three groups of criteria for effective policy (see Table 1). First order criteria are related to the direct operational consequences of the application of the instrument. Second-order criteria relate to broader aspects of administration and economy. Strategic criteria, the most general category, relate the instrument to the broader culture and institutions in society.

Table 1. Criteria for evaluating policy instruments (adapted from: Huppes and Simonis 2009)

First-order Criteria	Second-order Criteria	Strategic Criteria
Effectiveness	Social and political acceptability	Fitting in with the broader conceptual framework for public policy
Social costs	Within administrative capacities	Fitting in with the broader institutional framework of society
Distributive justice	Limited changes in competitiveness	Fitting in with general cultural developments
Generative equality	Incentive for sustainable technology development	Fitting in with general economic developments

Effective policy instruments should be coherent with overall policy orientations. A certain set of policies can together be more effective than any single policy would be. In their study on transport policy instruments, Vieira et al. 2007 found that most of the policy instruments studied had positive synergy effects, i.e. the effectiveness of instruments implemented together is potentially greater than the effectiveness of each instrument separately. It is also important to look at which current policies might provide conflicting incentives and which should be removed. Policy instruments should also be reviewed in the context of maritime shipping system changes. (Greiner et al. 2000; Vieira et al. 2007; Walker 2000)

One aspect of the effectiveness of jurisdiction based policy instruments is the consequences of non-compliance. Non-compliance should result in penalties or economic consequences severe enough to minimise the temptation of an actor to break the rules. (Greiner et al. 2000)

2.1 Comparison of Regulatory, Economic and Information Guidance Instruments

Regulatory instruments are very effective and easy to enforce, because they are, by their nature, compulsory. The weaknesses of regulatory instruments can include their economic efficiency and public acceptance, and their enactment and implementation can be expensive, difficult or practically impossible. (Vieira et al. 2007) Regulatory policy instruments may not promote changes or innovations, because there is no economic incentive (Klemmensen et al. 2007), although many times the implementation of regulatory instruments adds to the costs, and economic incentives might result from that.

Economic instruments can achieve environmental targets with good economic efficiency from the point of view of a more social-efficient allocation of resources. However, economic instruments often face acceptance difficulties, because they tend to increase prices. If they have lateral effects or are used in combination with other policies, they can be more acceptable if the price increase in the first is compensated by the price decrease of the other. (Vieira et al. 2007)

Information guidance is premised on the idea that justified information can contribute to a voluntarily change in behaviour. While regulatory and economic instruments are in most cases based on legislation and there are consequences in case of non-conformity, the effect of information guidance is totally dependent on the voluntary interest of an actor.

2.2 Formal Safety Assessment

IMO has developed the Formal Safety Assessment (FSA) method which can be used as a tool to evaluate regulations for maritime safety and to make comparisons between existing and new regulations. FSA consists of five steps:

1. the identification of relevant accident scenarios with potential causes and outcomes
2. the evaluation of risk factors
3. the identification of risk control options (RCO)
4. determining the cost-effectiveness of previous RCOs
5. recommendations for decision-making (Ruud and Mikkelsen 2008).

There are many examples how FSA method has been used to evaluate maritime safety policies, e.g. in the evaluation of navigational arrangements in the Sound between Denmark and Sweden (Rambøll Danmark A/S 2006), in the development of risk-based rules for offshore crane systems (Ruud and Mikkelsen 2008), in the evaluation of the cruise ship safety (Lois et al. 2004), or in the analysis of the risk of LNG carrier operations (Vanem et al. 2008). The problem with FSA studies has sometimes been the lack of adequate data for the proper analysis of risk factors and cost-effectiveness of RCOs and different applications of the guidelines (Knapp and Franses 2009).

