
Study on the Mutually Supportive Advancement of APEC'S Trade Facilitation and Secure Trade Goals post September 11

*Analysis and Case Studies prepared for
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Part I: Analysis of the Issues and Next Steps

*Paper prepared by members of the
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¹ Contributors to this paper included Christopher Findlay, Shams Rahman, and the authors of the case studies undertaken as part of the project. Comments and suggestions were provided by David Parsons and a number of other members of the PECC network. An earlier version of some of the material here is contained in Rahman and Findlay (2003).

Introduction

APEC Leaders in Shanghai in late October 2001 agreed to work on concrete measures to cut transactions costs in international trade by 5 percent across the region by the end of 2006. When making their commitment, the Leaders reiterated aspects of the Osaka Action Agenda by observing the importance of taking into account the diversity among the members and the value of capacity building programs. Their statement is also significant because of their reference to working ‘in close partnership with the private sector’. These ambitions were widely welcomed. At the same time, APEC members were facing new challenges with respect to their trade facilitation agenda as they also sought to achieve higher levels of security in the trading system, following the experience of the events of September 11, 2001. As the security-driven agenda developed in the following years, some economies expressed concern about whether the goals of the security agenda would conflict with those of the trade facilitation agenda.

The purpose of this study is to respond to this concern by undertaking the following tasks:

1. examine the impact of the recent spate of terrorist acts on APEC’s Trade Facilitation goal of achieving a significant reduction in transaction costs in the APEC region;
2. consider the range of business and trade related responses and measures being adopted following terrorist attacks in the US, Indonesia, the Philippines and elsewhere and how they will affect transactions costs (either positively or negatively), including how they can reduce the ongoing cost of terrorism;
3. consider both the challenges and the opportunities for the APEC Trade Facilitation Goals associated with the measures and responses under consideration, including the possibility for new security-related technologies to drive efficiencies in trade and border controls, thus reducing transaction costs; and
4. identify areas for potential international cooperation to achieve APEC’s twin goals of secure trade and trade facilitation.

This study examines developments in trade facilitation and in efforts to secure trade. It is intended to contribute to the wider goal of developing and demonstrating an efficient and integrated response in the region to the risk posed by the threat of terrorism to the region’s growth and prosperity. All APEC economies face these new challenges as both importers and exporters and are responding with a wide range of initiatives. During the

course of this limited study, changes and initiatives have continued to occur and it is therefore not possible to include a comprehensive survey of more recent developments. The United States has been a leader in developing new strategies and this study therefore makes wide use of examples of trade with the United States. This does not imply that many other APEC economies are not actively pursuing the same goals and strategies.

This Study includes six practical cases studies from the region illustrating how business, port authorities and other agencies engaged in maritime trade and security are meeting the challenges. The case studies highlight many issues which would be common to other APEC economies and other sectors. The scope of this Study does not allow for a more comprehensive range of cases to be examined.

Background on the facilitation goals in APEC

APEC adopted at its meeting in Shanghai in 2001 a target of a 5% reduction in transactions costs over the following 5 years:

Leaders instruct Ministers to identify....concrete actions and measures to implement the APEC Trade Facilitation Principles by 2006 in close partnership with the private sector.

The objective is to realize a significant reduction in the transaction costs by endeavoring to reduce them by 5% across the APEC region over the next 5 years.

Leaders also instruct Ministers to explore the possibility of setting objective criteria on trade facilitation, taking fully into account the diversity among the members as well as progress achieved in respective economies so far.

Leaders also agree that assistance programmes to help build the capacity of developing economies in trade facilitation is particularly important.²

This commitment was adopted some weeks after the terrorist attacks in the United States in September 2001. Leaders, it can be presumed, had in mind the conditions of the trading environment that applied after those attacks, and were anticipating the ways in which governments and businesses would respond.

Although a significant commitment, the statement refers to an interim target. The long-term objective is for a more substantial reduction: free and open trade and investment by 2010 for developed economy members and 2020 for developing economy members as laid out in the Bogor Declaration and the Osaka Action Agenda.

Technology will play a key role in meeting these facilitation targets to 2006 and beyond. Digital technologies can process information more

² Extract from the Shanghai Accord, Appendix 1 to the APEC Leaders Statement, Shanghai, 2001

efficiently, and substitute for more costly methods of collection and transmission of information. The contribution that new technology can make is already evident, for example, in work in APEC on paperless trading. The Electronic Commerce Steering Group points out that:

Fifteen economies have now prepared Paperless Trading Individual Action Plans. These outline the steps APEC economies are taking to meet APEC's target to reduce or eliminate the requirement for paper documents needed for customs and other cross-border trade administration and other documents and messages relevant to international sea, air and land transport, that is, "Paperless Trading" (for trade in goods), where possible, by 2005 for developed and 2010 for developing economies, or as soon as possible thereafter.

