THE EFFECTS OF PORT SECURITY COMPLIANCE ON THE COMPETITIVENESS OF UNITED STATES AND EUROPEAN UNION PORTS AND MARITIME INDUSTRY TERMINAL FIRMS

An Undergraduate Research Scholars Thesis

by

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ABSTRACT

The Effects of Port Security Compliance on the Competitiveness of United States and European Union Ports and Maritime Industry Terminal Firms (May 2014)

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This research addresses how maritime security regulations affect company competitive strategies. This research attempts to measure the impact of the *way* these security regulations are implemented on perceived competitiveness of terminals and ports located in the United States (U.S.) and the European Union (E.U.). A survey of U.S. and E.U. port based companies, questions companies if the way the company complies with the International Ship and Port Security code of 2004 and other U.S. and E.U. regulations provide them a competitive advantage.

The survey asks ports and firms to determine if their assets are unique, valuable, not easily imitated, not easily substituted, specific to that firm, or holds no competitive advantage. This determination is based upon Resource- Based Strategic Theory, which proposes that certain assets available can give firms a competitive advantage. The survey was distributed to all ports and terminals in the U.S. The list of ports and terminals was retrieved from the Sea-Web Port and Terminal guide.

The U.S. and E.U. firms results show that their competitive advantages mostly comes from the use of intangible assets. These particular differences are what will assist in answering the question of what do U.S. ports think creates their competitive advantage.

DEDICATION

I would like to dedicate this work to my loving family and friends that have supported me in all of my endeavors. I would especially like to dedicate this to my mom who has been there for me when I pushed myself to my academic limits to excel and whom I could never show enough appreciation for all of her support and love.

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CHAPTER I

INTRODUCTION

Maritime security is crucial to the transportation of goods over water. With 68,036 port calls in the United States in 2011, the security of goods before, during, and after transport is important to the industry and the businesses involved ("Vessel calls," 2013). The United States is one of the few countries that had a security requirement for ports prior to the attacks on September 11th, 2001. The International Ship and Port Security Code, or ISPS, created by the International Maritime Organization, or IMO, and adopted by the United States government created certain additional requirements for ports to have for security purposes. The code recommended certain infrastructure protections, such as fences, lighting, and scanners. All security measures, whether physical or technical, are investments to companies involved in the maritime industry. The security measures available could cause a company to not select a certain port due to the threats. This project is being conducted to expand upon prior research conducted in the European Union ports to answer the question: How does United States' ports compliance with security measures enhance them and make them more competitive?

In 2012, according the U.S. Department of Maritime Administration, the total value of waterborne trade in the U.S. was $1,781,334,356. This number translates to a total of 1,292,080,082 metric tons of products traded by water in 2012 ("U.S. waterborne foreign trade," 2013). It is clear that the security of U.S. ports is crucial to ensure the safety of the goods that bring revenue to the U.S. and also are expenses.

The research combined with the U.S. research was done in the E.U. and found that like the U.S. the E.U. port and terminal managers feel that intangible assets give them more of a competitive advantage (Stone, 2013). This research is being done to extend upon the research done in the EU measuring the core competencies and will be compared to view the differences in port competitive strategies between the two areas. It is thought that since the U.S. ports have operated with physical structures longer than the E.U. ports, the technical and human assets are expected to give a competitive advantage. The prior research used a survey to determine what ports and businesses felt were their most competitive assets, a similar survey was distributed to gather data relating to what U.S. ports felt were their competitive assets in this project.

CHAPTER II

LITERATURE REVIEW

To create the survey instrument that was utilized to gather this research, resource based theory was used. Resource based theory has been applied in prior research that involved the maritime industry. Researchers such as Chou and Chang (2004), Gordon, Lee, and Lucas (2005), Pringle and Kroll (1997), all utilized resource based theory principles to gather their research in the maritime industry. Chou and Chang (2004) evaluated the Taiwan shipbuilding industry with resource based theory. Gordon, Lee, and Lucas (2005) used resource based theory to interpret the impact of technology to the Port of Singapore. Pringle and Kroll (1997) assessed the British naval fleet through resource based theory in the Battle of Trafalgar. In this paper, the perceptions that managers had on their competiveness in the way that they applied their port security assets, capabilities, and competencies.

Resources utilized in a firm have proven to be important in relation to the firm's efficiency and competitiveness. The resource based view on strategy has grown since Barney (1991) proposed that certain resources allow firms to implement strategies that improve their efficiency and effectiveness. Resources were defined by Barney (1991) as "all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc. controlled by a firm." Sirmon, et. Al. (2008) presents the idea that "resources are instrumental to competitive advantages but add that management must effectively bundle and deploy an organization's resources for an advantage to be realized." This proves that it is important to properly bundle, manage, and deploy resources to gain a competitive advantage.

