Case study

A voluntary logistics security program and international supply chain partnership

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Abstract

Purpose – To investigate the practices and value of a voluntary logistics security program, C-TPAT certification, and its impact on international supply chain collaboration.

Design/methodology/approach – Both case study and secondary data research methods were used to collect data from five companies (one customs broker, three importers, and one transporter/freight forwarder) at different supply chain positions. A case study protocol was designed and used to guide the interviews and data collection. Data analysis was performed at three levels: within-case analysis, cross-case analysis, and expert analysis.

Findings – In addition to reporting the current practices of the C-TPAT implementation, the results confirmed the significant impact of the C-TPAT program to the international trade community. As for the overall goal of improving border security, the results suggest that the C-TPAT is a means rather than an end and its current value to logistic security is not clear due to the inconsistent practices of supplier involvement. International supply chain security is still in its infancy and has many issues to resolve before it becomes a fully collaborative system.

Research limitations/implications – Future research with more samples is necessary to validate the findings and research positions.

Practical implications – A voluntary logistics security program such as C-TPAT could enhance the collaboration with international suppliers. Global logistics security systems can learn from the quality movement by focusing on “prevention” and adopting the “total supply chain” approach.

Originality/value – This paper addresses the anxiety and confusion in the international trade community toward the C-TPAT certification and its impact on international supply chain security. The findings confirmed the linkage between quality program and supply chain security systems.

Keywords Distribution management, Terrorism

Paper type Research paper

Introduction

The United States is the leading importer and exporter of goods in the world. According to the US Department of Commerce, the total exports in the first quarter of 2003 were valued at $247.2 billion (Cassidy, 2003). In 2002, US exports totaled $694 billion dollars and imports reached $1202 billion dollars. International trade is clearly important to the US economy. Such volumes of international trade are dependent on the efficient operation of global logistics – the process of designing and managing a system that controls the flow of materials into, through, and out of businesses across international borders (Schary and Skjott-Larsen, 2001).

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The efficient operation of international logistics was significantly affected by the September 11 tragedy. In response to the tragedy, the US government launched some initiatives to tighten border security for imports and exports. Table I lists several security initiatives currently in place. Although these initiatives are beneficial to trade security, the international trade community is concerned with their impact on trade efficiency and cost. It is estimated that the total added cost of the new security measures will reach approximately $151 billion annually for the United States economy (Bernasek, 2002; Damas, 2001). To make the issue more complicated, some of those security initiatives expect firms to collaborate with foreign manufacturers and logistics providers to develop a supply chain wide security. Since many US importers have never physically visited their foreign suppliers, the thought of establishing a supply chain-wide partnership to enhance security can be overwhelming. The need to balance security needs and efficiency presents a conflict for managers of international businesses. A recent survey found that many managers are still unsure of necessary
### Table 1 Security initiatives

<table>
<thead>
<tr>
<th>Security initiative</th>
<th>Program description</th>
<th>Implementation date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Container Security Initiative (CSI)</td>
<td>Objective is to identify high-risk containers before they arrive in the US by placing US Customs inspectors at foreign ports where they screen US-bound containers</td>
<td>February 2002</td>
</tr>
<tr>
<td>Customs-Trade Partnership Against Terrorism (C-TPAT)</td>
<td>C-TPAT is a joint government-business initiative to build cooperative relationships that strengthen overall supply chain and border security</td>
<td>April 2002</td>
</tr>
<tr>
<td>24-hour rule</td>
<td>The 24-hour rule allows Customs to evaluate containerized shipments for potential terrorist threats before they are loaded on to ships. Ocean carriers must file a complete manifest for all shipments with Customs at least 24 hours prior to a vessel's departure from a foreign port bound for the US</td>
<td>December 2002</td>
</tr>
<tr>
<td>Free and Secure Trade (FAST)</td>
<td>FAST program is an expedited truck processing system that will include dedicated lanes for vehicles that have been identified prior to arrival as carrying low-risk shipments</td>
<td>December 2002</td>
</tr>
<tr>
<td>Smart and Secure Trade Lane (SST)</td>
<td>SST focuses on deploying security of goods from the point of origin to the point of delivery across multiple global trade countries</td>
<td>July 2002</td>
</tr>
<tr>
<td>Operation Safe Commerce (OSC)</td>
<td>OSC is a collaborative effort between the federal government, business interests, and the maritime industry to develop and share best practices for the safe and expeditious movement of containerized cargo</td>
<td>February 2002</td>
</tr>
<tr>
<td>Partners in Protection (PIP)</td>
<td>Canada’s Partners in Protection program works in conjunction with C-TPAT to expedite and process goods quicker at the US Canadian border</td>
<td>December 2002</td>
</tr>
</tbody>
</table>

Note: For more details of these initiatives, see the US Customs web site, available at: www.customs.gov

The process of shipping goods around the world is long and complex (Schary and Skjott-Larsen, 2001). Figure 1 displays the process of international logistics (i.e. freight forwarders, non-vessel operator common carriers, export trading companies, customs, customs brokers, and third party logistics) as goods move across national boundaries. Each trade transaction can involve up to 25 different parties. As products and information travel through those parties, the potential increases for loss of information, damage to products, and delay. In addition, companies face many complex barriers, including documentation requirements, transportation modes, information processing, and varying regulations. For instance, a typical cross-border transaction might involve filing 35 documents, communicating with 25 parties and complying with more than 600 laws and 500 trade agreements (Cassidy, 2003). In 1994, US Customs processed 12.3 million commercial entities and by 2004 this number will increase to 30 million.

