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Maritime security guidelines: a study of Swedish ports' perceived barriers to compliance

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ABSTRACT

Due to the constant risk of piracy and terrorist attacks which cause disturbances within international shipping of goods, barriers to the adoption of maritime security guidelines (MSGs) at European ports have become prevalent. In this paper, a conceptual framework was created to explore the perceived barriers that prevent compliance with MSGs. To verify the conceptual framework, empirical data were collected using a mixed-methods approach, which was comprised of interviews with national experts and a survey of 47% of Swedish ports involved in the shipping of goods. According to the presented framework, the perceived barriers of Swedish ports to compliance with MSGs were linked to collaborations within the Swedish Maritime Security stakeholder network, available resources and educational knowledge about security culture. In addition, the perceived barriers of smaller ports were linked to the adaptation to MSGs at different levels and the absence of specific tools of maritime security management. Due to an increased interest in international shipping of goods, this paper is currently one of few that addresses the barriers to compliance with MSGs. Moreover, the paper presents a general conceptual framework, novel managerial implications and recommendations for future research.

KEYWORDS

Ports; Regulation; Maritime Security; Shipping; Risk; Security Policy

1. Introduction

The maritime sector is essential for the international shipping of goods. International shipping of goods has also increased the need for increased maritime security, especially with regard to piracy and terrorist attacks (Papa 2013). The increased risk of piracy and terrorist attacks has also evoked a rising interest among stakeholders in the development of and compliance with statutory maritime security guidelines (MSGs) (Germond 2015). An example of one such guideline is the International Ship and Port Facility Security (ISPS) Code, which was implemented in 2004 to enhance security due to perceived global piracy and terrorist threats (IMO 2012). In compliance with the ISPS Code, the European Union (EU) implemented Regulation (EC) No. 725/2004 (European Commission 2004) and Directive (EC) 65/2005 (European Commission 2005). In addition to international statutory MSGs, various member states of the EU have implemented domestic regulations with regard to the ISPS Code, including the United Kingdom's Ship and Port Facility (Security) Regulation and Sweden's Act 2004: 487.

In addition, the past three decades have seen an intensification of academic interest in MSGs (Germond 2015). The extant studies on MSGs reveal that a lack of consultation with stakeholders during development (Papa 2013) act as a barrier to compliance. There is, however, a gap in research published studies which explores the barriers to ports' compliance

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with MSGs (Yang, Ng, and Wang 2014). This paper seeks to fill this gap and enhance existing knowledge regarding the perceived barriers to compliance with international- and national MSGs within the international shipping of goods.

Following this introduction, a literature review of maritime security management, Swedish maritime security framework and Swedish maritime security stakeholders are presented. Subsequently, the applied methodology, which includes a multiple case study and a conceptual framework used to analyse the perceived barriers to the compliance of ports, is presented. Next, the results of the analysis, based on the developed conceptual framework, are presented. The paper concludes with a discussion of the results, managerial implications to enhance compliance and recommendations for future research.

2. Literature review

2.1. Maritime security management

In recent decades, the association between transport security and management has become significant for stakeholders involved in maritime transportation (Thai 2009). The increased significance of this association is due to the fact that states adhere to their legal, ethical and political responsibilities in order to secure and protect global interests within economic and federative regions (e.g. the EU). There is also increased interest in the management of the flow of goods and people to prevent smuggling and illegal immigration (Germond and Germond-Duret 2016). In accordance with this, maritime security has become an important term within the field of international maritime shipping (Bueger 2015; Germond 2015).

New threats faced by the maritime sector adversely affect international maritime stakeholders business, especially since the operational and economic impacts of security disruptions in the maritime sector are widespread (Wengelin 2012). In some cases, maritime security management is regarded as a resource burden for ports, since the allocation of resources may differ depending on the size of the port (Bichou 2004). In addition, to be involved in global trade, ports are required to have their own financial and personnel resources to ensure that their security is in compliance with MSGs (Wengelin 2006). Because of this, smaller ports are adversely impacted by financial strain due to the costs of implementing security measures that comply with statutory MSGs (Bichou 2004). This adverse impact has led some studies to suggest that the level of compliance with MSGs should be quantified based on the cost of implementing security and recovery measures (Dekker and Stevens 2007). However, the cost of implementing these security measures still needs to be established and quantified (Edgerton 2013), especially when one considers the lack of understanding among stakeholders regarding the investments needed to ensure efficient security management (Burns 2013).

In addition to financial resources, personnel should be trained on security activities and processes that are based on the perception and awareness of threats (Ekwall and Rolandsson 2013). Edgerton (2013) specifically emphasises the importance of investment in training, roles and responsibilities in relation to security management at ports. Published research also reveals an association between stakeholders knowledge of the efficiency of MSGs and their willingness to adopt them (Sadovaya and Thai 2016). When personnel are sufficiently trained regarding MSGs and maritime security management, it positively affects the security culture at stakeholders (Thai and Grewal 2007).

Maritime security management is affected by the commercial and public interests of stakeholders within the relevant security network. A security network consists of interlinked governmental, municipal and business stakeholders who collaborate to enhance security (Whelan 2017). However, Roe (2009) address the conflict between national regulatory bodies in relation to the efficient management of global trade. There is also a lack of adaptation to MSGs at national and international levels due to a dearth of common definitions in relation to the management of goods and services within different MSGs (Andritsos and Mosconi 2010).

Moreover, the security level of a port affects supply-chain stakeholders on both operational and financial levels (Hassanzadeh 2013), as failure to comply with statutory MSGs may result in the withdrawal of a stakeholder's operation licence by the regulatory body, thus leading to economic losses for the stakeholders in the supply chain (Hopkin 2018). The management of maritime security in ports should thus include the use of both common and specific tools, including the Hazard and Operability (HAZOP) Analysis, risk registers and the Balanced Scorecard (Hopkin 2018; Wengelin 2012). The HAZOP Analysis is a tool used to for identification of potential safety hazard- or operational risks related to equipment, systems or products (Hopkin 2018). Risk registers are used to record results of risk assessment related to the process, operation, location or unit under consideration (Hopkin 2018). The Balanced Scorecard is a framework for translation of visions into operative goals, communication of visions, and for linking of visions to performance. The framework aims to strengthen business planning and an organisations ability to learn and adjust to strategies (Wengelin 2012).