Assets, capabilities, competencies and management of these must be valuable, rare, inimitable, and/or not easily substitutable (VRIN) in order to gain a competitive advantage (Barney, 1991). Valuable means that a resource holds more value in relative cost and benefits than a similar resource in a competing firm and may be specific to the firm. Rare indicates that a resource is scarce relative to demand for its use so it may be unique. Inimitable means it is difficult for competitors to replicate or imitate. Non-substitutable refers to a lack of functional substitutes for the resource (Barney, 1991).

In this paper, we do measure the competitiveness or competitive advantage based on the perceptions of the managers of the firms. The actual competitiveness of each firm could not be measured since this would require knowledge of each firm's security plan and the specific assets they have available, which most may not be willing to share. Therefore, we ask managers if they perceive whether they have gained a competitive advantage in the way they bundled, managed, and deployed their security assets based on ISPS regulations.

The regulations that this paper is based off of are the measures in International Ship and Port Facility Security Code (ISPS). The measures that are described in the code allow for the enhancement of the security of ships and port facilities. These were created to have a standard set of measures for global ship and port protection by the IMO. ISPS is an amendment to the Safety of Life at Sea (SOLAS) Convention and instead of specifying which measures should be implemented in each port and ship, it outlines "a standardized, consistent framework for

evaluating risk, enabling governments to offset changes in threat with changes in vulnerability for ships and port facilities." (ISPS, 2003)

Port facility security should cause minimum interference to the shipping process. At a minimum, the port facilities must control access to the port facilities; monitor the port facilities including anchoring and berthing; monitor restricted areas to ensure that only authorized persons have access; supervise the handling of cargo; supervise the handling of ship's stores; ensure that security communication is readily available; and have a port facilities security plan and a port facilities security officer. The port facilities plan must include measures to prevent weapons and unauthorized access to the port; procedures for responding to security threats, breaches and instructions from the government; procedures for evacuation and interfacing with ship security activities; procedures for reviewing and updating the plan; procedures for reporting security incidents; measures to ensure effective security of cargo and cargo handling equipment; procedures for responding to a security alert; and procedures for facilitating shore leave for ship personnel and access to the ship by appropriate persons (ISPS, 2003). The port facility officer is the responsible person for these activities and his/her duties include developing and maintaining the port facility plan; undertaking regular security inspections of the port facility; recommending and incorporating modifications to the port security plan; enhancing security awareness and vigilance by the port facility personnel; reporting to relevant authorities and maintaining records of occurrences which threaten the security of the port facility; coordinating with security services; ensuring that the standards for security personnel are met; ensuring that security equipment is properly maintained and assisting ship security officers in confirming identity of those seeking to board a ship (ISPS, 2003).

As stated earlier, resource based theory defines resources as assets, capabilities, competencies and the management of these resources. To determine what items are considered security resources in a port, we reviewed the United States Coast Guard (USCG) port security best practices. Security assets/resources are categorized consistent with resource based theory as physical, ongoing management, planning and structuring management, human, technological, intangible, and financial (Chou and Chang, 2004). Referring to the USCG list of security practices (USCG, 2005), physical resources are defined as physical structures, perimeter barriers, lighting, screening and detection devices, towers, fencing, turnstiles, anti-vehicle barricades, and uniforms. Ongoing management resources are communication systems, documentation and security reports systems, patrolling systems, access systems, cargo tracking systems, security and access procedures, security incentive systems, warning and alarm systems, and checklists. Planning and structuring management resources include security planning systems, assessment systems, dual usage asset plans, brainstorming session system and security logistics design. Human resources include employee knowledge, employee experience, and employee training systems, guard forces, trained canine units and drill exercises. Technological resources include biometrics, software protection, electronic access control, electronic surveillance, electronic and automatic tracking and enterprise resource planning systems (ERP). Intangible assets are location, capacity, complementary infrastructure, third-party security contracts, and relationships with local fisherman, a safety culture, union relationships and outreach relationships. Finally, financial resources are defined as port security fees, other revenue generation for security and safety and cost savings from security compliance (USCG, 2012).

CHAPTER III

METHODOLOGY

In order to collect information on the perception port and terminal managers have on the competitiveness of their deployment of security resources, we administer a survey instrument to all ports and terminal operators in U.S. ports and E.U. ports. Since measuring actual competitiveness or competitive advantage would require specific knowledge of the port's security system, we only evaluate the perception that the port and terminal managers have of their assets. The survey allows them to give us their perception of whether or not they have gained a competitive advantage in their bundling, management and deployment of their security assets.