Taking advantage of new technology depends on a willingness to make investments in its installation and access to human resources with sufficient skill to implement and operate it. It also depends on the presence and quality of the complementary infrastructure such as the telecommunications system. The process of reform is often impeded by inconsistencies between arms of government. Inconsistencies between local and international standards can also impede innovation.

The constraints on the adoption of new technology tend to be more significant in developing economy members, although there are examples of developing economy members of APEC making rapid progress in adopting paperless trading. But because of these challenges of adoption, APEC members would normally be expected to move to lower transactions costs at different timetables and this condition is reflected in the design of the Paperless Trading Action Plans in APEC.

There are advantages in coordinating the introduction of new systems because of the 'network effects' that wider adoption offers. The returns to investment in this type of technology in any single economy are higher, the larger is the number of other users.³ The APEC membership therefore has a strong common interest in designing systems and capacity building programs that allow common and widespread introduction of paperless trading initiatives.

Impact of terrorist threat

The presence of the terrorist threat has accelerated work on the facilitation agenda. The threat involves two dimensions; the direct effects from the actual acts of terrorism and the indirect effects arising from the perceived risk of such acts.

Direct and indirect effects

An act of terrorism can clearly have a substantial disruptive effect. There are immediate losses, including perhaps the loss of life, of transport

³ Wilson and Hafer (2003) provide a numerical example in this context of the adoption of technology that adds to security in transport systems.

vehicles and of infrastructure. Various studies have examined the effects of a shut-down of key infrastructure components as a consequence of an attack, including those of delay, diversion of traffic and loss of economic activity.⁴ These are the direct effects.⁵

The indirect effects which emerge via changes in the perceptions of risk can be substantial. Some early estimates, made in the period immediately after September 11, of the rise in trade costs associated with the response to the perception of a higher security risk lay in the range of 1 to 3 percentage points of the value of the goods being shipped. OECD (2002) notes that these figures seem to represent an upper bound for the impacts and to the extent that the new border security measures persist, the ensuing costs will be ongoing, though perhaps declining over time as technical and procedural process is realized (page 10). However, the loss of welfare at a global level from a 1 percentage point rise in trade costs has been estimated to be \$US75b or, for most regions, a percentage change of less than 0.4 percent as a proportion of GDP (Walkenhorst and Dihel, 2002).

According to the OECD (2002), the direct costs of terrorist attacks are highly variable and are likely to be much smaller than the indirect costs associated with the change in perceptions of risk as a result of the attacks.

Costs of responses

Governments, reacting to this situation without international and domestic cooperation and with the constraints of old technologies, run the risk of imposing high costs on the trading system. For example, suppose under these circumstances governments made unilateral demands for inspections at each point of transshipment of cargoes in their territories. This would add to the administration burden required to support the movement of goods as well as to financial outlays if governments imposed new charges to cover the costs of these arrangements. This situation illustrates at the extreme how costs could be affected in an ill-prepared system.

Business bears not just monetary costs but also faces the costs of delay associated with the inspections or time taken to complete paperwork. These time costs would increase in the circumstance just described. Hummels (2001) estimates that the cost of a delay in moving goods across borders is equivalent on average to an extra ad valorem tariff of 0.5

⁴ An often-quoted study is that by the Conference Board with Booz Allen Hamilton which simulated the effect of widespread port closures in the US and estimated the cost at \$US58b over the 92 day simulation period.

⁵ The literature on these effects is also reviewed by Walkenhorst and Dihel (2002); see also Rahman (2003) and Rahman and Findlay (2003), on which this discussion is based. There is another set of effects on investor confidence and on economic growth. These impacts were highlighted in the paper tabled by Australia in the First STAR Conference in Bangkok in February 2003 and updated in a paper tabled at the APEC High-Level Meeting on Maritime Security in Manila in September 2003.

percent for every day of delay.⁶ The OECD (2002) reports that ‘prior to the terrorist attacks, estimates of the costs of time delays, paperwork and compliance related to border crossing ranged from 5 to 13 percent of the value of the goods involved’ (p. 10).