The international community has made strides in improving the efficiency of global logistics. Many importers began to implement Global Trade Management software to enhance tracking and inventory control. Third-party logistics companies, such as UPS Logistics, provide various value-added services such as e-commerce, wireless transactions, freight services and supply chain services to help optimize efficiency in their global supply chains.

Efforts toward efficiency of international logistics were severely challenged by the increased concern for security after the September 11 terrorist attack. With 90 percent of world trade transported in containers on ocean ships (Cuneo, 2003), the potential impact on security is staggering. Approximately twenty million containers move through 220 ports around the globe annually, and of those, six million containers enter US ports each year. This translates to 17,000 containers a day entering US ports. While it is clear that increased inspection of containers would cause delays the logistics process, there is no guaranteed improvement to border security.

**Global logistics security**

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**Government initiatives in logistics security**

To address the security concerns of manufacturers and transportation companies without compromising supply chain efficiency, the US Customs office launched several initiatives, including the Customs-Trade Partnership Against Terrorism (C-TPAT), Container Security Initiative (CSI), the 24-hour rule, Operation Safe Commerce (OSC), Smart and Secure Trade Lane (SST), and Partners in Protection (PIP). These security programs involve all parties in supply chains, including foreign governments, to ensure border security. Figure 2 gives an overview of these initiatives in relation to international logistics operations.

Very similar to various approaches to enhance product quality, those security initiatives cover three major points of security – source inspection, in-transit process control, and
prevention. For inbound logistics, the inspection of goods is required, but process time can be reduced if collaboration with suppliers is established. In addition to source inspection, \textit{in-transit process control} utilizes comprehensive monitoring to reduce the risk of tampering and intrusion during shipment. The last layer of security initiative, \textit{prevention}, requires a total supply chain effort – from government to supplier to end consumer. Similar to ensuring quality in a manufacturing process, prevention is a more effective approach to border security and begins with the suppliers. The premise is that the security of international logistics is only as strong as the weakest link. Therefore, firms are vulnerable to attacks on their own assets as well as other elements throughout their supply chain.

The specific security initiative with the prevention function is the Customs-Trade Partnership Against Terrorism (C-TPAT). Overall, C-TPAT was designed to provide a template on how to assure the integrity of conveyance loading, documentation, and sealing (ARC Advisory Group, 2002; Edmonson, 2004). Under this regulation, trade partners must review their entire supply chain to ensure that it is tamper-proof and provide Customs with compliance documentation. The ultimate objective is to reduce the risk of tampering in transit, with comprehensive monitoring for contraband and intrusion. Participating in C-TPAT is voluntary and US Customs provides a number of incentives for companies to join (Table II).

\textbf{Potential impacts of the C-TPAT certification}

C-TPAT was implemented in April, 2002. As of March, 2004, approximately 5,800 importers, carriers and intermediaries have become C-TPAT members but only half of them have submitted security plans. Of those C-TPAT members, 200 have completed validation while another 500 companies are awaiting validation (Edmonson, 2004).

Figure 3 summarizes the C-TPAT certification and validation process. At the certification stage, all potential C-TPAT participants must conduct a comprehensive self-assessment of their supply chain using C-TPAT security guidelines. US Customs reviews submitted documentation and makes certification decisions. Companies must then validate their certification through a site visit by US Customs and supporting documentation. Finally, self-assessment requires that companies submit annual reports of their current practices. In the certification process, US importers...
survey their foreign suppliers to ensure the establishment of proper security systems. Once a company is certified, it becomes a C-TPAT partner and receives benefits such as reduced inspections, faster inspections and an assigned account manager.

There is a great deal of anxiety and confusion in the trade community toward the C-TPAT certification (La Londe, 2002; Lee and Wolfe, 2003; Sheffi, 2001) due to the lack of understanding of the certification process and the uncertainty regarding its ultimate value. In response to these concerns and the potential for C-TPAT to impact the entire international supply chain, we decided to examine and report on the current C-TPAT certification practices, the value of the certification, and the effects of the certification on international supply chain security. Specifically, we will address the following questions:

- How do firms work through the C-TPAT certification process? Are some approaches to obtaining certification more effective than others?
- What are the cost and benefits of the C-TPAT certification? Does the certification improve logistics security?
- How effective is the C-TPAT program in enhancing international supply chain collaboration?