2.3 Maritime Safety Policy Instruments

Maritime safety is the most prominently legislated within the framework of the United Nations and the International Maritime Organisation (IMO). However, maritime safety is also regulated at supra-national, national and regional levels. In principle, these levels should work in a so-called nested hierarchy, where the international level is the outmost circle and other levels are within each other in the circle. The inner circles should be consistent with the outer levels of the circle in order to make the implementation of regulation effectual. In the real world, this has not always been the case, and the supra-national (e.g. European Union) and national (e.g. the United States) levels have taken steps to regulate the same issues as the IMO before the IMO has taken action, for example in case of double-hull tankers. (Roe 2008) Some maritime safety issues belong to the sphere of national regulation, for example piloting. Besides the regulatory bodies of maritime safety, there are actors in the shipping industry who do not have legislative power, but who in some way or other influence maritime safety, for example classification societies or marine insurance companies.

Regulatory instruments are the most widely used policy instruments, also in the maritime world. Table 2 is a summary of how maritime safety is regulated by means of regulatory instruments and who is the main legislator or actor.

It is typical for shipping related economic instruments that they are mainly used to improve the competitiveness of the sector rather than to promote maritime safety related goals. It is also typical for economic instruments that they are adopted at the national level or used between private actors (see Table 3).

Information guidance instruments are also used in maritime safety issues; for example, the IMO issues codes, guidelines or recommended practices on important matters not considered suitable for legally binding conventions. Voluntary education, voluntary certification systems and maritime safety related awards are other examples of information guidance instruments.

Table 2. Maritime safety – regulatory instruments[*]

Regulated Sector		*Main Legislator/Actors*
Ship construction and equipment	• Construction and subdivision • Stability • Equipment • Stowage • Navigation • Handling of the cargo	– IMO
Surveillance of ship conditions	• Flag state control • Port state control • Host state control • Classification societies • Vetting inspections	– IMO – IMO, PARIS MOU – EU – Private companies – Private companies
Mariners and safety management	• Working conditions • Employment conditions • Manning of ships • Safety and quality management	– IMO, ILO
Navigation	• VTS • Ship reporting systems • Traffic separation schemes and routings • Traffic recommendations and restrictions • Piloting • Waterway safety • Nautical charts • Information supply on weather, water level, ice situation etc. • Towage services	– IMO – IMO, regional co-operation – IMO, regional co-operation – IMO, regional co-operation and nations – Nations – IMO, IALA – IMO, IHO – IMO – Nations, private companies

[*] Information in Table 2 has been gathered from several sources, for example: Boisson (1994), Eide et al. (2007), Finland's Ministry of Transportation and Communications (2009), Roberts (2007), Stopford (2009); and from the Internet-pages of International Maritime Organisation, www.imo.org

Table 3. Maritime safety – economic instruments[**]

Regulated Sector	*Main Legislator/Actors*
Dues related to maintenance of waterways	– Nations
Port dues	– Nations, private companies
Marine insurance	– Private companies, IMO (obligatory insurances)
P&I Clubs	– Private companies
Liability and compensation (oil pollution)	– IMO
Incentives, e.g. GreenAward Certification System	– Private companies, nations

[**] Information in Table 3 has been gathered from several sources, for example: Bennett 2000, Bennett 2001, Faure & Hui 2008, Kaps 2004, Finland's Ministry of Transportation and Communications 2009 and Noussia 2007.

3 Critique of the Maritime Safety Policy System

Although maritime safety regulation can be shown to have improved maritime safety when looking at such as the number of casualties and their seriousness, undesirable phenomena still exist in the shipping industry. The maritime safety policy system can be criticized on many points. Most of these are interconnected, reflecting the fact that the problem ultimately lies in the foundations of the system and the shipping industry.

Roe (2008; 2009) has criticised strongly the current maritime policy making. "It fails to have the desired effect (ships still sink; beaches get polluted; it is generated by inappropriate bodies (national governments rather than international authorities for an international industry; it is diffuse and partial (Port State Control and the failure to target high-risk ships and operators) and unclear from where it emerges, the motives behind it or the methodology for its application" (Roe 2008, 265).

Below, the problems of the maritime safety policy system are looked at as regards three aspects: international maritime safety regulation, the role of private parties and the role of human factor and safety management in the promotion of maritime safety.