2.2. The Swedish maritime security framework

To ensure security, the Swedish maritime security framework consists of statutory and non-statutory MSGs across four different levels (three international levels and a national level).

2.2.1. The national level

To ensure compliance with MSGs on the first international level, every nation has its own regulatory guidelines on the national level. The national level with regard to Sweden, as a member of the EU, includes statutory acts and ordinances, as well as non-statutory dictates.

In compliance with Regulation EC 725/2004, Sweden implemented Act 2004: 487. The act includes statutory provisions that allow governmental authorities to make decisions on reviews of properties and people, determine the appropriate security levels for ships and port facilities and decide the penalties of non-compliance i.e. SFS 2018:1089 (Swedish Government 2019). The Ordinance 2004:283 has also been developed—this is comprised of the regulatory guidelines for port stakeholders. The ordinance includes statutory guidelines regarding the responsibility of Swedish authorities for the management of maritime security. To support stakeholders in compliance with Act 2004:487 and the Ordinance 2004:283, non-statutory guidelines on maritime security are included in the Dictate SJÖFS 2004:13 (Swedish Maritime Administration 2019). Similarly, to ensure maritime security in compliance with Directive 2005/65/EC, Act 2006:1209 has been implemented in Sweden (Swedish Government 2019). Statutory guidelines to support port stakeholders in complying with Act 2006:1209 are included in the Ordinance 2006:1213. The Ordinance 2006:1213 also stipulates that the Swedish Transport Authority (STA) is the main stakeholder responsible for maritime security in Sweden, i.e. SFS 2014:1278 (Swedish Government 2019). Finally, non-statutory guidelines regarding port security that support stakeholders' compliance with Act 2006:1209 and Ordinance 2006:1213 are included in Dictate SJÖFS 2007:1 (Swedish Maritime Administration 2019).

2.2.2. The first international level

To ensure security within economic and federal regions, the EU, in compliance with MSGs on the third international level, has developed the first international level. For the EU, this level comprise the two statutory MSG Regulation (EC) 725/2004 and the Directive 2005/65/EC. Regulation (EC) 725/2004 on enhancing ship and port facility security includes statutory requirements on the formal understanding and implementation of the non-statutory MSGs of the ISPS Code (Part B) to ensure the highest possible level of security within the EU (Papa 2013). Accordingly, the regulatory guidelines in Regulation (EC) 725/2004 are extensions of the requirements of the ISPS Code and are intended to develop a harmonised interpretation and common framework that is applicable to all member states of the EU. Moreover, the regulation comprises areas of implementation in relation to the ship-type

and states that it is the responsibility of the European Commission to undertake supervisions and inspections. The Regulation EC 725/2004 applies to all member states, while the Directive 2005/65/EC applies to all EU ports and aims to provide a sufficient and effective security level that protects the entire maritime infrastructure and transportation chain (Andritsos and Mosconi 2010). However, a regulation must be implemented and applied in all Member States in the European Union, compared to a directive which only concerns one or a group of Member States.

2.2.3. The second international level

The second international level exists to provide non-statutory guidance to stakeholders in their regulatory compliance with MSGs on the third international level. Because MSGs on the second international level are non-statutory, stakeholders are not legally required to comply with them. The second international level comprise the non-statutory accreditation standard ISO 20858:2007. The ISO 20858:2007 standard presents a framework for the specifications of employee competence at port facilities, where said employees are required to conduct security assessments and develop, implement and draft the Port Facility Security Plan (PFSP) (ISO 2018). However, the ISO 20858:2007 standard does not include guidelines for the designation of a recognised security organisation at a port facility to perform security assessments or develop the PFSP.

2.2.4. The third international level

The third international level includes statutory MSGs that apply to all member states of the United Nations (UN) and the IMO. In the EU, two statutory regulations exist on this level—namely, the UN Convention of the Law of the Sea (UNCLOS) and the ISPS Code. The UNCLOS is a statutory regulation, and it states that it is the responsibility of every sovereign state to sustain maritime security within their own exclusive economic zones of seas and oceans (Edgerton 2013). Moreover, the ISPS Code is a statutory guideline introduced by the IMO to prevent the risk of terrorist attacks. The ISPS Code has been enacted at the first international level in the EU, and the United States. This is because the code is part of the International Convention for the Safety of Life at Sea (Metaparti 2010). The ISPS Code applies only to international cargo ships of at least 500 gross tonnes, international passenger ships, mobile offshore drilling units and the port facilities of international ships. The ISPS Code addresses three levels in the management of security threats—namely, the daily basis level, the potential threat level and the incident level. The daily basis level comprises a minimal compliance with statutory and non-statutory security requirements; the potential threat level states that a potential threat has been detected; and the incident level refers to the occurrence of a threat or any available reliable information about a clear threat (IMO 2017).

To support governmental authorities in evaluating security risks and mitigating the vulnerability of ships and port facilities the ISPS code provides a standardised framework that is divided into a statutory section (Part A) and a non-statutory section (Part B). Part A specifies the statutory requirements, while Part B includes the implementation guidelines for said requirements. Failure to comply with the implementation of non-statutory guidelines is regarded as a failure to exercise security in daily operations (IMO 2017). Furthermore, according to Part A, port facilities are required to have a port facility security plan (PFSP) that has been approved by the national authority and a port facility security officer who is responsible for the assessment and maintenance of security (Andritsos 2013). However, the actual threat that the ISPS Code is meant to mitigate is not defined, though it is clear that it stems from the fear of terrorism (Wengelin 2012). Furthermore, the ISPS Code lacks a cost–benefit analysis in relation to the implementation of security measures (Bichou 2011).

A summary of all Swedish MSGs is presented in Figure 1 along with each compliance level.

