

PERCEPTIONS OF SMALL TO MEDIUM PORTS
IN NORTHERN EUROPE ON THE IMPACT OF
SECURITY INITIATIVES



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Abstract

In the aftermath of the terror attacks on New York in September 2001 several initiatives are set up to protect global supply chains from larger disruptions by antagonistic threats such as terrorism or piracy. Many security initiatives such as the International Ship and Port Security (ISPS) code, the Container Security Initiative (CSI) or the Authorized Economic Operator (AEO) are targeting the maritime infrastructure and especially sea ports to prevent future disruptions to this vital part of the global economy.

In logistics, the quality of the service is much more important than in goods dominated industries due to the absence of physical clues. Therefore, the effect of security on service quality is much discussed. On the one hand, studies found that security initiatives can increase transparency, decrease variability and improve customs clearance. On the other hand, negative effects such as financial burdens and increased administration are found as well. Moreover, much of the previous research into the effects of supply chain security on ports assumed quantitative and static measures while being mostly focused on larger ports.

Therefore, this study aims to investigate the perspectives of small to medium ports in northern Europe about the impact of security initiatives on their service quality and thereby aims to enrich the understanding of how supply chain security impacts service quality. Hence, this study conducts three expert interviews to create understanding of the problem in the real world and then applies the gained insights into the composition of an online questionnaire which is answered by small to medium ports in northern Europe. The results show that the respondent ports today hold slightly positive perceptions on the impact of security initiatives on the service quality aspects of efficiency. Further, the ports display a relaxed attitude towards the impact on the service quality aspect of customer satisfaction with a light tendency to positive perceptions.

Keywords: port security, service quality, supply chain security, efficiency, customer satisfaction, security initiatives, maritime security

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Introduction

This chapter familiarises the reader with the research topic by presenting the socio-economic arguments for investigating this topic. Then, in an academic problem discussion a more academic perspective is introduced. Subsequently, a literature review follows that brings recent and major findings of other researchers to the reader's attention. Finally, based on the previous discussion the research gap and research questions will be presented.

Societal Relevance

A well-coordinated attack using a dirty bomb such as a radioactive dispersive device (RDD) against the port of Los Angeles will potentially result in a temporary shutdown of operations due to radioactive contamination and extensive damage to the port facilities. Apart from the constructional and humanitarian damage the potential economic impact will be severe for the port, but especially for the national and international economy. In their research on this topic Roshoff and Von Winterfeld (2007) applied a project risk analysis of such an incident and estimate that a shut-down of the port of Los Angeles for 120 days would potentially result in costs of \$63 billion – a stop of operations for one year could even impose costs of \$252 billion! Although the estimated costs of such an attack range significantly depending on the model that is used for the impact assessment and the specific case, it is obvious that serious damage to the hard-to-replace infrastructure of an international port would create a real challenge for any economy (Murphy, 2009).

This scenario manifests the importance of seaborne trade and the maritime transportation network which are often described as the backbone of the world economy and the engine of globalization. The increased use of global sourcing, the development of cheap transportation and reduced trade barriers lead to the evolution of ever longer supply chains that are supporting all industries and all sectors of modern economy. For instance, a car manufacturer in Detroit (USA) will have to interrupt its production line when the ships with containers or other goods for the factory are delayed in the port of Chicago - and similar will the supermarket or gas station run out of commodities after a few days without fresh supply.

Hence, in organisations the notion of supply chain security is today recognized as an important activity of managing business risks due to the potential negative effects from security incidents (Lam & Dam, 2015). According to Voss, et al. (2009) the main goal of supply chain security is the protection of upstream and downstream actions from natural and antagonistic threats in order to secure smooth and cheap transportation. Therefore, the activities of the supply chain security concept incorporate the application of international guidelines and regulations and further the identification and mitigation of risks and potential threats along the whole supply chain (Closs & McGarrell, 2004; Wengelin, 2006). In the maritime supply chain, the notion of supply chain security was not considered a big topic before

the terror attacks on New York and Washington in September 2001 (Peck, 2003; Murphy, 2009; Metaparti, 2010). In the aftermath of 9/11 authorities and international communities such as the International Maritime Organisation (IMO) pushed the development and implementation of security initiatives to protect the maritime supply chain from unlawful disruptions (Metaparti, 2010). Examples of such initiatives are the Container Security Initiative (CSI), the Customs-Trade Partnership against Terrorism (C-TPAT), the Advanced Economic Operator (AEO) by the EU, the Safety of Life at Sea (SOLAS) convention and the inherited International Ship and Port Security code (ISPS).

On the other hand, in a service industry such as logistics a company is constantly evaluated against its abilities to create high quality in its service offering and hence “a service company is defined by its service quality” (Berry & Parasuraman, 1992, p. 5). Early research (Berry, 1985; Parasuraman, et al., 1985; Gummesson, 1991) showed that in services the concept of quality is much more central and critical to success on the market than in a goods dominated business due to the absence of physical clues which are easily assigned to goods and further due to the distinct characteristics of intangibility, heterogeneity and inseparability of services. Although the research community has not reached mutual agreement on a definition of service quality yet, it can be understood as the global attitude of a customer that evolves around certain dimensions and respective aspects of a service (Grönroos, 1984; Parasuraman, et al., 1985; Cronin Jr. & Taylor, 1992; Schembri & Sandberg, 2002). According to Voss, et al. (2009) and Sternberg, et al. (2012) in logistics, one of the main dimension to evaluate service quality is evolving around the dimension of efficiency with aspects of reliability, punctuality and cost. The second main area of service quality in logistics is the dimensions of customer satisfaction which is an aspect of the customer’s expectation which therefore can be “perceived as a subjective feeling that depicts the degree to which the consumers expectations concerning a particular purchase encounter are met” (Brady, et al., 2002, p. 20).

Zooming out and putting these two concepts into context, one can see that maritime supply chain security and service quality do not coexist parallel to each other but have significant areas of potential conflict: supply chain security is important to secure business activities while at the same time high quality of the service is vital to the economic success. Previous research (Urciuoli, et al., 2010; Mazaheri & Ekwall, 2009; Sternberg, et al., 2012) showed that this means the activities and initiatives of supply chain security to protect business activities from disruptions can interfere with efforts to achieve high quality in service operations, which eventually can result in economic loss.

The research gap

The impact from implementation and application of security initiatives is therefore discussed controversial among practitioners and researchers alike. The concern is that any engagement into trade is a potential disruption itself, a danger to the principles of free trade, and therefore hampering

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competition or even worse distort competition to the benefits of others and exert negative pressure on economic growth for all actors involved (Banomyong, 2005; Hintsa, et al., 2009; Urciuoli, et al., 2010). However, as reported by Yang and Wei (2013) the attention towards security has moved during time from being considered dangerous for trade to a powerful asset in an organization's risk management activities. Closs and McGarrell (2004) in their work on enhancing security in the supply chain support the concept that an enhancement of security measures will eventually result in benefits of different kinds such as higher visibility, cargo tracking possibilities, opportunities for cost savings, and the ability to build better relationships with partners along the whole supply chain. This beneficial view of the security – service quality relationship is further supported by the work of Rice and Spayd (2005). Haugton (2007) examines the case of the Canadian Free And Secure Trade (FAST) programme and likewise finds that once a critical level of engagement from actors within the network is reached the benefits of a being a certified member outweigh the costs by a large extent. Similar results are presented by Willy and Ortiz (2004) who link higher transparency and fewer delays through customs to reduced costs and less transit time – hence, the service quality improves. According to Prentice (2008) the benefits of increased security are often more subtle and less pervasive: he argues that benefits can be found in improved social and psychological circumstances and cannot be easily priced but are certainly valuable. Further, Prentice (2008) criticises the fast temptation to conclude that the benefits of security outweigh the costs because the quantification of benefits in practice is often more complex than researchers do it in theory.

On the contrary, other scholars find that security initiatives are affecting quality in a negative way. For instance, Mazeradi and Ekwall (2009) conducted a case study about the impact of the ISPS code on Swedish ports and found that it increases paperwork as well as meaning more administration and documentation. Further, it raises the financial burden for ports who have to invest in personnel training and hardware in order to comply with the code. The issue of financing is further complicated, argues Hintsa, et al. (2009), because especially logistic companies consider it tough to justify these costs in front of their customers and hence they are beard internally. Powanga (2006) adds that imposed benefits from increased transparency and other aspects may only be applicable to larger organizations which are able to compensate for the related costs. Moreover, according to Urciuoli, et al. (2010) the increased workload and forced costs on terminal operators are the reasons for decreased performance in the efficiency dimensions of reliability and flexibility. Nyquist (2007) investigates the effects of increased security at the RoRo terminal in the port of Gothenburg and describes how technology based solutions can increase efficiency. The author finds that generally all security initiatives affect efficiency negatively, mainly due to increased complexity in the interactions between carriers, port operators and customs. In a later research article Sternberg, et al. (2012) identify four major efficiency issues at the port of Gothenburg that lead to decreased performance: waiting times

due to slow administration and long access queues, no information on parked trailers in the port, no pre-arrival notification, and lack of support for customs by transport operators. However, they are picking up on these issues and find a close link between efficiency and security, namely that a focus on increasing efficiency will increase security as well.

Given the above described discussion, the perception arises that recently imposed security initiatives do have negative and positive effects on service quality and the dimensions of efficiency and customer satisfaction, although no clear consent could be reached yet. However, the perspective adopted in the majority of previous research such as Wengelin (2006), Closs & McGarrell (2004), Mazaheri and Ekwall (2009), Thai (2009), Urciuoli, et al. (2010) is shaped by the assumption that performance in logistics is to some extent static and can be measured by objective and empirical indicators that are important to customers. Further, it is presumed that companies are easily comparable and have little to no room to manoeuvre when it comes to implementing security requirements. However, according to Bryman (2012) the social constructivism perspective explains that companies chose different strategies to build a competitive advantage based on their own construction and reconstruction of the current situation with regards to political, economic and social circumstances. Therefore, one can understand that because the ports' perceptions of the effects of security on service quality is what drives their actions it is necessary to understand the issue from their perspective to know more about the real impact of security initiatives. In addition, scholars like Banomyong (2005), Voss, et al. (2009), Low, et al. (2013), Wei (2013) have looked at the relationship between efficiency and security with the eye of the customer and although the concept of service quality suggests likewise, not much is known about how the second party in this relationship perceives the impact of security on the quality they deliver. Moreover, within the vital maritime transportation network ports are considered to represent the weakest part and the most likely point for disruptions to the supply chain (Stana, 2005; Murphy, 2009; Greenberg, 2011). This is also the reason why security initiatives such as the ISPS code, CSI, C-TPAT and other target their efforts at ports and port facilities (Marlow, 2010). Because ports are inherently logistic service providers they are therefore constantly dealing with the dilemma between applying security and creating service quality (Helmick, 2008). Due to the above presented reasons ports are an ideal point within the supply chain to enrich the understanding of the security – service quality relationship.

Purpose

Therefore, the purpose of this thesis is to study how ports perceive that security initiatives are affecting the service quality aspects of efficiency and customer and to match these findings to those of previous research in order to enrich the understanding of how supply chain security affects service quality.

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Research Questions

For further illustration and understanding the purpose of this thesis is broken down into specific questions which have been answered in this thesis:

RQ1: How do small to medium ports in northern Europe perceive the impact of security upon aspects of efficiency?

RQ2: How do small to medium ports in northern Europe think security influences customer satisfaction?

Outline

In pursuance of answering the research question this thesis is structured as follows: First, the following chapter '*Theoretical framework*' starts presents and discusses the relevant theoretical foundations that are guiding this research. For further illustration the applicable maritime security initiatives are described here. Then, the chapter '*Methodology*' continues to elucidate the methodological aspects presents the research design and challenges the quality of the research as well as the limitations. Subsequently, the chapter '*Results & Analysis*' will present the results from the survey and put them into relation to previous research and the theoretical concepts. Finally, the chapter '*Conclusion*' is presenting the conclusions of this research and suggests ideas for future research.

Theoretical framework

This chapter first elaborates on the concepts of service quality and the aspects of efficiency and customer satisfaction. Secondly, the concept of supply chain security is defined and its connection to maritime transportation explained. Throughout the chapter the aim is to lay out the theoretical base for this study as it is guiding and informing this work from a theoretical perspective.

Service quality

The topic of quality is relevant to all companies that operate in a competitive environment no matter whether they are producing goods or offer a service and the reasons for an interest in achieving high quality are manifold: reducing costs in productions and operations, gaining a competitive advantage over the competition, applying the principals of lean management or the six sigma approach or reducing negative external effects on social or environmental aspects (Gummesson, 1991; Berry and Parasuraman, 1992; Brady, et al., 2002; Schneider and White, 2004). In general, striving for high quality in operations is based on the theory that the cost of correcting a quality mistake, which can be described as bad quality, is more costly than taking actions before a product or service is presented to the customer (Crosby, 1979). This idea is similar to the perception that not the creation of high quality costs money but instead poor or no quality costs a lot of money (Radomir, et al., 2012).

In practice a service is often connected to an accompanying physical product and hence the characteristics of a product do influence the overall quality perception of the service (Radomir, et al., 2012). This aligns with the two elements of a service: the 'How' and the 'What' (Radomir, et al., 2012). For instance, the 'how' refers to the process of buying a container to ship your products overseas and the 'what' to the actual product (here: the shipment) that you get. This two-component theory of service quality is used by many scholars under slightly different names: Zeithaml (1988) uses perceived and objective quality, Lehtinen (1983) refers to process and output quality, other such as Holbrook and Corfman (1985b) use terms like mechanistic and humanistic quality. According to Dalton, et al. (1980) and later Shang and Lu (2009) the concept of service quality is therefore build out of two perspectives that contemplate each other: one the one hand there is quality as perceived by the consumer, which is often closely tied to the moment of truth and independently defined by the customer himself. This dimension of the quality construct depends largely on 'soft' measures like the nature of your personnel or the setting in where the service takes place (Shang & Lu, 2009). On the other hand, there is the objective quality of the accompanying product as determined not by the customer alone but also by the managers with regards to set standards of industry organisations, governments or other institutions (Shang & Lu, 2009). This dimension of quality is regarded to be under more direct control of the company and depends more on 'hard' measures (Dalton, et al., 1980) .

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Service quality is also often described as “the outcome of an evaluation process, where customer compare their expectations with the service they have received” (Grönroos, 1984, p. 37), “a comparison of consumer expectations with actual performance” (Parasuraman, et al., 1985, p. 42), and it is “best conceptualized as an attitude” (Cronin Jr. & Taylor, 1992, p. 58). It can further be understood as a “multidimensional attitude held by consumers, with each dimensions comprising of a number of attributes or service aspects” (Schembri & Sandberg, 2002, p. 190). Although today there is still no overall consent of what quality in service actually is and what its dimensions are included in different service settings, researchers and reactionaries alike agree upon the idea that “if the service company's service is mediocre, the company is mediocre” (Berry & Parasuraman, 1992, p. 5).

Evolution of service quality

Levitt (1972) was an early adopter of the principle to transfer manufacturing principles and practices to services to improve quality and efficiency. However, Levitt built his ideas on using principles and concepts based in manufacturing to improve services without considering the differences between both disciplines (Talluri, et al., 2013). A little later, other scholars began to undertake developing and deepening research into a quality concept for services: Grasing and Hessick (1988) use the illustrating example of goods quality evaluation on a car with lots of clues compared to that of an insurance policy and conclude that physical clues are not what customers consider when purchasing something intangible. In fact, scholars such as Parasuraman, et al. (1985), Berry (1985) and Gummesson (1991) argue that quality is much more complicated in services due to the absence of such physical clues that are much more easily assigned to physical products. The three characteristic differences of services as opposed to goods – intangibility, heterogeneity, and inseparability - are used by these scholars as a starting point to explain the ambiguity when it comes to the service quality concept: for the consumer the absence of physical clues due to intangibility of a service means that they use other indicators to assess the performance of a service. Further, they state that from a company perspective the quality of every encounter depends largely on the front line personnel and their interaction with the customer because every interaction is different from the next (heterogeneity). Directly connected to this is the notion of inseparability which describes the inability to differentiate between production and consumption in services making ‘the moment of truth’ – the above described interaction between personnel and customer – is the most important point in time during the service to assess quality from a consumer perspective (Parasuraman, et al., 1985; Gummesson, 1991).

