# *Port Security Issues*

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**Abstract**

The purpose of this study was to evaluate the effectiveness of counter terrorism programs C-TPAT and CSI as perceived for security consultants, ports operators and importers. The sample includes 30 participants (10 consultants, 10 ports operators and 10 importers). The distribution of the responders was consultants (10/10) 100%, ports operators (10/10) 100%, importers (5/10) 50% and the total (25/30) 83.3%. The interviews were analyzed using cross-case displays: exploring and describing what involved the tactic of cross-category clustering.

The general conclusion after analyzing the output of the study is that the C-TPAT and CSI programs should continue operating because both programs are effective. According to the findings, the consultants, ports operators and importers agree that the C-TPAT and CSI programs have made some improvements in containerization security. Also, they agree that it is definitely much better today. But they also agree that it is not foolproof and there is still work to do. They also agree that the type of protection that CSI provides is deterrence and detection and the type undesirable events that CSI guards against is introduction of dangerous good. They also agree that CSI is effective, but not highly effective in deterring and detecting. They also agree that CSI is effective, but not highly effective in stopping introduction of dangerous goods. Other important findings in the study were the strength benefits such as better visibility in supply chain, cycle time improvement, shorter transit time, better inventory control, finding deficiencies and reducing cost of theft.

## Introduction

This article represents a combination of ideas, combined with a collection of existing information about port security that will be helpful in an effort to critically evaluate and revisit port security issues. There has been an increased research interest in the area of security, in both conceptual and practical levels. During the last years and after September 11, the interest of seaport security in the United States has been clearly revealed by the increase in the number of journals and governments organizations that are specializing or focusing in this topic (Clifford, 2004).

Today, due to the phenomenon of globalization of markets, globalization of business, and a highly increased possibility that maritime infrastructure may be used as a means for a new terrorist attack, it has become imperative to understand what is security. The September 11, 2001, attacks demonstrated the extent of vulnerability to terrorist threat. In the aftermath of this attack, the United States nation has demonstrated the importance of protecting the critical infrastructure from further terrorist exploitation. In this effort to protect the United States, critical infrastructure government managers and company managers in medium and larges size companies around the world have come to recognize the vulnerability of the maritime transportation system and the importance of seaport security for the rest of the world and for the United States economy (Juhel, 2001; Kim, n.d.).

The primary motivation of this article is to demonstrate the issues of vulnerability in ports and how important seaport security is for the United States government, for the maritime industry and for the rest of the world and also to identifying the effectiveness of existing countermeasures programs C-TPAT and CSI. In this special issue of seaport security, private organizations and government departments have an important role to fulfill. They must have the commitment to implement a program that stands to protect the interests of the seaport and its various constituents. Ports play a leading role in facilitating trade and prosperity of the United States. The expansion of global economies and other economical pressures as the change in the increase of the amount of trade and cargo moving through ports, and vessel sizes are altering the structure of maritime transportation and increasing the problem of implementation of seaport security.

Before going deeper into discussion about port security and countermeasure programs C-TPAT and CSI, it is important to understand the component of the maritime transportation system, and the role that ports play in the system. It is really imperative to know about all these components before mentioned because this is going to give an idea about the difficulty of port operation and, at the same time, how difficult it is to secure ports in today’s port environment.

## Literature Review

*Maritime Transportation System*

The maritime infrastructure has different components including ports and their associated assets, ships and passenger transportation systems, coastal and inland waterways, locks, dams and canals, and the network of railroads and pipelines that connect these waterborne systems to other transportation networks. The United States has 361 seaports in which operations range widely in size and characteristics. Most ports in the United State have diverse waterside facilities, some of which are controlled and operated by port authority, and others privately operated. Most of the ships have private owners and operators. Cargo is stored in terminals at ports and loaded and unloaded onto ships or other vehicles that go to a domestic or international destination (The National Strategy for The Physical Protection of Critical Infrastructures and Key Assets, 2003).

The size, diversity and complexity of the port's infrastructure make the inspection or the implementation of port security extremely difficult to undertake. Current inspections, both physical and technological, are limited and costly. As with any other modes of transportation that move goods across borders, the industry must create an effective balance between efficient processing or movement of cargo and adequate security (The National Strategy for The Physical Protection of Critical Infrastructures and Key Assets, 2003). After the attack of September 11, most organizations conducted risk assessments for all ports. These assessments have helped to identify container ports as a critical vulnerable infrastructure and illuminated the need for development of new security initiative.

After describing the different components of the maritime transportation system, it is also important to know the principle users of the MTS that are composed of domestics and international marine carriers; pilot, and operators of tugboats, dredges, and passenger-vessels; terminal, shipyard and marina operators; truck, rail and pipeline operators; waterfront employers and labor; manufacturers, distributors and retailers; agricultural, chemical, petroleum, mining and utility companies; vacationers, natural enthusiasts, and recreational users; commercial fishing and U.S. military. Continuous progress in the MTS security system is imperative for the United States economy and for the rest of the world. Getting cargo in and out of the ship using high-speed cargo handling is important; but it is also important to provide to the United States, direct and indirect users, a national security value (A Report to Congress, 1999).

*U.S. Economic Growth and the Maritime Transportation System*

Raymond, Sims, and Miniace (2000) stated in the paper "U.S. Economic Growth and the Maritime Transportation System," the United States is the world's largest trading nation, accounting for nearly 20 percent of the world's ocean borne trade. The United States network is connecting oceans, lakes, rivers, canals, locks, and dams with 25 miles of navigable island and coastal waterways. The MTS has 362 public and private ports with 1,912 commercial cargo facilities. They also explained that MTS is a vital component in the total United States

transportation system because the tremendous demands that will be placed on the already overburdened system during the next two decades. The foreign trade and the domestic cargo are conservatively estimated to grow at an annual rate of 3.3%. Also, the cargo tonnage will be double, which means that the MTS has to be prepared to handle the increment in demand of moving cargo. The MTS is crucial for the future of the United States and global economies. In addition, the MTS generates, directly and indirectly, jobs for 2.5 million Americans, as well as jobs for millions of people employed with trading partners. Additionally, 4.9 million jobs are generated by the production of waterborne exports that move via the MTS. Combined, this provides a grand total of 7.4 million jobs that account for nearly of 6 % of total U.S employment. (Raymond, Sims, and Miniace ,2000, p.3)