The issues related to this type of data collection methodology include three concerns. The first concern is the need to have confidence in the information collected and that the information collected is not biased. The second concern is that the information measured across all respondents is consistent and comparable. The final concern is that the data collected under this method is consistent with other non-survey based data sources (Fowler, 1993)

In order to ensure that these concerns are addressed, we conducted the surveys in the following manner. First, we determined the population to interview. Second, we designed the questions and determined the reliability and validity of the questions across the interviewees. Third, we calculated the response rate and composition of the survey respondents to determine whether the

rate led to a conclusion with bias. Finally, we complied with the rules on human subjects under the 1981 U.S. policy for the Protection of Human Subjects (Title 45, Part 46).

The entire population of U.S. port managers and terminal operators was surveyed. A list of addresses and e-mail addresses was obtained from the 2011-2012 IHS Fairplay Ports and Terminals Guide. IHS Fairplay makes every effort to ensure quality, accuracy, and completeness of the information in this guide. This guide has contact information for each port in the U.S. including the terminal operators. Therefore, we do not anticipate any bias due to the frame selection of the population for survey (Fowler, 1993).

The survey questions were developed from various stakeholder input. The stakeholders included port authority managers, terminal operators, consultants, Baltic and International Maritime Council (BIMCO) officers, USCG operation officers, NATO officers, European industry journalists and academic experts on port security and on Resource-based strategic theory. Questions were developed to determine which security resources owned and deployed by the respondent are considered to contribute to competitiveness of his/her port or terminal organization.

The port managers and the terminal operators received the survey questions (See Appendix 1) either via email or letter mail. The survey instrument was sent to the entire population of port authority managers and terminal operators in the U.S. The survey instrument used in the E.U. was sent in English, Spanish, and French (Stone, 2013). Recipients with invalid email addresses

were contacted via letter mail. Second requests were made to non-respondents via email, mail and telephone.

The total number of U.S. ports surveyed was 176 in 22 states. The responses received represented 10 of 22 coastal states with all three seacoasts, Alaska and Hawaii represented. The total number of E.U. ports surveyed was 1,068 in the 22 countries in the E.U. with a coastline. Responses received represented 21 countries, all E.U. countries with ports except Portugal. We conclude that this methodology of collection of survey responses for all respondents does not bias the responses. The entire population was surveyed causing no sampling bias. The letters are consistent to each respondent causing no survey interviewing bias.

Failure to collect data from a high percentage can create a bias in the information collected (Fowler, 1993). Those who do not respond may represent a systematically different group from those who responded. Survey responses for port authority managers and terminal operators were combined to increase response rates. Results of the requests for information from U.S. port and terminal operator managers represented 10.8% and from E.U. port terminal managers represented 5.52%. In general, the total response rate for email surveys for industry surveys is found to be approximately (in two different studies), 6 percent or 13.35 percent (Tse, 1995; Hamilton, 2009). However, due to the fact that all but one E.U. country (Portugal) and all three U.S. coasts, Hawaii and Alaska are represented, we feel that there is no non-response bias in the survey findings. Though, we should note that no New York port or terminal operator responded, the center of the 9/11 incidents.

In order to ensure that the measurement across all respondents is consistent and comparable, the validity and the reliability of the survey instrument must be addressed. Validity refers to the ability of the question in a survey instrument to measure what it purports to measure (Academic.Luzerne.edu, 2005). Reliability refers to the ability of the question to provide consistent measures in comparable situations (Fowler, 1993).

The type of validity applicable in the survey instrument here is content validity that focuses on the content of the information being asked (Academic.Luzerne.edu, 2005). The survey instrument asks for some factual information from the respondent that can be compared to the port or company website. In order to increase the validity of the instrument, we further had to make sure that the respondents understood the questions, knew the answer, and were willing to reveal their knowledge (Fowler, 1993).

In order to increase the validity we took the following steps. The questions were tested on a pilot sample of sample of E.U. port and terminal managers, and we received feedback as to the wording of the questions, who should be asked based on who was knowledgeable on these matters in each port organization and who would most likely share the knowledge. The findings were confirmed with the respondents to ensure that we understood the information that was shared. Therefore, we concluded that the survey instrument was valid. In reporting results, if a respondent answered that an asset/resource was unique or specific it is categorized as “rare” which is the resource-based theory definition noted. In developing the survey, the stakeholders and pilot sample respondents believe that “rare” could be best captured if the construct was divided into the two categories.