The difference between product and service quality was further explored by the work of Grönroos (1984) who stresses that the role of the co-producer in services makes services fundamentally different from goods where the consumer only receives the end product. Hence, Grönroos (1984) calls for a definition of service quality from the customer's perspective. Others further enhance this view of

centralizing the evaluation of service quality around the customer's subjective impression: Ennew and Waite (2007) go in the direction of Grasing and Hessick (1988) when they describe service quality as subjective and determined by the customer due to the fewer physical clues and lack of an objective reference frame. Further, in their social science work on consumer perceptions towards service quality, Adelman et al., (1994) found that the moment of truth stands out and they consider it to be the most critical moment for a service company to achieve high quality. On the other hand, Steenkamp and Hoffman (1994) outline the possibility to find objective indicators in a service encounter such as waiting time or correctness of information provided and the benefits of using those in comparison to subjective measures. In an attempt to strengthen this approach Schneider and White (2004) state that the use of objective measures is most appropriate in products and services with a high degree of standardization. Further, Schneider and White (2004) also point to the risk to be blinded by objective indicators of quality if the frame of reference is unknown or does not align with the frame of reference of the customer.

Dimensions of service quality in logistics

In logistics a company is constantly evaluated against its abilities to create high quality in its service offer and hence "a service company is defined by its service quality" (Berry & Parasuraman, 1992, p. 5). It is critical to a service company to be aware which dimensions and aspects are influencing the quality perception of the customer because there is supposedly more influence from subjective criteria than from objective (Berry, 1985; Parasuraman, et al., 1985; Gummesson, 1991). Further, Schneider and White (2004) argue that service companies should try to understand in which way these dimensions and aspects are influencing quality in order to create good quality for their customers. Therefore, service quality is understood as the global attitude of a customer that evolves around certain dimensions and respective aspects of a service (Grönroos, 1984; Parasuraman, et al., 1985; Cronin Jr. & Taylor, 1992; Schembri and Sandberg, 2002).

Dimension of efficiency

In logistics one of the main dimension to evaluate service quality is evolving around the dimension of efficiency (Voss, et al., 2009; Sternberg, et al., 2012). The transportation of goods using road, air or sea for strategical and organisational advantage is a highly time dependable activity and hence issues of efficiency can cause problems in quality (Simons, et al., 2004). In logistic operations, efficiency is defined as the allocation of resources across alternative uses, or in other words it is about minimizing inputs given a level of output (Achabal, et al., 1984) or the cost-effective use of available resources (Grönroos & Ojasalo, 2004). Sternberg, et. al. (2012) found that the main issues of efficiency for terminal operators are within the aspects of waiting times, unknown locations of cargo, lack of information and delays in transit time due to customs checking procedures. Urciuoli, et al. (2010)

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identify transit time, costs, reliability, flexibility and quality as the relevant indicators to represent the efficiency degree of logistic companies. In their work, reliability is defined as the “capacity to fulfil customers’ orders according the agreed specifications” (Urciuoli, et al., 2010, p. 7) and flexibility as the ability to adapt to changes from customer or business side quickly. Further, Low, et al. (2013) in their proposal of a port performance measurement model give storage capacity, vessel turnaround time and port charges as corresponding aspects of operational performance in a port. Banomyong (2005) argues that transit time is critical for efficiency because goods in transit cost money instead of earning money and any reduction in transit time has the potential to decrease overall costs – hence, the development of just-in-time supply chains is favourable. Further, as part of the suggestion for a more customized and less technical measurement of port efficiency Fourgeaud (2000) emphasizes to look at aspects of cost, quality, adaptability and reliability in port services.

Dimension of customer satisfaction

The second main area of service quality in logistics is the dimensions of customer satisfaction which is an aspect of the customer’s expectation and can therefore be “perceived as a subjective feeling that depicts the degree to which the consumers expectations concerning a particular purchase encounter are met” (Brady, et al., 2002, p. 20). Because the concept of service quality is inherently customer focused and evolves around the perception of the customer, the customer satisfaction dimension is antecedent to service quality and therefore influencing the bespoke global attitude (Brady, et al., 2002). Because of the subjectivity of customer satisfaction the aspects influencing it vary between business areas and according to Sternberg, et al. (2012) and Bichou and Grey (2005) even the operations between different kinds of ports (RoRo, Container, Bulk, etc.) can have a great deal of process variety. Therefore, every service requires a different set of relevant indicators for customer satisfaction in order to give relevant results (Cronin Jr., et al., 2000). However, there is no previous research into the aspects of customer satisfaction at small to medium ports and therefore suitable aspects need to be composed. Nevertheless, previous researchers of customer satisfaction in logistics or transportation such as Chul-Ho, et al. (2010), Lisińska-Kuśnierz and Gajewska (2014) or Yuen and Thai (2015) used subjective aspects of satisfaction with regards to timeliness, flexibility, and responsiveness as well as aspects such as the number of customer complaints or speed of operations.

Supply Chain Security

The term supply chain security is defined as a “discipline of contingency planning” (Peck, 2003, p. 13) and as an instrument “designed to handle perceived threats that could originate from the flow of goods [...]” (Wengelin, 2006, p. 4). Further, supply chain security is understood as “the application of policies, procedures, and technology to protect supply chain assets (product, facilities, equipment, information, and personnel) from theft, damage, or terrorism, and to prevent the introduction of unauthorized contraband, people, or weapons of mass destruction into the supply chain” (Closs & McGarrell, 2004, p. 8). According to Stemmler (2010) the concept of supply chain security emerged from the financial services industry and is foremost concerned with “the identification, assessment and control of risks [... which] enables partners to optimize their risk management system” (Stemmler, 2010, p. 178). In order to be successful “it should integrate with the transport chain security, corporate local, regional and national level, extending well ashore and quite far out to the sea” (Andritsos, 2013, p. 1). Further, together with enterprise risk management (ERM) supply chain security is today present in the decision making process within almost all organisational divisions (Zsidisn & Ritchie, 2008) and according to Lambert and Stock (2001) in its strategic managerial function it can affect costs, inventory, purchasing behaviour and thereby ultimately alter the value of a product or service.

The terminology used to describe this concept range from transport security (Talas, 2012), risk management in the supply chain (Stemmler, 2010), transport security management (Sternberg, et al., 2012) to logistics security (Hintsa, et al., 2009). Even though the researchers used different terminology their work generally refers to the topic around security in transportation. For the sake of clarity the author of this thesis therefore decided to use the term *supply chain security*.

The need for supply chain security

In the early stages of the supply chain security concept, when it began to spread towards other sectors, it was perceived as another burden and non-value adding activity with primarily financial objectives (Stemmler, 2010). Nevertheless, through time companies began to realise the opportunity to employ risk management to gain competitive advantage through redesigning their activities in order to minimize the impact of potential threats (Peck, 2010). Although the operational benefits of professional risk management became visible by the examples of companies that failed to manage substantial risks such as Swedish mobile-phone producer Ericsson or German multi-supplier Bosch AG, it took time for stakeholders to see the real need for more security in the supply chain (Peck, 2010).

In order to be competitive on the world market a company has to be excellent in all aspects of business and according to Low, et al. (2013) recently this movement has reached the activities of logistics. The transport function in a company operating on global or even regional level has transformed from being

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a support function with considerable low impact on the product or service to a key value-adding activity that can create a competitive advantage (Mangan, et al., 2012). For such a critical business function the margin for errors such as delayed or wrong deliveries, lost pieces of shipment, theft or any other kind of damage and disruption within the supply chain is very small (Mangan, et al., 2012). Moreover, according to Greenberg (2011) disruptions may not only result in the loss of trust from your customers but, for instance with just-in-time supply chains, there is also the potential of breaking up whole production lines.

The development of fast and reliable seaborne transportation enabled businesses to ship their products for a competitive price and multinational companies began to build factories in Southeast Asia that produced products for the European market with a head office steering activities from North America (Peck & Jüttner, 2002). Today, the cost for worldwide transportation only amounts to “2 or 3% of the shelf price or less” (Helmick, 2008, p. 16) and it is further estimated that in 2014 over 80% of world trade in volume or 9.6 billion tonnes or over 70% of world trade in value are carried on sea and handled by ports worldwide (UNCTAD, 2014). Further, studies show a positive relationship between the volume of trade and economic growth, emphasizing that maritime trade represents the most cost-effective and viable means of transportation for the globalized economy (Low, et al., 2013). It has therefore become clear to companies, politicians and the public that seaborne trade is the backbone of globalization and the world economy as we know it today (Levinston, 2010).

However, Murphy (2009) takes the stance that the use of the maritime supply chain has long been accepted as given and there was no need to consider security issues in a wider scale apart from small cases of smuggle or theft. The terror attacks on New York and Washington in September 2001 have changed this mind-set completely and the international community realized the scale of antagonistic threat brought up by terror groups (Marlow, 2010). The scope of threat from terrorism ranges from a direct attack on ships at land based facilities to the use of kidnapped ships against ports or the misuse of containers to smuggle a bomb on-board a ship (Murphy, 2009). With terroristic networks growing the misuse of the maritime transportation network to smuggle funds, people or material for these groups is growing as well as it is described by Murphy (2009).

Threats against the maritime supply chain

The map of the main dimension of risks for disruption of the maritime supply chain has changed in the last two decades, mainly due to the above described rise of terrorism activities and piracy on international water ways. Before the terrorist attacks on New York and Washington in September 2001 the risks towards the maritime transportation network were shaped more in the direction of natural disasters, labour wars and the threat of trade distractions by war zones (Loh & Thai, 2004; Levinston, 2010). For instance, labour wars at the New York docks in the 1950s caused a temporary closure that

threatened seaborne trade and caused major cargo delays and cost increase (Levinston, 2010). The risk from natural disasters such as hurricanes, tsunamis or earthquakes did not lose in importance but through technical progress the ability to avoid such threats has grown extensively (Marinekommando, 2013).

However, the risk from piracy is nothing totally new to shippers and mariners because piracy is one of the oldest business still alive today (Talas, 2012). Nonetheless, Talas (2012) emphasizes that the nature of piracy has changed and today piracy is considered one of the biggest threats against the free movement of ships through important international waterways. Recent figures show a rise in piracy activities that threaten to interrupt the flow of seaborne trade along the main trade routes. Especially the chokepoints of international oil trade such as the Suez channel, the Strait of Malacca and the area around the Horn of Africa have been hotspots of piracy attacks: in 2014 there have been 245 actual and attempted acts of piracy reported to the International Maritime Bureau's (IMB) piracy reporting centre (ICC International Maritime Bureau, 2015). The dark figure will supposedly be larger as shippers often do not report unsuccessful attacks for various reasons such as higher insurance payments or potential damage to their image (Marinekommando, 2013). This number has declined the third year in a row after peaking at 445 attacks in 2010 after a steady rise in the years before (ICC International Maritime Bureau, 2015a). In 2015 there have been 100 attacks so far (05.07.2015) which shows the positive effect of anti-piracy missions such as Atalanta by the EU's Naval Forces off the coast of Somalia (ICC International Maritime Bureau, 2015a). Nevertheless, in November 2008 the oil tanker 'Sirius Star' was taken hostage by Somalian pirates showing that even very large vessels are running danger of being captured. The 'Sirius Star' was carrying crude oil with a value of \$110 million and was released after the shipper paid a ransom of \$3 million to the pirates (Rice & Glendinning, 2008). Other ships were taken hostage as well and some are still anchored off the Somalia coast waiting to be released – causing, apart from the loss of material and even lives, an increase in shipping costs by raising insurance fees and longer routes (Bendall, 2009). Consequently, this is increasing overall costs for companies around the world (Bendall, 2009).

In the contrary, the risk of terrorism towards the maritime supply chain was something that has not been considered before the 9/11 attacks and only then revealed the full scale of possibilities those groups are able to utilise (Murphy, 2009). Both public and private entities recognized the need to create ways to protect supply chains from this type of disruptions and their potentially disastrous outcomes for both human lives and the economy. But terrorism in this context does not exclusively relates to attacks on transport facilities such as ships or ports directly by using ships as weapons or taking them hostage, but increasingly also incorporates the misuse of the transportation network, for instance to smuggle dangerous goods or transfer terrorist funds across the globe (Murphy, 2009). The way more usual and frequent risk, although with potentially lower impacts, stems from all kinds of

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smuggling, theft and fraud along the supply chain (Homeland Security, 2015). This begins with small disruptions due to broken seals on containers, continues through manipulated loading documents to avoid extra fees up till the theft of valuable goods directly from port facilities (Homeland Security, 2015).

But there are more risks to be considered apart from antagonistic attacks through terrorism or piracy. In their work towards improving supply chain security the researchers Closs and McGarell (2004) outline two more reasons for increased security: the globalization of the world economy is heavily relying on cheap, reliable and smooth worldwide transportation via sea without disruptions. With today more than 90% of the world trade is seaborne the world economy simply cannot live without it (Bundeswehr, 2013). Secondly, and somehow connected to the first reasons, is the increased demand by companies for efficient transportation operations that are tasked with supplying plants, factory's and the consumer market with Just-in-time deliveries.

The role of ports in the supply chain

According to Andritsos (2013) ports can be understood as nodes connected by shipping lines across the world within a tightly knit web that are responsible to organize the exchange of goods between different carriers. Further, Andritsos (2013) says they are also the points where cargo leaves the network or new cargo is added. Loh and Thai (2004) state that the role of seaports has transformed and they are no longer a simple gateway but the place where “important value adding and complex logistic-related activities take place” (Loh & Thai, 2004, p. 98). Murphy (2009) sees ports as the chokepoints for maritime transport and criticises that a disruptions do neither have to be numerous nor forceful to disrupt as the system is relying on strict timetables, short turnaround times and maximal utilisation. Greenberg (2011) argues that ports require attention due to the following characteristics: First, ports have a need to be highly accessible and located in strategic and vital locations to be successful and therefore are often located in densely populated areas where they create local spill-over effects. Moreover, this rules out risk mitigation by choosing remote locations or heavy access control as for instance applied to nuclear power plants. Second, ports represent a geographic concentration of value adding activities as many companies work closely in the same area and often on the same cargo. Many ports offer services beyond pure logistics such as ship maintenance, fuel bunkering, or personnel support activities Greenberg (2011) states. This density of various actors with manifold agendas makes the implementation of any kind of standardized security procedure complex and longsome process (Greenberg, 2011). Another aspect to consider is that ports are never the first or the last point of a supply chain and therefore have connections upstream and downstream which would make a potential disruption here reflect accordingly (Voss, et al., 2009). Stana (2005) explains that due to the amount of cargo and people travelling through ports, the ready transportation links towards many locations across the border and into the hinterland, ports are considered the weakest link of the maritime supply chain from many perspectives.

Maritime security initiatives

Due to the increased threats from various directions against members and actors of the maritime supply chain several initiatives for more security have been introduced after the events of 9/11 in New York. Because ports are considered the weakest link of the supply chain (Stana, 2005) the majority of initiatives aims to increase security at ports in order to protect the whole supply chain. In the following, the most relevant initiatives that apply for international trade between ports are presented.