The first two questions address the confusion with the C-TPAT certification (Bernasek, 2002; La Londe, 2002). To a certain extent, the C-TPAT certification resembles the ISO

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**Table II Benefits of C-TPAT certification**

<table>
<thead>
<tr>
<th>Benefits/category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>More secure supply chain</td>
<td>C-TPAT allows companies to work toward building a stronger relationship with their partners to ensure understanding and adherence to the guidelines</td>
</tr>
<tr>
<td>Considered low risk importer</td>
<td>C-TPAT partners are considered low risk importers; thus, these companies will receive the benefits of reduced inspections and delays</td>
</tr>
<tr>
<td>Assigned account manager</td>
<td>Account managers work with C-TPAT certified companies to establish and update action plans to reflect C-TPAT commitment</td>
</tr>
<tr>
<td>Eligibility for account-based processes</td>
<td>Companies are eligible for account-based processes such as bimonthly or monthly payments to further streamline customs procedures</td>
</tr>
<tr>
<td>Emphasis on self-policing</td>
<td>Companies continually assess their own security guidelines, allowing them to identify any vulnerable spots in the supply chain and rectify these issues</td>
</tr>
<tr>
<td>Ability to participate in the FAST program</td>
<td>C-TPAT provides entry into the Importer Self-Assessment trade compliance program. It is also the prerequisite to participating in the Free and Secure Trade (FAST) Program</td>
</tr>
</tbody>
</table>

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**Figure 3 C-TPAT Certification/Validation process**

CERTIFICATION
To require that companies develop a program to enhance security throughout the supply chain in accordance with C-TPAT guidelines

Procedure
1. Company signs a Memorandum of Understanding (MOU)
2. Company files and sends Customs a Security Profile within 60 days after signing MOU
3. Customs reviews and makes certification decisions within 60 days of receiving Security Profile
4. Once certified, company becomes a C-TPAT Participant

Within 3 years of certification

VALIDATION
To ensure that C-TPAT participants have implemented the security measures outlined in their Security Profile

Procedure
1. Customs arranges an on-site tour of the company for C-TPAT validation (30 day notice is given)
2. Necessary supporting document must be submitted within 30 days after receiving written notice
3. Customs sends a Partnership Validation Team (PVT) to conduct the on-site C-TPAT validation (~10 days)
4. PVT prepares and delivers Participants a copy of Validation Report

After validation

SELF-ASSESSMENT
1. Company must submit a written self-assessment, which indicates the current practices on a yearly basis
2. Onus is on the company to inform Customs of any changes outlined from the original Security Profile submitted
9000 certification program, since both programs require documentation prescribing a firm’s security/quality systems rather than examining its actual security and quality performance. In other words, both programs are a generic security or quality assurance system instead of a security or quality performance standard. In addition, the procedure of gaining the ISO certification (i.e. application, documentation review, and on-site audit) is similar to that of the C-TPAT certification illustrated in Figure 3. In that regard, we hypothesize that the experience from previous ISO certification experience could enable the US trade community to prepare for the C-TPAT certification. For instance, several studies (Webster, 1997; West, 2001) have identified critical factors to the success of ISO 9000 certification such as top management support, education, consultant involvement, and cross-functional team.

The trade community also questions the value of the C-TPAT certification. While the US Customs promised to provide the certifiers various benefits (Table II), it is not clear whether the certification program could effectively enhance the border security as the Customs office intends. Previous literature indicated that ISO certification only examined compliance to a quality management system, but it did not directly lead to quality improvement, at least not immediately (Evans, 1997; Yusof and Aspinwall, 2000). In other words, ISO provides a set of good basic practices for initiating a quality program, and is an excellent starting point for companies with no formal quality assurance program. The significant quality improvement, however, is achieved only when companies engage in continuous improvement programs after the certification (Seddon, 1997; Evans and Lindsay, 2004). In that regard, we hypothesize that the C-TPAT certification does not immediately improve logistics security.

The third research question concerns the type of collaborative activities engaged in by firms during the C-TPAT certification process. Prior to this initiative, many importers had very little knowledge about their overseas suppliers (Teach, 2003), but C-TPAT requires that the US companies develop a more detailed understanding of foreign suppliers to monitor their shipments. This is the first time that the US trade community has been forced to examine the concept of supply chain collaboration beyond the national boundary. The practice of sourcing from foreign suppliers, while economically sound, now challenges companies to collaborate with suppliers to improve security. We hypothesize that the C-TPAT certification would force US firms to develop logistics security systems with more involvement from their foreign suppliers.