In order to ensure reliability we asked each respondent the same set of questions. A certified professional translator completed translations of the instrument into French and Spanish. To ensure that the questions mean the same to every respondent and that the appropriate type of response is communicated consistently to and from all respondents, the stakeholders and the pilot sample members reviewed the meaning of each question. Finally, we reviewed all responses and summarized them. The results showed that the respondents consistently reported similar knowledge in a similar manner. Hence, it appears that the instrument is reliable.

CHAPTER IV

RESULTS

The results of the U.S. port and terminal operators are reported in Table 1. A majority of U.S. port and terminal operators do not find that security physical assets provide a competitive advantage. Although, a strong minority (over 40%) finds that certain security assets such as perimeter barriers, lighting, screening and detection devices, and fencing can provide a competitive advantage. Perimeter barriers are considered valuable, rare and not easily imitated. Lighting, screening and detection devices are determined to be valuable, rare and not substitutable. Fencing is determined to be rare and not substitutable.

Ongoing management resources deployed are considered generally enhancing competitive advantage is four assets categories of communication systems, documentation and security reports, patrolling systems, and checklists. There is also a strong minority (42.86%) who find that warning and alarm systems deployed can provide competitiveness. Communication systems are considered competitive across all categories of VRIN. However, documentation, security reports and patrolling systems are found to be rare, not easily imitated and not substitutable. Finally, checklists are considered rare and not substitutable.

For planning and structuring management resources, only security planning systems were considered to contribute to competitiveness. U.S. port and terminal operators indicate that these resources are rare and not easily imitated. For human resources, possessing employee experience

in security is deemed a competitive advantage in that it is rare and valuable. There is a strong minority (46.15%) who feel employee knowledge is also rare and valuable.

Technological assets do not appear to contribute to competitive advantage for U.S. ports and terminals. However, a strong minority (over 40%) perceives that software protection and electronic surveillance can be VRIN or RIN. Financial assets are perceived as not providing competitiveness.

U.S. port and terminal managers perceive that they receive a significant competitive advantage from intangible security assets. Port security capacity of the organization, complimentary security infrastructure (hinterland assets) of the organization, safety culture and outreach relationships are all considered valuable, rare, inimitable, and not substitutable. Location of the firm in the port, or of the port, provides some advantage in security deployment that is valuable, rare or not substitutable. Further, a strong minority (over 40%) believes third party security provides a competitive advantage. This confirms that the way assets are deployed and managed, in the case of U.S. ports and terminals, through intangible assets, is the most effective way to gain a competitive advantage.

Table 1: U.S. Port and Terminal Operators Survey Responses

U.S. Port and Terminal Operators Survey							
Physical Resources	**Valuable**	**Rare**	**Not Easily Imitated**	**Not Substitutable**	**Total Advantage**	**No Advantage**	**Total**
Structures	14.29%	14.29%	7.14%	0.00%	35.71%	64.29%	100%
Physical and Perimeter Barriers	14.29%	21.43%	7.14%	0.00%	42.86%	57.14%	100%

Lighting	7.14%	21.43%	0.00%	14.29%	42.86%	57.14%	100%
Screening and Detection Devices	7.14%	21.43%	0.00%	14.29%	42.86%	57.14%	100%
Towers	0.00%	7.14%	0.00%	0.00%	7.14%	92.86%	100%
Fencing	0.00%	26.67%	0.00%	13.33%	40.00%	60.00%	100%
Turnstiles	0.00%	0.00%	7.69%	7.69%	15.38%	84.62%	100%
Anti-vehicle barricades	7.69%	15.38%	0.00%	15.38%	38.46%	61.54%	100%
Uniforms	0.00%	7.14%	7.14%	14.29%	28.57%	71.43%	100%
Ongoing Management Resources							
Communication Systems	7.14%	14.29%	21.43%	7.14%	50.00%	50.00%	100%
Documentation and Security Reports	0.00%	21.43%	14.29%	14.29%	50.00%	50.00%	100%
Patrolling Systems	0.00%	28.57%	7.14%	14.29%	50.00%	50.00%	100%
Access Systems	0.00%	21.43%	14.29%	0.00%	35.71%	64.29%	100%
Cargo Tracking Systems	0.00%	7.14%	7.14%	14.29%	28.57%	71.43%	100%
Security and Access Procedures	0.00%	13.33%	13.33%	6.67%	33.33%	66.67%	100%
Security Incentive Systems	0.00%	14.29%	14.29%	7.14%	35.71%	64.29%	100%
Warning and Alarm Systems	0.00%	35.71%	0.00%	7.14%	42.86%	57.14%	100%
Checklists	0.00%	35.71%	0.00%	14.29%	50.00%	50.00%	100%
Planning and Structuring Management Resources							
Security Planning Systems	0.00%	28.57%	21.43%	0.00%	50.00%	50.00%	100%
Assessment Systems	0.00%	7.69%	23.08%	7.69%	38.46%	61.54%	100%
Dual Usage Asset Plans	0.00%	7.69%	23.08%	7.69%	38.46%	61.54%	100%
Brainstorming Session System	0.00%	7.69%	15.38%	15.38%	38.46%	61.54%	100%
Security Logistics Design	0.00%	8.33%	16.67%	8.33%	33.33%	66.67%	100%
Human Assets/Resources							