CSI - Container-Security Initiative

Homeland Security (2015) states the CSI was launched as one of the quickest responses by the US government after the 9/11 terror attacks to protect the USA from dangerous goods arriving by ship in

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US ports. The US Customs and Border Protection (2015a) explains it is based on an algorithm that analyses freight data information, such as origins and cargo loaded, to detect patterns as well as physical inspections in the port of origin. Moreover, the data has to be provided by members of the CSI 24 hours before the container is loaded on an US bound ship in a foreign port. According to Banomyong (2005) the CSI aimed to be applied in the world's largest container ports that have direct connections to the US through a bilateral agreement that allows in theory both parties to send inspectors to other nation's ports. There are currently 58 foreign ports participating in CSI, accounting for 85 percent of container traffic bound for the United States (US Customs and Border Protection, 2015a).

24 hours rule

In 2002 the US Customs & Border Protection (US CBP) released a Trade Act that is also known as the 24 hour advance filing rule. According to the Mearsk Line A/S (2015) it requires the carrier to send detailed information about any cargo destined for the US or transiting to the automated manifest system of the US Customs 24 hours before the cargo leaves the foreign port. Moreover, the US CBP does not allow for vague or missing descriptions and will put a 'do not load' order into place if the carrier does not provide the data in time or if it is incomplete (HapagLloyd, 2015). This means that carrier may require for the container to arrive at the port some time before departure, at least 24 hours. Although the 24 hours rule is very similar in its purpose to the CSI it applies in all ports, also if they are not CSI members (Mearsk Line A/S, 2015).

C-TPAT – Customs-Trade Partnership Against Terrorism

The US Customs and Border Protection (2015) explains that the C-TPAT is another US based security program that was quickly developed and released in the aftermath of 9/11. Further, its goal is to create a critical level of security in the whole supply chain through a voluntary public-private relationship program with the theory that once a critical mass of members is reached the notion of security will spread fast and reimburse itself. Therefore, the US customs certifies trade related businesses who assure integrity of security in their supply chain and gives them benefits in the terms of decreased number of inspections, faster inspections, security consulting, seminar and other (US Customs and Border Protection, 2015). Hence, and according to Haugton (2007), becoming a certified member of C-TPAT should be a win-win situation for both parties involved.

AEO – Authorised Economic Operator

The European Union's voluntary security initiative AEO is the counterpart for the C-TPAT on the other side of the Atlantic and is part of the SAFE framework as developed by the World Customs Organisation in order to spread supply chain security across the world (WCO, 2012). According to the European Commission (2015) every company active in the end-to-end supply chain can apply to become an AEO

in order to benefit from simplified custom rules, regulations and inspections which is thought to benefit their competitiveness. The AEO takes a more holistic approach towards security in the supply chain by integrating every entity from manufacturers to the importer of the product and thereby enhances the chance to detect dangerous cargo (European Commission, 2015). In order to become an AEO a company needs to show appropriate compliance with custom regulations, record-keeping, prove financial solvency, and achieve set security and safety standards. Further, the European Commission (2015) explains that the AEO knows three different levels of certification for an operator depending on the level of compliance with before mentioned requirements. Of course, the benefits they will achieve will increase with the level of compliance.

ISPS code – International Ship and Port Facility Security Code

It was after the 9/11 terror attacks that the International Maritime Organization (IMO) decided to develop a comprehensive set of measures to enhance the security of ships and port facilities which should become mandatory for all of its 148 contracting parties (IMO, 2015). According to Talas (2012) its main objective is to enable ports facilities and ship owners to assess and manage threats and risks to ensure that the maritime supply chain performs satisfactory. Since the 1st of July in 2004 the ISPS code is active for all member states that have signed the Safety of Life At Sea (SOLAS) convention. Mazaheri and Ekwall (2009) explaining that from a framework perspective it is part of the SOLAS convention and is split into two parts – one mandatory (Part A) and one recommendatory (Part B) which can be seen as a toolbox on how to implement part A. Although part b is not mandatory the USA declared that all ships visiting a US port need to comply with part b as well – which in the interweaved web of international shipping means more or less every ship. In addition, the EU commission in its attempt to transfer parts of the ISPS code into EU regulations made some areas of part B mandatory for their member states as well (UK Maritime and Coastguard Agency, 2012).

According to the IMO (2015) the code builds on an intensive and reoccurring risk assessment activities conducted at port facilities and ships. The Ship Security Assessment (SSA) and Port Facility Security Assessment (PFSA) aims to identify vulnerabilities in infrastructure, processes, personnel, communication systems and other areas. Then it suggests options to minimize or eliminate these vulnerabilities to make the supply chain more robust and resilient. These results are then transferred into a Ship Security Plan (SSP) and Port Facility Security Plan (PFSP) which are enforced and guarded by a responsible officer at the port and ship respectively. As the IMO (2015) explains this construction assures that the process for risk assessment is carried out similar at all facilitates, at least to a certain degree, and hence provides a profound basis of security measures. Further, the respective contracting government further sets one of the three defined security levels for the ships and ports to operate in. These levels are chosen by the government based on their own independent national risk assessment

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activities in order to match the activities of maritime security with the overall threat level. Level 1 defines the appropriate minimum activities that need to be maintained at all times. Level 2 means an increase in security measures during a period of time due to a temporary increase in risks and, finally, level 3 describes the state of security that needs to be maintained when an incident is probable or imminent (IMO, 2015). Should ever either a ship or port facility operate with a higher level than the other party then the party with the lower security level has to 'upgrade' its security before entering the port / berthing a ship (IMO, 2015).

Methodology

In this chapter the research design including the philosophical perspective and sampling technique are presented. Further, the methods which were used to gather data and results are explained and discussed in greater detail. Then, the previously presented methodology is challenged in order to address validity and reliability. Finally, the limitations of this research are discussed.

Philosophical perspective

According to Silverman (2013) decisions about methodology are always loaded with theoretical ideas and therefore the choice of methods should mirror both the research topic and general research strategy. In order to explain the research design it is therefore necessary to elaborate the philosophical standpoint of this thesis.

This thesis adopts a constructivist approach to knowledge creation which is often used when adopting a social science perspective (Neuman, 2011). With a constructivist approach the researcher is interested in understanding the action of human behaviour and by understanding is meant to identify the underlying structures that are shaping human actions on an individual or group level (Neuman, 2011). According to Bryman (2012) the constructivist approach further argues that only through understanding human actions real change can be initiated. In the context of the research problem this means that understanding how ports perceive that security is influencing aspects of their service quality will enrich the knowledge upon port security in theory and practice which can be a way to change the situation.

Constructivist research is often supported by an open, explorative and inductive reasoning that incorporates the interpretation of data to create meanings of an insider view upon the topic (May, 2011; Silverman, 2013). This meaning is then used to formulate a theory based on the data which holds the advantage of fading out any personal judgement or prejudices that interfere with the data gathering (May, 2011). The opposite approach, namely a deductive reasoning, is concerned with taking the methods from established theory in the research field and in turn guides the data collection process (May, 2011). This research employs both approaches in is therefore abductive in nature: in the beginning an inductive approach guided the interviews and helped to interpret the insider perspective to find a theoretical connection between theory and the real world. Later, a deductive reasoning was applied in creating a survey and analysing the gathered data.

In accordance with the request by Silverman (2013) as stated above this philosophical viewpoint serves as a basis for deciding on research design and strategy. Therefore, the following section presents the research process in greater detail.

Research process

The answers to the research questions of this thesis are founded on data that have been gained both through theoretical and empirical works that are intended to interconnect with each other and work towards a common goal: answering the proposed research questions. Therefore, the research process is designed as presented in

Figure 1:

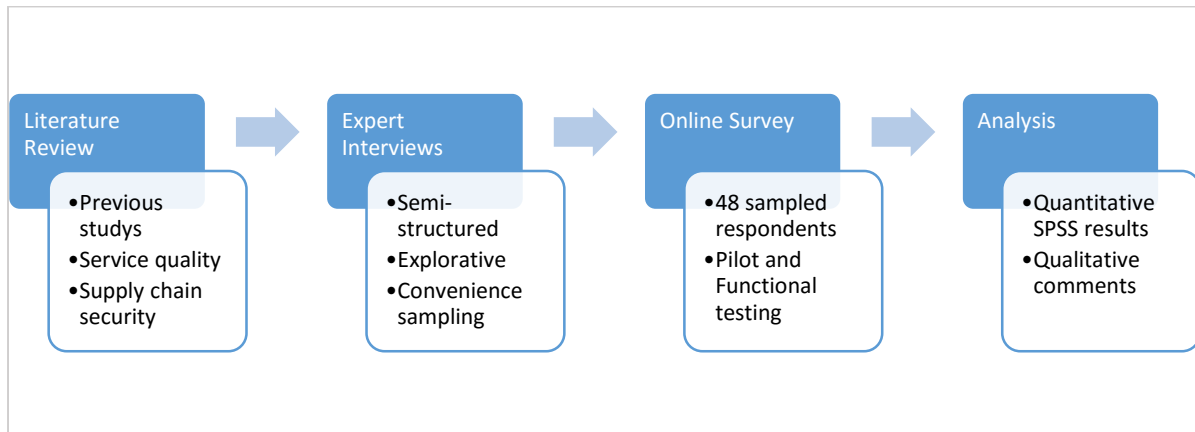


Figure 1: Visualisation of research process

In the beginning of this research the relevant literature is reviewed. At first, this secondary type of research includes books and articles around the topic of maritime and port security as well as previous research studies about this topic by authors such as Nyquist (2007), Sternberg, et al. (2012), Mazaheri and Ekwall (2009), UNCTAD (2007) and Wengelin (2006). Once the author developed a clearer picture of the topic the concepts of service quality and supply chain security with connection to port security are studied in greater detail. Secondly, primary insights from three expert interviews aimed to enrich the understanding of the problem with a practical perspective. The interviews are open and explorative in order for the experts to present their personal views and perceptions about the topic. After the interviews the author combined personal notes from the expert interviews with insights from the literature review to compose an online questionnaire. This questionnaire includes 25 open and closed questions of various types that focus on three major areas: general questions about port security, impact assessment of security on dimensions of service quality, and perception on future challenges. After piloting and testing the questionnaire for functionality it was distributed via email to a sample that includes 48 small to medium sized ports in northern Europe. After a period of 6 weeks and several reminder - emails the data collection is closed. The raw data is then transferred into SPSS and finally analysed using quantitative statistical methods as well as interpreting qualitative comments. In the end, through putting them into context with the bigger picture the research questions are answered.

As stated above, it is important that the research process aligns with philosophical viewpoints. Here, the constructivist view is mirrored in the choice of semi-structured, explorative interviews and open questions in the survey. Further, the deductive nature can be found in the conceptualization of the online survey which is based on previous findings. On the contrary, the entrance into the topic is inductive and especially in the early stages not imprinted by established theories.

The chosen type of abductive, constructivist research design calls for a mixed method approach. When applying a mixed method approach the researcher aims to analyse a problem with more than one method for various reasons (Bryman and Bell, 2011; Silverman, 2013). According to Bryman (2006) there are commonly 16 kinds of reasons to choose mixed method approach and while during the research design process probably one reason dominated there can appear multiple others during later stages. Further, new reasons for mixing methods may emerge as the study is underway and it is important to be open for change (Bryman, 2006). The benefits of a mixed method approach are depending on the kind of reason for choosing it (Morse & Niehaus, 2009). In this thesis, the kind of reasons for a mixed method approach lies with 'Explanation' which is referred to "when one [method] is used to help explain findings generated by another [method]" (Bryman, 2006, p. 106), meaning that the literature review and expert interviews help to design and compose the survey. The benefit is then that only by gaining the results of one method it is possible to conduct the other method.

Data collection methods

Under the epistemology of this research there are several ways of gaining understanding such as interviews, focus groups or observations and according to Silverman (2013) the appropriate data collection method can only be found in connection to the research topic and design. Following the above presented research process the applied data collection methods and their proceedings are presented below.

Semi-structured expert interviews

Part of the primary data for this research was gathered through face-to-face semi-structured interviews with three experts on the field of ports security. Bryman and Bell (2011) state that this way of interviewing is ideal to gather as much information as possible since the interviewees are not limited in their answers and are able to speak freely. In addition, it allows for rich insight into respondents responsibilities, biographies, experiences, opinions, values and aspiration which otherwise might not be possible (May, 2011). Further, May (2011) explains that the semi-structured interview allows for changes during the interview which is advisable if the interviewer is not as proficient as the interviewee, as it was the case here.

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The declared purpose of these interviews is to enrich the authors understanding of how security initiatives are perceived and handled within the real business world of international sea ports. Therefore, the population of potential interviewees is defined as people with expert insight into the international sea port business of northern Europe. A non-probability sampling method, namely convenience sampling, was applied to find interview partners. This refers to choosing respondents who are available and willing to participate in the time frame and geographical reach of the research project (May, 2011). Further, this sampling method is applied because it is less expensive and time consuming than a probability sampling (May, 2011). Two of the sampled interviewees are working as port security officers (PSO) as described in the ISPS code and one interviewee is working with advanced professional training activities related to the application of port security initiatives.

Table 1: Summary of interview information

Interview #	Date of execution	Duration	Language of interview
1	28.04.2015	78 minutes	German
2	18.05.2015	70 minutes	English
3	20.05.2015	64 Minutes	English

For the three semi-structured interviews a set of basic questions was used as a guide (see Appendix B: Interview Guide), allowing for the interviewees to set the pace and break out of the original topic if they desire to bring in a new perspective as it is suggested by Fisher (2010). Moreover, following the idea of May (2011) the interview guide was adapted for each interviewee due to the different areas they come from with regards to the conditions of accessibility and cognition for a successful interview. In the beginning, interviewees are introduced to the topic and the researcher's background in order to familiarize them with the situation. Further, it was explained which purpose the interviews has and how it will contribute to the overall goal of the study. Because the topic of port security is very sensitive, interviewees were ensured full anonymity and confidentiality about their identity and companies. As a results, it was agreed to not record the interviews. Nevertheless, all three interviewees gave their oral permission to the interviewer to take notes for personal use.

In the beginning of the actual interview respondents are asked to describe their job responsibilities and its connection to port security in general. Moreover, they are asked to explain how security is organized in their organisation. In the main part of the interview the conversation evolved around any experiences with positive or negative changes in service quality due to security measures. If it was

necessary, certain example dimensions are proposed in order to draw attention to efficiency and customer satisfaction. Finally, interviewees are invited to state their views on future challenges of port security. Although the interview guide contained several direct questions the possibility to break out and explore unforeseen topic areas was always prioritized. Therefore, leading questions or words with strong connotations were avoided throughout the interview in order to not distort the interviewee in his own thoughts as it is suggested by Silverman (2013). *Table 1* summarizes the relevant information about the conducted interviews.

Immediately after each interview the author organized his notes and wrote down additional impressions and insights from the interview to avoid losing any data which is especially relevant when audio recording is not possible (Fisher, 2010). Finally, after the third interview was conducted, all notes were combined by clustering the main points to highlight commonalities and discrepancies in the interviewee's opinions about different topic areas which was then used to guide the composition of the online survey. *Table 2* presents the aggregated insights from the interviews about the most important aspects to consider in the problematic area between service quality and maritime supply chain security as well as in the future challenges of port security.