**Research design**

We used both case study and secondary data research methods to collect necessary data in this project. The case study method was employed because it allows researchers to explore a wide range of issues in targeted settings (Eisenhardt, 1989; Yin, 1994). Case studies provide evidence for hypothesis generation and for exploration of areas where existing knowledge is limited. Since the issue of C-TPAT and supply chain security has not been addressed in prior research, this exploratory method was appropriate. In this study, case research involves the data gathering from four C-TPAT certified organizations. Additionally, a secondary data analysis was made based on the literature (Shanahan, 2004) regarding the C-TPAT certification practices in JC Penney. Secondary data is defined as data collected by others and archived in some form, not specifically for the research question at hand (Stewart, 1984). It has been contended that secondary data analysis could be valuable to researchers in this situation (Hakim, 1982). For the purpose of the present study, the literature and the corporate website offered the information needed regarding JC Penney’s C-TPAT certification program.

For the purpose of this study, we selected five companies (one customs broker, three importers, and one transporter/freight forwarder) at different supply chain positions, with various sizes and businesses. All firms are C-TPAT certified. We were primarily interested in studying the practices of the US importers since they have to collaborate with foreign supply chain partners. The customs broker and forwarder were included in the analysis to understand the impact of C-TPAT on Third-Party Logistics (3PL) providers.

Structured interviews were conducted to collect necessary data from all organizations except JC Penney’s. Based on the research questions and relevant literature, a case study protocol was designed and used to guide the interviews and data collection. The protocol was reviewed and pre-tested by a group of researchers and senior managers in international trade. It consists of four sections:

1. Company background (size, business, and time of certification);
2. Certification process and effort (management support, major endeavors, challenges, and changes);
3. Collaboration with supply chain partners (type of activities, resistance, and changes); and

Most questions are open-ended soliciting for facts and examples pertaining to the research questions. To measure the outcome of supply chain partnership, each company was asked to rate (low, medium, high, very high) its degree of collaboration with supply chain partners based on the variety of collaborative activities performed.

On-site interviews and observations were conducted after the pretest was concluded. Prior to each interview, the protocol questions were shared with the interviewees for the purpose of their preparing and gathering necessary information. The respondents were also informed of the purpose of the study. In all cases, we met with at least two interviewees, who were involved in the C-TPAT certification, and at least two researchers participated in the interviews in order to reduce confirmation bias. The first researcher wrote up notes from the visit and the second researcher verified those notes. Disagreements were handled by follow-up telephone calls. Sources of data collection included interviews, documentation, and archival records. The use of multiple sources of evidence enhanced both the reliability and validity of this study (Voss et al., 2002).

**Case studies and findings**

Each company was treated as an individual “case”, thus the research presented a multiple-case study seeking to explore issues related to international logistics security. Data analysis was performed at three levels: within-case analysis, cross-case analysis, and expert analysis. The within-case analysis
summarized case study for each company and focused on the information regarding the C-TPAT certification practices and supply chain partners involvement in individual companies. This analysis “allows the unique patterns of each case to emerge before a generalized pattern across the cases is created” (p. 540, Eisenhardt, 1989). Next, the cross-case analysis searched for patterns regarding relationships between independent variables (e.g., company characteristics and certification practices) and dependent variables (e.g., supply chain partnership) across the five cases. Specifically, the analysis of pattern matching involved the investigation of explanations (how and why) for outcomes in one case, and the findings (identified patterns) from this case were then augmented by other cases to ensure the validity. Finally, the results of cross-case analysis were discussed with a customs representative and an international trade attorney for further confirmation and refinement. In the following section, we provide a brief overview of each of the five cases, with key findings displayed in Table III.

Company A – Customs Broker
Company A is a licensed US Customs Broker and international freight forwarder providing management support services for clients engaged in international trade through a network of offices and affiliates located in the major trading centers of the United States and abroad. The company became C-TPAT certified in 2003. The certification process took approximately 180 days and cost $18,000. Most of this time and cost was spent on gathering data and installing the security processes required by US Customs. The company estimated that 250 to 300 hours of work were required. A cross-functional team was formed to conduct the certification project, including a Chairperson (project manager), a branch office manager, an information technology specialist, a transport department specialist and a Customs department specialist. The corporate leadership gave strong support for the certification program.

Regarding collaborative activities, Company A noted that it worked with its consolidators, warehouse, drayage and forwarders to develop its security system and a rating of “high” was given in terms of the degree of cooperation with its supply chain partners. Company A also met with its supply chain partners, discussed and developed security guidelines and the security questionnaire required by US Customs. The company also established procedures that regularly monitor their partners to ensure that the set security guidelines were not violated.

In terms of benefits, Company A indicated C-TPAT certification has brought about less inspection, faster clearance, and better insurance protection against the disruption or delay of goods. The process of C-TPAT certification has also allowed its associates and supply chain partners to become more aware of security issues.