Business too will react with changing perceptions of risk. One of its concerns is the disruption in supply of products. Business may decide to bear that risk itself, in which case it would add to costs. It may also duplicate its sources of supply. A lower-cost method of managing the risk may be to add to inventories, but that too can be expensive. For example, in 2001 large US companies on average held 1.36 months of inventory, compared to 1.57 months in the early 1990s. The OECD (2003) gives the results of a study which reported that inventory levels would rise in 2002 to 1.43 months if companies were to move back to a ‘just in case’ approach to inventory holding rather than a ‘just in time’ approach. It was estimated that this would add \$US50b to \$US80b to business costs. That cost would remove ‘approximately half of the logistics productivity gains realised in the United States over the last 10 years’ (p. 18). The OECD (2003) stresses the significance of the inventory effects however, it notes that many of the measures proposed have distinct benefits that are not related to their anti-terrorism task. These benefits result from reduced delays, faster processing times, better asset control, decreased payroll (due to IT improvements), fewer losses due to theft, decreased insurance costs, etc. While some measures may slow trade, many others can in fact lower trade costs (page 3).

OECD (2003) indicates that “most participants in the international maritime trading system agree that the recently enacted maritime security measures are desirable. They are not free, but they do bring about benefits that go beyond their mitigating impacts on terrorism. The extent of their costs is uncertain but is likely to be much less than the extent of costs linked to inaction. What is certain is that some of these measures have the potential to change long-established practices in the industry – for the better. This then, is the silver lining. Responses to terrorist threats to the sector have offered new opportunities for the maritime transport industry to better organize itself, its practices and ultimately, its contribution to a more prosperous world” (page 56).

This gives a clear indication of how costs can be avoided: firstly by a higher degree of coordination in the responses to the greater risk of terrorist attacks; and, secondly by application of new technologies. These new technologies are the same as those already being introduced to increase the efficiency of moving goods through government systems in member economies.

Generally a response to the risk of terrorism requires a higher degree of traceability of cargoes. Origins need to be checked and handling

⁶ Hummels (2001) estimates the tariff equivalents associated with a delay for different goods. The rates range from very low numbers for some agricultural products to 0.94 percent a day for petrochemicals. These estimates are applied in an assessment of the effects of new customs arrangements by Hertel, Walmsley and Itakura (2001).

monitored as the cargo moves through the transport system, so that authorities are confident the material delivered is not associated with any form of threat. Available resources can then be employed in more intensive checking of some cargoes which risk analysis indicates should be treated more carefully. Digital technologies can be used to establish the source of products, the composition of the containers or ships in which they are travelling and whether or not their state or condition has changed during transit. Furthermore, as in the case of innovation to support paperless trading, the coordinated introduction of that technology could yield greater benefits than unilateral introduction.

The application of digital technology to paperless trading leads to reductions in labour requirements and to improvements in the efficiency of risk management systems (DFAT, 2001). There are examples of gains to business in the range of 1.5 to 15 percent of the value of the goods shipped. The benefits come from savings in communications, shorter handling time, gains from reductions in errors or reductions in requirements to check for errors, faster settlement times, savings in shipping times, and savings from requirements to re-enter data. These changes also help in the management of inventories.

The application of new technology has indirect effects on the operational efficiency of the supply chains. Performance levels may increase from higher quality information flows and greater coordination of this information along the chain. The use of automated technology, such as wireless communications, special ID tags, tamper proof seals on containers, global positioning systems, etc, all help in monitoring containers during transit as well as reducing inefficiencies. Sharing information can allow freight to move through terminals without any new physical investment. Simplification of customs procedures increases the chance of detection of criminal activity. The use of electronic information systems cuts administration costs. The World Bank (2003) refers to estimates that automated customs lower the direct costs of clearance by the equivalent of 0.2 percent of the value of traded goods and by 1 percent when the indirect benefits of reduced delays costs are also taken into account.

Implications for APEC's Goals

What are the implications for APEC's facilitation goals? The appropriate base-line for making such an assessment is a situation without significant technological change and without a coordinated response to the change in the risk of terrorist attacks. It should also include reactions by business to the risk of disruptions in their production and transportation systems. In this base-line case, transactions costs would be affected directly by government actions and there would be a flow-on of indirect costs from

more risk-averse business decisions on production, storage, handling and transportation activities.⁷

The introduction of new integrated technology and coordinated change and policy design is likely to make a significant difference in absolute terms compared with base-line transactions costs. First, a technology package lowers the costs associated with meeting government requirements as well providing the potential for significant gains in efficiency. Second, when effective and coordinated systems are in place, the risks of disruption are reduced so the private sector can avoid a number of cost-increasing responses.

This suggests there is scope through cooperation and coordination for APEC members to achieve significant reductions of transactions costs over the next few years from the relevant base-line situation. It indicates APEC's goal of a 5 percent reduction in transactions costs is highly relevant and achievable.

Technological change and improved procedures already underway

The capacity of APEC members to organise these cooperative and consistent responses depends on the extent of technological change and the feasibility of its adoption by business and by government and on procedural improvements. The evidence in all these areas is encouraging.