Table 2: Aggregated insights from expert interviews

Aspects in Service Quality - Efficiency	Aspects in Service Quality - Customer satisfaction	Future Challenges
Throughput time of cargo	Acceptance of delays	More containers
Flexibility in operations	Distribution of responsibility	Larger ships
Problems due to insufficient documentation	Transparency of security requirements for customers	Traffic to developing countries
Transparency of operations	Contribution to security	Digital data theft
Unknown locations of cargo at port	Demand for high security	
Vessel turnaround time	Number of complaints	
Quality of information flow		
Quality of cargo information		
Cargo delays		

Online survey

The second method to collect primary data is an online survey. An online tool called SoSci Survey (SoSci Survey GmbH, 2015) developed by the Ludwig Maximilian University of Munich in cooperation with the University of Zurich was used to create, design, and publish the questionnaire. Because the topic investigated is security of course the tool for data collection has to fulfil highest standards for security as well. Therefore, the author made use of the privacy functions of SoSci survey such as SSL Encryption, minimal recording of user data, SSE (Secure Server Environment) with servers in Munich, no cookies

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and the rights on collected data remaining with the author only. Moreover, SoSci Survey offers professional means of programming, the possibility to integrate with SPSS, and the use for non-commercial research is free.

Because an online survey has no possibility to prompt and probe respondents, adapt or change questions, answer questions of respondents, or ask a series of complex questions it is necessary to ask *relevant* and *on-target* questions to gain relevant results (Bryman, 2012). Therefore, the composition of the questionnaire is informed by the insights from the three expert interviews (*Table 2*) and is organised around three main sections: at first, respondents indicated characteristic numbers for their port such as cargo throughput, the type of security initiatives applied, and the number of ship calls per year at their port. This served both the aim to familiarize respondents with the online tool as well as pointing their mind into the direction of the topic. Secondly, respondents are asked to complete an impact assessment of security initiatives. In order to create comparability, closed questions with a five-point Likert scale ranging from 'strongly increased' to 'strongly decreased' as answer are used in the first part upon aspects of efficiency. Here, respondents are asked to indicate whether they perceive that an aspect decreased or increased due to security initiatives. In the other part of the impact assessment upon customer satisfaction, a five-point Likert scale from 'strongly agree' to 'strongly disagree' was employed which referred to several statements about customer satisfaction. The different kind of question was chosen to avoid habituation in the impact assessment which can increase accuracy of the answers because respondents have to think differently than before (Bryman, 2012). In the third part, respondent's perceptions towards future challenges of port security are measured with three closed and one open question. In the last part of the questionnaire, respondents are given the possibility to leave every remaining comment on the topic. Respondents further always had the possibility of not answering a question by ticking 'I do not know'. In addition, if the suitable answer was not among the presented options the respondent could explain his answer under the point 'other'. Along with a farewell, respondents could also make use of a form to leave their email address in order to receive a copy of the final report. By reasons of promised anonymity the email address data was of course transmitted independently from the rest of the answers.

Due to the disadvantages of questionnaires compared to interviews, that is to say respondents cannot ask direct questions or get explanations in case questions are unclear, it is important to minimize flaws in the questionnaire before publishing it (Bryman, 2012). Therefore, an extensive pre-test of the questionnaire took place among thirteen testers to assure understanding and clearness. The testers were chosen by a simple non-probability convenience sampling technique out of a population defined as people with experience in social survey research. Among the pre-testers are ten students of Lund University currently studying a master's degree programme at the Business or Social Science Faculty.

Two other pre-testers are former professional associates of the authors with more than 15 years of experience in an international maritime consulting company and one is acting managing director at a larger engineering corporation with several years of experience in research and graduate teaching. In addition, a functional test was conducted by the author to avoid later problems when integrating and analysing results with statistical software. Results and feedback of both tests have been included into the final version of the questionnaire (see Appendix A: Online questionnaire).

Sampling technique

The population of respondents to this survey is defined as all sea ports located in northern Europe. Due to the scope on small to medium ports, the overall population of ports had to be sampled. Therefore, a non-probability sampling technique, namely purposive sampling and in more detail homogenous sampling, was applied to the population. This technique is chosen when the research question that is being address is specific to the characteristics of the particular group of interest (Bryman, 2012). Here, the respondent ports need to fulfil the following criteria:

- Regular international connections
- Ships above 500 gross tonnes calling at the port
- Apply at least one international security initiative (ISPS, AEO, C-TPAT, CSI, 24h-rule)
- Handle less than 50 mio. tonnes of cargo annually

In *Figure 2* the list of 45 sampled ports that fit the above listed criteria is presented. As suggested by Bryman (2012) the author identified a suitable contact for each port before the questionnaire was published in order to increase the response rate and assure that the respondent has the cognitive ability to answer the questions. Because ports with international traffic are usually applying the ISPS code the Port Security Officer (PSO) was identified as most suitable to answer the questionnaire. Hence, through internet research and contacting the port businesses directly the PSO's email address is investigated and included in the automatic mailing system of SoSci Survey. If the PSO could not be identified another suitable staff member was found with assistance of the respective port.

At initial contact respondents were informed about the author and purpose of the study, the applied rules of anonymity and confidentiality, the supervising University and instructed on how to use the online tool. Further, they were kindly asked to answer the questionnaire within the next six weeks. Finally, by using a personalized link that was included in the Email they could access the online questionnaire. Because SoSci Survey allows to use anonymized serial numbers the author could track the response rate and send reminders to those respondents who have not yet answered. During the answering period, reminders (see Appendix C: Emails & Reminder Emails) were send one week, three days and 24 hours prior to the end of the six weeks total timeframe. By applying these measures as

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recommended by Bryman (2012, p. 236) a total of 32 responses or response rate of 71.1% could be achieved. As stated in Bryman (2012) this response rate can be classified as an acceptable result. However, due to reasons of confidentiality and anonymized serial numbers a list ports who have responded cannot be published.

Sweden	Location	Germany	Location	Latvia	Location
1	Helsingborg	21	Hamburg	33	Riga
2	Gothenburg	22	Lübeck		
3	Copenhagen Malm"	23	Bremerhaven und Bremen	Estland	Location
4	Trelleborg	24	Willelmshaven (Jade Weser Port)	34	Tallinn
5	Oxl"sund	25	Rostock		
6	Lulea			Finland	Location
7	Visby, Gotland	Denmark	Location	35	Helsinki
9	Wallhamn	26	Esbjerg	36	Turku
10	Landskrona	27	Frederikshavn	37	Oulu
11	Kalmar	28	Aarhus	38	Kemi
12	Stockholm	29	Odense	39	KotkaHamina
13	Lysekil				
14	Gavle	Poland	Location	Norway	Location
15	Falkenberg	30	Stettin	40	Frederikstad (Borge Havn)
16	Umea	31	Danzig	41	Oslo
17	Ystad			42	Kristiansand
18	Södertalje	Lithuania	Location	43	Stavanger
19	Halland	32	Klaipeda	44	Bergen
20	Karlskrona			45	Trondheim

Figure 2: List of sampled ports

Analysis method

The primary raw data as collected by the questionnaire through questions with pre-defined answers was converted to quantitative data and integrated into the statistical software SPSS in order to compare them to each other by i.e. drawing charts and figures. Then, viewing those charts and figures through an analytical lens and connecting it to previous knowledge and the theoretical concepts enabled the author to see what the raw data indicated. The collected qualitative data as derived from the open questions is put into the context of the other results to enrich understanding. Finally, the results on this level are connected within the bigger picture to answer the research questions.

Validity and reliability

In order for the results of a research study to be relevant they have to be valid and reliable. However, quantitative and qualitative research streams differentiate in what validity and reliability mean in these disciplines. According to Golafshani (2003) for quantitative research the terms describe something measureable such as standard deviation within a data set or something that can be tested for instance through t-tests. Further, it refers to the stability of a measure over time and the internal-validity of scales and indexes used in the research which for instance can be assessed by the Cronbach Alpha test (Golafshani, 2003).

The reliability dimension in qualitative research is traditionally defined as “asking whether a measure is stable over time, so that we can be confident that the results relating to that measure for a sample of respondents do not fluctuate” (Bryman, 2012, p. 169). Here, this means to ask whether the chosen methods would produce comparable results over time. First of all, due to the nature of the constructivist approach the research results are merely reliable within the group of people who participated at this certain point in time. This means that due to changes in port security, international types of threats or new security initiatives the results of a similar study would be different because the indicators would change as well. However, it must become clear that it is *not* the purpose of this study to produce such results or to reveal a general truth that accounts for all scenarios possible but that it aims to enrich understanding of human actions in the research context. Therefore, reliability in its meaning of replicable results is rejected and the idea of reliability as connected to trustworthiness embraced.

As suggested by Lincoln and Guba (1985) as well as by Golafshani (2003), for qualitative research the terminology should be rephrased to trustworthiness. They explain that the trustworthiness dimension contains certain aspects as of credibility, transferability, dependability and conformability which are argued to better suit the purpose of qualitative research. As Fisher (2010) suggests, using a combination of secondary and primary data gives more valuable information and hence improves the validity and reliability of the findings. It is therefore reasonable to view the mixed-method approach as a way to increase the quality of the study. In the following, it is described how the trustworthiness of each method is established.

Trustworthiness of expert interviews

The convenience-sampling technique for the interviews was applied because time and resources are limited in this work and the interviewees needed to be in range for the author. Moreover, the purpose of the interviews is to enrich the understanding of the research problem with a real-life perspective and after three interviews were conducted, the author decided that the marginal gain by another interview does not outweigh the additional expenses in terms of time and travel cost. To increase the trustworthiness of the three interviews the author took several actions before and during the interviews. As suggested by Silverman (2013) the author stated no personal opinions but only established findings from secondary literature. Further, as a semi-structured interview enables the respondent to answer freely they were not limited in their answers, which in turn increases the conformability of the findings (Lincoln & Guba, 1985). Another important factor was to not influence the interviewees in any way by leading questions or suggestive statements during the interviews to increase credibility and confirmability. The credibility was also increased through the selection of the interviewees: because they are familiar with the topic on a professional level and have both access to

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information and cognitive understanding of the topic their comments and perceptions are considered relevant. On the other hand, one might argue that trustworthiness has been decreased due to a small number of interviews. Although this might be the case if the method would be stand-alone this is not an issue here because the interviews were exclusively used to enrich understanding for the problem with a practical perspective. The issue of a language barrier is further not relevant to this research as all interviewees as well as respondents of the online survey use the English language on a daily basis and are familiar with technical terms as well. The interview in German was held because it is the mother tongue of both the interviewee as well as the interviewer. As it is suggested by Bryman (2012) the trustworthiness is further increased by describing in great detail on how the interviews were conducted, including sampling technique and motivations for questions asked in order for the reader to comprehend the data collection process.

Trustworthiness of the online survey

The content of the online survey is based on the previously generated insights and does not use new sources which expands the validity of those previous sources onto the survey. Further, classic validity test in the quantitative research methodology such as the Cronbach alpha test do not apply here because although the method is quantitative the research question is seeking qualitative answers. Therefore, the application of a quantitative method in this type of research method does not require substantial statistical tests to prove validity. Instead, the validity of the collected data is assured through the following measures: One the one hand, substantial pre-test affirm minimal distortion and misunderstanding from the respondents which increases the credibility of their answers. Moreover, through the previous interviews it was ensured that the questions asked in the online survey are targeting the problem and hence produce data that helps to answer the research questions. By directly sending the questionnaire to employees with the correct qualifications credibility is further increased. Because respondents might not answer truthfully if the answers can be traced back to them they were assured anonymity through using coded serial numbers and a professional online tool. Especially because security is a highly sensitive topic for ports, data security was a priority and hence contributes to the trustworthiness of respondents answers.

Moreover, the trustworthiness of the generated data is also connected to the sampling technique and sample size. According to Bryman (2012) there is always a trade off in sample size between time, cost, need for precision and considerations such as analysis method, the heterogeneity of the population and non-responses. In this research, an absolute sample size of 45 ports is considered large enough to make valid statements towards the situation of small to medium ports because it represents the maximum number possible under the time and cost dimensions in a one-year master's thesis. Further, the analysis is looking for frequencies in the answers rather than contingency tables which requires a lower number of data sets (Bryman, 2012). Finally, due to a high homogeneity of the population the

absolute sample size does not need to be large if the non-response rate is normal (Bryman, 2012). This means that because sea ports in northern Europe have relatively little variation in their characteristics, although there are differences, a smaller sample does not mean less valid data. On the other hand, the validity of the sample has to be seen in the context of scope and possibilities of the whole research project: in order to achieve insights from several ports in northern Europe that are comparable to a certain degree an online survey is the only conductible method here. Other methods such as face-to-face interviews, phone interviews, focus groups or observations would have been too time consuming and too costly (Silverman, 2013).

Limitations of this study

During the work on this thesis the following main limitations towards the research findings could be identified: First, the scope is limited to small and medium sized ports in northern Europe that have regular international connections and are eligible to apply at least one international security initiative. In addition, the employed purposive sampling is a non-probability technique that limits the possibility to generalize to some extent. Second, as it lies with the constructivist approach, the gathered data is assumed to represent the subjective impressions of the respondents which neither must display the reality nor one can be sure that respondents really do as they say they would.

The focus on small and medium ports in northern Europe was adopted due to the following reasons: On the one hand, the qualitative part of this study aimed to get subjective impressions from ports on the subject and the author aimed to decrease the number of external factors that might influence this impressions. By focusing on ports in northern Europe factors such as political orientation, economic situation and cultural background are predominantly comparable and are potentially not responsible for distributions in the data. Further, another deficiency is that ports have not been divided by their main line of work (container, RoRo, bulk) which potentially displaces results. However, the majority of ports handles containers and the security initiatives examined do not have specific regulations for other cargo in place. Hence, the potential distortion due to these differences is viewed as light.

A non-probability sampling method, namely purposive sampling and in more detail homogenous sampling, would limit the generalizability of results in a purely quantitative study. Here, it was applied because for the experiences of the port to be relevant to the results certain characteristics have to be fulfilled and the author was interested in the intricacies of participant's opinions. For such goals the purposive sampling method offered the best way to choose respondents. In addition, the collection method is borrowed from quantitative research but the questions asked have a qualitative background. Thus, generalization was not a proclaimed target of this particular research. However, because this sampling method is very open to the researcher bias the criteria to choose respondents

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are mostly rational and empirical in nature. Finally, non-probability sampling techniques are cheaper, faster and easier to conduct which is beneficial for the limited resources of a one-year master's thesis.

It lies with the constructivist proposition that is interested in how people build their meanings of the world around them, that one has to take their word at face value. It cannot be assured that what respondents answer is really their true opinion or whether respondents adopted some kind of other standpoint due to whatever reasons they may have. Although this may decrease the validity of this study there is no way around it as to build a trustful relationship with the respondents. In order to acquire data the author decided to take this risk and applied the appropriate measures to decrease this risk as far as possible.

Overall, the research design and methods are considered trustworthy in connection to the particular research topic and methodology applied in this work.

Results & Analysis

This chapter presents and analyses the results of the online survey and is structured as follows: First, information on the general data distribution is laid out. Then, the findings of the impact assessment about the effects of security upon efficiency and customer satisfaction are analysed. Finally, the results of the section future challenges are put into context. Throughout this chapter results are compared against findings from relevant previous literature and the interview as well as connected to the concepts presented in the theoretical framework.

General data distribution

In terms of port size, the results show that 33.3% of respondent ports handle between 1.1 mio. and 5 mio. tonnes of cargo and further a cumulative 62.5 % handle less than 20 mio. tonnes annually. With 12.5% another larger group in the distribution of answers handles between 30.1 and 50 mio. tonnes yearly. A relatively similar picture is seen in the number of ships above 500 gross tonnes calling at the ports with 46.9 % indicating that less than 4.000 ships call at their port annually. The remaining answers are nearly equally distributed with 12.5% for 4.001 – 8.000 calls and 15.6% for 8.001 to 12.000 calls.