Employee Knowledge	30.77%	15.38%	0.00%	0.00%	46.15%	53.85%	100%
Employee Experience	23.08%	30.77%	0.00%	0.00%	53.85%	46.15%	100%
Employee Training Systems	7.69%	23.08%	7.69%	0.00%	38.46%	61.54%	100%
Guard Forces	0.00%	7.69%	0.00%	7.69%	15.38%	84.62%	100%
Trained Canine Units	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100%
Drills	7.14%	14.29%	7.14%	7.14%	35.71%	64.29%	100%
Exercises	7.69%	15.38%	7.69%	7.69%	38.46%	61.54%	100%
Technological Assets							
Biometrics	9.09%	0.00%	9.09%	0.00%	18.18%	81.82%	100%
Software Protection	8.33%	16.67%	8.33%	8.33%	41.67%	58.33%	100%
Electronic Access Control	8.33%	8.33%	8.33%	8.33%	33.33%	66.67%	100%
Electronic Surveillance	0.00%	8.33%	8.33%	25.00%	41.67%	58.33%	100%
Electronic and Automatic Tracking	0.00%	8.33%	0.00%	25.00%	33.33%	66.67%	100%
Enterprise Resource Planning System	8.33%	8.33%	0.00%	8.33%	25.00%	75.00%	100%
Intangible Assets							
Location	7.14%	57.14%	0.00%	7.14%	71.43%	28.57%	100%
Capacity	25.00%	25.00%	16.67%	8.33%	75.00%	25.00%	100%
Complementary infrastructure	7.69%	30.77%	15.38%	7.69%	61.54%	38.46%	100%
Third-party security	8.33%	8.33%	8.33%	16.67%	41.67%	58.33%	100%
Relationships with local fishermen	25.00%	8.33%	0.00%	0.00%	33.33%	66.67%	100%
Safety culture	15.38%	23.08%	15.38%	15.38%	69.23%	30.77%	100%
Union Relationships	15.38%	23.08%	15.38%	0.00%	53.85%	46.15%	100%
Outreach relationships	30.77%	30.77%	7.69%	7.69%	76.92%	23.08%	100%
Financial Assets							
Port Security Fees	0.00%	16.67%	0.00%	0.00%	16.67%	83.33%	100%

Other Revenue Generation for Security and Safety	0.00%	10.00%	10.00%	0.00%	20.00%	80.00%	100%
Cost Savings from Security Compliance	0.00%	15.38%	7.69%	0.00%	23.08%	76.92%	100%

The results of E.U. port and terminal operators are reported in Table 2. Unlike U.S. managers, E.U. port and terminal operators perceive that competitive advantage can be obtained in the deployment and management of physical structures and perimeter barriers. They are considered valuable, rare, not easily imitated and not substitutable.

Ongoing management security resources are considered to give competitive advantage in only one category, documentation and security reports, but this category is also considered to give competitiveness by U.S. managers. These resources are considered to possess VRIN. A strong minority of managers (over 40%) considers the following ongoing management security resources to be also be VRIN. They are communication systems, patrolling systems, cargo tracking systems, security and access procedures, warning and alarm systems and checklists.

E.U. port and terminal managers do not perceive planning and structuring management security resources as competitive. Again, however, there is a strong minority (over 40%) who perceive that security planning systems and assessment systems are VRIN. Further, a strong minority of managers (40%) feel that security logistics design can be rare, inimitable and not substitutable.

For E.U. port and terminal operators, human security resources seem to provide a great perceived competitive advantage. Employee knowledge, employee experience, employee training systems,

drills and exercises all are deemed valuable, rare, inimitable, and not easily substituted. Further, a strong minority (47%) believes guard forces can also provide competitiveness.