2.3. The Swedish maritime security stakeholder network

Published research on maritime security reports that maritime security stakeholders are classified as being governmental, municipal or business stakeholders (Wengelin 2006). A further review of

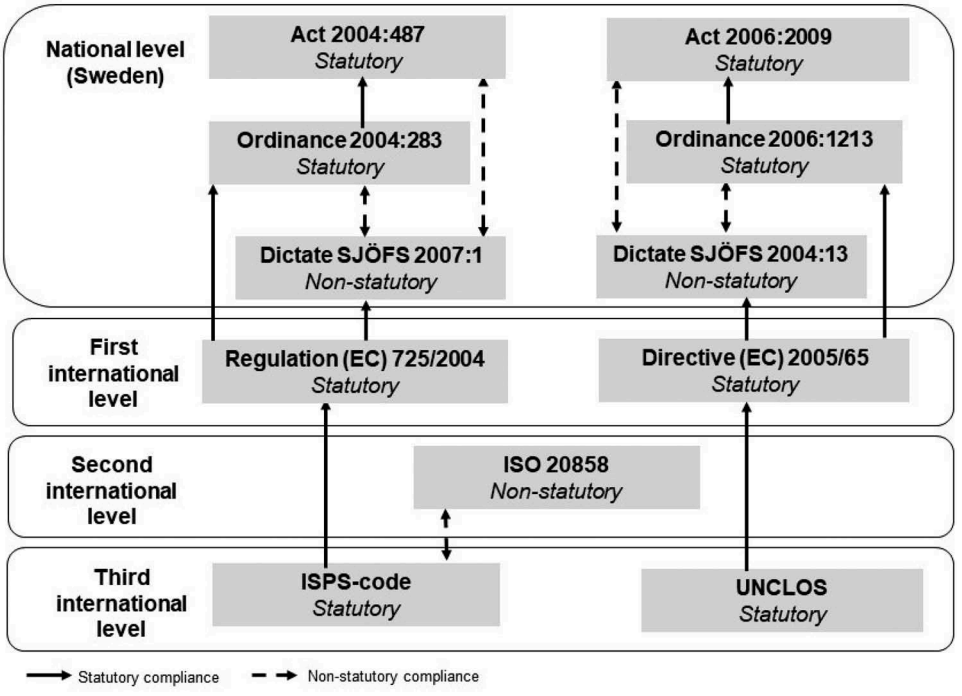

Figure 1. A summary of Swedish non-statutory and statutory MSGs.

stakeholders responsible for the development and implementation of MSGs and security surveillance in Sweden reveals that governmental stakeholders consist of the Swedish parliament, the Swedish government and the Swedish authorities the Swedish Transport Agency (STA), the Swedish Customs Agency (SCA), the Swedish Coast Guard (SCG) and the Swedish Police Authority (SPA).

The Swedish parliament is the principal authority regarding the creation of national statutory MSGs (Sveriges Riksdag 2005) included in the state budget. The Swedish government, however is the main authority for submitting statutory and non-statutory MSGs to the Swedish parliament. The Swedish government is also responsible for implementation of parliament decisions, for the security budget approved by the Swedish Parliament. The STA is the main line of authority for the creation, follow up, reporting and coordination of work conducted by the SCA and SCG (Wengelin 2006). The SCA is responsible for deciding on and collecting custom charges, VAT, taxes and fees. Additionally, the SCA is responsible for monitoring the safety of vessels and maritime traffic at the Swedish border (Swedish Government 2019). The SCG is responsible for carrying out surveillance, monitoring activities and environmental rescue services at sea. The SCG must monitor the transport of chemical- and hazardous goods as well as the vessels that enter and leave Swedish ports. In addition, the SCG is responsible for the control of fishery activities (Sveriges Riksdag 2005). The SPA is mainly responsible for the determination of security levels at Swedish ports and port facilities. Additionally, the SPA holds the monopoly on enforcing protection from criminal violence in Sweden by the use of local police stations (Sveriges Riksdag 2005). Because of this, SPA also exists as a municipal stakeholder.

Municipal stakeholders' compliance with MSGs is linked to the responsibility as a public authority to prevent accidents and preserve a high level of emergency preparedness with regard local conditions. This includes the provision of maritime emergency service to prevent human, property, or environmental damages in cooperation with other Swedish authorities regardless the ownership of the port according to SFS 2003:778 (Swedish Government 2019).

Business stakeholders consist of private security companies that are contracted by ports with the responsibility of conducting security surveillance in the port area. Due to the high demand for private security, as a complement to security provided by public stakeholders, private security has become a lucrative business that is dominated by multinational companies (Nalla and Cobbina 2016). There still exists, however, a lack of common legislation regarding private security in the EU. Private security guards also emphasise that a lack of training adversely affects their level of job satisfaction (Nalla and Cobbina 2016). Due to this lack of training and legislation, European member states have different methods of training security guards (Abrahamsen and Williams 2009).

3. Methodology

The purpose of this paper is to explore the perceived barriers to ports' compliance with MSGs in relation to the international shipping of goods. To achieve the stated purpose, an integrative literature review (Seuring 2008), empirical data from a case study of Swedish ports and an analysis based on a developed conceptual framework have been applied.

The integrative literature review comprised a sample of papers published in maritime, transport, security, international policy and business management journals. Elsevier, Emerald, ScienceDirect and Taylor and Francis were the databases consulted for this literature review. To facilitate the identification of published papers that matched the objective of this paper, a structured literature search was carried out that consisted of three stages—namely, the 1) identification stage, 2) the initial selection stage and 3) the final selection stage.

The identification stage comprised a structured literature search based on the keywords, maritime security, port security, port organisations, ports, regulatory compliance and regulatory security framework. The studies had to be published from January 2004. The ISPS Code was implemented in 2004, thus meaning it was suitable for the start date (IMO 2012). Sixty-one papers were selected in total (stage 1). Thereafter, the abstracts of the selected papers were assessed based on their scope and objectives, which reduced the number of papers to 58 papers (stage 2). Thenceforth, duplicates in the initial round of selected papers were removed, and the content of the identified papers was screened. If the content of the paper focused on security management and was linked to compliance with statutory guidelines, it was included in the final selection of papers for further analysis (stage 3). Fifty-one papers made the final selection. The selected papers were then sorted into the five categories; maritime, transport, security, international policy and business according to the three stages of identification (Figure 2).