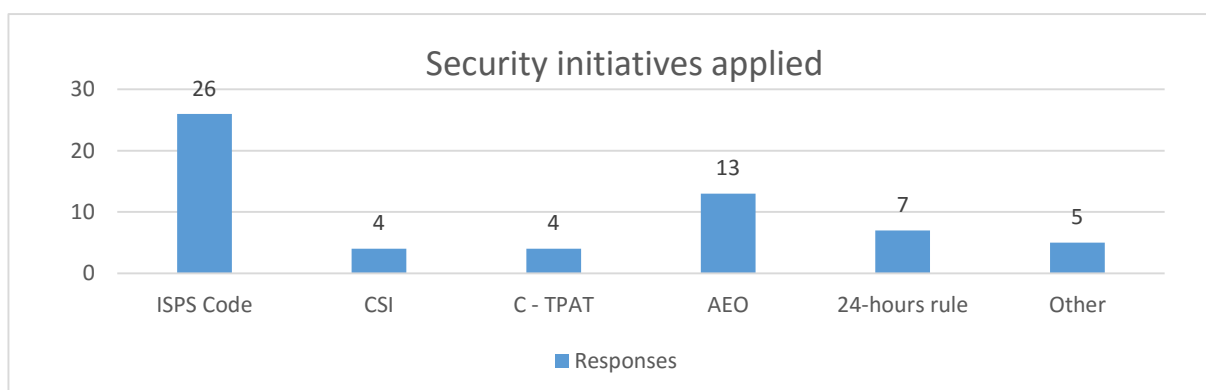


Figure 3: Security initiatives applied in respondents ports

Out of all responses 26 ports indicated that the ISPS code applies to them, 13 further are AEO certified and 7 are operating under the 24-hour notification rule, as it is visualised in Figure 3 **Error! Reference source not found.** The CSI and C-TPAT each are applicable in four ports. In total five respondents indicate that they are using other initiatives. As they stated in the comment section of this question these are for instance HSE – regulations or national acts. As expected, small to medium ports are less likely to apply the CSI or the C-TPAT because they often do not have direct connections to the USA which would require such initiatives. This aligns with the comments of one interviewee who described the USA targeted security initiatives as unimportant to northern European ports.

In the 26 ports that are operating under the ISPS code all (100%) indicated they are normally operating on level 1, the lowest threat level out of 3 possible in the code. When asked whether they would continue to operate when the highest level 3 is active the majority with 56.3% stated they would stop

business until the level is decreased. Although level 3 of the code aim to protect ports from an imminent threat and is presumably only active for a short time, this results questions whether the agreed levels are the best fit for small to medium ports. From an economic perspective, a shut-down of operation is only reasonable if the opportunity costs by an incident are higher than pausing operations. For northern European ports this situation (level 3) is so unlikely that they obviously do not prepare actions to apply level 3 but would rather pause operating – which could have severe impact on the economy if level 3 should become active someday.

In terms of relevance all respondents find the ISPS code relevant or very relevant for their daily operations, followed by 24-hours rule and the AEO. Comparably, the C – TPAT and the CSI are less relevant (see Table 3). This results allows the interpretation that small to medium ports have less use for US centred security initiatives but do see how security initiatives influence their operations. Their awareness of the security initiatives also strengthens the importance of this research area.

Table 3: Relevance of security initiatives

	ISPS Code	24-hour rule	AEO	CSI	C - TPAT
Mean	3.59	3.30	3.29	3.0	2.8
Mode	4	4	4	3	3

1 = not relevant at all 2 = irrelevant 3 = relevant 4 = very relevant

Impact assessment

In the second part of the survey the impact of security initiatives upon service quality, namely aspects of efficiency and customer satisfaction, is investigated by a series of short and precise questions and statements. To complete the picture the possibility to leave of open, completing comments is given as well. However, before going directly into the results of the impact assessment a look on what respondent ports perceive as the main threats towards their operation will increase the understanding of the problem between supply chain security and service quality.

Perceived threats to ports

Respondents perceive “smuggling of goods” and “theft” as the main threats to security at their port while the threat of “trespassing” comes in third. The issue of “maritime terrorism” comes in fourth position closely followed by the issues of “digital data theft” and “smuggle of people” in fifth and six, respectively. These results align with the perceptions of the interviewees who also see less concern for maritime terrorism, the initiator for many port security initiatives, but more risk in the area of crime

supporting activities. One can say that small to medium ports in northern Europe are concerned about the misuse of maritime transportation instead of fearing direct disruptions to the supply chain. This supports Mazaheri and Ekwall (2009) who found that ports in low risk countries find the application of anti-terrorism procedures unnecessary. However, incidents like the manipulation of digital information at the port of Antwerp between 2011 and 2013 to cover drug traffic shows that ports may not fully aware of what other threats are out there (Bateman, 2013). Accordingly, one interviewee reports that the protection of digital information and insider knowledge will become more important in the future. As described in the theoretical framework the goal of the supply chain security concept in ports is to mitigate the threats that may cause disruptions to the overall supply chain. However, according to the above shown results it can mean different things for different sized ports. The following section therefore analyses the perceived impact of current security initiatives on the aspects of efficiency and customer satisfaction as part of the service quality in small to medium ports.

Impact on service quality – efficiency dimension

The results of the impact assessment on efficiency are presented in Figure 4. The amplitude on the radar is representing the mean of all answers given for the respective question and thereby showing the arithmetic middle, giving an impression about the average perception of respondents for this item. In order to interpret the graphic the following must be understood: respondents were asked to specify their understanding to what degree the respective efficiency dimensions changed due to the impact of security initiatives. They indicated their perception on a five point Likert-type scale ranging from 1 = strongly decreased to 5 = strongly increased with the middle score 3 representing the impressions of none or a neutral effect. As an assistance to read the graphic one line is representing the middle score three as orientation and the other the mean of given answers. Therefore the amplitude can be seen more easily. As one can see, neither strong decreases nor strong increases could be measured in any item. Instead, scores are relatively close to neutral or no effect. The highest amplitude in a positive manner is in the item 'quality of information between ship and ports' followed by 'Quality of information about cargo'. Accordingly, the skewness of these distributions is with $s = -1.269$ and $s = -1.292$ respectively quite firmly shifted to the left end of the score distribution. Here, one can see that security initiatives started a process of clearing and organizing parts of the port business that previously did not receive attention. Requirements for pre-arrival notifications and information on cargo are used by ports to better organize capacity and activities.

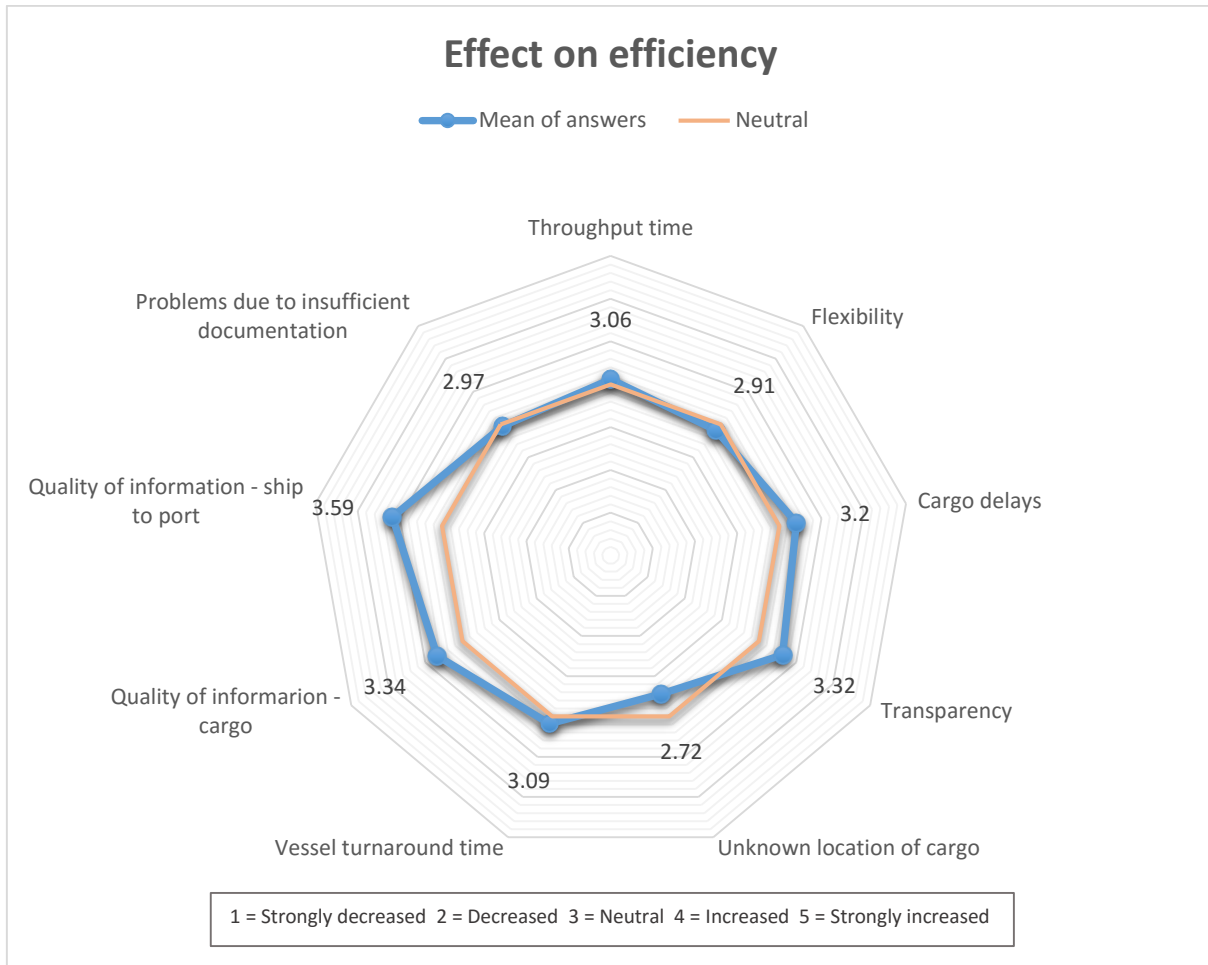


Figure 4: Effect on efficiency

As shown in Figure 5, ports ranked ‘providing new equipment’ as the main cost driver, followed by ‘solving security issues’ and ‘spending time on documentation’. While the expenditure on equipment takes by far the highest rank the other cost drivers are much closer together in means of importance. This result is partly similar to the results of Mazaheri and Ekwall (2009, p. 34) who have found equipment and infrastructure costs taking the biggest chunk. However, costs for hiring and training staff have become less important and at the same time more money is spend on solving security issues. Hence, it can be said that port security has left the initiation period and costs for maintaining security are in focus today. Nevertheless, because the service quality concept explains that investments outside the core dimensions impact quality negatively it is surprising that no such perceptions could be found in small to medium ports. On the one hand, it can be argued that because the running costs of maintaining security are lower than initial investments and therefore do not impact quality anymore. On the other hand, this can also describe that security has become a core dimension of service quality for port operators. Hence, investments here rather increase quality then decrease.

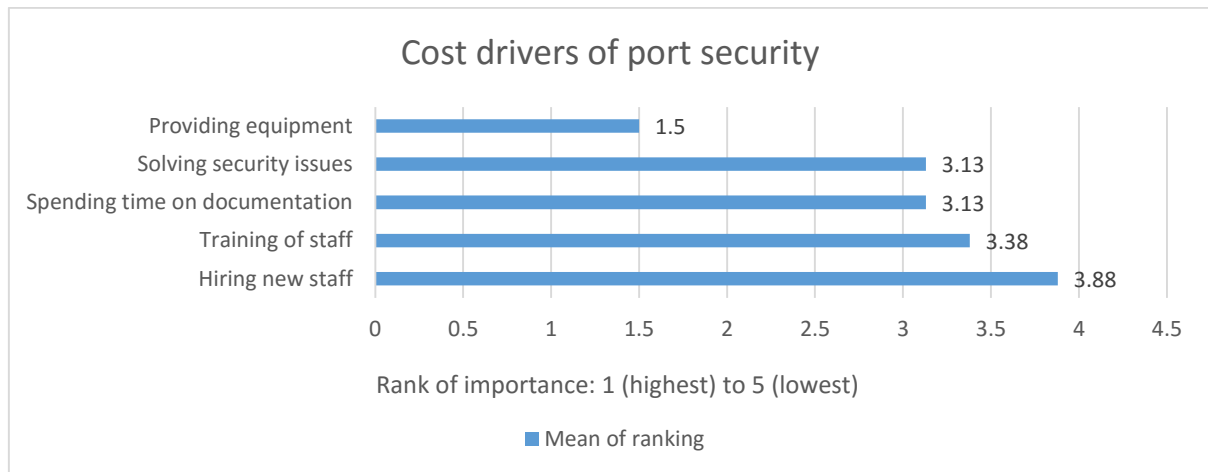


Figure 5: Cost drivers of port security

It was also found that 100% of respondents that answered indicated that the port is financing the costs for security internally. Another 45.8% stated that the cargo owner contributes as well and 20.8% said the ship owner is involved. Only 8.3% of all cases see government participating in the financing of port security. These results demonstrate the following: although the concept of supply chain security argues for joint efforts from the public and private sector because supply chain security is important to everyone, in reality the financial burden is out of balance. As argued above, this financial burden can impact service quality in the long run and the overall security of supply chains in general. Further, this distribution supports the concern that was addressed in literature and interviews: according to Hints, et al. (2009) ports find it difficult to justify costs for increased security towards customers and shareholders and hence bear costs internally. Moreover, especially smaller ports are assumed to find it harder to make use of security benefits due to the higher percentage of security costs in relation to their turnover (Powanga, 2006). However, with 56.3% of ports stating that they are using a security surcharge it can be assumed that this situation has improved. Moreover, one interviewee stated that customers accept these charges now as well as charges for missing or false documentation. This gives ports more possibilities to finance security and takes of the pressure to cope with it internally and hence means less impact on service quality. According to another interviewee some ports even use security surcharges to generate revenue because costs from initial investments are amortized already and ongoing expenditures are smaller than expected. This results show that also small to medium ports have improved the financing situation of security. From an service quality perspective this improvement in costs is very important because in a small margin business such as logistics additional cost can decrease quality rapidly. Therefore, the above presented results may result in a more positive overall view about the impact of port security on service quality.

The same accounts for the flow of information between ships and ports that has been standardized and streamlined as well. Many security activities aimed to reduce variability which in turn limits the

possibilities for unseen – and in that case disruptive – events which according to the supply chain security concept is desirable (Hintsä, et al., 2009). However, as mentioned in previous research (Sternberg, et al., 2012) as well as by one of the interviewees, a decrease in variability also means a decrease in flexibility, one of the core capabilities of logistic service providers in order to deliver high quality. This decrease in flexibility in trade for higher security could mean a deficit for service quality. Yet the perceptions of ports towards this impact shows no such concern as the mean of their answers about how ‘flexibility in port operations, i.e. rescheduling or staffing’ changed is with 2.91 close to a neutral perception. When viewing this through the service quality lens it could be argued that either flexibility is not decreased or has not such big impact as assumed.

The strongest decrease can be seen at the item ‘Number of unknown locations of cargo in the port’ which has to be interpreted as a positive development as well: due to a decreased number of unknown locations the port can better utilise its full efficiency and reduce the time and money spend on correcting mistakes. In two interviews the topic surrounding the term ‘overview in port operations’ was also stated repeatedly as important area of improvement in port efficiency. Simultaneously, the interviewees independently agreed that ports are happy to use security measures as an excuse to increase transparency and hence be given a possibility to increase service quality. From a supply chain security perspective and according to Sternberg, et al. (2012) this increase in transparency benefits both service quality and security and is therefore a very positive development.