3.1 Critique of International Maritime Safety Regulation

The international regulation process often is slow, and the result can become a compromise of compromises (Stopford 2009). At the regional level, there would often be willingness to react more quickly to the deficiencies in the maritime safety system. The IMO does not support regional decision-making, and regional systems are problematic from the point of view of the global shipping industry. An example of an occasion where national or supra-national legislation has conflicted with the international level is double-hull tankers, which were first required by the United States and the US Oil Pollution Act. Later in the EU, a number of member states introduced legislation to enforce the use of double-hull oil tankers before this was agreed at the EU level and well before the date recommended by IMO. (Roe 2008; Roe 2009) The contradictions in the current maritime legislation system are also manifested in the Particularly Sensitive Sea Area (PSSA) system, where the principle of freedom of the high seas and uniform international legislation is challenged. The designation of the PSSA area can be seen as an attempt to extend national and regional authority in the sea area (Uggla 2007). In fact, such regional arrangements can be regarded as a failure of the international system to make comprehensive regulation in shipping industry (Goss 2008; Kaps 2004).

IMO legislation can be considered mostly reactive – regulation is revised or made more stringent after major marine accidents, and preventive actions are still uncommon. This kind of "post accident" policy is often unsuccessful. Policy-making is not very comprehensive, and one particular risk receives too much attention (Goulielmos 2001; Karvonen et al. 2006; Knapp and Franses 2009).

At the international level, national representatives make up the IMO, devising maritime policies for a globalized industry from a national perspective. Problems arise when national interests conflict with supra-national ideas. Failures of shipping policies derive from the development of internationalised ownership of industrial and capital operation resulting from national protectionist regulations. (Roe 2008; Roe 2009)

3.2 The Role of Third Parties in Promotion of Maritime Safety

Regulation also depends on the enrolment of third parties, both public and private (financial firms, insurers, government agencies, auditors, consultants etc.). Third parties have the power to influence the behaviour of companies. They can implement incentives or sanctions affecting other parties, from the making or breaking of social and economic relationships to concrete financial penalties formalised in legally binding contracts. Still, third parties are still rarely exploited in the promotion of public interests. In maritime regulation, third party actors, such as associations of shipowners, cargo owners, insurers, classification societies and banks, have potential to exert an influence over ship safety and environmental standards. (Bennett 2000)

Third parties could be enrolled to assist the public policy for instance by holding them liable for environmental damage caused by their clients, making it a legal requirement that the objects of regulators use the machinery of third parties (such as auditors or insurers). Governments can also create rights, e.g. tradable permits and incentives, such as a less stringent scrutiny by regulatory authors. Also the liability of the cargo owner and the shipper in cases of accidents should be discussed. (Bennett 2000)

Hänninen (2007) has observed that the marine system lacks egalitarian stakeholder groups which would monitor risks and risk taking behaviour in maritime transportation. In other industries, such as the nuclear power production and the forest industry, egalitarian watch and interest groups are common and provide fresh and unconventional views on matters of safety, thus creating pressures on other groups to pay attention and upgrade their safety related risk classification and regulatory practises.

Not all shipping companies are the same. There are companies that have a policy of "buying second-hand ships cheaply, operating them cheaply, skimping on safety measures and, when prospective repairs become expensive, abandoning them, and their unpaid crews, in some obscure port from which the owners cannot easily be traced" or a policy of "being very good indeed at every aspect of shipping, being willing to experiment selectively with new technologies (without always being the pioneer), acting as good employers, achieving a high reputation with consumers and thus making good profits most of the time" (Goss 2008, 143). The problem is that good and bad companies are competing in the same market (Goss 2008). The shipper plays a crucial role in maritime safety. For example, in case of the *Erika* accident, it turned out that the ship was chartered because the offered transportation was affordable, and the shipper had little interest in the condition of the ship (Permanent

Commission of Enquiry into Accidents at Sea 2000). If a shipper requires from a transporter a high safety level instead of solely looking at the price of transportation, obscure firms will not be able to operate in the market and distort fair competition.