Company B - Importer
Company B was founded in 1985 as a subsidiary of a manufacturing company. It is an experienced import service provider specializing in product and component part sourcing for US manufacturers and distributors. The company has 21 employees who provide solutions in the areas of product development, packaging, inspections, logistics, customs, and supply chain management. Headquartered in the Midwestern
<table>
<thead>
<tr>
<th>Critical variable</th>
<th>Company A</th>
<th>Company B</th>
<th>JC Penney</th>
<th>Company C</th>
<th>Company D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Industry/Business</td>
<td>Broker/Freight forwarder</td>
<td>Import service provider</td>
<td>Importer, Retailer</td>
<td>Transportation/Freight forwarding</td>
<td>Importer</td>
</tr>
<tr>
<td>2. Size</td>
<td>130 employees</td>
<td>21 employees</td>
<td>147,000 employees</td>
<td>360,000 employees</td>
<td>15,000 employees</td>
</tr>
<tr>
<td>3. Certification:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Length of process</td>
<td>180 days</td>
<td>160 days</td>
<td></td>
<td>210 days</td>
<td>160 days</td>
</tr>
<tr>
<td>4. Cost</td>
<td>$18,000</td>
<td>$4,000</td>
<td>N/A</td>
<td>$3,500</td>
<td>$5,000</td>
</tr>
<tr>
<td>5. Time</td>
<td>250-300 hours</td>
<td>160 hours</td>
<td>N/A</td>
<td>80 hours</td>
<td>140 hours</td>
</tr>
<tr>
<td>Team members included</td>
<td>Managers and Senior Specialists</td>
<td>President, Q&amp;A Manager, Product Manager, Operation Manager</td>
<td>Team members included CEOs and managers of logistics, quality control, warehouse, and legal</td>
<td>Team members included VP of International Trade Management &amp; Security Manager</td>
<td>Team members included Q&amp;A Manager, VP of Operation Management</td>
</tr>
<tr>
<td>7. Major endeavors or challenges</td>
<td>Adapting new procedures</td>
<td>Two positions were created to gather information</td>
<td>Implementing/rolling out security standards globally to all suppliers</td>
<td>All supply chain partners were on board with C-TPAT certification</td>
<td>All supply chain partners were on board with C-TPAT certification</td>
</tr>
<tr>
<td>8. Collaboration with supply chain partners (Degree? Who? What Activities?)</td>
<td>High</td>
<td>Moderate to High</td>
<td>Very High</td>
<td>Very High</td>
<td>Very High</td>
</tr>
<tr>
<td>CONSOLIDATORS, DRAYAGE, WAREHOUSE, FORWARDERS</td>
<td>Foreign manufacturers, freight forwarders, customs brokers</td>
<td>Developed &amp; conducted a security survey</td>
<td>Foreign manufacturers, ocean carriers, &amp; ground carriers</td>
<td>Developed &amp; conducted a security survey</td>
<td>Foreign manufacturers, suppliers, transporters</td>
</tr>
<tr>
<td>Supply chain partners provided feedback on security measures</td>
<td>Used Custom’s questionnaire</td>
<td>Conducts regular inspections</td>
<td>Developed &amp; conducted a security survey</td>
<td>Conducts regular inspections</td>
<td>Developed &amp; conducted a security survey</td>
</tr>
<tr>
<td>9. IT Upgrade (Did the company invest new IT?)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>10. Benefits</td>
<td>Less inspection, faster clearance, insurance against disruption of goods, aware of security issues</td>
<td>Smooth, uninterrupted flow of goods, faster clearance, less inspection, designation as low risk importer, high customer service level</td>
<td>Smooth, uninterrupted flow of goods, faster clearance, less inspection, designation as low risk importer, high customer service level</td>
<td>Higher level of customer satisfaction, faster clearance</td>
<td>Smooth, uninterrupted flow of goods, faster clearance, less inspection, designation as low risk importer, high customer service level</td>
</tr>
</tbody>
</table>
suppliers had strong security measures and quality systems already implemented. Another important aspect of collaboration with suppliers is the security education and training. As an example, the company sent suppliers information on how to better check containers before loading. To reiterate the importance of security, the company embarked on rigorous and regular inspections of their suppliers' facilities. If a supplier did not comply with C-TPAT and JC Penney's standards, they had 90 days to rectify the problem. If the supplier failed to meet the standards, JC Penney would cease business with the supplier. The security committee also conducted bi-annual supplier summits where corporate staff would update suppliers on recent developments with security issues in the retail industry. The goal of JC Penney's security initiative was to ensure smooth, uninterrupted flow of goods. Their efforts have earned the company the status of low-risk importer. According to JC Penney, the inspection rate for the industry is approximately 6 percent; however, their inspection rate is less than 1 percent. Reduced inspections have given the company the advantage of a more efficient supply chain, reduced costs and higher levels of customer satisfaction. Since information pertaining to JC Penney was collected from existing literature and the corporate website, we were not able to obtain cost figures or time spent attaining certification. Fortunately, such information is not critical to address our research questions.