Additionally, Google Scholar, EUR-Lex and the IMO were used to identify published non-statutory and statutory guidelines and scientific reports. This aspect of the literature review resulted in three published IMO reports (of 30 identified in total), four regulations and directives (of 49 identified in total) and five scientific reports. Empirical data from a case study by Yin (2014) of ports were used in the analysis of the compliance of ports with MSGs. The case study comprised 16 (47%) of the total number (34) of port organisations in Swedish freight ports. Subsequently, the selected ports were categorised based on their annual management of goods. small ports managed <2 million tonnes; medium ports managed 2–5 million tonnes; and large ports managed >5 million tonnes (Trafikanalys 2017). Within the case study, a combination of quantitative and qualitative approaches (i.e. a mixed-methods approach) (Tashakkori and Teddlie 2003) was applied in the collection of empirical data.

The quantitative approach comprised a web survey consisting of 16 semi-structured questions regarding compliance with MSGs. This survey was sent out to security managers who were each employed by port organisations in each freight port (i.e. 16). The response rate was 100%. A five-point Likert scale (1 = do not agree; 5 = highly agree) (Tashakkori and Teddlie 2003) was applied to closed-ended questions to obtain empirical evidence about the ports' perceived barriers to compliance with MSGs, adaptation to national and international MSGs, and the use of available specific tools. Open-ended questions in the web survey were related to

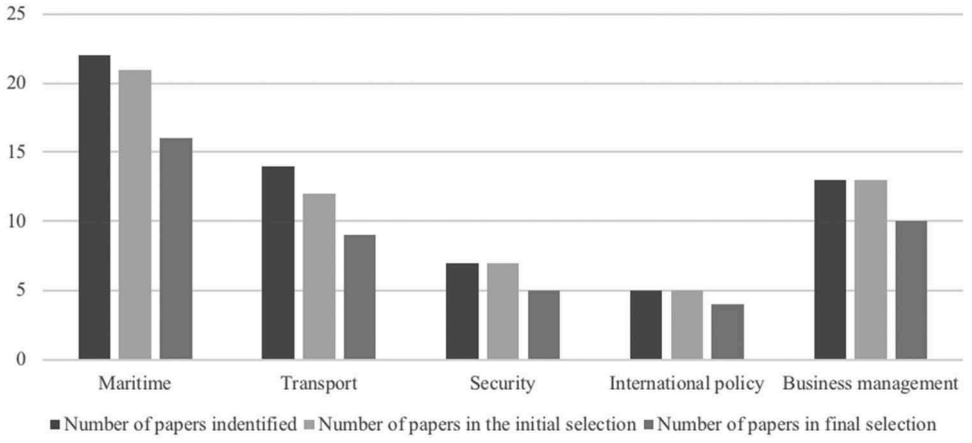

Figure 2. Papers included in the integrative literature review.

experiences of compliance with MSGs. In addition to open-ended questions, the qualitative approach included interviews with experts (Kvale 2007) about the barriers to port' compliance with MSGs. The expert interviewees included a special adviser in maritime security (SA1); a special adviser in maritime and supply chain security (SA2); another special adviser in maritime security (SA3); a lawyer within transport and maritime transport security (LE); and a governmental manager within transport and security. The expert interviews were semi-structured so as to allow respondents to freely express their attitudes and opinions without the influence of predefined response alternatives. Furthermore, the interviews were, as far as practicably possible, conducted face-to-face (Kvale 2007). To verify the interview results, a summary of each interview was sent to the respondent so that they could review and confirm their answers (Yin 2014).

Based on the integrative literature review, a conceptual framework was developed to analyse the perceived barriers to ports' compliance with MSGs based on the four elements; security resources, security culture, security network and security management (Figure 3):

The element of security resources comprised questions about available personnel (Ekwall and Rolandsson 2013) and the financial (Dekker and Stevens 2007) and intellectual resources (i.e. personnel specialized in specific MSGs) (Sadovaya and Thai 2016) used to comply with MSGs. Published research specifically posit that ports' should invest in training and education of personnel to comply with efficiency requirements within maritime security management (Thai and Grewal 2007). Due to this, the element of security culture comprised questions about educational knowledge, training of personnel (Thai and Grewal 2007) and the understanding of MSGs as financial and personnel investment (Edgerton 2013). The security network element comprised questions of compliance regarding the adaptation to MSGs at different levels (Andritsos and Mosconi 2010). In addition, the security network element included questions about collaboration within the maritime security stakeholder network (Whelan 2017). This is because ports' may prioritize MSGs at different levels and have stakeholder collaboration difficulties due to the impact on their daily operations. The security management element comprised questions about the use of specific tools (e.g. HAZOP Analysis, risk registers, balanced scorecards) to enhance the efficiency of maritime security management (Thai 2009). Thus, questions about specific tools also only evaluated ports' perceived awareness of specific tools, and not their perceived lack of awareness of specific tools.

Moreover, to ensure the validity of the results based on the developed conceptual framework, the analysed results from the web survey were triangulated with the analysed results from the semi-structured interviews (Easterby-Smith, Thorpe, and Jackson 2015). For the consistency in the publication of the paper the authors agreed upon that the co-author was responsible for the data collection, and that the

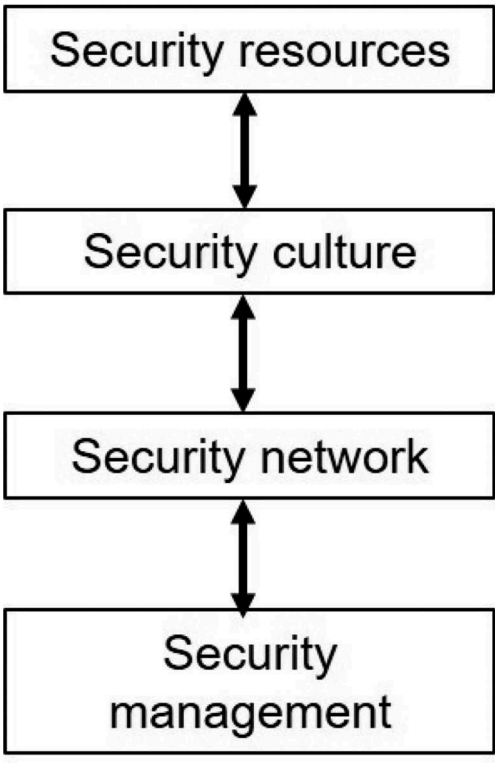

Figure 3. The conceptual framework used to analyse the perceived barriers to ports' compliance with MSGs.

analysis were jointly performed between the corresponding author and the co-author. Finally both authors agreed on that the corresponding author wrote the manuscript, and the co-author critically revised the manuscript. Both authors read and approved the final version of the manuscript.