Some governments have moved quickly to adopt new technologies, and the US is a leader in the field, through a modernization program of US Customs which includes the establishment of an Automated Customs Environment (ACE). This facility, which began operating in February 2003 includes a new portal for US Customs, an account management service, and a system for processing electronically-filed data about cargo. It also includes the 'capability to access data in the international supply chain that Customs needs [in order] to anticipate, identify, track and intercept high-risk shipments'.⁸ This system illustrates the complementarity between initiatives undertaken for facilitation goals and the security objectives. A cost-benefit study was also undertaken of ACE and in a report published in 2002 it was found that the system would reduce 'transactions costs' for companies by \$US22.2b over the following 20 years (in present value terms) and would save US Customs \$US4.4b over the same period.

Relevant technology has been developing rapidly, for example, the use of RFID (radio frequency identification) tags. These tags contain a computer chip and antennae. When the tagged item, such as a container, a case or

⁷ When establishing a monitoring process for the facilitation program, further work is required on the relationships between government imposed monetary costs and those costs directly associated with government actions in the supply chain, and the indirect effects of those actions through the responses by business and in terms of the performance of the supply chain.

⁸ 'The United States Selection of Actions and Measures Pursuant to the APEC Trade Facilitation Action Plan', Paper 016.20, Committee on Trade and Investment II 25-26 May 2003, Khon Kaen, Thailand, available from http://www.apecsec.org.sg/apec/documents_reports/committee_trade_investment/2003.html

even a single product, passes by a reading station, the presence of the item is recorded. The chip is now estimated to cost 15-20 US cents a piece, but some indicate that the price could fall to 5 US cents a tag by 2005.⁹ RFID tags can hold 128 bytes of information, compared with 1.1 bytes in a bar code and, unlike bar codes, RFID tags can be read without a line of sight. This progress has been possible because of research on the numbering system to apply in the tags.

A striking instance of the increasing business-relevance of the RFID tags is the request of the very large US retailer, Walmart, to its top 100 suppliers. By 1 January 2005, Walmart wants its suppliers to add RFID tags to all the cases or containers that they ship to the company. Most other suppliers are expected to comply by 2006. At this stage, individual products will not be tagged, but the application to each individual item is eventually possible. Walmart expects to see large benefits from stock control and from avoiding situations in which stock runs out. The system will also reduce errors in inventory management and cut theft. The top 100 suppliers are expected to spend between \$US13m and \$US23m to build the infrastructure required for the system. Analysts estimate that Walmart will save billions of dollars. The US Department of Defense has made the same request of its suppliers, and other retailers are expected to follow Walmart.¹⁰

International organisations and APEC have identified the importance of improving the human element in tandem with technological innovation. The World Customs Organization in its Revised Kyoto Convention on Customs Simplification and Harmonization¹¹ identify and target human activity. Specifically, it seeks improved inspection techniques, better cooperation among customs authorities, and expedited release of express shipments can all advance trade facilitation and are all human process improvements.

Government mandated actions

Business will respond to the risk of terrorism for commercial reasons. This means their responses are driven by, and will only take into account, their own costs and benefits, and not the contribution to other businesses and economies. Governments, on the other hand, have a responsibility to act on behalf of their whole constituency and to respond immediately to the threat of terrorism. This is the basis of the case for a wider government role in the response. This also provides the case for cooperation between governments, since actions by one also have benefits for trading partners.

⁹ See http://www.infoworld.com/article/04/02/13/07OPreality_1.html, and <http://www.computerworld.com/mobiletopics/mobile/story/0,10801,85869,00.html> accessed 27 February 2004

¹⁰ See <http://news.com.com/2100-1022-1013767.html?tag=nl>
<http://news.com.com/2100-1008-5101416.html>
<http://news.com.com/2030-1008-5101767.html?tag=nl>
accessed 22 February 2004.

¹¹

http://www.wcoomd.org/ie/En/Topics_Issues/FacilitationCustomsProcedures/facilitationcustomsprocedures.html

As a result, governments are now seeking business to make immediate investments in technologies and systems that business might have preferred to defer or not to have made at all because of the perceived longer term pay-offs. The wider social evaluation of the terrorist threat leads governments to seek faster action. Under these extraordinary circumstances, governments react not by relying on incentive measures but instead they mandate changes of the type now described.¹²

The responses in maritime transport, which is the focus in this Study, can be divided into two broad groups:

1. international cooperation organised through the International Maritime Organisation (IMO), a part of the United Nations. It includes changes to the IMO'S International Ship and Port Facility Security (ISPS) Code, and
2. national-level initiatives which so far are mainly led by the United States but are growing rapidly across all economies.