Security technological assets as well provide competitiveness for E.U. ports and terminals. Software protection, electronic access control, electronic surveillance are perceived as VRIN. A strong minority of E.U. managers (over 43%) also perceived electronic and automatic tracking and their enterprise resource planning systems as enhancing competitiveness. Financial assets are not considered as helping competitiveness. However, a strong minority (40%) perceives cost savings from security compliance as beneficial to competitive advantage.

Similar to U.S. port and terminal managers, E.U. managers perceive that intangible security assets are very important in providing competitive advantage to the organization. Location in the port, security capacity of the organization in the port, complementary security infrastructure, union, local fishermen and outreach relationships and safety culture are all considered VRIN for competitive advantage. Again similar to the perception of U.S. managers, this perception of E.U. port and terminal managers confirms that the way assets are deployed and managed through intangible assets is the most effective way to gain a competitive advantage.

Table 2 – EU Port and Terminal Operators Survey Responses

EU Port and Terminal Operators Survey							
Physical Resources	**Valuable**	**Rare**	**Not Easily Imitated**	**Not Substitutable**	**Total Advantage**	**No Advantage**	**Total**
Structures	10.26%	33.33%	12.82%	2.56%	58.97%	41.03%	100%
Physical and Perimeter Barriers	2.63%	28.95%	7.89%	13.16%	52.63%	47.37%	100%
Lighting	2.70%	13.51%	5.41%	13.51%	35.14%	64.86%	100%

Screening and Detection Devices	7.89%	10.53%	2.63%	7.89%	28.95%	71.05%	100%
Towers	3.03%	9.09%	6.06%	15.15%	33.33%	66.67%	100%
Fencing	0.00%	21.05%	5.26%	7.89%	34.21%	65.79%	100%
Turnstiles	3.03%	9.09%	6.06%	9.09%	27.27%	72.73%	100%
Anti-vehicle barricades	6.45%	6.45%	9.68%	6.45%	29.03%	70.97%	100%
Uniforms	5.41%	16.22%	5.41%	10.81%	37.84%	62.16%	100%
Ongoing Management Resources							
Communication Systems	7.69%	20.51%	15.38%	2.56%	46.15%	53.85%	100%
Documentation and Security Reports	10.26%	30.77%	2.56%	7.69%	51.28%	48.72%	100%
Patrolling Systems	10.53%	23.68%	5.26%	5.26%	44.74%	55.26%	100%
Access Systems	7.89%	18.42%	5.26%	7.89%	39.47%	60.53%	100%
Cargo Tracking Systems	10.81%	16.22%	8.11%	5.41%	40.54%	59.46%	100%
Security and Access Procedures	5.41%	27.03%	5.41%	5.41%	43.24%	56.76%	100%
Security Incentive Systems	5.88%	20.59%	5.88%	5.88%	38.24%	61.76%	100%
Warning and Alarm Systems	5.41%	27.03%	2.70%	5.41%	40.54%	59.46%	100%
Checklists	2.70%	27.03%	8.11%	5.41%	43.24%	56.76%	100%
Planning and Structuring Management Resources							
Security Planning Systems	5.13%	23.08%	10.26%	7.69%	46.15%	53.85%	100%
Assessment Systems	7.69%	23.08%	2.56%	7.69%	41.03%	58.97%	100%
Dual Usage Asset Plans	2.94%	23.53%	5.88%	5.88%	38.24%	61.76%	100%
Brainstorming Session System	2.78%	11.11%	11.11%	11.11%	36.11%	63.89%	100%
Security Logistics	0.00%	22.86%	11.43%	5.71%	40.00%	60.00%	100%