The respondents further perceive neutral effects on the aspects ‘*Throughput time*’ and ‘*Vessel turnaround time*’. It seems that the effects of port security are more vivid in paper-activities and less effect is perceived on the ports operational efficiency. However, the indirect effects of increased quality of information and other aspects remains unclear at this point. In an open comment one respondent wrote:

- “Lots of documents are kept - do not see the benefit. Ask for document from vessel - actual need is not topic for discussion.”

This comment hints at the increased work of documentation and administration with little to none perceived benefit for small to medium ports. Moreover, the respective respondent argues that they simply follow procedures of the ISPS code although neither ship nor port has any use for the documentation. Once more, this comment addresses the issue of different threat profiles for small to medium ports in low risk countries compared to larger ports: instead of terrorism they see smuggling and theft as main issues and thus have no benefit from applying anti-terrorism procedures.

The results presented in Figure 4 also display very slight increases in both '*Transparency*' and the '*Number of cargo delays*' which show that while general transparency of port activities increases this goes not without complications such as potential delays due to missing or insufficient documents or customs clearance. From the perspective of the service quality concept such incidents represent a decrease in quality, especially because reliability and punctuality are critical aspects in logistics efficiency (Sternberg, et al., 2012). However, important here is whether or not the customers criticises the port for these delays instead of accepting it as his own mistake. One interviewee comments on this by saying that the majority of customers is primarily looking for a logistics partner that is experienced in the management of security initiatives and customs because this implies smooth, fast and reliable handling of cargo without delays and not looking for real security of their cargo. The concept of supply chain security yet argues that modern supply chains are too complex for a single actor to effectively organize security (Bichou & Evans, 2006). Therefore, through this theoretical lens the above presented results imply a decrease of security because not all actors along the chain are participating actively.

Impact on service quality - customer satisfaction dimension

Figure 6 display the results of the impact assessment towards customer satisfaction with seven dimensions. Here, respondents indicated their intensity of agreement on a five point Likert – scale with a statement that referees to a previously identified area of customer satisfaction that is potentially impacted by security initiatives. A score below three means that respondents agree or strongly agree with the statement and consequently a score above three indicates disagreement or strong disagreement. As above, a score of three is outlining a neutral position towards the respective statement.

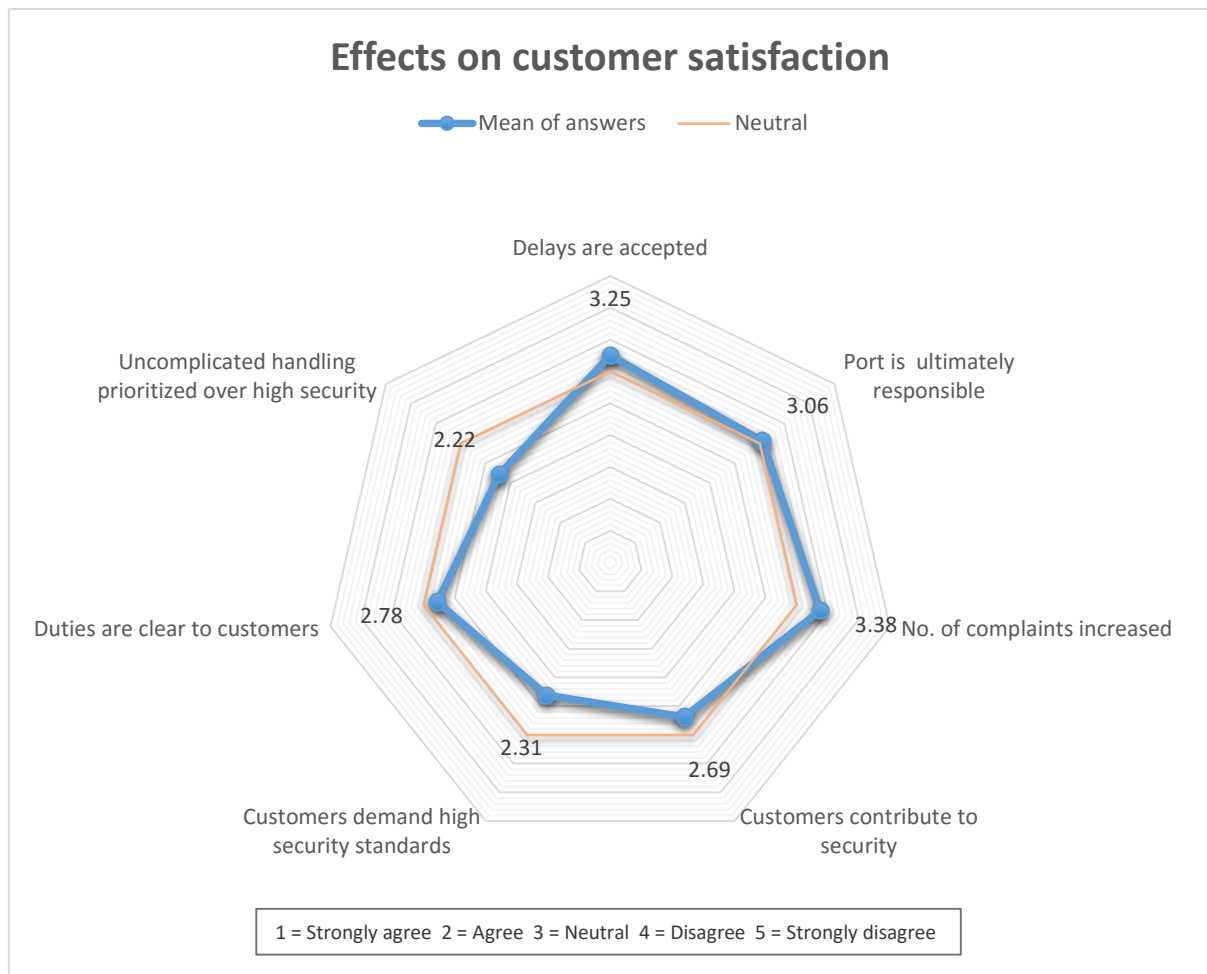


Figure 6: Effect on customer satisfaction

The highest amplitude and thus the strongest agreement can be seen at ‘Customers are looking for smooth and uncomplicated handling of their cargo when it comes to security measures rather than high security standards and protection of their goods’. This aligns with the above stated comment by an interviewee that customers focus on operational capabilities rather than real security. Further, it shows how ports think some customers perceive port security efforts: as something unnecessary that needs to be done as required by law but provides little to no benefit to their own business. The supply

chain security concept however appeals that security is not only worthwhile to single business but to the public and environment as well. The perceptions that customers do not agree will in turn shape the engagement with security initiatives as service businesses are focusing on what the customer wants and needs in order to create good quality. Hence, it can be assumed that small to medium ports perceive security efforts as 'extra work' without benefit to customers and hence do not treat security as priority. The comment "Customer satisfaction is always reflected on", which is given in the open comment section, supports the perception that customer satisfaction and therefore service quality is a central target for ports.

The mean of respondents agreement is nearly equally strong with the item '*Customers want high security standards for their cargo and ships because it is vital for their business*'. This results allows another interpretation of the role of ports security: here, it seems that customers value the ports efforts because they see it as a critical success factor. At first, this seems contrary to the above presented results. However, from a supply chain security concept perspective it can be interpreted that customer require a basic level of security but at the same time require smooth management of such security which relates back to service quality concept.

In comparison to the previous presented results, respondents are very neutral towards the statement '*Customers think that the port is ultimately responsible for all security incidents*'. Similar comments have been made by the interviewees. Putting this into the context of customer satisfaction reveals that as long as ports do not think that customers hold them responsible for security actions they have no need to be concerned about distorted competition. Almost the same manner can be observed when respondents do not agree too much with the statement that '*complaints due to security have increased*'.

Overall, it can be seen that ports have a relaxed relationship with the effects of port security initiatives upon customer satisfaction. Nevertheless, ports perceive that "customer satisfaction is always reflected on" as one respondent commented. This shows that there is a concern for the service quality as critical success factors. Another respondent commented that "to achieve customer satisfaction an important task is to communicate everything which can have an impact on the customer" and "customer success is a core issue in the business strategy" which again highlights the importance of customer satisfaction for ports. One respondents describes his efforts to achieve customer satisfaction like this:

"[I] have spent a lot of time rewriting security plans as to reflect practical operating procedures on the various terminals. Involvement from users are the best security tool there is. To achieve that they must retain a sense of fairness in the level of security measures".

Once more, the role of customer satisfaction for service quality is strengthened and it can be highlighted that ports aim to achieve this quality by actively designing security operations that work for the customer.

The above presented results also allow the interpretation that although high security is demanded and delays due to security are not appreciated, ports think that customers do accept and participate in security while not holding them ultimately responsible for incidents. This perception aligns with the supply chain security concept in its request for holistic security efforts along the whole supply chain.

Overall impression

Overall, an overwhelming majority of 73.3% respondents state that they think the increased security has a positive or strongly positive impact on efficiency and customer satisfaction (see Figure 7).

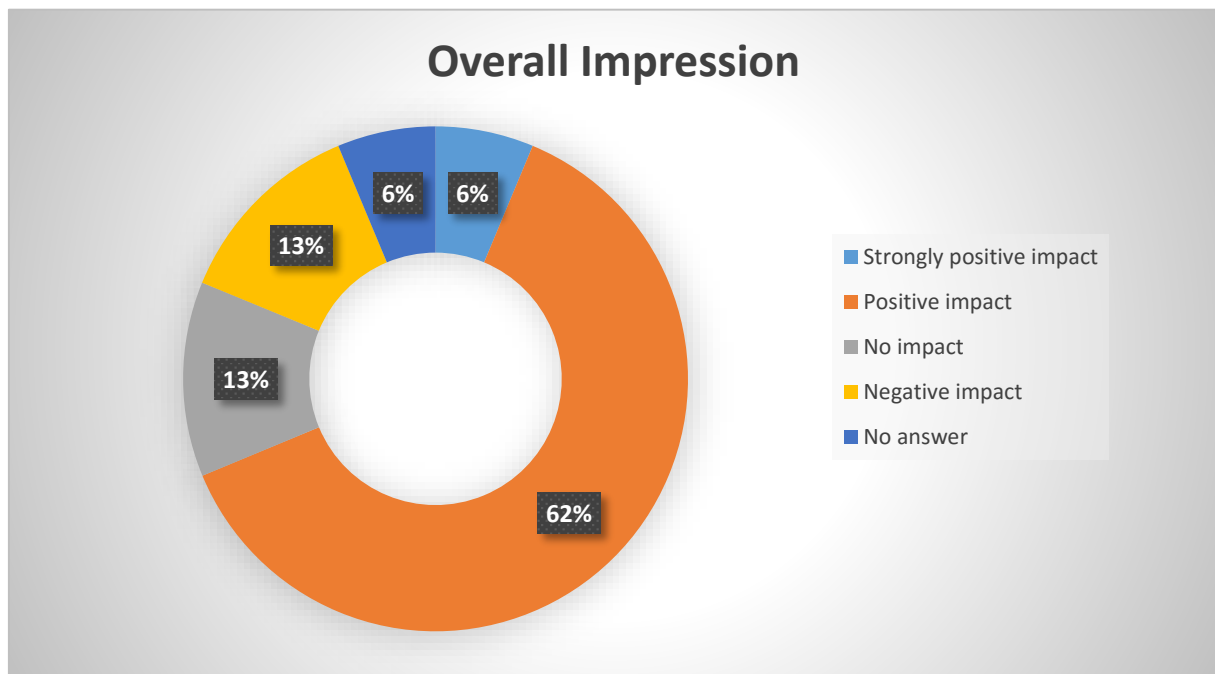


Figure 7: Overall Impression of respondents about the effects of security initiatives on service quality

Moreover, not one respondent declared strongly negative impacts which is also reflected in a skewness of $s = 1.017$ that indicates a higher density of answers to the far left end of the scale (strongly positive). In comparison to many of the negative effects and risks of increased security towards operational efficiency of ports that has been found in previous literature such as Sternberg, et al. (2012), Stevenson (2005) or Banomyong (2007) it can be observed that here the respondents themselves interpret the effects of security initiatives on service quality as very positive. One respondent summarizes that “port security has improved the HSE - situation, [and] thefts and vandalism is reduced to almost nil” while another respondent explains that “port security have provided port related businesses with an opportunity to ‘close out’ the public” which could eventually have made their operations more

transparent and easier to control. One interviewee further commented that port begun to use compliance to security initiatives as competitive advantage and marketing strategy. This transforming of security in its meaning for ports towards a success factors shows how actors begun to realize the potential benefits apart from internal effects and the importance of security towards their overall service quality.

Future challenges

As presented in Figure 8, respondents are confident that current security initiatives such as the ISPS code or the AEO are capable of handling the challenge of even more containerized cargo in the future. Further, one can see that the majority of respondents expect the same capabilities towards dealing with bigger ships in the ports. The comment of one interviewee could explain this confidence which comes from the fact that security initiatives tend to have the same measures in place for small and big ships and that respondent ports are small to medium in size and hence will not experience much bigger ships. However, a relatively high number of 10.3% respondents think that security initiatives are ‘not capable at all’ when it comes to handling the challenge of bigger ships representing a comparably big uncertainty in this issue between respondents.

Respondents are comparably less confident when it comes to the risks dating from ‘more cargo to and from developing countries’ even though 59.2% consider today’s security capable or very capable of this issue.

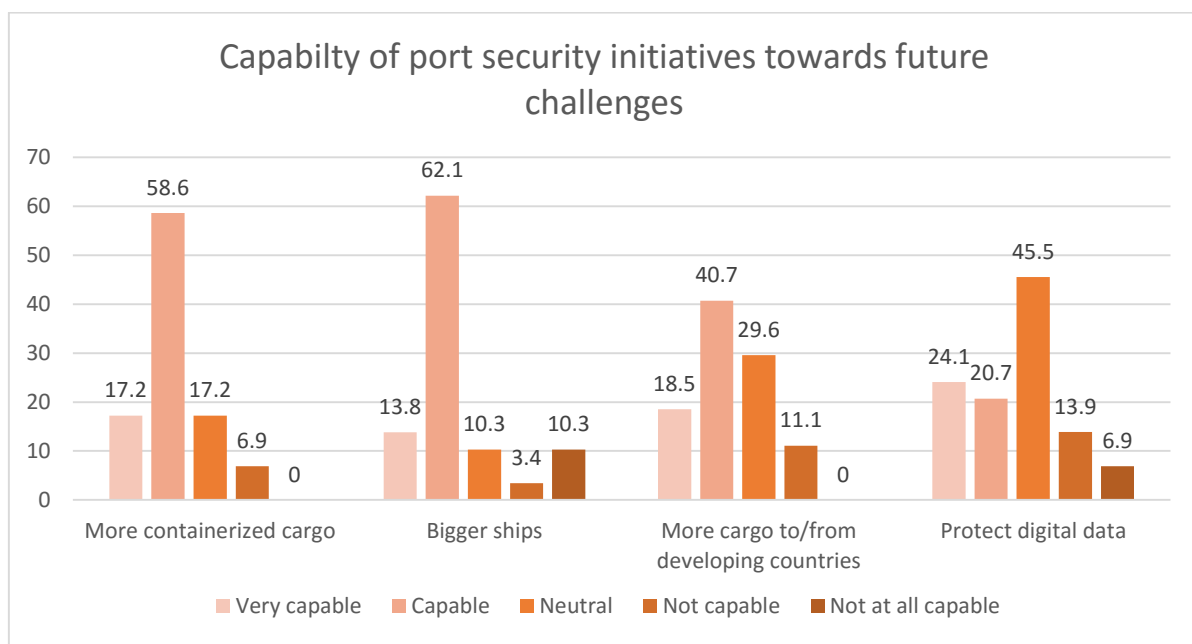


Figure 8: Capability of port security initiatives towards future challenges

The perceptions in the area of digital data protection are centred on a neutral perspective with a twist towards the sense of ‘very capable’. However, one interviewee points out that in this area much has to be done to close gaps in digital security. Further, another interviewee states that the problem here is that many ports as well as authorities are not even aware of the ways in which digital data theft or manipulation might be used against the maritime supply chain. Due to this perception, the result can be interpreted as alarming because ports might feel safe when in reality they are not. From the view of the supply chain security concept this is especially dangerous because ports are regarded as the

weakest link in the maritime supply chain (Greenberg, 2011). According to Ekwall (2009) groups with criminal intentions will move to weaker targets in the supply chain when security is increased. Hence, ports might be even more likely to be disrupted by digital data attacks because protection is weak. This interpretation is also supported by the wide spread of answers, indicating that respondents do not have a mutual understanding of this issue.