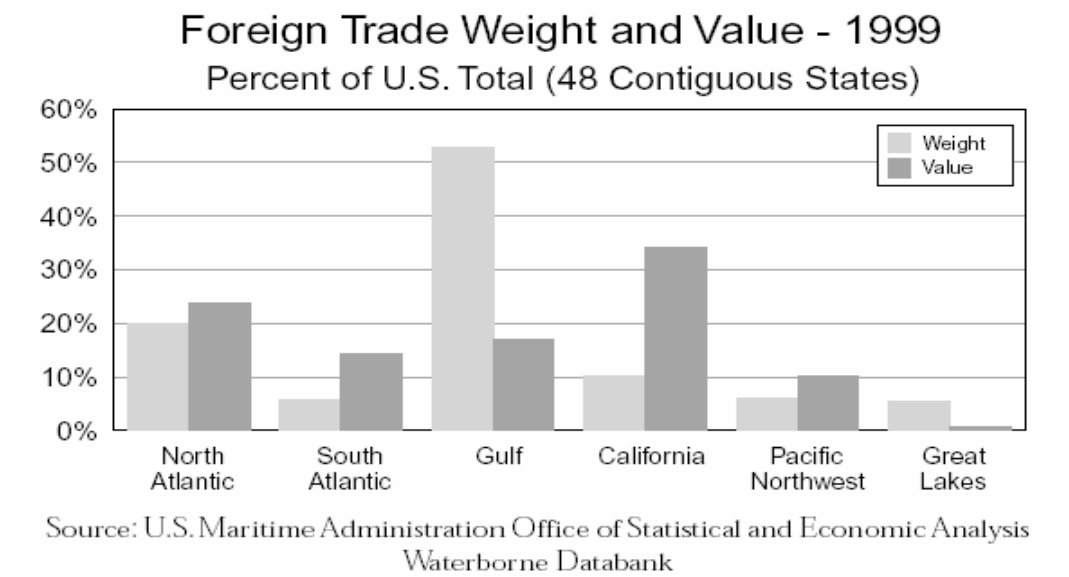
Raymond et al. (2000) also stated, "(MTS) handled nearly 2.3 billion tons of waterborne cargo in 1999, including 1.2 billion tons of international cargo and 1.1 billion tons of domestic cargo. International waterborne cargo volume has increase more than doubled over the last year, averaging a 3% annual growth rate" (p.2). This is a substantial contribution for the MTS in moving cargo, and dependence on the global marketplace, which means that security of MTS, is vital to ensure the future competitiveness of the United States in delivering goods to the international market.

### *The Economic Contribution of the Coastal Seaports*

The continued progress of the global economy and the increment of trade demonstrate the important role that seaports have in the United States economy. In 1999 the contribution of foreign imports and export cargo that was moved through seaport facilities was 1.2 billion tons, representing a contribution of $630.8 billion for the United States economy. The value of this cargo represents 6.6% of the $9.6 trillion of the Gross Domestic Product of the United States. Also, the domestic cargo was 228 million tons, and another 114 million tons handled in U.S. seaports (Raymond, Sims, & Miniace, 2000).

To measure the economic impact of foreign trade in the United States economy, Raymond, et al. (2000) used the Martin Associates composite economic impact models for each cost district. The composite economic impact models were developed from detailed economic data collected from important ports in each district. More than 3000 surveys were collected from the maritime community from each of the key ports. The model in Figure 5 shows the contribution and the impact of cargo vessels activity by coastal district: North Atlantic, South Atlantic, Gulf, North Pacific (Pacific Northwest), South Pacific (California), and Great Lakes.

Figure 2.5 Foreign trade weight and value by costal districts




Note. "U.S. Economic Growth and the Marine Transportation System," by Raymond, C., Sims, F., & Miniace, J., December 18, 2000, p. 4. Copyright 2005 by the Name of Copyright Holder. Reprinted [or Adapted] with permission.

Another important contribution of the seaports in the same year was that it generated employment for 1,088,447 people in United States who earned $48.8 billion in wages. This is an average of $40,220 per person, $10,834 more in comparison with the national average which is $29,386. Businesses generated $55.6 billion in income providing services to importers and exporters. More that $11 billion was paid in federal taxes and local governments collected $5.1 billion of tax revenue from the activities (Raymond, Sims, & Miniace, 2000, p.4). The future of the coastal seaports must be addressed now! The country must have the best port security system to secure the American economy.

***Value of Coastal Seaports to Users***

The Maritime transportation system is of vital importance for movement of foreign trade, and elements that are part of the MTS are essential to the operation of the entire logistics system. The seaports are the only cheap method to move export bulk cargo, as well as general cargo. If the seaport is attacked by terrorists, not only will there be lost jobs directly related to the maritime industry, but also the entire export-related economic sector suffers. Close to $182 billion in export income was delivered through seaports so, not only did these exports generate jobs in the MTS, but they also generated jobs for other sectors. For example, national farms generated 840,000 jobs, manufacturing facilities generated 757,000 jobs, and the automobile industry generated 620,000 jobs in the farm equipment, transportation equipment, and manufacturing industrial sectors (Raymond, Sims, & Miniace, 2000, p. 6).

The value of seaports for the industry and for the people who depend on this component of the Maritime infrastructure is uncalculated. Seaports are critical gateways for the movement of international and domestic commerce. Seaports contribute to the success of the maritime industry and are like the umbilical cord between United States economy and the rest of the world.

***The Role of Seaport in the Transportation System***

Ports play a big role in the United States transportation system because of the crucial interconnection between land and sea. Stopford (2002), author of *Maritime Economics,* described the ports as follows:

> It is in this place where much of the real activity takes place. In the days of cargo liners and tramps the activity is obvious. Ports are crowded most of the time with ships and bustling with Dockers loading and unloading cargo. Artists loved to paint these busy scenes and the waterfronts were famous for the entertainment they provided to sailors during their long port calls. Anyone could see what was going on (p.29).

Today, ports are more sophisticated and ships now make fleeting calls using highly automated systems. Ports in the United States at times have apparently become deserted terminals because workers often stop by only a few hours to load or discharge cargo. The action is less obvious but more intense. Cargo handling is much faster today, and many times faster than twenty or thirty years ago (Stopford, 2002).

Before continuing discussions about ports, it is important to know the difference between port, port authority and terminal. Stopford (2002) defined ports as “a geographical area where ships are brought alongside land to load and discharge cargo – usually a sheltered deep water area such as a bay or river mouth” (P.29). Stopford (2002) described Port Authority as “organization responsible for providing the various maritime services required bringing ships alongside land. Ports may be public bodies, government organizations or private companies. One Port Authority may control several ports, e.g., Saudi Ports Authority” (p.29). Finally, Stopford (2002) defined terminals as:

> Section of the ports consisting of one or more berths devotes to a particular type of cargo handling. Thus we have coal terminals, container terminals, etc. Terminals may be owned and operated by the port authority, or by a shipping company which operates the terminals for its exclusive use (p.29).

Ports have different important functions in the maritime infrastructure, one of which is to create a connection between the sea and the land; but the main purpose of the ports is to provide secure locations where ships can berth. Ports consist of other elements, such as railways, roads and inland waterways which must be efficiently integrated into the port operation. United States seaports have been, and remain, an essential component of this national extraordinary growth because they handle more than 2 billion tons of domestic and

international comers each year. American businesses depend on the seaport facilities to ensure that economical goods are available to United States citizens and to consumers around the world (Stopford, 2002).