The IMO initiatives include measures targeting contracting governments, ships, maritime carrier companies and ports. The ISPS Code is a comprehensive set of measures to enhance the security of ships and port facilities, developed in response to the perceived threats to ships and port facilities in the wake of the 9/11 attacks in the United States. The ISPS Code is implemented through chapter XI-2 Special measures to enhance maritime security in the International Convention for the Safety of Life at Sea (SOLAS). The Code has two parts, one mandatory and one recommendatory. In essence, the Code takes the approach that ensuring the security of ships and port facilities is a risk management activity and that, to determine what security measures are appropriate, an assessment of the risks must be made in each particular case. The purpose of the Code is to provide a standardised, consistent framework for evaluating risk, enabling Governments to offset changes in threat with changes in vulnerability for ships and port facilities through determination of appropriate security levels and corresponding security measures.¹³

The IMO reported that, on June 30 2004, the eve of the entry-into-force date, that a majority of ships and ports worldwide had achieved full compliance with the ISPS Code and that many more were well on the way towards doing so. The latest ISPS Code implementation figures showed a continuing improvement, particularly as far as port facilities were concerned.¹⁴ The APEC Transportation Working Group has been supporting this effort recognizing that there is significant value in knowing what others are doing. It conducted a workshop in Beijing in April 2004 to exchange views extensively on implementation of the ISPS Code.

¹² This material is taken from Rahman and Findlay (2003). The case studies including in this report also include more detail of the new security measures.

¹³ <http://www.imo.org/home.asp>

¹⁴ ISPS Code Update 05:
http://www.imo.org/Newsroom/mainframe.asp?topic_id=892&doc_id=3687

In terms of national initiatives, the two main US-led measures are the Customs-Trade Partnership against Terrorism (C-TPAT)¹⁵ and the Container Security Initiative (CSI)¹⁶. Other APEC economies are also undertaking a range of activities that support and complement transport security measures in general and the objectives of APEC STAR in particular (DFAT, 2004).

The C-TPAT is a voluntary scheme open to participants who agree to comply with a specified supply chain security profile. The CSI places US Customs Service staff at foreign ports to pre-screen containers. This initiative is to be extended from its initial coverage of 18 of the world's busiest ports to 100% coverage of containers entering the US.¹⁷ These measures do not cover the whole supply chain. The coverage of the various measures is illustrated in Figure 1.

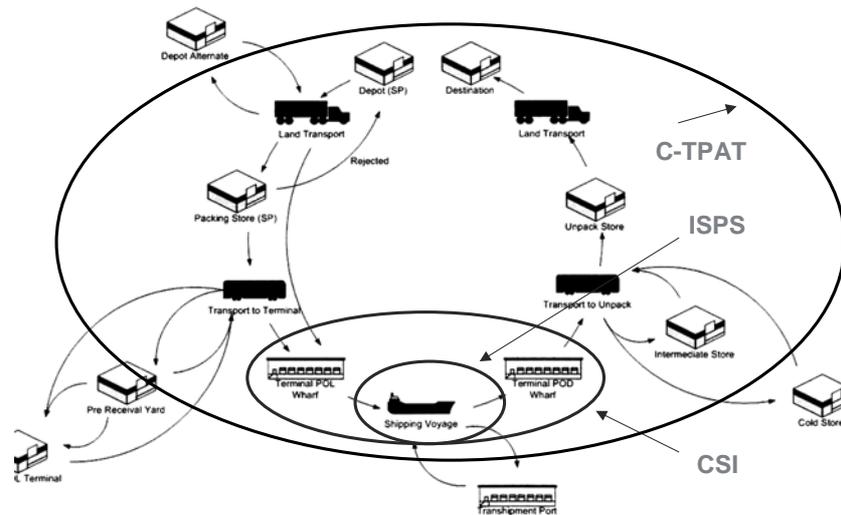
The US Customs Service has also introduced a 24-Hour Advance Cargo Manifest Rule. Cargo manifests must be provided electronically 24 hours before loading a container bound for a US port.

¹⁵ A full description of C-TPAT and how to apply to become a participant is available at the official website http://www.customs.gov/xp/cgov/import/commercial_enforcement/ctpat/. Information on C-TPAT in this Study was obtained from published sources including the internet or from participants of the Case Studies.

¹⁶ A full description of CSI is available at the official website http://www.cbp.gov/xp/cgov/enforcement/international_activities/csi/. Information on CSI in this Study was obtained from published sources including the internet or from participants of the Case Studies.