Future security efforts

Out of five offered potential strategies to handle future security efforts only three were selected by respondents (see Table 4). Out of all cases, 54.8% will potentially increase security in order to be more competitive compared to other ports while 35.5% will probably increase port security as a reaction to customer demands. This reaction is easily understandable when put into context with the previous results: offering and managing high security standards for the customers supply chain has become a competitive advantage and selling point. One interviewee explains that customer increasingly focus on the security offers of ports which in turn fuels ports competition in this dimension. On the other hand, 48.4% indicated they will only adapt security efforts if laws or regulations require them to do so which reflects the dissatisfaction of smaller ports who see no benefits in effects such as documentation and administration. Out of the 4.4% of cases that will react differently one commented that they will “adapt to change, remove inefficient measures [and] invest time and resources in cooperation with stakeholders”. This hints at an advanced understanding of security where the port wants to create the best security possible for his customers while at the same time recognizes the importance of communicating his efforts so that they are supported by stakeholders. From a conceptual perspective this aligns with the overall goal of supply chain security.

Table 4: How will your port handle security efforts in the near future (5-10) years in your opinion?

<i>How will your port handle security efforts in the near future (5 – 10 years) in your opinion?</i>	Percentage of cases
<i>Increase due to customer demands</i>	35.5 %
<i>Only change when laws or regulations require</i>	48.4 %
<i>Increase due to competition</i>	54.8 %
<i>Other</i>	4.40 %
<i>Leave unchanged</i>	0.00 %
<i>Decrease security because of customer complaints</i>	0.00 %

Summary of main findings

The results of the first part of the survey show that small to medium ports perceive different risks or threats towards their own facilities and operations as opposed to what is on top of the international maritime security agenda such as terrorism. This partly results in dissatisfaction and unwillingness when it comes to the application of security initiatives because small to medium ports in northern Europe rather seek protection from smuggle, theft and other misuse but still have to apply anti-terrorism initiatives. However, it could also be shown that over time acceptance grew and ports today think that side effects of security initiatives indeed increased their service quality. However, the initial burden of costs due to security upgrading and providing equipment is still perceived as the biggest cost driver while it seems ports assign less importance to staff training costs. On the one hand, this can be seen as an indicator that ports begin to include security into their daily routines and responsibilities and try to utilize it as a value adding activity. As presented, this assumption is supported by several comments in the expert interviews. On the other hand, it can be alarming that staff training seems to be relatively unimportant to ports but is regarded as critical to real security by experts. However, in order for the supply chain security concept to work all parts of the supply chain need to be managed - but if staff training, in services a critical factor for operations, falls short the overall goal of a more secure supply chain might not be reached.

The impact assessment on service quality presents a tendency towards an improvement in the aspect of efficiency as well as customer satisfaction. The results are also supported by an overwhelmingly positive overall impression as presented in *Figure 7*. In comparison to some of the previous literature findings such as Powanga (2006), Urcioli, et al. (2010), Yuen and Thai (2015) the amplitude of the impact is less in this study - to both directions: the results show neither very strong increase nor very strong decreases across all categories considered for service quality. For that matter it can be interpreted that the effects of security initiatives have either worn out over time or are not relevant in the ports perceptions or are simply not existent. But because this survey only measured the perceptions of ports an explanation for this development cannot be provided here. Nevertheless, the perceived improvements can be located in the paper-based activities connected to documentation and information gathering which increases transparency. A similar effect was observed by Mazeradi & Ekwall (2009) in swedish ports. In the customer satisfaction aspect it stands out that repondent ports perceive ambivalent demands from their customers: ports think that customers demand high security standards for their cargo but at the same time are looking for business partners that gurantee smooth and disruption free service. Most likely, this is because customers do want security but also think that terrorism is not a threat to them. Thus, they want protection from smuggle and theft but no delays caused by anti-terrorism measures. This conflicting demand pattern as perceived by ports can increase

confusion and make business more complicated which eventually can influence service quality. However, when customer require both high security and smooth handling the security of the overall supply chain might be improved. The second main finding here is that ports have an relaxed attitude towards the effects of security on their customer satisfaction as they do not think customer are holding them ultimately responsible for security complications. Therefore, this may indicate that ports are satisfied with their management and communication of security topics which makes the customer more a partner in security matters than an opponent.

Conclusion

In this concluding part of the thesis the following sections are going to be presented: First, the main findings are highlighted and it is shown how they answer the research questions as presented in the introduction. Second, the contribution of the results to the literature in this field is assessed. Finally, the author makes suggestions for future research in this topic area.

This thesis was designed with the purpose to investigate how ports themselves perceive the impact of security initiatives upon the service quality aspects efficiency and customer satisfaction. The research design was composed after a preceding literature review and used three semi-structured expert interviews in the beginning of the research to generate deeper insight into port perceptions. Based on the gained insights, an online questionnaire was composed and published to 48 sampled small to medium ports in Northern Europe that matched the sampling criteria. Finally, the gathered data from 32 respondents was analysed with the objective to answer the research questions in mind.

Answers to research questions

In the following, the research questions are addressed and answered individually:

RQ1: How do small to medium ports in northern Europe perceive the impact of security upon aspects of efficiency?

The results of this research shows that small to medium ports in northern Europe see improvements in the efficiency of support functions of their business such as the quality of information flow and general transparency of operations. From a service quality concept perspective these improvements are thought to increase efficiency and thus improve the overall service quality. However, aspects such as flexibility and excessive documentation are perceived as decreasing efficiency as they cause delays and extra work for the ports. In connection to the perceived main threats and applied security initiatives in the ports it can be analysed that increased bureaucratic efforts for anti-terrorism initiatives are not perceived as beneficial from the ports perspective. The data distribution also showed that respondent ports had bigger agreement upon the perceived effects in administrative aspects such as documentation than on indirect effects such as flexibility. This shows that the impact of supply chain security initiatives are not yet fully understood by the ports. Overall, the amplitude on both decrease and increases of efficiency aspects is low, showing a relatively neutral attitude of small to medium ports towards the effects of security on their efficiency.

RQ2: How do small to medium ports in northern Europe think security influences customer satisfaction?

The data shows that small to medium ports have a relaxed attitude towards the effects of security on customer satisfaction. They neither see very good nor very bad impacts but perceive that their customers on the one side demand real security for their while at the same time ports think that customers prefer a business partner who is very skilled in organizing security and thus does not generate problems or delays. The reasons for this ambivalent demand pattern could not be fully explained. However, from the conceptual perspective of supply chain security this pragmatic focus on smooth security handling may create a weak sport in the overall security efforts. Ports further recognize the critical importance of customer satisfaction with security related issues for their service quality and thus state that they integrated security in their business strategies. Therefore, the impact on customer satisfaction is likely to be indirect in the way that ports expand their competitive advantage portfolio with security capabilities as a reaction to increased demands from customers.

Contribution

The purpose of this thesis is to study how ports perceive that security initiatives are affecting the service quality aspects of efficiency and customer order to enrich the understanding of how supply chain security affects service quality. As presented in the introduction, previous research identified positive impacts such as higher transparency, less transit time, cost savings, or persuasive social and psychological benefits. However, other findings indicated negative effects such as increased administration and documentation, higher internal financial burdens, losses in flexibility and generally a higher complexity of operations. In summary, it can be said that no clear consent about the impact of maritime supply chains security initiatives on service quality could be reached. Moreover, much of the studies in this field investigated data from larger ports with global importance and therefore little is known about the effects in small to medium ports.

This thesis aimed to shed light into this research gap by exploring the perceptions of small to medium ports in northern Europe towards the impact of security. It contributes to the literature by presenting one piece of a puzzle to close the research gap through answering the proposed research questions (see above). Further, it enhances the concept of supply chain security in ports with an inside perspective which strengthens this young concept - although the results are not easily transferable to other situations. Moreover, because the goal of supply chain security is to avoid any disruptions it needs all actors along the chain to participate and therefore the here generated insights can offer ways to increase motivation by avoiding negative impacts for participants. Another contribution is that this thesis applied the young and much discussed concept of service quality to the business of international sea ports. By discussing how efficiency and customer satisfaction reflect on overall quality it could be proved that both are important aspects to consider for ports when assessing the quality of their service.

Conclusion

Especially the importance of customer satisfaction seems to be more relevant than the concept suggested. Overall, the here conducted application of the service quality concept to a new business area is both improving the concept and broadening the understanding of it. For instance, relevant indicators for the measurement of customer satisfaction from a supplier perspective could be generated.

Apart from theoretical contributions, the results also have a few strong contributions to the maritime transportation industry: First, the reasoning that only large commercial ports along the main trade routes are important is outdated since the meaning of smaller ports for their respective countries rises, especially in developing countries. Therefore, policy makers on national and international level can gain insight into the security needs and challenges of smaller ports to increase overall supply chain security. Moreover, the weakest link theory requires all parts of the network to be secure and thus present a need for an adjusted security approach for smaller ports. The results are therefore partly a starting point for practitioners to argue against the 'universalness of rules' in maritime security. Second, both ports and policy makers might use the generated data for future justification of changes in security efforts and gather impulses for improvements in communication and collaboration. When zooming out and viewing the situation as a service process with the port being the customer buying security initiatives from the authorities one must realize the following: only by knowing the customers' evaluation criteria one can produce a successful security initiative.

Suggestions for future research

The author would like to make suggestions for future research in the area of port security based on two criteria: First, suggestions on how to overcome weaknesses of this research and secondly, suggestions based on questions that had to remain unanswered or popped up during the research procedure.

In future research, the limitation of limited scope to a geographic region can be overcome by applying a similar research design to another region to investigate if there are critical differences. In addition, insights from psychological research might reveal which factors are most influential in the formation of perceptions. Those findings can potentially be used to adjust the data gathering process. Further, a larger study in this area with appropriate funding both financially and time wise may have the ability to conduct a probability sampling – although this might be more an aspect of research philosophy. In order to tackle the issue of respondent's truthfulness a replication of this research will allow to verify findings and strengthen its conceptual value.

Due to reasons of scope and time this thesis was not able to investigate concrete ideas on how to improve current security initiatives for small to medium ports in different regions. This might be a rich

topic for future research which might kick up some ideas to the authorities. Moreover, it would be very interesting to know more about what the ports expect from the future in terms of security and what they think are the most likely risk scenarios to them. Finally, the data from both the interviews and the questionnaire points out that ports do not have a clear agenda on the topic of digital data protection. This situation could be improved, for instance by a comparative study into how other transportation sectors such as airborne trade handle this issue.

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Appendix A: Online Questionnaire



Druckansicht vom 14.08.2015, 18:32

Bitte beachten Sie, dass Filter und Platzhalter in der Druckansicht prinzipbedingt nicht funktionieren. Fragen, die mittels PHP-Code eingebunden sind, werden nur eingeschränkt wiedergegeben.

[Korrekturfahne](#)

[Variablenansicht](#)

[PHP-Code ausblenden](#)

Seite 01

Questionnaire - Effects of port security

Welcome to this questionnaire and thank you for participating in this research!

With your answer to this questionnaire you will help to investigate the topic of port security and the effects of security measures such as the ISPS code, CSI, and other on aspects of port efficiency and customer satisfaction. In particular, this research will contribute to the understanding of the theoretical conflict of interest between applying high security measures on the one hand while at the same time ports have to be efficient and generate high levels of customer satisfaction.

The results of this questionnaire will contribute to a master thesis at Lund University in Sweden as part of the course Service Management & Logistics. The questionnaire consists of four sections that are structured as follows:

1. General implementation of security
2. Effects on efficiency
3. Effects on customer satisfaction
4. Future expectations

Of course, participation is voluntarily and anonymous. Moreover, you can skip any question that you prefer not to answer. Further, your data will be kept confidential and secured to the high standards of Lund University and not used by anyone else than the author of the study.

In the end of the questionnaire you can also leave contact details to receive a copy of the final research report which might provide interesting findings for your own interest.

If you have any questions or technical issues, please do not hesitate to contact me at any time using the details provided below.

Kind regards,
Olaf Habert

Lund university student
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Seite 02

Section 1 - General information

In this section general questions about the implementation of security measures at your port will be asked. Please note that for this questionnaire only your *own opinion* and not hard facts are from interest.

1. In 2014, how much cargo did your port handle in total over all categories (i.e. container, bulk, ferry)?

Please choose the categorie your port fits in. All numbers in mio. tonnes.

[Please choose]

2. In 2014, how many ships above 500 gross tonnes (GT) called at your port?

[Please choose]

3. The ISPS code describes three levels of security for port facilities. In normal conditions, on which ISPS security level does your port operate?

Level 1

Level 2

Level 3

We don't use the ISPS levels

4. Which of the following international initiatives for maritime security is your port using?

Multiple answers possible!

ISPS code

CSI (Container Security Initiative)

C – TPAT (Customs-Trade Partnership Against Terroism)

AEO (Authorized Economic Operator)

24-hours rule

Other

5. In your day-to-day operations, how relevant do you consider the following security initiatives for the security at your port?

Please indicate the relevance on the scale

	Very relevant	Relevant	Irrelevant	Not relevant at all	Not used
ISPS code	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CSI (Container Security Initiative)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C – TPAT (Customs-Trade Partnership Against Terrorism)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

AEO (Authorized Economic Operator)

24 hours rule

6. Which of the following do you think are the most important issues of security at your port?

Please drag and drop the items in the right order, starting with the main issue at the top. You can also double-click each item to place them in order.

Theft	Maritime terrorism	1
Smuggle of goods	Smuggle of people	2
Trespassing	Digital data theft	3
		4
		5
		6

7. How many security incidents of any kind did your port experienced in 2014?

0 – 20

21 – 40

41 – 60

61 – 80

81 – 100

above 100

I don't know

Prefer not to answer

8. Many security initiatives are enforced by the national authorities like customs, police or other agencies and they have a certain leeway to what extent or degree they apply the rules to the national ports.

How strict do you think your national authorities are in enforcing security measures?

Please tick one of the answers below and be aware that only your personal impression and experience is relevant and not hard facts.

Very strict Implementation Strict Implementation Normal Implementation Soft Implementation Very soft Implementation Prefer not to answer I don't know

9. How well do you think your national authorities are working together in coordinating the efforts for port security?

- Very good communication and collaboration
- Good communication and collaboration
- Bad communication and collaboration
- Very bad communication and collaboration

- I don't know
- Prefer not to answer

10. Compared to other countries in Europe, how strict do you think are your national authorities?

- National authorities are stricter as other
- National authorities are the same as other
- National authorities are easier as other

- I don't know
- Prefer not to answer

11. In order to implement and comply with security initiatives, certain cost occurred. Apart from the initial costs in the beginning for equipment and training of staff, who is financing the costs for the management of security today?

Multiple answers possible!