Design							
Human Assets/Resources							
Employee Knowledge	26.32%	21.05%	2.63%	10.53%	60.53%	39.47%	100%
Employee Experience	28.21%	23.08%	0.00%	10.26%	61.54%	38.46%	100%
Employee Training Systems	10.26%	28.21%	10.26%	2.56%	51.28%	48.72%	100%
Guard Forces	8.82%	26.47%	2.94%	8.82%	47.06%	52.94%	100%
Trained Canine Units	10.00%	16.67%	3.33%	6.67%	36.67%	63.33%	100%
Drills	5.26%	28.95%	10.53%	5.26%	50.00%	50.00%	100%
Exercises	7.69%	30.77%	5.13%	7.69%	51.28%	48.72%	100%
Technological Assets							
Biometrics	10.00%	16.67%	3.33%	6.67%	36.67%	63.33%	100%
Software Protection	9.09%	30.30%	6.06%	12.12%	57.58%	42.42%	100%
Electronic Access Control	14.29%	28.57%	2.86%	8.57%	54.29%	45.71%	100%
Electronic Surveillance	11.43%	31.43%	2.86%	8.57%	54.29%	45.71%	100%
Electronic and Automatic Tracking	9.38%	21.88%	6.25%	9.38%	46.88%	53.13%	100%
Enterprise Resource Planning System	6.25%	21.88%	6.25%	9.38%	43.75%	56.25%	100%
Intangible Assets							
Location	35.29%	29.41%	5.88%	5.88%	76.47%	23.53%	100%
Capacity	33.33%	25.00%	5.56%	5.56%	69.44%	30.56%	100%
Complementary infrastructure	22.22%	25.00%	5.56%	11.11%	63.89%	36.11%	100%
Third-party security	14.71%	11.76%	2.94%	5.88%	35.29%	64.71%	100%
Relationships with local fishermen	17.65%	26.47%	5.88%	5.88%	55.88%	44.12%	100%
Safety culture	19.44%	25.00%	5.56%	11.11%	61.11%	38.89%	100%
Union Relationships	17.14%	25.71%	5.71%	17.14%	65.71%	34.29%	100%

Outreach relationships	14.71%	26.47%	14.71%	11.76%	67.65%	32.35%	100%
Financial Assets							
Port Security Fees	5.56%	19.44%	5.56%	5.56%	36.11%	63.89%	100%
Other Revenue Generation for Security and Safety	3.03%	18.18%	12.12%	6.06%	39.39%	60.61%	100%
Cost Savings from Security Compliance	14.29%	17.14%	2.86%	5.71%	40.00%	60.00%	100%

CHAPTER V

CONCLUSION

The security measures that ports have in place are crucial to ensure the safety of the cargo and the community that the port serves. This research extends upon prior research with the same survey instrument distributed in the E.U. to compare how regulations are complied with in both the E.U. and the U.S. and how that affects port and port terminal competition. When compared, the results show that both the E.U. and the U.S. perceive that the way they deploy their intangible assets gives them a competitive advantage. The security measures available at a port could affect the port selection by companies and vessels, hence, port security assets are important.

This research shows that physical, technological, and planning security assets are important to the firms in a port but they are not perceived to be as important to competitiveness as the intangible assets. Resource-based strategic theory helps us to understand the combination of assets, capabilities, competencies and the management of this mix and how it is important to port security management. Further research is needed to evaluate manager perceptions and the actual competitive advantages that firms gain through their adoption of regulations.

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APPENDIX 1

SURVEY INSTRUMENT

WHY YOU SHOULD COMPLETE THIS SURVEY

We are trying to determine if United States of America ports can receive a competitive advantage from their methods and processes of security compliance with ISPS and U.S.A. Regulation.

BENEFITS TO YOU This research should provide companies with information on the management practices that help you beat your competition and make better security compliance decisions. The knowledge gained will be freely shared with you in final tabulator form. We will not reveal the nature of any individual response to any outside source.

WHY YOU You are a manager in a United States of America port.

WHO WE ARE We are nonprofit university research professors from the World Maritime University (Malmo, Sweden) and Texas A & M University at Galveston (Galveston, Texas, USA).

TIME TO COMPLETE The time to complete is approximately 15 minutes. We know you are busy and will appreciate your help with this voluntary survey.

When we refer to Assets/Resources we mean only assets/resources acquired after July 1, 2004.When we refer to Competitive Advantage or Competitiveness we mean that which makes your company perform at a higher level than others in your same industry or market. Your competitors may include companies in other ports.

1. Your title

2. Your port

The following questions 3 through 9 list security compliance assets/resources by type. This list was obtained from the U.S. Coast Guard's best practices. Please check each box that applies for each asset. The headings mean: Unique means the asset/resource is unique from my competitors' assets/resources, Valuable means the asset/resource is more valuable than my competitors' assets/resources, Not easily imitated means the asset/resource is difficult for my competitors to imitate(replicate).Non sub means the asset/resource is not easily substituted by other resources (rather than exactly imitated)Specific means the asset/resource is specific to my company and cannot be easily acquired or used by my competitors. No competitive advantage means you have the asset/resource but you are not sure it gives you a competitive advantage.