Company C - Third-Party Logistics Provider
Company C is a division of a global transportation and freight forwarder. The company provides logistics, global freight, financial services, mail services and consulting to importers and exporters. Its customers include many Global 500 companies and growing companies who are involved in various supply chain services such as warehousing, distributing, transporting, and customs brokerage services. Due to its handling of a high volume of packages, the company believes that security is always a critical issue. Company C became C-TPAT certified in 2003. The entire certification process took 210 days and cost $3,500. Company C estimated that a total of 80 hours was required to complete the necessary certification requirements. A cross-functional team (including VP of International Trade Management, International Security Manager, and C-TPAT Coordinator) was formed to conduct this certification project. Company C was given a “very high” rating in terms of collaborating with their supply chain partners. The company conducted surveys on all of its supply chain partners regarding their existing security measures and procedures. In addition to working with air, ocean and ground carriers, the company also communicated with its global suppliers to guarantee adherence to security compliance. Although Company C did not have participation from their partners in creating the security guidelines, it performed overseas audits of its facilities on a regular basis. The company reported that its partners were eager to embrace the C-TPAT program. Partners were held accountable if they deviated from the set guidelines. Since becoming C-TPAT certified Company C has experienced increased customer satisfaction due to the faster inspection at the borders. In addition, the company’s culture has changed. The company’s operation, sales force and supply chain partners are now more aware of the importance of security. As a result, gaining C-TPAT certification has created a win-win situation between the company and its customers and partners.

Company D - Importer
Company D is a US retailer of footwear and imports footwear products from overseas. The company also ships its products to stores around the world. With sales of more than 215 million pairs of shoes in 2002, the company is clearly concerned with security issues in the importing and exporting of their products. Company D became C-TPAT certified in March of 2003. The C-TPAT process took 160 days. In addition, the company spent 140 hours and $5,000 to prepare for C-TPAT certification. The company has several branch offices located close to its overseas suppliers to perform product design, quality inspection and delivery operations. Due to its historically close relationship with suppliers in quality programs, Company D did not face many major challenges in certification. The company visited every supplier facility, understood their current security system, communicated the standard procedure, and provided suppliers with necessary assistance. Company D made efforts to ensure that its suppliers had security measures in place so that its supply chain was not vulnerable to illegal trafficking. The major challenges that Company D faced came from the suppliers in China, where many security procedures are often established and monitored by the government and any changes must go through a long process of application and approval. The government often assigned security personnel who were reluctant to comply with any new security procedures without government approval. This matter remains a constant battle even after the C-TPAT certification. By being C-TPAT certified, Company D enjoys similar benefits to the previous companies discussed – a smooth, uninterrupted flow of goods. Also, there was less inspection and faster clearance due to the fact that the company was designated as a low risk importer. Meanwhile, the company reduced its transportation expenses by reducing the number of carriers used and leveraged the increased volumes to negotiate better rates.

Discussion and research propositions
Based on the data collected from individual companies, we performed cross-case analysis to search for cross-case patterns pertaining to the C-TPAT practices and supply chain activities. The findings were discussed with two experts (a customs representative and an international trade attorney). This section summarizes findings related to the three research questions (practices and value of C-TPAT certification and supply chain partnership) and presents two research propositions for future research in logistics security.

C-TPAT best practices and benefits
Cross-functional teams, education, and top management support were indispensable
All firms constructed a cross-functional team to implement the certification. This team approach seems to be indispensable since the certification imposes security requirements on many aspects of business, including facilities, personnel, information, and suppliers. Implementation teams were mostly led by the CEOs, quality
managers, or operations managers. Every company provided employees with security related training and made efforts to raise the awareness of the security issue. Two companies even sent employees to take the certification training course from consulting companies. While some interviewees were unsure of the effectiveness of the C-TPAT program in preventing terrorism attacks, all companies believed in the need for a security program and assigned CEOs or high-level managers as the team leader. All interviewees admitted that the crucial role played by the top management led to the success of the certification. In summary, the emphasis of team approach, top management support, and education seem to facilitate the certification process. This finding is consistent with previous ISO certification experience (Webster, 1997; West, 2001).

**IT changes were not required for certification**

Prior to this study, we anticipated that a compatible IT system would be necessary to facilitate the flow of security information between supply chain partners in order to enhance the logistics security. Such an IT system would provide accurate, complete, and protected information about shipments to those who need it in a timely manner (Sheffi, 2001). However, our results showed that the C-TPAT program requires no major efforts in upgrading IT systems. None of the companies studied made substantial efforts to develop tight integration of information systems across suppliers, manufacturers, logistics providers, and customers. It remains to be seen whether this finding holds true for the long term or across a broad range of industries.