The operation of sub-standard ships is also enabled by the failure of the flag-state control system to control ship conditions in a uniform way in all flag states. To verify the real conditions on the ship, there are several ship inspection systems besides flag sate control: port state control systems, supervision performed by classification societies and vetting inspections. The various inspection systems do not recognize inspections performed by another regime. There do not seem to be significant differences between various inspections, which increase the workload on the ships and add to the costs. (Knapp and Franses 2007)

3.3 Human Factor and Safety Management – Problem Recognised, but not Solved

The human factor has been identified as the most important cause of maritime accidents (e.g. Kujala et al. 2009; Trucco et al. 2008), and in all shipping accidents, the human factor plays some role. Technological development has lead to the reduction of failures in technology, which in turn has revealed the underlying level of influence of human error in accident causation (Hetherington et al. 2006). The influence of economic pressure in a strongly competitive industry may also have added to the human factor causing shipping accidents (Trucco et al. 2008).

If the human factor is seen to be the major cause for accidents, effective policies should examine how the effect of the human factor in accident causes could be diminished. It seems that in the shipping industry, there is a growing awareness of the role of the human factor in maritime safety, but finding good policies which would tackle the human factor appears to be difficult. Safety management, including inspection and training, are commonly thought to be the key means of tackling the human factor contribution to accidents (Trucco et al. 2008). The working conditions, safety culture on board, and proper use of technological and other tools are also perceived to have a role in preventing accidents caused by the human factor (Karvonen et al. 2006).

Errors related to the human factor can be of two kinds: active and latent errors. Active errors are ones made by the pilot, control room crew, ship officers or other operators. The biggest threat to safety comes from latent errors, however, which are caused by poor design, incorrect installation, faulty maintenance, poor management decisions etc. An active error made by the operator is just the finishing touch on the human factor based error leading to the casualty (Hänninen 2008). In other words, the error based on the human factor can be said to be the final act in a long and complex chain of organisational and systemic errors. According to Hetherington et al. (2006), the fundamental error inducing character in shipping lies in the social organization, economic pressure and the structure of industry.

Hänninen (2007) points out in his study on the Estonia accident that the safety culture of the shipping industry is, in many ways, old-fashioned. For example:

- There is a high tolerance for incidents and near misses in the maritime community.
- Shipping companies are profit-oriented and neglect safety issues.
- Mariners are not proactive on safety issues.

Studies on the ISM Code have found that there are serious deficiencies in the reporting of near misses and weak points in the shipping industry (Lappalainen 2008). For example, in case of the Estonia accident, it was found out in the accident investigation that shipping companies had noticed structural weaknesses in visors, but this information never reached the authorities and was not discussed between companies (Hänninen 2007).

Maritime law is still based on the principle that the shipmaster is in absolute charge of his vessel. The master's duties and responsibilities are numerous and extensive. He is, for example, the owner's personal representative, bears the ultimate responsibility for safety in the navigation of the vessel and for the loading, stowage and discharge of cargo. (Branch 2007, Sage 2005) Pilots and VTS centres cannot command ships, only give advice. In case of an accident, the master (and other officers as well) can even be criminally liable, even if there had not been any criminal intention or conscious negligence (Lawford 2002). This practise seems quite odd when compared to other industries, e.g. aviation, and when thinking of the safety culture and management at the organizational and industry-wide levels, which are probably a greater cause of accidents than the actions of a single officer on board.

According to Roe (2009), maritime safety is by its nature a very complex issue, and it "is as much related to culture as anything else – language, authority and communication are all intensely complex and determined by individual or institutional relationships that may or may not be affected by jurisdiction… policies need to reflect the complexity of inter-relationships and the multiplicity of centres of authority that influence safety and environmental standards, complicity and the implementation of penalties" (Roe 2009, 48).