- Port
- Government
- Cargo owner
- Ship owner
- Other

12. Does your port take security surcharges to cover the cost for security measures?

- Yes, we use a security surcharge
- No, we do not use a security surcharge

- I don't know
- Prefer not to answer

13. What are the main cost drivers in maintaining the security level and applying with the regulations?

Please drag and drop the items in order, starting with the main cost driver at the top. You can also double-click each item to place them in order.

Training of staff

Hiring new staff

1

Providing equipment	Spending time on documentation	2
Solving security issues		3
		4
		5

14. Please describe if your port made any experiences in its human resource management that are connected to port security. For instance, did the selection process of new employees changed? How did port security affected leadership in your port?

Please feel free to write any comments in the box below.

15. The ISPS code uses security level 3 in case of an imminent threat for an incident and applies tight security measures. Would your port continue to operate at ISPS level 3?

- Yes, we would continue to operate
- No, we would stop operating until the level is decreased
-
- Prefer not to answer
- I don't know

Seite 03

Section 2 - Effects on efficiency

Many security initiatives in place today emerged from an increased awareness on threats against maritime transport after the terrorist attacks on New York in September 2001. Many ports had to change and increase their activities for security, which in turn affected the efficiency of a ports operation. The purpose of the following section is to find out how security initiatives (ISPS, C-TPAT, CSI, AEO, 24h rule) affected different aspects in your port since 2001.

Please note that for this research solely your *own perspective* on the presented aspects and not hard facts are of interest.

16. In the following, please indicate to what degree the particular aspect (stated below on the left side) has changed in your port since the implementation of security initiatives after 2001.

Strongly decreased Decreased Neutral Increased Strongly increased Don't know Prefer not to answer

Average throughput time of cargo	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flexibility in port operations, i.e. rescheduling or staffing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Number of cargo delays	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Transparency of port operations for customers and customs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Number of unknown locations of cargo at the port	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vessel turnaround time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quality of the flow of information between ship and port	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quality of information on cargo	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Number of problems due to insufficient documents for cargo	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17. Are there other aspects of efficiency that changed due to the implementation of port security? What else in your port operations is affected by port security?

Please feel free to write any comment in the box below.

Seite 04

Section 3 - Effects on customer satisfaction

Implementing and managing security at a port does not only influence the efficiency of a port's operations but will also have an impact on how satisfied customers of the port are with the service provided. The purpose of this section is to find out to what degree and in which ways customer satisfaction changed at your port.

Please note that for this research solely your *own perspective* on the presented aspects and not hard facts are of interest.

18. In the following, please indicate to which level you agree or disagree with a statement from your own ports perspective.

Customers accept delays when they occur due to security measures.

Strongly disagree Disagree Neutral Agree Strongly agree

Customers think that the port is ultimately responsible for all security incidents.

Strongly disagree Disagree Neutral Agree Strongly agree

Number of complaints from customer, due to security issues, has increased.

Strongly disagree Disagree Neutral Agree Strongly agree

Both shippers and land based customers are actively contributing to our security efforts.

Strongly disagree Disagree Neutral Agree Strongly agree

Customers want high security standards for their cargo and ships because it is vital for their business.

Strongly disagree Disagree Neutral Agree Strongly agree

Their duties and responsibilities are clear to our customers.

Strongly disagree Disagree Neutral Agree Strongly agree

Customers are looking for smooth and uncomplicated handling of their cargo when it comes to security measures rather than high security standards and protection of their goods.

Strongly disagree Disagree Neutral Agree Strongly agree

19. In your experience, are there any other effects of port security on customer satisfaction? Do you think that concerns for customer satisfaction are reflected in your management or business strategy?

Please feel free to write any comment in the box below.

20. Do you think that in general increased security has a negative or positive impact on your ports efficiency and customer satisfaction?

[Please choose]

Section 4 - Future prospects

The maritime transport system has been a target for many kinds of unfaithful acts in the past, but luckily there was no major incident and ports were able to protect themselves and their employees. This raises the question to what extend the implemented security measures are really necessary and if they are capable to protect ports in the future.

21. Although the growth of the maritime transport industry was slowed down by the economic crisis of the recent years, it is picking up pace again. That means that ports in the future will have to handle new types of challenges, while still maintaining a high security level. But how well is port security prepared for this?

Please indicate to what degree you think current security measures (ISPS, CSI, C-TPAT, AEO etc.) are capable of dealing with the challenges stated on the left.

	Very capable	Not capable at all	Don't know	Prefer not to answer
More containerized cargo	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bigger ships	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/>	<input type="radio"/>
More cargo to and from developing countries	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Protecting digital information of importance	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/>	<input type="radio"/>

22. How will your port handle security efforts in the near future (5-10) in your opinion?

Multiple answers possible!

- Increase security due to customer demands
- Leave unchanged
- Decrease security because of customer complaints
- Only change when laws or regulations demand so
- Increase to be more competitive in comparison to other ports

Other

23. The topic of increased maritime security in the last decade has been driven by the creation of general international rules and regulations. However, the implementation and management were expressed as guidelines and highly individual for every port. In the future, ports could do benchmarking in order to learn from other ports how to manage many issues and problems in security most effectively.

Please indicate on the scale below to what degree you think this could help improve port security.



24. Do you further think that benchmarking between ports could work, given that ports are very different from each other in terms of size, cargo, customer, risk, and other?

Please choose an answer and elaborate it from your perspective.

Answer (Yes or No)

Explanation

Seite 06

Thank you for participating

The questionnaire is now finished and your input is highly appreciated!

If you want to add any comment concerning your experience with port security and its impact on your operations, please feel free to do so in the box below. Also, any feedback or other comments are welcome.

25. Please use the box below for any comments.

26. You are welcome to leave your contact details below in order to receive a copy of the

research report. Please note that this information will be treated confidential and not used for other purposes! Further, it will be submitted separately from your answer and therefore it will not be able to identify your answer.

- Yes, I want to leave an e-mail address

Your contact information is safe!



Please note that this information will be treated confidential and not used for other purposes! Further, it will be submitted separately from your answer and therefore it will not be able to identify your answer with your contact details.

Letzte Seite

Thank you for completing this questionnaire!

We would like to thank you very much for your input for this research study.

Your answers were transmitted, you may close the browser window or tab now.

[Olaf Habert](#), Faculty of social sciences, Lund University – 2015

Appendix B: Interview Guide

Semi-structured interview guide (German interview)

Aim:

Investigate how do ports on the Baltic coast and German North Sea understand and manage the different targets of security one the one side and efficiency and customer satisfaction on the other side. Find out what the effects of security measure on service quality are.

Research Question for this interview:

What are the insights on the effects of security measures? Which experience have they made in the past and what is their perspective on this topic?

Why semi-structured interview?

To gain insight into a relatively unknown topic area in an early stage of the project and profit from what the interviewee sees as important to the topic.

Planned duration:

max. 90 min, although only a target and not a hard fact!

Guide

In the beginning, introduce the interviewee into the topic and aim of the study and highlight how important and valued his input will be. Ask for confidential issues and whether or not taking notes is ok. Give guidelines: Talk as freely as you like and as long as you like, everything and all answers are voluntary, ask for clarification when something is not totally clear. Advise that in the whole interview his perspective and interest in the topic are from most importance and not concrete answers to my questions.

It may be necessary to ask a question in order to make the interviewee talk about this area but it is the responsibility of the interviewer to ask follow up questions and encourage respondents to give an answer (called probing). Win-Win: the more the interviewee feels appreciated, the more he talks hence the richer our information.

Start with general questions (warm up):

- Die Arbeit des [REDACTED] und die von [REDACTED] [REDACTED] im speziellen
- Welche Leute bilden sie aus? Woher kommen die?
- Wie gut sind die Seminare besucht?
- Wie sieht ein typische Ablauf eines Seminars aus?

Wird das Thema Sicherheit bei Ihren Teilnehmern im Unternehmen als ein „Zwang“ gesehen der erfüllt werden muss oder gibt es „wahre Begeisterung“ und Engagement für mehr Sicherheit?

Sind PFSO und SSO nur zusätzliche Jobs bei bereits bestehenden Mitarbeitern oder gibt es neue Stellen?

Berichten Teilnehmer von Konflikten zwischen Sicherheit und betrieblicher Effizienz oder Sicherheit und Kundenzufriedenheit (Verspätungen, Non-loading order, mehr Papierkram, strengere Vorschriften -> höherer Kosten, 24 hours rule, Erhöhung des Security Levels)

Gibt es besondere Anstrengungen genau sowas zu vermeiden? Wie wichtig ist dieser Aspekt den Teilnehmern / deren Unternehmen? Was müsste in den Sicherheitsrichtlinien verbessert werden damit es weniger Konflikte gibt?

Haben die Häfen Bedenken was die Verbindung von Sicherheit und Wettbewerbsstärke betrifft? D.h. glauben sie, dass Häfen die nicht bestimmte Anforderungen erfüllen einen Nachteil haben?

Spielt Sicherheit eine Rolle wenn der Kunde seinen Hafen auswählt?

Aus Sicht und Erfahrungen des ma-co, was sind die größten Bedrohungen für Seehäfen in Nordeuropa? (Schmuggel, Terrorismus, Diebstahl, Anschläge, Digitale Daten)

Wie gut sind die aktuellen Sicherheitsvorschriften dazu geeignet auch die Anforderungen der Zukunft zu meistern (Größere Schiffe, höherer Konzentration der Fracht).

Semi-structured interview guide (English interviews)

Interviewee: [REDACTED]

Date & Location: 20.05.2015, 14:00h at [REDACTED] office

Aim:

Investigate how do ports on the Baltic coast and German North Sea understand and manage the different targets of security on the one side and efficiency and customer satisfaction on the other side. Find out what the effects of security measures on port performance are.

Research Question for this interview:

What are the insights on the effects of security measures? Which experience have they made in the past and what is their perspective on this topic?

Guide

In the beginning, introduce the interviewee into the topic and aim of the study and highlight how important and valued his input will be. Ask for confidential issues and whether or not taking notes is ok.

Give guidelines: Talk as freely as you like and as long as you like, everything and all answers are voluntary, ask for clarification when something is not totally clear. Advise that in the whole interview his perspective and interest in the topic are from most importance and not concrete answers to my questions.

It may be necessary to ask a question in order to make the interviewee talk about this area but it is the responsibility of the interviewer to ask follow up questions and encourage

respondents to give an answer (called probing). Win-Win: the more the interviewee feels appreciated, the more he talks hence the richer our information.

General Questions:

Why do you think port security is important?

How is security organized in your port?

- How well do PFSO, Risk Assessment and other fit into your business security strategy?
- Is the job of the PFSO an additional burden? Or is their real focus on security?

How relevant is the ISPS code/ CSI / 24h rule for your port?

What do you think are the main threats for the port of Helsingborg? (Theft, Smuggle, Terrorism...)

Do you have incidents? Are they serious and do they pose a threat to the operation of the port?

Have there ever been ships neglected to the port? For what reasons?

Efficiency

Can you describe if there have been any effects of increased security measures on the ports efficiency?

Are there other areas of efficiency that have been influenced?

How is the overall perception of the impact of security measures on the port?

Customer satisfaction

Also interesting for my work is whether you have any experiences with changes in customer satisfaction / loyalty due to security measures.

Number of complaints from customers due to security issues?

What do you think are the customer's perceptions towards their active participation in security?

Do customers want high security for their cargo and transportation or are they interested in a port that guarantees smooth customs transition and so on?

Do you have any experience with unhappy customers due to security reasons?

Future

How and why do you think security will change in the next 10 years for your port?

Do you think that the ISPS code and other are prepared to guarantee security for future challenges (More containers, bigger ships, more to and from risk countries)?

Are there efforts to discuss security management with other ports to learn? Something like benchmarking? Do you think that this can help port security?

Appendix C: Emails & Reminder Emails

Opening Email – known contact

Dear [Name from database],

My name is Olaf Habert and I am contacting you today because I am conducting an **academic study on the effects of port security on port performance and customer satisfaction**. The study is supervised by Lund University in Sweden and part of my Master's degree in Service Management & Logistics.

The aim of this study is to better understand how ports in the northern Europe region manage international demands for security and the effects initiatives like the ISPS code have on their ports. Further, it tries to identify the biggest challenges that security faces in the future for this kind of ports. Moreover, only perceptions and personal experiences from respondents are of interest for this research and not hard facts like company figures.

It would be very much appreciated if you could take part in this research by answering an online questionnaire which will take less than 15 minutes to complete, is fully anonymous, and your answer can help giving the stream of research in this topic a new direction!

Please use this link to get to the questionnaire:

The questionnaire is open until the 3rd of June, 24:00 hours.

Thank you very much for your time and interest - if you have any further questions, please do not hesitate to contact me at any time at the below stated contact details!

Kind regards,

Olaf Habert

Service Management & Logistics student, Lund University
olaf.habert.951@student.lu.se
+46 73 5868 925

Opening Email – unknown contact

Dear addressee,

My name is Olaf Habert and I am contacting you today because I am conducting an **academic study on the effects of port security on port performance and customer satisfaction**. The study is supervised by Lund University in Sweden and part of my Master's degree in Service Management & Logistics.

The aim of this study is to better understand how ports in the northern Europe region manage international demands for security and the effects initiatives like the ISPS code have on their ports. Further, it tries to identify the biggest challenges that security faces in the future for this kind of ports. Moreover, only perceptions and personal experiences from respondents are of interest for this research and not hard facts like company figures.

It would be very much appreciated if you could be so kind to forward this email to an appropriate contact within your company, who might be willing to assist in this matter.

To participate in this research, you can answer an online questionnaire which will take less than 15 minutes to complete, is fully anonymous, and your answer can help giving the stream of research in this topic a new direction!

Please use this link to get to the questionnaire:

The questionnaire is open until the 3rd of June, 24:00 hours.

Thank you very much for your time and interest - if you have any further questions, please do not hesitate to contact me at any time at the below stated contact details!

Kind regards,

Olaf Habert

Service Management & Logistics student, Lund University
olaf.habert.951@student.lu.se
+46 73 5868 925

First & Second Reminder – known contact

Dear [Name from database],

Recently you have been invited to participate in a research concerning “effects of port security on port performance and customer satisfaction”.

This is a final reminder that the online **questionnaire is open until tonight, 24hours!** Your participation is highly appreciated and will take 15 minutes only. Also, I am solely interested in your personal perception and not hard facts so answering will take no further actions for you.

Please use the following link enter the questionnaire:

Kind regards,

Olaf Habert

Service Management & Logistics student, Lund University
olaf.habert.951@student.lu.se
+46 73 5868 925

First & Second Reminder – unknown contact

Dear,

A little more than a week ago I invited you to participate in a research concerning “effects of port security on port performance and customer satisfaction”.

Today I would renew this invitation – every answer helps to investigate this topic and increase the understanding of port security! Therefore, I would very much appreciate your participation in the 15 minutes online survey which is fully anonymous.

Please use this link to get to the questionnaire:

The questionnaire is open until the 12th of June, 24:00 hours.

Please ignore this message if you already participated in the questionnaire.

Kind regards,
Olaf Habert

Service Management & Logistics student, Lund University
olaf.habert.951@student.lu.se
+46 73 5868 925

Final Reminder – known contact / unknown contact

Dear

Recently you have been invited to participate in a research concerning “effects of port security on port performance and customer satisfaction”.

This is a final reminder that the online questionnaire is open until tonight, 24hours! Your participation is highly appreciated and will take 15 minutes only. Also, I am solely interested in your personal perception and not hard facts so answering will take no further actions for you.

Please use the following link enter the questionnaire: %link%

Kind regards,
Olaf Habert

Service Management & Logistics student, Lund University
olaf.habert.951@student.lu.se
+46 73 5868 925