**C-TPAT certification provided hypothesized benefits**

Most of the benefits listed in Table II were confirmed in the case studies. Four out of the five businesses reported faster inspections at the border, reduced costs, and increased customer satisfaction. (Company B has not received any benefits as of yet since it was recently certified). On the other hand, four out of the five firms claimed that the assignment of account manager from US Customs has not produced much benefit. An account manager is assigned to each participating firm to assist in maintaining its account and accumulating information about the company's operations. The expected benefit is that the participating company can work with the same customs official for each new transaction, which should reduce the amount of process time and effort for the company and Customs. With the exception of JC Penney, where no such information was available, companies reported that they received little assistance from their account managers. A follow-up interview with a Customs representative indicated that resources at US Customs might be short due to the overwhelming number of the C-TPAT applications.

**C-TPAT certification encouraged international supply chain partnership**

Overall, Customs has received some initial success of what it originally set up to accomplish through the C-TPAT certification – foster the collaboration of international trade partners to work together on the security of the supply chain system. Prior to the certification, Company B, like many other US trade companies, seldom communicated with its foreign suppliers other than regular trade-related issues. The C-TPAT certification forced Company B to understand “little but critical things” regarding its overseas suppliers, such as the practice of “loading a container in the middle of street”. Even for the other four companies, who used to work closely with supply chain partners, the certification definitely enhanced the international supply chain partnerships as the result of regular facilities visits, communication of security standards and vision, sharing of shipment and personnel information, and offering of education and training. Overall, the certification process definitely raised the degree of supply chain security partnership.

**Improvement on logistics security is unclear**

All five companies hold their partners accountable for any deviation from the security guidelines. For instance, Company D requested all of its suppliers install camera security devices to monitor production and loading areas. Suppliers who do not adhere to the guidelines are given a certain amount of time to rectify the security problem. If the problem is not rectified, the company ceases the business relationship. Overall, the companies felt more confident with their current logistic security systems but were unsure of the improvement in border security. Similar to the previous literature regarding the value of the ISO certification (Seddon, 1997), the C-TPAT certification forces companies to document security standards and systems with their supply chain partners, but it does not have immediate impact on logistics security.

The finding of inconsistent supplier involvement imposed an even more serious question about the improvement of logistics security. During the interview, all five companies confirmed the improvement of the relationship with their supply chain partners. The process of developing security guidelines and soliciting feedback from supply chain partners, however, varied from company to company as indicated in Table III. In the case of Companies A and B, most of their collaborative activities were limited to documentation and virtual communication, such as sharing of security vision and guidelines. In comparison, Companies C, D, and JC Penney engaged in more frequent and higher level collaborative activities (e.g., on-site visits, regular meetings, and training). Obviously, due to the loose guidelines of the C-TPAT certification, overseas supplier collaboration in some cases remains at the paperwork level and there is still no guarantee of comprehensive monitoring for tampering and intrusion in overseas logistics process. Consequently, companies might be certified, but the certification does not assure that every link of the supply chain is secure. Thus, certification must be treated as means rather than end for enhancing international logistics security.

Further analysis reveals that the variations of supplier activities could be attributed to two variables: the size of the firm and the existing quality programs. The remainder of this section reviews these two variables from the perspective of their effects on developing global security program. Accordingly, two research propositions are developed.

**Research propositions**

**Company size, certification, and security program**

The size of a company seems to have impact on its collaboration with suppliers during the certification process. For example, Company B did not solicit input from its foreign suppliers during the certification process, nor did it visit supplier facilities. The company admitted that the resource limitations prohibited it from any supplier collaboration beyond information exchange of security visions and standards. The remaining four companies, however, all developed a security questionnaire with active participation from their supply chain partners, and some conducted
supplier site visits. These companies worked to harmonize and standardize security processes internationally. A high level of collaboration was especially evident from the two larger importers, JC Penney and Company D. Both companies engage in various collaboration activities with their foreign suppliers, including training and education, regular security audits, and meetings to update new security development. Based on this finding, we propose the first research proposition for future research.

**P1.** The size of a company does not affect its C-TPAT certification but it could affect the level of collaboration with foreign supply chain partners.

**Existing quality program, certification, and security program**

One interesting finding was that the certification preparation was easier for firms who have previously installed security procedures for controlling theft and reducing contraband. Moreover, pre-existing collaborations with suppliers on quality management processes appeared to help in the efficient development of supply chain security systems. For example, JC Penney and Company D had well-established quality programs and historically worked closely with their suppliers not just with incoming material quality but also in product and process design. Company C is a 3PL provider and has no regular manufacturing quality program, but it has ISO 9000 certification and always works closely with its upstream and downstream partners in eliminating paperwork and duplicated processes. All three of these firms seemed to be more receptive to the new security requirements and were able to build the concern of security into their existing quality program. As a JC Penney manager commented: We already had a QC program in place where our inspectors will go to a factory and verify that production is being done and quality is being met. So it was easy to roll the C-TPAT program in there. (Shanahan, 2004) It is likely that companies who have ISO certification have developed a system of continuous improvement with suppliers, which provides a more conducive environment for implementing C-TPAT. As a result, we hypothesize that global logistics security systems can learn from the quality movement by focusing on “prevention” and adopting the “total supply chain” approach.