¹⁷ Those already participating include Hong Kong, China, Shanghai, China, Singapore, Rotterdam, Netherlands, Pusan, Korea, Bremerhaven, Germany, Tokyo, Japan, Genoa, Italy, Yantian, China, Antwerp, Belgium, Nagoya, Japan, Le Havre, France, Hamburg, Germany, La Spezia, Italy, Felixstowe, United Kingdom, Algeciras, Spain, Kobe, Japan, Yokohama, Japan.

Figure 1: Scope of risk management initiatives



Source: Rahman and Findlay (2003)

Adjustment strategies: results of case studies

There will always be adjustment costs in the transition to new systems for the movement of goods. However, the urgency required of government responses to the terrorist threat has reduced the available time for the necessary changes to lower transactions costs with secure trade. Substantial up-front investments are required and higher levels of operating costs would be incurred. The investments in new systems and technologies will yield their own savings and benefits over time and facilitate trade more effectively but adjustment remains an issue. For example, according to the OECD (2003), the cost of implementation of the government measures targeted at ships and carriers is \$US1,279m for the set-up stage and \$US730m a year thereafter. The bulk of the costs are related to the creation of a new post of Company Security Officer, and also of equipping ships with security equipment, including automatic identification systems for ships.

The **Singapore case study** included in this report provides details of the sorts of changes made in port administration. It stresses that an effective security system requires attention beyond the port to the larger transport and logistics industry. It also outlines the capacity building program so far undertaken, and it describes the establishment of Recognised Security Organisations (RSOs) which are able to verify compliance of ships and port facilities with the new security standards. The case study also provides some examples of the ways in which costs of meeting the new requirement are being distributed between the port, the customs authorities, shippers and shipping companies.

The **Sydney case study** provides similar information on the response in that port. The matter of the deadline for compliance of 1 July 2004 is highlighted in the case study. The extent of the investment required is

discussed, and details are provided of the steps taken to comply with the new procedures.

The implementation of the 24-Hour Advance Cargo Manifest Rule is likely to be the major concern of shippers. The World Bank (2003) refers to extra costs likely to be associated with the 24 hour rule, including the costs of documentation, and to the relatively large burden these procedures can place on small to medium enterprises. Some goods by their nature are shipped with very short lead times. For example, the Bank points out the difficulties created for some fresh produce which previously had not been picked for longer than 24 hours prior to departure. The rule makes the handling of emergency replacement parts or medical suppliers more complex.

The **Thai case study** included in this report examines the experience of a shrimp exporter. That firm was already collecting and using the same sort of information required by the new security measures for the management of its own supply chain. The effect of the new security policy has been to make mandatory, actions that were previously assessed and adopted by the firm on commercial terms. The case material suggests therefore that the policy change has brought forward investments in this technology. The burden of meeting the new regulations could be relatively large for smaller firms, according to the case study, and some form of cooperation between small firms and shipping companies might be required in order for those firms to meet the requirements.

Thailand and the US have developed a project, as an initiative developed through APEC, to increase security in the transport system between the ports of Laem Chabang and Seattle. Bearing Point has undertaken a study of the project's costs and benefits. The work involved the 'establishment of security protocols, business procedures, and the installation of a supply chain security and tracking solution, as well as capacity building efforts..' (Wilson and Hafer, 2003). The security system involved the use of RFID tags, including a one-time cost for infrastructure of \$US0.44m, a one time implementation cost of \$US3.43m. Operating costs include an annual cost of \$US0.1m plus a cost per container of \$US86. Bearing Point found that there was an 80 percent probability that the net benefits would exceed \$US220 per container. Sources of benefits included a fall in the probability of inspection on arrival, avoiding other costs associated with US Custom's trade security measures, reductions in 'safety stock' and inventory carrying costs, and reductions in theft and pilferage.

These benefits are distributed between shippers and customers, which in the analysis of costs and benefits of the Thai-US project are treated as one. The Thai case study presents a perspective of a firm which exports to the US and which is paid at the point of export in Thailand (that is, the firm has a contract in which prices are determined fob). The case shows how the benefits of this particular technology are not apparent to a shipper of that type which has also already adopted the requirements of the C-TPAT system. However the benefits determined in the Bearing Point study would be redistributed, eventually, up and down the supply chain.

The **case material from the Philippines** refers to a manufacturer of automotive parts. The firm was trans-shipping its products through Kaoshiung. This is an example of an option for exporters in economies that are not immediately able to comply with new security requirements. In the case study, the use of the trans-shipment option also meant the deadlines for providing information on shipments was already within the transport sequence employed.

The Philippines material compares the experience of the automotive component manufacturer to that of an exporter of canned tuna. That product is also trans-shipped via Kaoshiung but the effects of the new security requirements on the organization of production and transport have been more burdensome. These changes partly reflect the greater requirements, associated with the anti-bioterrorism regulations, facing a food exporter. Food exporters, because their raw material comes from natural sources, face greater uncertainty on the supply side of their business and therefore potentially more difficulty in meeting all the reporting deadlines.