### *Container Transport Security*

The success of containerization has generated many industry efficiencies and innovations, such as the development of quick and efficient movement, containers that can control the temperature to make it economically feasible to ship sensitive products, such as meats, vegetables, fruits, frozen food, and specialized container cranes and handling equipment that assist in loading and unloading vessels. Ocean containers typically are 20, 40 or 45 ft long and handle many types and varieties of general cargo, such as computers, chemicals, clothing, and furniture. An example would be one forty-foot container that can hold 500 computer monitors, or 3,600 men's suits on hangers, or 6,000 pairs of shoes, or more than 20,000 toy dolls (Koch, 2004).

Christopher Koch (2004), President and CEO of the World Shipping Council, described the important role that port containerization represents for world trade as follows:

> In 1980, ocean borne containerization trade accounted for 13.5 million TEUs of cargo. Recent estimates put this year's likely world container trade at about 98 million TEUs. Containerized trade volumes will have virtually doubled in the seven years since 1996-with continued rapid growth expected for the foreseeable future, especially in the Asia-based trade (p.3).

Maritime transportation system faces a number of crime and security challenges relating to the containerization system. These challenges are related to theft of goods and vehicles, attacks on truck drivers, illegal immigration, transportation of dangerous goods, and drug and contraband smuggling. Another crime-related challenge is the possibility that terrorists are targeting transport vehicles and infrastructures. An area in particular that has consistently been cited for being extremely important is the possible misuse by the terrorists of the maritime shipping containers transport system. It is important to understand, from the point of view of different organizations in charge of United States port security, that containers are still today the principle target for terrorists in their effort to be successful. Also, the United States and many other countries understand that they have relatively little control over possible misuse of the system by terrorists. Containerization has been the driving force of the expansion of international trade, dramatically reducing the movement of goods, and developing different services on which the global economy depends. Today, 93% of international trades in manufacturing goods are moving via containers (Koch, 2004). In addressing security threats to the container transportation system, different authorities have established various initiatives to protect our ports from future attack using containerization as a road to introduce weapons of mass destruction to our system.

## Problem Background

Prior to September 11, 2001, there was little literature related to security in relation to maritime transportation system issues specifically related to ports, which is one of the most important components of the maritime infrastructure. Ports are one of the most important components in the U.S. transportation system because that is where most goods are handled and moved in and out of the United States. Ports play a leading role in facility trade and prosperity. The expansion of the global economy and other economic pressures are altering the structure of maritime transportation. This change has resulted in several important trends for ports. Examples include increasing amounts of trade and cargo moving through ports, the increments in vessel size, the new regulations to maintain environmental and economic balance in their operations, the need for new capital investment in port infrastructure, and, most important and sensitive, the increment in port security.

Ports handle different types of cargo and use different methods to move cargo, such as pallet cargo, liquid cargo, refrigeration cargo, and the most commonly used, container cargo. As explained in the article, "Senate Panel Finds Problem with Cargo Security," (Marinelog.com, 2005), many terrorist experts believe maritime container shipping may serve as an ideal platform to deliver weapons of mass destruction to the United States. They also say that there are two reports of smuggling, January 15 and April 2, 2005, of 30 Chinese immigrants emerging from a container at the Port of Los Angeles, revealing inherent vulnerabilities in the global supply chain. Experts also highlighted that these incidents demonstrated concerns that smuggled immigrants could have included members of terrorist organizations or containers could have contained weapons of mass destruction (Marinelog.com, 2005). Another report dated May 26, 2005, similarly reported that security regarding containers is "deeply troubled by the discovery twice this year of dozens of illegal immigrants who were smuggled into the Port of Los Angeles inside cargo containers" (Eckert, 2005, para.9). A 2005 report from a Senate Subcommittee stated the concern of security in containers as follows:

> The national security problem of containers entering the United States without adequate inspection is a real one. A dramatic example of the container security is customs' allowance of containers carrying trash into the United States—hundreds of which enter Michigan every day from Canada, which can be used to hide weapons or other contraband, and which can't be adequately screened using available technology—it just doesn't work we have a long way to go before Customs solve the container security problem (Marinelog.com, 2005, para. 8).

It is clear that the United States has a security problem in containerization. It is also clear that the inspection program for cargo destined for the United States is too weak to guard against a terrorist attack. Port managers face a number of crime and security challenges relating to the system under their jurisdiction. These persistent challenges include theft of goods and

vehicles, attacks on truck drivers, illegal immigration, transport of dangerous goods and drug and contraband smuggling. In addition, port managers must remain vigilant to possible terrorist use or targeting of transportation vehicles and infrastructure. Among these multiple threats, however, one in particular has been consistently cited for being extremely important. This threat is the maritime shipping container transport system that can be misused for terrorism (Anonymous, n.d.).

Some reports created by the U.S. Department of Transportation about maritime security support the vulnerability of the maritime transportation, specifically the container system. These reports embrace a focus on international criminal activity and security issues, which could pose a threat to the United States. The maritime security reports are intended to increase awareness of the scope and severity of criminal exploitation of the maritime transportation system. For example, in August of 1995 the maritime security report released information about some potential problems in security as the possibility of an impending terrorist attack directed against an unspecified American target. The same report stated that two to three containers bound for export and local destinations are hijacked every day in the New York City metropolitan area. The same report presented regional analysis of piracy attacks on merchant ships in ships at sea and in ports. The report also presented false registration of ship users by Asian crime gangs in theft of entire cargos and that the crime is perpetrated by using a stolen or purchased ship which is then fraudulently registered. Other sections of the same report showed that weapons were smuggled to Colombian guerrillas in commercial containers, via Panama ports, and the maritime fraud (Blum, 1995).

Another report, from January 1996, showed currency smuggling from the United States facilitated front companies exporting containerized maritime freight (U.S. Department of Transportation Maritime Administration, 1996, January). In April 1996 another report from the U.S Department of Transportation Maritime Administration reported dramatic increases in theft and in-transit hijacking of entire containers and trailers and a growing risk of stowaways smuggled in containers (U.S. Department of Transportation Maritime Administration, 1996, April). The report from January 1997 summarized that increased drug smuggling via Lesser Antilles threatens growing maritime container trade (U.S. Department of Transportation Maritime Administration, 1997).