**P2.** Implementation of global logistics security program is more effective when TQM programs are in place in both the certifier and supply chain partners.

The variations in C-TPAT practices and supply chain activities raise an important question regarding the effectiveness of C-TPAT program in achieving logistic security and developing supply chain partnerships. Understanding the impact of size and quality program on the level of collaboration would enable managers to prepare for enhancing their security programs.

**Conclusions**

While US Customs launched a number of security programs, the C-TPAT program is the only one whose sole purpose is enhancing logistics security through the collaboration of the entire international supply chain. In theory, C-TPAT creates a chain of trust that parallels the importer’s supply chain. The chain starts with the factory in a foreign country, and runs through carriers and intermediaries to the importers warehouses. If every link in this chain is safe and secure then goods will be considered safe to enter the US. This study selected five companies from various industries to investigate the practices of the C-TPAT implementation and supply chain collaboration. In addition to reporting the current practices of the C-TPAT implementation, our results confirmed the significant impact of the C-TPAT program to the international trade community. As for the overall goal of improving border security, our results suggest that the C-TPAT is a means rather than an end and its current value to logistic security is not clear due to the inconsistent practices of supplier involvement. Studying the two research propositions would be the first step toward understanding and rectifying the inconsistent practices. Until we are able to harmonize and standardize the security processes internationally and domestically, border security remains as a concern.

None of the five companies have been able to turn their logistics security program into value-added activities at the present time. Companies should look beyond the certification and address the balance between security and effectiveness. One suggestion would be to examine supply chain security based on the principles of quality management (Lee and Wolfe, 2003). Prior to 1980s, companies made trade-offs between quality and cost with the belief that quality can only be achieved at the expense of the cost. However, since 1980s, many companies have found that better quality can lead to lower defects and failure costs, higher customer satisfaction, more sales, and higher profits. Manufacturers learned to focus on “prevention” and took a total quality management approach by working closely with suppliers and customers to improve quality.

A similar approach exists regarding environmental policies. Traditionally managers held a passive attitude toward environmental policies, claiming that environmental protection can only be achieved at the expense of profitability (Klassen and Whybark, 1999). Recently, companies that have taken a prevention-oriented approach (e.g. Xerox, 3M) have shown that sound environmental management with proactive supplier participation can actually lead to more profit (Geffen and Rothenbery, 2000; Maslennikova and Foley, 2000). Hart (1995) also advocated that the experience of total quality management implementation enables the introduction of a pollution prevention program. Table IV illustrates the similarities across quality management, environmental management, and logistics security management. It is clear that the philosophy of prevention and supply chain partnership prevails in all three management areas.

In conclusion, international supply chain security is still in its infancy and has many issues to resolve before it becomes a fully collaborative system. Our second research proposition hypothesizes that global logistics security systems can learn from the quality movement by focusing on “prevention” and adopting the “total supply chain” approach. As the international trade community begins to think about supply chain security in terms of prevention, process control, and design improvements, companies have better chance to improve security without increasing costs or jeopardizing productivity. There are many possibilities for enhancing logistics security without sacrificing efficiency. For instance, the self-assessment of current security can result in valuable process improvements for a company’s customs department with savings of duties and taxes (Teach, 2003). With more advanced IT, mobile communication, and global trade
| Table IV  Logistics security, quality management and environmental management |
|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|
| **Quality management**                         | **Environmental management**                     | **Logistics security management**                |
| **Cost of failure**                            | Defects are very costly                          | Environment pollution and waste damage health,  |
|                                                 |                                                 | safety and natural resources                     |
| **Philosophy**                                 | Total Quality Management                        | Green supply chain system                       |
| **Supplier involvement**                       | Supplier quality program,                      | Supply chain partnerships in new product design |
|                                                 | Just-in-time systems                            | and green purchasing                            |
| **Management focus**                           | Prevention                                      | Go beyond compliance and focus on pollution    |
|                                                 | Source inspection                               | prevention                                       |
|                                                 | Process control                                 | Green purchasing                                 |
| **Analytical tools**                           | Root Cause Analysis                             | Reengineering production processes to reduce   |
|                                                 |                                                 | pollution and waste                              |
| **Value of program**                           | "Quality is free"                               | Environment management creates competitive      |
|                                                 |                                                 | advantage and improves sustainability            |
| **Note:**                                      | "The information in quality management and     | Higher productivity with supply chain security  |
|                                                 | security management is from Lee and Wolfe (2003)| and confidence                                   |

Note: The information in quality management and security management is from Lee and Wolfe (2003)
software available, companies could reengineer the current long and inefficient global logistics process. The C-TPAT and other security programs have helped managers realize the need for collaborating with supply chain partners, but the revolution of the international logistics has just begun.

References


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