4. Results and analysis

The web survey explored ports' perceived barriers to compliance with MSGs. The results of the survey showed that Swedish ports perceive their barriers to compliance with MSGs to be more on a national level than on an international level (Figure 4). Interestingly, more than 30% of the surveyed ports analysed in this study were fully compliant with the ISPS code, while only 12.5% were fully compliant with STA regulations. It ought also to be noted that none of the ports included in the study reported zero compliance with any of the MSGs

In addition, results from the interviews with experts indicated that the perceived barriers to the compliance of ports with national MSGs were a lack of inclusion of national MSGs in PFSPs, a lack of instructions and the risk of adverse impacts on business. In the following sections, the perceived barriers to the compliance of ports with MSGs are analysed according to the four elements of the conceptual framework.

4.1. Security resources

The results confirmed the results of extant studies regarding the impact of available resources in maritime management (e.g. Ekwall and Rolandsson 2013; Dekker and Stevens 2007; Sadovaya and Thai 2016). The results from the web survey revealed that the average score curve of the perceived available resources (i.e. personnel, financial, intellectual) at each port (horizontal axis) follows the

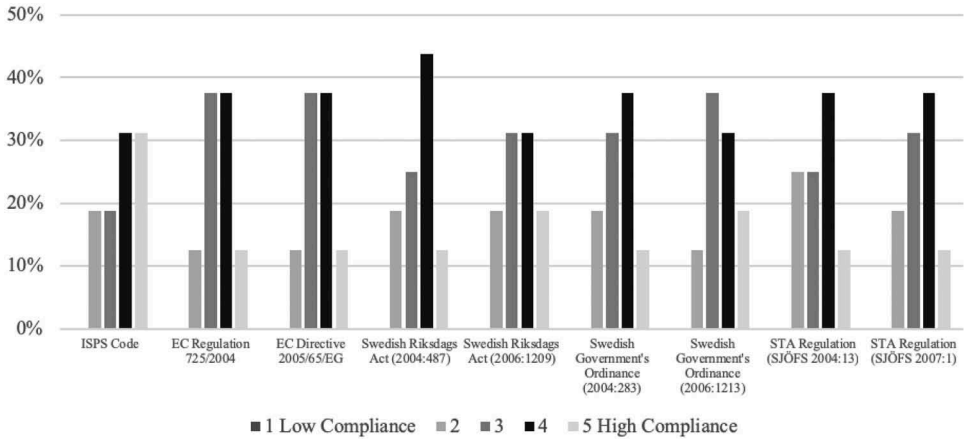

Figure 4. The views of ports regarding compliance with MSGs at different levels.

average score curve of perceived compliance with MSGs on the national-, first-, second- and third international level (vertical axis) (Figure 5).

The analysis also indicated that personnel resources (average 3.00) were considered to be the resource that was most lacking when compared to financial (average 3.47) and knowledge resources (average 3.53). Interestingly, all of the surveyed ports also emphasised a difference in available intellectual resources regarding compliance with MSGs on the national level compared to MSGs on the international level. Ports invest in intellectual resources due to the high attention given to international MSGs. Additionally, according to the interviews with experts, it is not the total amount of each available resource but the combination of personnel, financial and knowledge resources that affects the compliance of ports with MSGs.

4.2. Security culture

The results address the importance of an efficient security culture for enhancing a port's compliance with MSGs. The results from the web survey showed that 50% of the ports have extensive knowledge in maritime security management and are capable of sharing their knowledge with other stakeholders in the maritime security stakeholder network. However, the interviews with experts

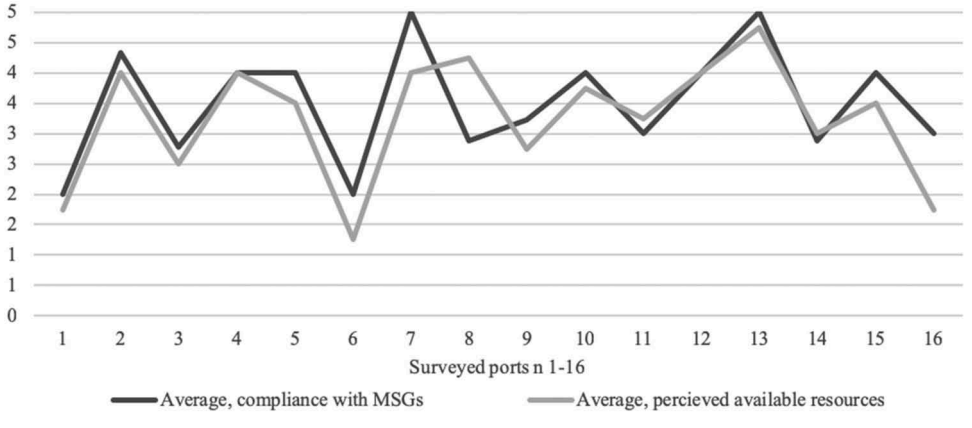

Figure 5. Average score curve of perceived compliance and perceived available resources.

revealed that ports should consider capacity, competence, risk awareness and job appropriateness when training personnel in order to enhance their compliance with MSGs.