3. Physical Assets/Resources include the following, etc.:

	Unique (1)	Valuable (2)	Not Easily Imitated (3)	Non sub (4)	Specific (5)	No Competitive Advantage (6)
Structures (1)	❍	❍	❍	❍	❍	❍
Physical and perimeter barriers (2)	❍	❍	❍	❍	❍	❍
Lighting (3)	❍	❍	❍	❍	❍	❍
Screening and detection devices (4)	❍	❍	❍	❍	❍	❍
Towers (5)	❍	❍	❍	❍	❍	❍
Fencing (6)	❍	❍	❍	❍	❍	❍
Turnstiles (7)	❍	❍	❍	❍	❍	❍
Anti-vehicle barricades (8)	❍	❍	❍	❍	❍	❍
Uniforms (9)	❍	❍	❍	❍	❍	❍

4. Ongoing Management Assets/Resources include the following, etc.:

	Unique (1)	Valuable (2)	Not Easily Imitated (3)	Non sub (4)	Specific (5)	No Competitive Advantage (6)
Communication systems (1)	❍	❍	❍	❍	❍	❍
Documentation and security reports systems (2)	❍	❍	❍	❍	❍	❍
Patrolling systems (3)	❍	❍	❍	❍	❍	❍
Access systems (4)	❍	❍	❍	❍	❍	❍
Cargo tracking systems (5)	❍	❍	❍	❍	❍	❍
Security and access procedures (6)	❍	❍	❍	❍	❍	❍
Security incentive systems (7)	❍	❍	❍	❍	❍	❍
Warning and alarm systems (8)	❍	❍	❍	❍	❍	❍
Checklists (9)	❍	❍	❍	❍	❍	❍

5. Planning and Structuring Management Assets/Resources include the following, etc.:

	Unique (1)	Valuable (2)	Not Easily Imitated (3)	Non sub (4)	Specific (5)	No Competitive Advantage (6)
Security planning systems (1)	❍	❍	❍	❍	❍	❍
Assessment systems (2)	❍	❍	❍	❍	❍	❍
Dual usage asset plans (3)	❍	❍	❍	❍	❍	❍
Brainstorming session system (4)	❍	❍	❍	❍	❍	❍
Security logistics design (5)	❍	❍	❍	❍	❍	❍

6. Human Assets/Resources include the following, etc.:

	Unique (1)	Valuable (2)	Not Easily Imitated (3)	Non sub (4)	Specific (5)	No Competitive Advantage (6)
Employee knowledge (1)	❍	❍	❍	❍	❍	❍
Employee experience (2)	❍	❍	❍	❍	❍	❍
Employee training systems (3)	❍	❍	❍	❍	❍	❍
Guard forces (4)	❍	❍	❍	❍	❍	❍
Trained canine units (5)	❍	❍	❍	❍	❍	❍
Drills (6)	❍	❍	❍	❍	❍	❍
Exercises (7)	❍	❍	❍	❍	❍	❍

7. Technological Assets/Resources include the following, etc.:

	Unique (1)	Valuable (2)	Not Easily Imitated (3)	Non sub (4)	Specific (5)	No Competitive Advantage (6)
Biometrics (1)	❍	❍	❍	❍	❍	❍
Software protection (2)	❍	❍	❍	❍	❍	❍
Electronic access control (3)	❍	❍	❍	❍	❍	❍
Electronic surveillance (4)	❍	❍	❍	❍	❍	❍
Electronic and automatic tracking (5)	❍	❍	❍	❍	❍	❍
Enterprise resource planning systems (ERP) (6)	❍	❍	❍	❍	❍	❍

8. Intangible Assets/Resources include the following, etc.:

	Unique (1)	Valuable (2)	Not Easily Imitated (3)	Non sub (4)	Specific (5)	No Competitive Advantage (6)
Location (1)	❍	❍	❍	❍	❍	❍
Capacity (2)	❍	❍	❍	❍	❍	❍
Complementary infrastructure (rail, roadways, pipeline, etc.) (3)	❍	❍	❍	❍	❍	❍
Third-party security contracts (4)	❍	❍	❍	❍	❍	❍
Relationships with local fishermen (5)	❍	❍	❍	❍	❍	❍
Safety culture (6)	❍	❍	❍	❍	❍	❍
Union relationships (7)	❍	❍	❍	❍	❍	❍
Outreach relationships (8)	❍	❍	❍	❍	❍	❍

9. Financial Assets/Resources include the following, etc.:

	Unique (1)	Valuable (2)	Not Easily Imitated (3)	Non sub (4)	Specific (5)	No Competitive Advantage (6)
Port security fees (1)	❍	❍	❍	❍	❍	❍
Other revenue generation for security and safety (2)	❍	❍	❍	❍	❍	❍
Cost savings from security compliance (3)	❍	❍	❍	❍	❍	❍