The Maritime Security Report for January 1997 found that use of legitimate commercial maritime freight containers by smugglers was the primary maritime method for shipping drugs through the Caribbean transit zone (U.S. Department of Transportation Maritime Administration, 1997). According to the report from October 1998, one of the biggest problems was a common objective of organized crime groups to corrupt public officials (U.S. Department of Transportation Maritime Administration, 1998).The report for May 2000 quotes the U.S Maritime Administrator, Clyde J. Hart, speaking about the importance of improving port security as follows:

> International organized crime groups are taking full advantage of the growth in sophisticated global commerce, transportation, communication, and financial links. Unconstrained by borders or national sovereignty, these crime groups are operated transnationally and deriving billions of dollars from a wide range of cargo crime—such

> as: cargo theft, smuggling of drugs, alien migrant, stolen goods including automobiles, contraband merchandise, and illicit currency shipments (U.S. Department of Transportation Maritime Administration, 2000, p.5).

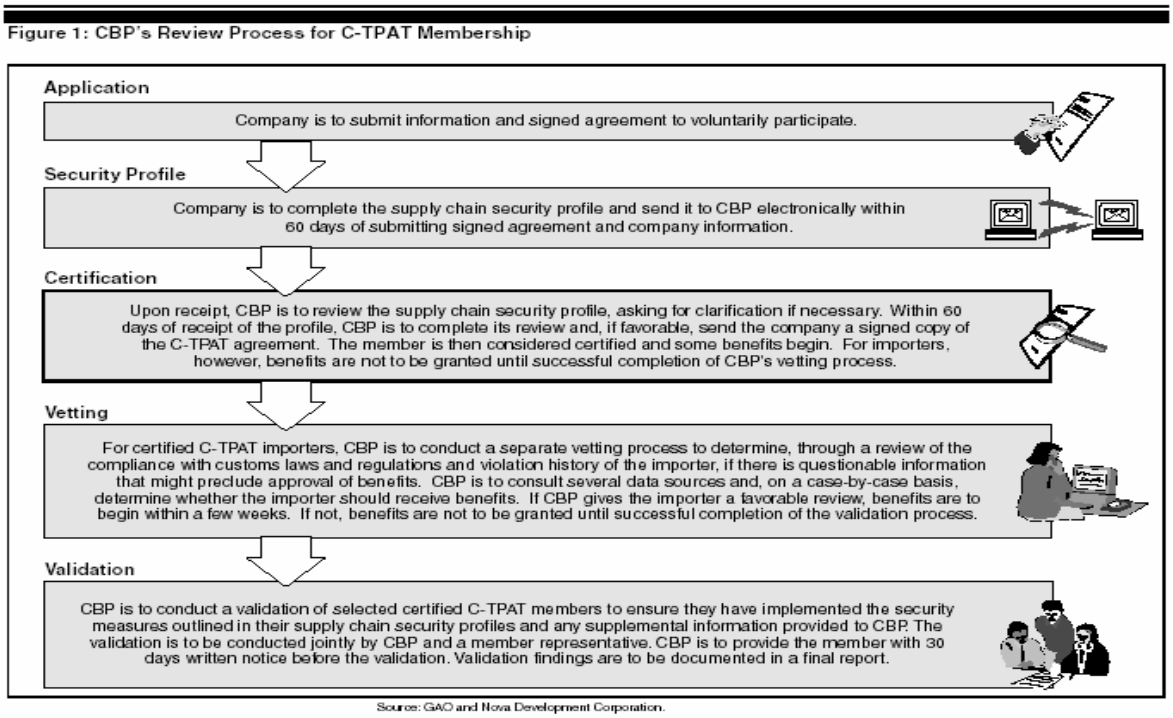
All of the reports before mentioned show a clear picture about the problem that the maritime containerization system confronts in the new millennium for United States security. Worldwide, containerized maritime cargoes are increasingly targeted by organized criminal conspiracies involved in alien smuggling, weapon smuggling, drug smuggling, money smuggling, and cargo theft, and with an endless numbers of other problems. Exploiting weaknesses in port security is central to these crimes. The associated costs reduce the competitiveness of those affected, including the ports. Improved port security will force criminal enterprises and terrorists out from the facilitating cover of commercial trade flows. Criminals and terrorists will then be more exposed to law enforcement operations, increasing the prospects for detection, interdiction, and successful persecution.

## Implementation Security Measures Since September 11, 2001

The authorities, in response to terrorist threats to use container shipping as a platform to perpetrate terrorist attacks, have developed a different evaluation. It has involved evaluation and adoption of new technologies, passage of new regulations, and implementation of new operating processes and protocols. To date, most efforts have concentrated on maritime shipping operations. The focus on seaports has occurred for two principle reasons: Seaports are America's principal connections to the global economy, and seaports are bottlenecks in the system in which it is possible to impose additional security provisions. This section presents an overview of two major U.S. and international initiatives to improve supply-chain and port security initiated since September 11, 2001 (Willis & Ortiz, 2004).

*Customs-Trade Partnership Against Terrorism Initiative*- The goal of Customs-Trade Partnership Against Terrorism (C-TPAT) is to push partners of the C-TPAT to improve security of the supply chains to meet C-TPAT security criteria. C-TPAT is another element of Customs Border Protection (CBP) strategy to improve the security of the infrastructure and, at the same time, maintain an efficient flow of goods. C-TPAT is a voluntary incentives program that shippers and carriers can enter to assure CBP that they have put into place the best security practices for the packing, tracking, and distribution of all containers and goods enrooted to the United States. In return, shippers and carriers are rewarded through expedited processing and reduced probability of inspection delays (U.S. Customs and Border Protection, 2004). Figure 2 shows ease interpretation of the process.