Furthermore, it was found that ports are knowledgeable of MSGs in terms of the financial and personnel investment they require. Thus, they are aware of the importance of MSGs in their daily operations. This is interesting, as the results also shows a lack in the educational knowledge of the security culture. This is supported by the analysed interviews with experts, who addressed the lack of knowledge regarding the estimations of security culture in daily port operations until an adverse event occurs. Thus, the results address the importance of providing training to personnel in relation to security culture in order to enhance compliance with MSGs.

4.3. Security network

The web survey results address the importance of a well-functioning security network, as this enhances compliance with MSGs. This was also confirmed by one of the experts: 'The advantage of a security network is that one has an established organisation in the case that something occurs' (Respondent SA3).

Furthermore, according to the results, the presence of a security network is more important for small and medium-sized ports than for larger ports. This is because larger ports have better financial and personnel resources and thus do not require the same amount of financial and intellectual support to comply with MSGs compared to small and medium-sized ports.

A deeper analysis of the web survey results regarding the impact of adaptation to MSGs at different levels revealed that approximately 60% of the ports emphasised a need for the development of the current Swedish maritime security framework. Surprisingly, all of the ports mentioned that there was few incentives to adapt e.g. in development of governmental relationships, invest in expertise and training needed to comply with MSGs at the national level and the international level. However, the results from analysed closed-ended questions based on Likert scales revealed that especially smaller ports (managing < 2million tonnes goods annually) showed a 79% (i.e. 3.95 out of 5) adaptation to MSGs on the national level compared to MSGs on the international level (21%) (Figure 6).

Furthermore, according to the analysed interviews with experts, the adaptation of ports to statutory MSGs at different levels is affected by politics, the timeframe of adaption, the complexity within collaboration between stakeholders in the maritime security network, and stakeholder interest in the development of MSGs. It was also found that in relation to collaboration within the maritime security network, ports perceive their barriers to compliance with MSGs to lie in their collaborations with the SCA and the SPA rather than in private collaborations (Figure 7).

This difference in perceived collaboration indicates the type of collaborative relationship that exists between a port and stakeholders in the maritime security network needed to comply with the MSGs. Ports have business relationships with private actors for security-surveillance reasons. However, the results of the web survey positioned the SPA as the main authority responsible for the exchange of information regarding security surveillance at ports. This is important, as ports are required to have adequate information concerning present and future threats to ensure that they can make appropriate decisions on how to act and react. Thus, the results suggested that the enhanced involvement of national policing authorities can increase opportunities for ports to comply with MSGs.

4.4. Security management

According to the web survey results, a majority of the ports claims that there is a lack of specific tools to help them manage security in order to comply with MSGs. The results may however be affected by a port's awareness of available specific tools. Nevertheless, the results from shows that the requirement for specific tools is especially emphasised by smaller ports but is also visible among medium-sized ports (Figure 8).

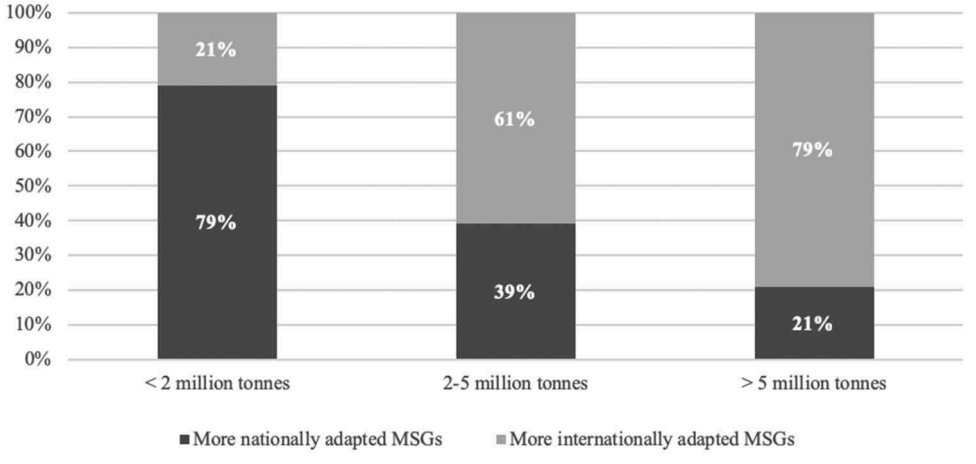

Figure 6. Adaptation to national and international MSGs with regard to port size.

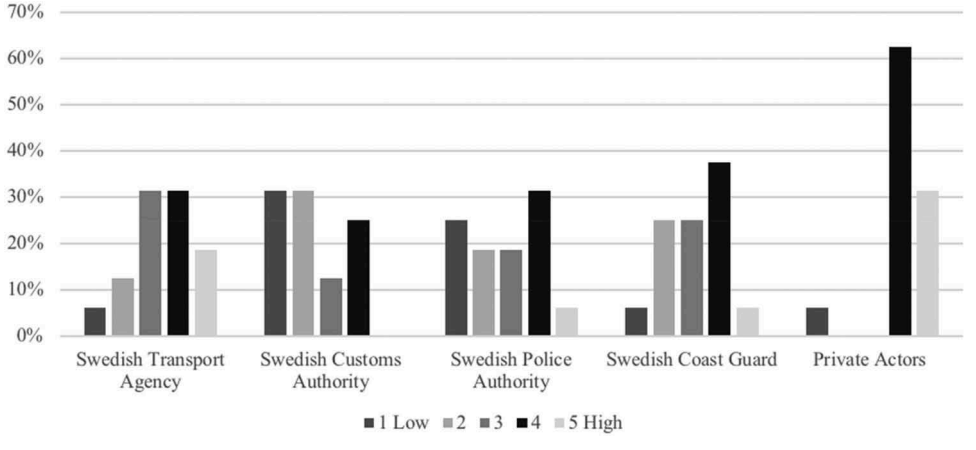

Figure 7. Collaboration between ports and stakeholders in the maritime security network.