4 Effectiveness of Maritime Safety Policy System

In Chapter 2, the criteria for an effective maritime safety policy system were presented. In this Chapter, each criterion is looked at in the light of the current maritime safety policy system – does it fulfil the criteria as a whole? Naturally, there are differences between individual policies, but our purpose here is to look at the system as a whole (see Kuronen and Tapaninen 2009).

Effectiveness – the policy instrument must be suitable for achieving a desired goal

Most maritime safety policy instruments can be considered suitable for their purposes. They address the issues that are directly connected to the operational circumstances of a ship, and improving them is likely to have an impact on shipping safety.

Some of the problems are that international legislation seems to lack the capability to take into consideration local circumstances and to provide fast responses when needed. The PSSA status system and the activities of the European Union to legislate on maritime safety can be seen as signs of this problem. International legislation also tends to focus on technical details and it seems difficult to find effective policies which would tackle the human factor and safety management of the industry, while these are the main cause of most accidents at sea. In short, international legislation system lacks comprehensive point of view into maritime safety factors.

Economic efficiency – the benefits versus the costs of implementing the policy instrument should be at balance

Economic efficiency varies between different policies and is difficult to estimate as a whole. Certainly, some people say that the cost of safety regulation is too high for the industry, because it is so extensive. Nevertheless, in principle the costs of implementing international regulation should not be a problem for the industry, as all actors bear the same costs. However, we know that this is not the case in the real world. Implementation levels vary, and regional regulation can alter the costs. However, economic efficiency is a very important criterion. Resources should be allocated to obtain the maximum benefit. There is no point in regulation that costs a great deal to the industry and has little impact. The problem is that the costs and benefits are in many cases hard to calculate, and it seems there is no comprehensive information on the cost-effectiveness of the maritime safety policy system. This is an area which needs further development, better methods and also fresh viewpoints on how investing in safety can be a competitive advantage to shipping companies.

Acceptability – the policy instrument must be accepted and the community by stakeholders

In a way, the slowness of the international regulation process reflects the fact that policy instruments which are not accepted by the stakeholders, at least not by the nations represented in the IMO, cannot be legislated on, because the slow process is a sign that the stakeholders have differing opinions on the matter and it takes a great deal of time to negotiate a result that is acceptable for a sufficient number of the stakeholders. It seems that in many cases the nation states are promoting their national interests in IMO, instead of promoting maritime safety interests. When looking at the broader community, it seems that it would be willing and ready to adopt more stringent maritime safety policies, but these are not accepted by the industry or violate the principles of maritime law (which are seldom questioned). For example, in the Baltic Sea, it has many times been proposed that the VTS system should be extended to cover the whole Baltic Sea area, but at the moment this is not possible due to the international legislation not allowing coastal states to employ the VTS system in high sea zones. (E.g. Karvonen et al. 2006)

Enforcement – the policy instrument can be implemented effectively

This is one of the core problems of the current system. International regulation based on national state implementation is not functioning properly. On the global scale,

the differences in the way maritime safety regulation is implemented are too great. The existence of flags of convenience is the most visible sign of this. The IMO has made attempts to improve the situation with the voluntary IMO Member State Audit Scheme, which intends to assess how effectively a member state administers and implements the mandatory IMO instruments covered by the scheme. This scheme is voluntary, but in the European Union, auditing of the national maritime administration will be compulsory. (European Commission 2009, IMO 2009a) In our opinion, the Member State Audit Scheme is only a band-aid solution, not interfering in the actual causes of bleeding.

Lateral effects – positive spill over effects of the policy instrument to other sectors
At its best, maritime safety policy has many positive spill over effects. Safer shipping means less human suffering and less polluted seas. These achievements affect the wider society positively in many ways. People are healthier, and live and work long. Marine ecosystems are protected, which improves the possibilities of using the sea both for commercial and recreational activities, although this depends on many other issues as well. Safe transportation also decreases transport damages and cargo losses.