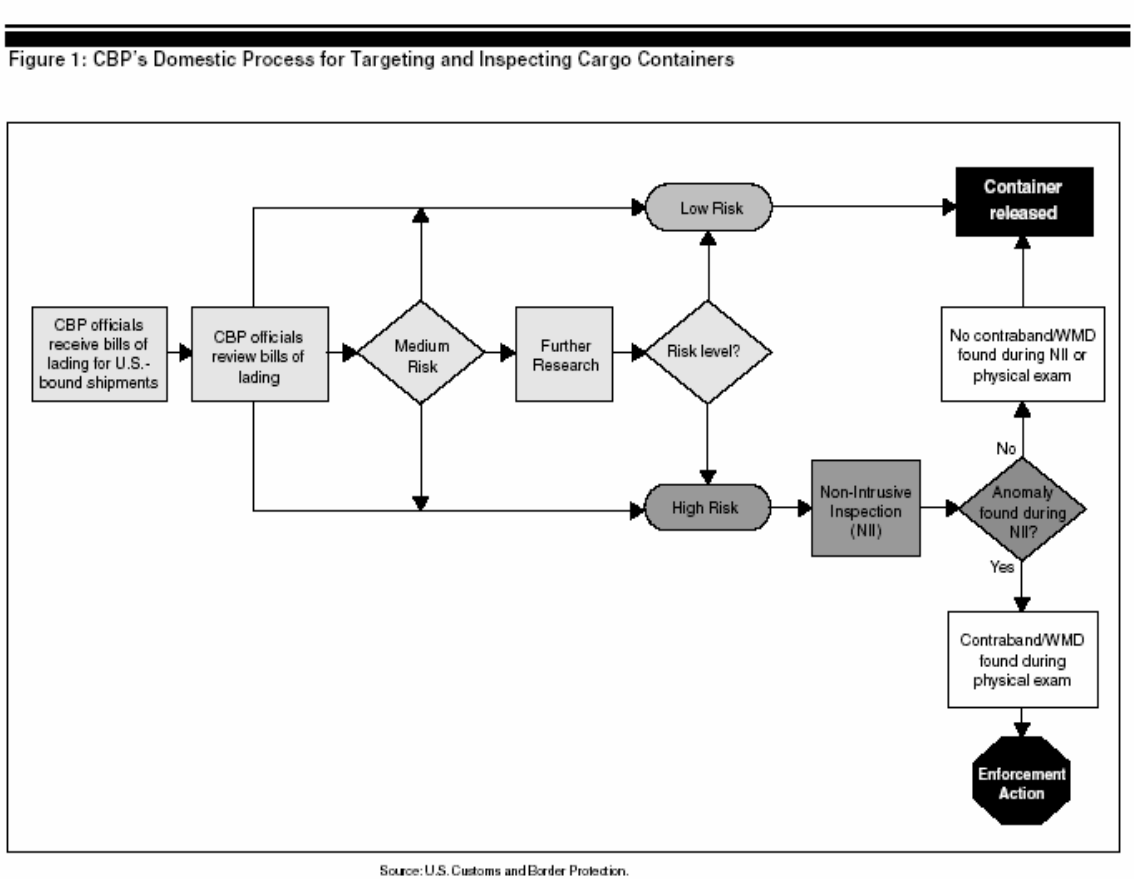
Figure 1.2 CBP' S Review Process for C-TPAT Membership




As figure [2] shows, applicants first submit signed C-TPAT agreements affirming their desire to participate in the voluntary program. Applicants must also submit security profiles—executive summaries of their company's existing supply chain security procedures—that follow guidelines jointly developed by CBP and the trade community. These security profiles are to summarize the applicant's current security procedures in areas such as physical security, personnel security, and education and training awareness. CBP established a certification process in which it reviews the applications and profiles by comparing their contents with the security guidelines jointly developed by CBP and the industry, looking for any weaknesses or gaps in the descriptions of security procedures. Once any issues are resolved to CBP's satisfaction, CBP signs the agreement and the company is considered to be a certified C-TPAT member, eligible for program benefits.
Note. "Cargo Security Partnership Program Grants Importers Reduced Scrutiny with Limited Assurance of Improved Security," United States Government Accountability Office, March 2005, p.11. Copyright 2005 by the Name of Copyright Holder. Reprinted [or Adapted] with permission.

*The Container Security Initiative*- The Container Security Initiative (CSI) inspects and clears containerized cargo before it comes into the United States. Through this program, CBP has deployed and implemented security measures. Since September 11, 2001, CBP has implemented the initiative in the world's major seaports. The goal of CSI is to make it more difficult to smuggle illegal things into the United States by implementing inspections at ports of origin, thus increasing U.S. security (Willis & Ortiz, 2004). Figures 3 and 4 present the process for the domestic and overseas targeting and inspection containers.

Figure 1.3 CBP's Domestic Process for Targeting and Inspecting Cargo Containers

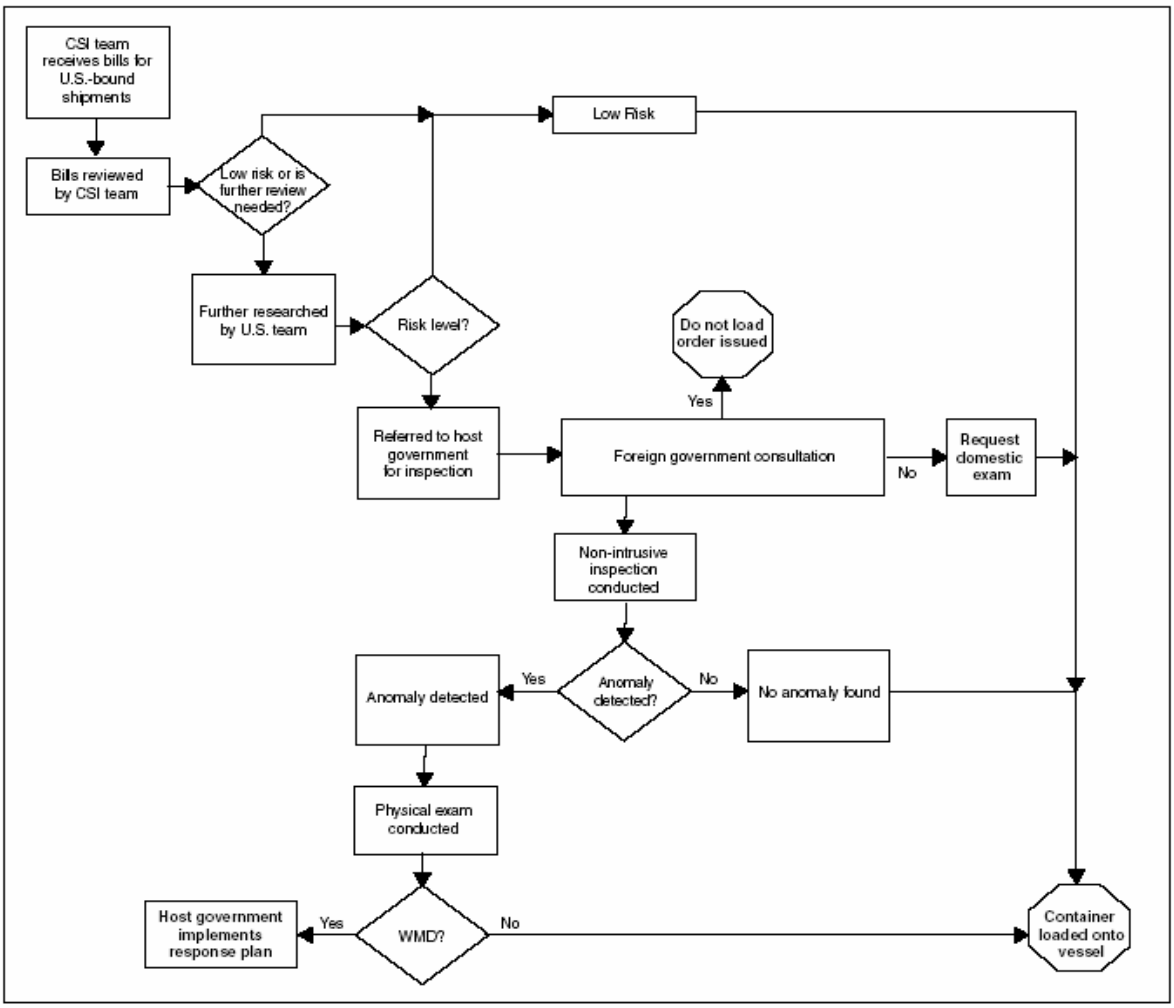



As shown in figure 3, CBP targeters at domestic ports target containers by first accessing the bills of lading and their associated risk scores electronically. The assigned risk score helps the targeters determine the risk characterization of a container and the extent of documentary review or inspection that will be conducted. For example, containers characterized as high-risk are to be inspected. Containers characterized as medium-risk is to be further researched. That is, targeters are to consider intelligence alerts and research assistance provided by the National Targeting Center (NTC) to the ports, and their own experience and intuition, in characterizing the final risk of shipments. Containers characterized as low-risk is generally to be released from the port without further documentary review or inspection.