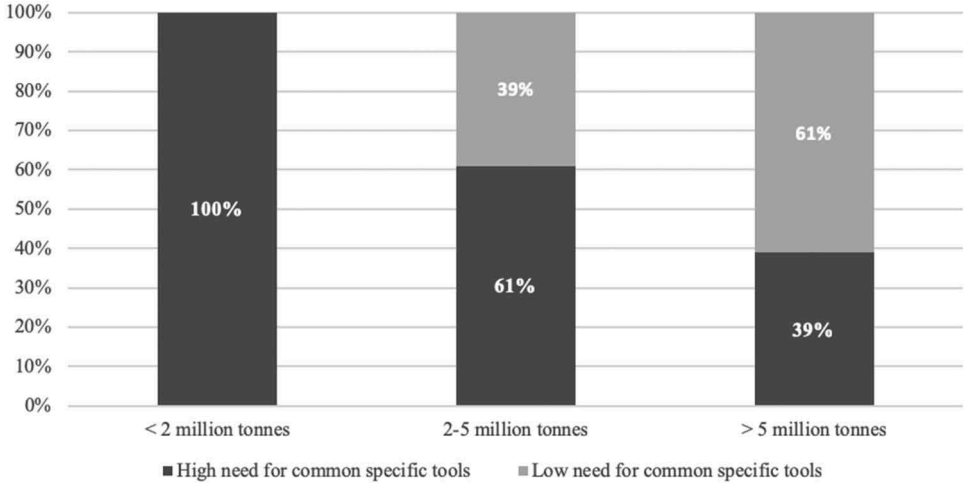

Figure 8. The need for specific tools in order to comply with MSGs.

The results presented above reveal the relationship between available resources and efficient compliance with MSGs. This is because the use of specific tools needed to comply with MSGs is limited by available financial (e.g. training costs) and personnel resources (e.g. educated personnel) at a port. This finding was also confirmed by the interviews with experts, who also addressed the enhanced possibilities for larger ports to acquire financial resources to purchase specific tools needed to comply with MSGs. The results also revealed that smaller ports with limited financial resources emphasise the need for information about the specific tools to be used within maritime security management to comply with MSGs.

5. Discussion and conclusions

The paper explores the perceived barriers to ports' compliance with international and national MSGs. For the analysis of the perceived barriers, the paper presents a four-element conceptual framework.

The paper shows that ports perceive the barriers to compliance with MSGs to be on a national level rather than on an international level, as the ports identify the perceived barriers as being linked to a lack of knowledge regarding compliance with MSGs on the national level and poor collaborations with national agencies and authorities within the security network. Thus, to conclude, this paper suggests that port security managers should include the subjects of national MSGs and relevant authorities within maritime security training. By including said authorities in maritime security training, port security managers will also have the opportunity to improve their prospects of collaboration with them.

Another interesting conclusion relates to the fact that the paper demonstrates that ports have sufficient knowledge about the impact of available financial and personnel resources, education in maritime security management, MSGs as financial and personnel investments, well-functioning security networks and the common specific security management tools. Thus, this paper posits that ports perceive barriers to compliance with MSGs to be linked to a lack of educational knowledge about security culture, intellectual resources and a lack of fully qualified personnel who are trained in this matter. To remedy these problems, this paper suggests that port security managers should include maritime security management as a topic within the continuous planning of daily operations, as recommended by Hopkin (2018). It is the combination of knowledge with financial and personnel resources, rather than the amount of resources, that impacts on a port's ability to comply with MSGs. Moreover, this paper confirms existing studies that evidence that security managers should invest in the training and education of personnel (Thai and Grewal 2007), especially in relation to security culture, in order to enhance ports compliance with MSGs.

Another significant conclusion is related to the fact that compliance with MSGs can be a burden for smaller ports. First, this paper confirms the results of previously published studies, i.e. that compliance with MSGs represents an economic burden for smaller ports (Bichou 2004). Second, the paper contributes to the extant knowledge regarding MSGs, as it finds that especially smaller ports perceive their barriers to compliance with national MSGs to be due to the absence of specific tools. Thus, to enhance compliance with national MSGs, port security managers (especially in smaller ports) should consider using both common and specific tools, such as those presented in the ISO 20858:2007 standard.

To date, few studies have covered the compliance of ports with non-statutory and statutory MSGs. Given the importance of compliance with national and international MSGs to enhance the security of the international shipping of goods and people, recommendations for future research that are linked to the presented research in this paper can be provided. First, the paper explored the perceived barriers of ports in relation to their compliance with MSGs based on a case study of Swedish ports. The fact that the study explored perceived barriers to Swedish ports' compliance with MSGs opens up for further studies which quantitatively evaluate actual barriers to ports' compliance with MSGs. Such studies should also include ports in other IMO member states and within international cruising. Second, this paper only explores the barriers to compliance with MSGs that are associated with transport within the international shipping of goods. This means that

there remains a need for studies to focus on information exchange between stakeholders in maritime security network to enhance compliance with MSGs. Such studies should consider MSGs in relation to the use of advanced technologies such as blockchain.

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References

Abrahamsen, R., and M. C. Williams. 2009. "Security beyond the State: Global Security Assemblages in International Politics." *International Political Sociology* 3 (1): 1–17. doi:10.1111/j.1749-5687.2008.00060.x.

Andritsos, F. 2013. "Port Security & Access Control: A Systemic Approach." Paper presented at the Fourth International Conference Information Intelligence Systems and Applications (IISA), Piraeus, Greece.

Andritsos, F., and M. Mosconi, 2010. "Port Decurity in EU: A Systemic Approach." Paper presented at the International Waterside Security Conference (WSS), Carrara, Italy.

Bichou, K. 2004. "The ISPS-code and the Cost of Port Compliance: An Initial Logistics and Supply Chain Framework for Port Security Assessment and Management." *Maritime Economics & Logistics* 6 (4): 322–348. doi:10.1080/0308883032000174454.

Bichou, K. 2011. "Assessing the Impact of Procedural Security on Container Port Efficiency." *Maritime Economics and Logistics* 13 (1): 1–28. doi:10.1057/mel.2010.16.

Bueger, C. 2015. "What Is Maritime Security?" *Marine Policy* 53 (1): 159–164. doi:10.1016/j.marpol.2014.12.005.