The same point about the impact of uncertain supply systems is made in the **case study of the Chilean salmon exporter**. That case material also highlights the extra conditions that must be met by a food exporter. It illustrates the information that must be retained by an exporter of this type and outlines the technological change required for that purpose.

The **Canadian case study** refers to an exporter of wheels and rims. The study finds the new requirements have had little impact on the design of the production and delivery systems of the firm. The company had already moved to an online system of providing the necessary documentation for its exported products. Some of the requirements could be met within that system but time and attention was required to understand and implement new rules. The company did notice that it faced increased time delays at some border crossings after September 11. To deal with that problem, at the time the case was prepared, it was applying for C-TPAT status. It also observed that the systems that it would install to achieve that status would have other benefits in terms of security to all its own operations. The study provides details of the fees and expenses that the company has been incurring.

Review of Case Studies

These experiences indicate that the responses to the new requirements are different among types of exporters, either in terms of the products they export or the size of their firms. Exporters of natural products may face more complex challenges than other manufacturers. Small firms face a relatively greater burden than large firms.

Some firms however had already adopted the sorts of technologies required to meet the new requirements. Even where the direct cost of the new measures is significant there may be an offset to these costs. The offset arises because of an indirect effect on the operational efficiency of the supply chains. Performance levels in supply chains may improve

because of the higher quality and coordination of the information flow along the chain. Investment in these technologies will contribute to the long-term achievement of APEC's facilitation goals but the terrorist threat has brought forward these investments and made them lumpier than might otherwise have been the case.

There were always going to be matters of concern as economies moved to meet the APEC facilitation agenda, just as there are adjustment costs in moving to the liberalisation goal. The terrorist threat has amplified these challenges, by demanding a more rapid and unified adjustment with less flexibility at an economy level to move at different timetables.

Deepening international cooperation and coordination: further steps

Success in advancing APEC's goals for facilitation and secure trade in a mutually supportive way depends on deepening the level of cooperation and coordination on a wide range of fronts.

Even after working with the significant challenges of streamlining coordination and cooperation at a domestic level, the goals cannot be advanced without international cooperation. This is required at the technical level for capacity building and to gain the networking effect of new technologies, at the policy and institutional level to build a credible process of regulation and system of governance, and with stakeholders in business to ensure there are market incentives for innovation and investment and that supply chains can become more efficient.

International cooperation and coordination is also vital to ensure that the systems put in place can be evaluated so that they remain dynamic, and responsive and flexible enough to incorporate new technologies and new policy settings.

APEC is well suited to facilitate this cooperation. Many of the officials which find themselves at the centre of these challenges have been working together for many years in APEC working groups. They have developed a culture of cooperation and an understanding of how developed and developing economies can cooperate effectively. With this track record, APEC can also ensure that the particular circumstances and interests of the Asia Pacific region are understood in international forums.

APEC is already involved in a substantial program of cooperative work in facilitation and increasing security in trade. The APEC projects demonstrate the value of capacity building to overcome constraints in investment, human resources and access to technology as identified above and the importance of international cooperation in undertaking this work.

The work program also shows the value of a community approach and importance of the common interest in resolving these issues at minimum cost. The STAR project has brought this work together is APEC's flagship operation in this field (see Appendix 1). APEC has also consulted widely through a series of conferences on these topics and Appendix 2 summarises some of their key conclusions. The Second STAR conference

was held in Chile in March 2004.¹⁸ The STAR project and APEC's overall effort is supported by many APEC working groups which are working on particular areas of facilitation and secure trade.

APEC could build upon the process of cooperation and coordination by stepping up efforts in some specific areas.

Developing principles of good regulation

Regulation should be directed to outcomes and not to the specific detail of processes. In this case the outcome would be high levels of security. Systems used to check conformance should also be managed without discrimination. This approach means allowing different economies to adopt solutions and processes which make economic sense from their points of view given relative labour costs, skill levels, and so on.

Investment in innovation and local solutions will help the adjustment process. It is therefore important that there are incentives for investing in new technology to meet the standards. New suppliers of relevant complementary services should be able to emerge and security standards should not become impediments to trade and investment. **Building capacity for better governance**

Many different elements of the overall security system must interact to both facilitate trade response to security threats because of the number of actors, the complexity of the supply chain, the number of possible breakpoints, and the multimodal issues. These different elements include agencies with responsibility for ports, ships/vehicles, goods and people. There is no one model for implementation – some economies are trying to amalgamate the relevant agencies, while others are looking to cooperation between them. One problem inherent in adopting different structures is that extra consideration will be required to map out effective international cooperation between these different architectures.