Note. "Container Security A Flexible Staffing Model and Minimum Equipment Requirements Would Improve Overseas Targeting and Inspection Efforts", United States Government Accountability Office, April 26, 2005, p.9. Copyright 2005 by the Name of Copyright Holder. Reprinted [or Adapted] with permission.

Figure 1.4 CSI Process for Targeting and Inspecting Cargo Containers Overseas

Figure 3: CSI Process for Targeting and Inspecting Cargo Containers Overseas




Source: U.S. Customs and Border Protection.

As shown in figure 4, on the basis of the initial review, CBP officials are to either (1) categorize shipments as low-risk, in which case the container holding the shipment is loaded onto the departing vessel without being inspected, or (2) conduct further research in order to properly characterize the risk level of the shipment.

Note. "Container Security A Flexible Staffing Model and Minimum Equipment Requirements Would Improve Overseas Targeting and Inspection Efforts", United States Government Accountability Office, April 26, 2005, p.15. Copyright 2005 by the Name of Copyright Holder. Reprinted [or Adapted] with permission.

## Purpose of the Study

Protecting America from terrorist use of the supply chain and containerization system as a tool to attack the United States requires constant measure. Essential to port security planning is the ability to document and measure evidence of security threats, vulnerability, loss control, and the success of security measurement implementation. Unless there is recognition of potential vulnerabilities, appropriate countermeasures cannot be developed. U.S Customs Border Protection (CBP) developed two programs to protect the United States containerization system and maritime supply chain system. The program was implemented in an effort to address the threat posed by terrorists smuggling weapons of mass destruction (WMD) into the United States using the complex supply chain network and containerization system. The programs that have been mentioned are the Customs-Trade Partnership Against Terrorism (C-TPAT) and Container security Initiative (CSI).

Different analyses of these programs have been conducted since they were implemented for the United States General Accounting Office (GAO). Some analyses from the GAO have been conducted to describe the purpose and the elements of these programs, while others have examined implementation of the program, benefits of the programs, eligibility for these benefits, the processes that have been implemented to ensure that the members had implemented security measures, how well CBP manages the C-TPAT and CSI programs, the factors that affect the CSI and C-TPAT programs, the extent to which high-risk containers have actually been inspected overseas, and the extent to which CBP formulated and documented strategies for achieving the program's goals. Other studies from GAO address the assessment of whether CBP development of its targeting strategy is consistent with recognized key risk managements and computer modeling practices and how well the targeting strategy has been implemented at selected seaports around the country.

These studies that had been conducted for GAO address the information that had been obtained from interviewed customs officials in Washington, D.C., with program responsibilities for CSI and C-TPAT, from private companies and industry associations, also they visited other countries where these programs were implemented for the first time. In addition, they interviewed officials from the private sector and officials that represented others countries, and also reviewed custom's Web site for information about the programs status and activities. The studies had revealed different limitations in the areas before mentioned by interviewed officials and experts, but no studies had been conducted in identifying the effectiveness of these programs or countermeasures from the point of view of consultants, importers and ports operators.

Establishing countermeasures is an ongoing activity that has to be constantly evaluated and revised from different forms. One of the most important aspects of protecting the containerization system and the supply chain network from being misused is your understanding not only of the facility vulnerabilities, but also of the limitations of the existing countermeasures. The purpose of this study will focus on investigations, if the programs are effective as perceived by participant in the programs such as consultants, importers and ports operators to protect our supply chain and containerization system. Also, the study will focus on

limitations and strength of the countermeasures programs. This is one of the key elements for the successful implementation or continued improvement of any security program.

## Methodology

### *Type of research design*

The study implemented descriptive research design. The advantage of this type of research approach was that the methodology would develop information and clarify or confront an immediate problem. Descriptive research would improve our understanding of the specific counter terrorism program that had been created to protect the containerization vulnerability in the maritime transportation system, with the intention of contributing to the solution and developing new knowledge. The descriptive researches promoted different types of research but in the program evaluation arena, practitioners promoted the two common designs such as summative or formative. (Patton, 1990, p. 155)

The type of descriptive research that was used in this study was the evaluation research summative and formative because they were designed as an evaluation and judgment tool to determine the program performance. Using this approach, the study opened the opportunity to a subsequent evaluation of the program and to provide information to guide program refinements. (Patton et al., 1990)

### *Sample Selection*

The participants that were interviewed were consultants, importers and ports operators. The amount or site of participant selection was thirty based on purposeful selection (Light et al., 1990, p.53); in other books the term is purposeful sampling (Patton, 1990, p.169) where the participants are selected deliberately, in order to provide information that cannot be obtained for other choices, for example “people who are uniquely able to be informative because they are an expert in an area or were privileged witnesses to an event” (Weiss 1994, p.17).

In this case the participants were experts in security. The data was collected from three types of participants: consultant participants where they were selected from the major consulting companies in security, importers that also were selected from the major companies and ports operators who were selected from the major containerization port in the U.S. The participant source was found throughout an intense and extensive meticulous research on the internet. The consult in security was selected from the International Association of Professional Security Consultants data bank, the importers were selected randomly and the ports operators were selected from the Home Land Security data bank.

### *Instrumentation*

The study utilized a questionnaire instrument used by Carl A. Roper (1999, p.65), author of the book *Risk Management for Security Professionals,* used to identify the effectiveness of existing countermeasures. Roper used this structured format in step three of the risk management process flow. Roper emphasized that by using this questionnaire, one should be able to understanding and valid conclusion of its true effectiveness of the existent

countermeasures. This instrument aided in identifying the objectives or purpose of the program and the effectiveness of the program. The data that was gathered was descriptive in nature, designed to present a picture of what existed and what happened. It was also used to explore the opinion and values of individuals that were experts in maritime security and who experienced and shared personal or communal problem such in this case maritime security.

When establishing validity of this instrument, it was important to say that Mr. Roper, the developer of this systematic analysis approach, is a former lead instructor with the department of Defense Security Institute, also his past experience includes jobs with the Assistant Chief of Staff for Intelligence, Department of the Army; Office of the Chief of Staff, U.S Army; and with the Defense Communications. He was a counterintelligence technician and Director of Security, 24th Infantry Division, Fort Stewart, GA, in support of Desert Shield/Desert Storm. (Roper et al. found, 1999) All of the experiences before mentioned contributed dealt with some plausible threats to the validation of the instrument measure.