Burns, M. G. 2013. "Estimating the Impact of Maritime Security: Financial Tradeoffs between Security and Efficiency." *Journal of Transportation Security* 6 (4): 329–338. doi:10.1007/S12198-013-0119-x.

Dekker, S., and H. Stevens. 2007. "Maritime Security in the European Union - Empirical Findings on Financial Implications for Port Facilities." *Maritime Policy & Management* 34 (5): 485–499. doi:10.1080/03088830701585274.

Easterby-Smith, M., R. Thorpe, and P. R. Jackson. 2015. *Management and Business Research*. London: Sage Publications.

Edgerton, M. 2013. *A Practitioner's Guide to Effective Maritime and Port Security*. New Jersey. John Wiley & Sons.

Ekwall, D., and B. Rolandsson. 2013. "Security Aspects on Corporate Culture in a Logistics Terminal Setting." *Journal of Transportation Security* 6 (1): 13–25. doi:10.1007/s12198-012-0100-0.

European Commission. 2004. "Regulation (EC) No. 725/2004 of the European Parliament and of the Council of 31 March 2004 on Enhancing Ship and Port Facility Security." *Official Journal of the European Union* 29 (4). Brussels.

European Commission. 2005. "Directive 2005/65/EC of the European Parliament and of the Council of 26 October 2005 on Enhancing Port Security." *Official Journal of the European Union* 25 (11). Brussels.

Germond, B. 2015. "The Geopolitical Dimension of Maritime Security." *Marine Policy* 54 (1): 137–142. doi:10.1016/j.marpol.2014.12.013.

Germond, B., and C. Germond-Duret. 2016. "Ocean Governance and Maritime Security in a Placeful Environment: The Case of the European Union." *Marine Policy* 66: 124–131. doi:10.1016/j.marpol.2016.01.010.

Hassanzadeh, M. A. 2013. "Port Safety: Requirements and Economic Outcomes." In *Marine Navigation and Safety of Sea Transportation: Maritime Transport & Shipping*, edited by A. Weintrit and T. Neumann (pp. 117–121). Boca Raton: CRC Press.

Hopkin, P. 2018. *Fundamentals of Risk Management: Understanding, Evaluating, and Implementing Effective Risk Management*. London: Kogan Page.

International Maritime Organisation [IMO]. 2012. *Guide to Maritime Security*. London: IMO Publishing.

International Maritime Organisation [IMO]. 2017. *International Ship and Port Facility Security (ISPS) Code*. London: IMO Publishing.

International Standards Organization [ISO]. 2018. "Ships and Marine Technology Maritime Port Facility Security Assessments and Security Plan Development." https://www.iso.org/standard/46051.html

Kvale, S. 2007. *Doing Interviews*. London: Sage Publications.

Metaparti, P. 2010. "Rhetoric, Rationality and Reality in Post-9/11 Maritime Security." *Maritime Policy & Management* 37 (7): 723–736. doi:10.1080/03088839.2010.524738.
Nalla, M. K., and J. E. Cobbina. 2016. "Environmental Factors and Job Satisfaction: The Case of Private Security Guards." *Security Journal* 30 (1): 215–226. doi:10.1057/sj.2016.12.
Papa, P. 2013. "US and EU Strategies for Maritime Transport Security: A Comparative Perspective." *Transport Policy* 28 (1): 75–85. doi:10.1016/j.tranpol.2012.08.008.
Roe, M. 2009. "Multi-level and Polycentric Governance: Effective Policymaking for Shipping." *Maritime Policy & Management* 36 (1): 39–56. doi:10.1080/03088830802652296.
Sadovaya, E., and V. V. Thai. 2016. "The Effective Maritime Security Management Model (EMSMM): A Perspective from Practitioners in Singapore." *Security Journal* 29 (4): 661–682. doi:10.1057/sj.2014.13.
Seuring, S. A. 2008. "Assessing the Rigor of Case Study Research in Supply Chain Management." *Supply Chain Management: An International Journal* 13 (2): 28–137. doi:10.1108/13598540810860967.
Sveriges Riksdag. 2005. *Sjöfartsskydd*. Stockholm: Riksdagstryckeriet.
Swedish Government. 2019. *Sfs 2003:778; Sfs 2014:1278; Sfs 2018:1089*. Stockholm: Sveriges riksdag.
Swedish Maritime Administration. 2019. *Sjöfs 2004:13; Sjöfs 2007:1*. Norrköping: Sjöfartsverket.
Tashakkori, A., and C. Teddlie. 2003. *Handbook in Mixed Methods in Social & Behavioural Research*. Thousand Oaks: Sage Publications.
Thai, V. V. 2009. "Effective Maritime Security: Conceptual Model and Empirical Evidence." *Maritime Policy & Management* 36 (2): 147–163. doi:10.1080/03088830902868115.
Thai, V. V., and D. Grewal. 2007. "The Maritime Security Management System: Perceptions of the International Shipping Community." *Maritime Economics & Logistics* 9 (2): 119–137. doi:10.1057/palgrave.mel.9100175.
Trafikanalys. 2017. *Shipping Goods 2016*. Stockholm: Sveriges officiella statistik.
Wengelin, M. 2006. "The Swedish Port Security Network – An Illusion or a Fact?" *Journal of Homeland Security and Emergency Management* 3 (1): 1–8. doi:10.2202/1547-7355.1214.
Wengelin, M. 2012. "Service, Regulations, and Ports: An Actor-Network perspective on the Social Dimension of Service-Dominant Logic." PhD diss., Lund University.
Whelan, C. 2017. "Managing Dynamic Security Networks: Towards the Strategic Managing of Cooperation, Coordination and Collaboration." *Security Journal* 30 (1): 310–327. doi:10.1057/sj.2014.20.
Yang, Z., A. K. Y. Ng, and J. Wang. 2014. "A New Risk Quantification Approach in Port Facility Security Assessment." *Transportation Research* 59 (1): 72–90. doi:10.1016/j.tra.2013.10.025.
Yin, R. 2014. *Case Study Research: Design And Methods*. London: Sage Publications.