Incentive and innovation – a good policy instrument encourages experimentation and gives incentives for improvement
Maritime safety policy is in many aspects very detailed, for example with regard to ship construction and equipment. The more detailed the legislation is, the less room there is for experimentation and innovations. Economic instruments are often thought to be better in promoting innovations, and they are not much used in maritime safety policy (e.g. Klemmensen et al. 2007). However, regulatory instruments can encourage innovation as well, and economic instruments do not necessarily do that. For example, the ISM Code includes the requirement of continuous improvement, but as Lappalainen points out in his study (2008), the shipping industry often lacks the kind of culture which would aim at the continuous improvement of safety culture. To sum up, the degree to which maritime safety policy instruments encourage experimentation and innovation varies from policy to policy, but it seems that more attention has recently been focused on making policies that are more innovative and encourage continuous improvement, for example goal-based construction standard of the IMO (IMO 2009b).

The current maritime safety policy system has been effective in many respects, and the open question is how effective it would be without some basic problems in the system. The major deficiencies are the implementation of policies and the failure of the system to minimise the role of the human factor and safety management in accident causation. Maritime safety regulation tends to focus on technical details instead of profoundly thinking of how safety can be enhanced. The fundamental problems of the maritime safety policy system imply that single policies can no longer be expected to greatly improve safety, and treaty-based relations between states can no longer accommodate the rule making processes for the shipping industry operating

in a global economy (Kovats 2006). Roe suggests that the problem of making effective policies lies in the failure to understand the relationships between jurisdictions operating at international, supra-national and national levels, which makes it possible for uncaring shipowners to take advantage of the failings of current regulation systems, and in the failure to incorporate stakeholder interests in the jurisdiction process. He proposes new approaches to shipping policy, such as multi-level governance, or a polycentric governance system. In these governance systems, authority is dispersed both vertically to other territorial levels and horizontally to non-state actors. These allow the integration of state and non-state actors and the dispersion of state activity to supra-national, regional and local authorities in a way that reflects the shipping industry itself. These governance systems may offer a mechanism to reflect the actual activities within the maritime sector and priorities of the stakeholders involved. (Roe 2008; 2009) An industry-wide self-governing and democratic constitution composed of maritime institutions and arrangements would offer full and equal representation from all the operational sectors of the industry at the global level (Kovats 2006). However, such changes in international legislation seem to be remote.

5 Conclusions and Further Research

There is an increasing amount of maritime safety regulation, and all in all, the number of maritime accidents has decreased in the past decades. Still, accidents and incidents happen at sea, and the current maritime safety regulation system can be criticised over several points: the difficulty of adopting truly global legislation, the failures of implementation and the incapability to address the human factor and safety management issues effectively. These problems are for example manifested in the existence of flags of convenience and several ship inspection systems. It seems that the current policy making system is merely trying to "block the holes" in the system with individual policies, instead of thinking of how safety could truly be improved: with technical details and more supervision, or by changing the whole maritime safety governance thinking?

For example, Roe (2008; 2009) and Kovats (2006) have proposed alternative systems that would not be based on treaty-based relations between national states, which are not able to regulate the global shipping industry effectively. Instead of national states, systems where authority would be dispersed besides the national authorities to stakeholders of the shipping industry, and besides the global level to the regional level, might better reflect the actual activities of the shipping industry. Instead of command-and-control policies, safety should be embedded in the industry so that, for example, sub-standard shipping would be impossible. Besides shipowners, the shippers, classification societies, marine insurers and other third parties would also need to take an interest in maritime safety and make efforts. The foundations of the current system must be called into question. In our opinion, this is the way that maritime safety could truly be enhanced from its current level.

The area of maritime safety policy could be further studied in a more concrete level by analysing the opinions of maritime experts on the effectiveness of different policy instruments. In addition to shipping companies and authorities, the opinions of third parties, such as shippers or marine insurers or NGOs would be highly interesting, for future development of maritime policy. In addition, it would be wise to study more deeply the connection between safety and corporate responsibility and its effect on the competitiveness of shipping companies. Is it possible to show that investing in safety pays off also commercially? Is the best result for all the parties gained through command-and-control policies or maybe through an active and co-operative attitude towards safety by all the stakeholders affecting the shipping industry?

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