Another method that the investigator used to develop validity in the study was respondent validation to deal with some other possible threats (Maxwell, 2005, p. 111). The purpose of this strategy was stated by Maxwell (2005) in the second edition of the Qualitative Research Design as follows:

> is [to] systematically soliciting feedback about our data and conclusion from the people that we are going to interview. This is the most important way of ruling out the possibility of misinterpreting the meaning of what participants say and do and the perception they have on what is going on, as well as being an important way of identifying our own biases and misunderstanding of what we observed. (p.111)

Also, the investigator interviewed five people, experts in the C-TPAT and CSI security programs and asked for their feedback about the questions used in the interview and whether they measured effectiveness and if the questions could identify the limitation and strength of the programs.

***Methods of Data Collection***

Qualitative research methods were selected for this study because statistic information from the authority in charge of the U.S. security was impossible to obtain and because it was desired to generate data rich in detail and embedded in context. The type of data collection or method that that was used in this study was telephone interviews.

This data collection procedure was presented in the book Research Design by John W. Creswell (2003) as procedures for recording data. He mentioned that the protocol for interviews had to include “heading, instructions, to the interviewer, opening statement, the key research question, probes to follow key questions, transition messages for the interviewer, space for recording the interviewer’s comments, and space whether the researcher records reflective notes.” (p.190)

***Assumptions or Limitation***

Because U.S. security is a sensitive topic to discuss today, one limitation of the study was the possibility that the respondent would have limitation in providing realistic information. Other limitations for the type of data collection was the possibility to "provide indirect information filtered through the view of interviewee, providing information in a designated place rather than the natural field setting, researcher's presence may have been bias responses, and people are not equally articulate and perceptive" (Creswell, 2003, p.186)

The advantages of this type of data collection are that it allowed researchers control over the line of questioning, participants could provide historical information, and it was useful when participants could not be observed directly.

***Procedure***

The study used primary date sources to address the research question which, in this case, were program participants and service providers. The form of the data was self-reports where the participants expressed their opinions about the countermeasure programs. The research participants were asked individually to provide, to the best of his or her ability, information about actual effectiveness of the countermeasures.

Data was being collected through the end of the April, 2006. The study was conducted in Kinko's conference room. All interviews were conducted using telephone interview. The interview was recorded using a USB telephone to PC and conference to PC recorder. The first contact with the participant was by e-mail with an attached letter. The e-mail included permission to record the interview. After the e-mail the participants were contacted by phone to motivate them to participate in the study and to start to develop a reliable environment, also in the same phone call the interviewer asked for permission to record the interview. The interview was directed by the investigator or researcher.

All the interviews that took place by telephone contained the same format as follows: The consultant, ports operators and importers interview began with and open-ended question such as "What is C-TPAT?" or "What is CSI?" Subsequent questions were converted in an attempt to get the interviewee to discuss in further detail something that he/she mentioned in an answer. For all the interviews, the procedure was the same. As more respondents were interviewed, questions arose to better understand what was going on in the security programs or countermeasures. Eventually a set of questions emerged; the same questions were asked of all interviewees.

Formal consultants, ports operators and importers interview lasted at least 30-40 minutes. For all of the interviewees interviewer used the data collection instrument which were appropriate and availability for both parties. The interviewees contributed with their opinions, to measure the effectiveness of the security program and what seemed important to the context of the study.

In order to make the responders more comfortable, the interview began with defining the investigation objectives and how long it is was expected to take. Also the interviewer emphasized the confidentiality of the interviews, to be sure that the respondents felt safe in the environment. The interviewer tape-recorded the interviews to make sure everything was captured and also took notes.

At the end of the interview, the interviewer gave the respondent the opportunity to the make add any additional comments. The interviewer closed the interview by explaining importance of their contribution to the study and explained that there was a possibility that they would be called again to respond to new ideas that may come up to confirm that the conclusion drawn from the interview seemed accurate.

***Data Analysis Procedures***

This part of the study addressed the data analysis procedures. At that time, the researcher chose the design of the study, and various approaches to data collection. Before developing the instrument, investigator drafted the analysis plan. The investigator did that in order to deal with two reasons that Bickman (1993, p. 87) found important prior to data collection "(a) that the design/data collection approach actually enabled the researcher to answer the critical study question and (b) made the study's execution as efficient as possible." (Bickman et al. found).

With the data analysis and procedure we answered the following questions:

1. How did consultants in security, ports operators and importers perceive the security in containerization infrastructure?

2. How did consultants in security, ports operators, and importers perceive the effectiveness of the CSI program?

3. How did consultants in security, ports operators and importers perceive the effectiveness of the C-TPAT program?

4. As perceived for consultants in security, ports operators and importers, what were the limitation and strength of the countermeasures programs?

The study processed simultaneously the data collection and data analysis. Merriam (1988) and Marshall and Rossman (1989) emphasized that data collection and data analysis have to be a simultaneous process in qualitative research. In the data analysis, the data was organized categorically and chronologically, reviewed repeatedly, continually coded, and the major ideas were chronicled. The interview was taped and the tape was transcribed verbatim; researcher notes were regularly reviewed.

The data analysis process involved using cross-case data analysis assuming that each case was special and unique. The first level of inquiry was true to, respecting, and capturing the details of the individual cases studied. After that the investigator proceeded with displaying a coherent format for each case. The investigator reduced the case data in to different categories. The next step was to build a partially ordered meta-matrix and enter future reduced data. The following step clustered the information by using the tactic of cross category clustering. The final step was to present the finding in a cluster summary table that contained some short quotes and summarizing phases.(Miles & Huberman, 1994, p.180)

## Findings

With the clear need for increased ports and containerization security after September 11 attack, the U.S. government along with the private sector are working to make appropriate changes in supply chain security practice to protect their assets and operation. In order to protect port assess and network infrastructure, Homeland Security in specific the Customer Border Protection Department, has developed two counter terrorism programs to secure U.S. ports and supply chain assets. The two major programs developed for the U.S. government to protect the U.S. maritime transportation infrastructure are CSI and C-TPAT. Protecting the U.S. from future attacks using the U.S. maritime transportation network system requires constant measure. Developing security programs is an ongoing activity that has to be constantly evaluated and revised to identify weaknesses and to develop the new measure to close the gaps.

The study will help to provide information about effectiveness and understand limitation and strength of the initiative or counter terrorism programs as perceived by consultants, importers and port operators. More generally, we could say that we are going to create a formative evaluation research to investigate the effectiveness, limitations and strengths as is perceived by the participants in the study.

The following sections will present a systematic content analysis that identifies and summarizes message content. The content analysis of the study will display the most important point for the interviews such as the participant knowledge, characteristics of CSI and C-TPAT program, impact of the programs, factors and effects.

Table 4.1

Content-Analytic Summary Table: Participant Experience

| Cases Participants | Years of Experience in the Industry | Years of experience With the Programs |
|---|---|---|
| Consult | 10 to 40 years | 3 to 4 years |
| Port Operators | 6 to 20 years | 2 to 4 years |
| Importers | 3 to 4 years | 3 to 4 Years |

Table 4.2

Content-Analytic Summary Table: Distribution of Respondents

| Consults | Ports Operators | Importers | Total |
|---|---|---|---|
| (10/10) 100% | (10/10) 100% | (5/10) 50% | (25/30) 83.3% |

Table 4.3

Clustered –Analytic Summary Table: How do consultants in security, ports operators and importers perceived the security in containerization infrastructure?

| Cases | Description | Quotation |
|---|---|---|
| Consults | Most consultants agree that improvements have been made in containerization security. Also, they agree that it is definitely much better, but they agree that still some works to do. | "definitely much better'<br><br>"pretty good"<br><br>"I think there are some improvement"<br><br>"I think that it's getting better"<br><br>"I think there are still some gaps" |
| Port Operators | Most port operators agree that containerization infrastructure is not totally secure, but they understand that is better than before. | "it is better? Yes. But is not fool proof? No."<br><br>"it is not totally secure, but there's been many improvement"<br><br>"it is secure but there are always improvement that can be done" |
| Importers | Most of importers understand that containerization is more secure now than before since C-TPAT and CSI was implemented. They also agree that improvement have been made, but they also understand that is not foolproof | "containerization is more secure now since C-TPAT and CSI"<br><br>"things are better"<br><br>"there are improvement, but it is foolproof not" |

Table 4.4

Clustered –Analytic Summary Table: How do consultants in security, ports operators, and importers perceived the effectiveness of the CSI program?

| Cases | Descriptions | Quotations |
|---|---|---|
| Consults | Most participant agree that the protection that CSI provide is effective, but it is not highly effective | "CSI is 6 to 7"<br><br>"Maybe 6.5 to a 7"<br><br>"I will say 7" |
| Ports Operators | Most participant agree that the protection that CSI provide is effective, but it is not highly effective | "Ummm, six"<br><br>"I would say it's about a 7" |
| Importers | Most participant agree that the protection that CSI provide is effective, but it is not highly effective | "I'd give it a 5"<br><br>"seven" |

4.5

Clustered –Analytic Summary Table: How do consultants in security, ports operators and importers perceived the effectiveness of the C-TPAT program?

| Cases | Descriptions | Quotations |
|---|---|---|
| Consults | Most participant agree that the protection that C-TPAT provide is effective, but it is not highly effective | "6 or a 7. Both? Deterrence and detection?"<br><br>"Um, I would probably give it a six" |
| Ports Operators | Most participant agree that the protection that C-TPAT provide is effective, but it is not highly effective | "It's – a 6 or a 7."<br><br>"I would say a seven" |
| Importers | Most participant agree that the protection that C-TPAT provide is effective, but it is not highly effective | "As it exists today, I would give it a 7."<br><br>"I would say it's eight." |

4.6

Clustered –Analytic Summary Table: Limitation and strength of the countermeasures programs?

| | Limitation CSI | |
|---|---|---|
| Cases | Type Protection Provide | Undesirable Event Guard Against |
| Consults | Most of participants agree that the type of protection that CSI provide is deterrence and detection. | Most of participants agree that the undesirable event that CSI guard against is introduction of dangerous good . |
| Port Operators | Most of participants agree that the type of protection that CSI provide is deterrence and detection. | Most of participants agree that the undesirable event that CSI guard against is surreptitious introduction of dangerous good. |
| Importers | Most of participants agree that the type of protection that CSI provide is deterrence and detection. | Most of participants agree that the undesirable event that CSI guard against is introduction of dangerous good. |

4.6 (Continue)

Clustered –Analytic Summary Table: Limitation and strength of the countermeasures programs?

| | Limitation C-TPAT | |
|---|---|---|
| Cases | Type Protection Provide | Undesirable Event Guard Against |
| Consults | Most participants agree that the type of protection that C-TPAT provides is deterrent. | Most participants agree that the undesirable event that C-TPAT guards against is introduction of dangerous goods. |
| Port Operators | Most participants agree that the type of protection that C-TPAT provides is deterrent and detection. | Most participants agree that the undesirable event that C-TPAT guards against is introduction of dangerous goods. |
| Importers | Most participants agree that the type of protection that C-TPAT provides is deterrent. | Most participants agree that the undesirable event that C-TPAT guards against is introduction of dangerous goods. |

4.6 (Continue)

Clustered- Analytic Summary Table: limitation and strength of the countermeasures programs?

| Cases | CSI and C-TPAT Strength |
|---|---|
| Consults | Reduce theft, delays, find deficiencies, speed in cargo. |
| | Integrity of purchasing, transportation and receiving processes. |
| | Closer relationship with business partners, Greater supply chain integrity. |
| | Better control in inventory, Declare the correct product in the container. |
| Ports Operators | More business, Tied up less the borders, Find deficiencies Make fright more secure. |
| | Better internal procedure, Consolidate services. |
| Importers | Shorter transit time, Cycle time is improved, Know there supply chain better |
| | Better safety stock, Better predictability, Strong brand name protection. |
| | Greater supply chain visibility. |

## Conclusion

The world of security is a complex and challenging field to study, with the objective to make more secure critical assets that require protection. The general conclusion after analyzing the output of the study is that the C-TPAT and CSI programs should continues operating because both programs are effective. The study found that the consultants, ports operators and importers agree that the C-TPAT and CSI programs had made some improvements in containerization security. Also, they agree that it is definitely much better today, but they also agree that it is not foolproof and there is still work to do. They also agree that the type of protection that CSI provides is a deterrence and detection and the type of undesirable event that CSI guards against is an introduction of dangerous goods. They also agree that CSI is effective, but not highly effective in deterring and detecting. They also agree that CSI is effective, but not highly effective in stopping the introduction of dangerous goods.

The consultants and importers agree that the type of protection that C-TPAT provides is deterrent, but the ports operators agree that they are deterrent and detection. Also, they all agree that the undesirable event that C-TPAT guards against is introduction of dangerous goods. The consultants and importers agree that C-TPAT is effective, but not highly effective in deterrent and the port operators agree that C-TPAT is effective, but not highly effective in deterrent and detection. All of them agree that C-TPAT is effective, but not highly effective in stopping introduction of dangerous goods. Other important findings in the study were the strengths benefits such as better visibility in supply chain, cycle time improvement, shorter transit time, better inventory control, find deficiencies and reduce cost of theft etc.

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