Significant resource issues are also involved. Allocating these resources complicates the process of reaching agreement on cooperation within economies. Sharing of experience among agencies at the highest possible levels on how best to cooperate within an economy is therefore a vital element of the capacity building agenda. The key issue is one of governance: creating the right legal structures, designing institutions and implementing reforms while managing cooperation between agencies.

Stronger technical capacity building

Capacity building should also include technical aspects on providing resources for adoption of the security agenda and on sharing ideas about processes. There are already many available ideas about processes and technologies and a substantial amount of work already in progress among APEC members. This cooperation is often organised bilaterally. It supports the transfer of both hard and soft components of technology. APEC itself is not designed to provide resources, but articulate the case and use political leadership to mobilise those with the appropriate

¹⁸ http://www.apec.org/apec/documents_reports/counter_terrorism_task_force/2004.html

resources. Cooperation might therefore be undertaken with the support of international financial institutions. The large number of bilateral initiatives remain beneficial and some coordination of these efforts would be useful.

APEC economies are at different stages of implementation and APEC provides a clearing house for coordinating capacity building offers and projects in economies where the returns are high. Another item of discussion is the design of transitional arrangements to the new international security codes. Assuming that not all members do meet the mid 2004 deadline, a structure for inter-economy communication on options would be beneficial providing it avoids duplicating other international cooperation on these issues. The case studies on the work in progress in major ports in the region highlight this problem. This work is part of a bigger agenda in which those economies that do not immediately move to full implementation can procure the security services from third parties or can cooperate with ports of destination for supplementary security services. Economies participating in this approach might consider a roadmap about how and when they might move to full implementation on their own account.

Developing effective evaluation systems¹⁹

'Import risk analysis' is generally used to evaluate various policy responses using the criterion of cost effectiveness. An increased threat of terrorism raises similar issues to other forms of risk.. . 'Import risk analysis' involves 'an evaluation of the costs of different measures in addressing a particular benefit. A measure is chosen on the basis that it involves the least aggregated cost.' (Binder, 2002). This approach takes the risk reduction target as given but then stresses the value of finding the least-cost method for achieving that target. An even more extensive approach would be a cost-benefit analysis of the proposed measures. The trade-off between the reduction in risk and the cost of the measure is analysed. The use of cost-benefit analysis is important in the design of trade facilitation initiatives.

In contrast, for the security agenda governments have adopted a specific target – an acceptable level of risk - *and* specific measures in response to the assessment of risk. This approach therefore appears to differ from that used in the trade facilitation agenda where both costs and benefits of various initiatives are generally examined. The alignment of these two approaches will be important to reach solutions which are mutually supportive of both trade and security.

An important part of the risk analysis is identifying types of threats. APEC could be a useful forum for assessing their relative importance: for example, sea versus air, or bulk versus container. It is possible that once new systems are in place in shipping for example, the risks of incident and disruption might shift to other modes of transport, or other vehicles, as terrorists reconfigure their strategies. A structure in which information and

¹⁹ This section is based on material in Rahman and Findlay (2003).

analysis of this ‘ballooning effect’ can be shared would be valuable. It would help ensure that the regulatory responses were proportionate to the risks.

Cooperation with business and business partnerships matter

It is possible for cooperation to take a commercial form and competition in this process is valuable. Transshipment options through larger regional ports is an example that has been cited. Being competitive may depend on access to foreign investment, for example, for port operators who specialise in meeting the new requirement, or who can build a ‘port within a port’ in which the standards are met. Inducing this form of commercially-driven cooperation requires sound policy on trade in port services and associated areas.

In some cases the solution to meeting the new standards may involve subcontracting through third parties or at the destination of the shipment. An economy which has a lower level of capacity to implement the codes might have its ships subjected to further inspection on arrival, whereas others from compliant ports or inspection processes might go in via a ‘fast lane’. An incentive therefore still remains for adoption of the codes. An alternative is to direct the freight through larger hub ports which provide the certification services.

Understanding the supply chain perspective

Meeting the long term goals of secure trade at lower transactions costs will require knowledge on how goods move through the region. This is the supply chain and business certainly views transactions costs with this in mind. Business looks at its total costs, not just costs imposed by governments. Its costs include all the transport, handling and storage costs. These costs are significant and inventory costs are especially important. They are a function of government policy at a broader level than just border policies, and are influenced by liberalisation and micro reform agendas. Government operations at borders also contribute and they affect processes and costs at other points in the supply chain. It is important for governments to understand the supply chain and take supply chain effects into account in order to achieve the longer term goals on transactions costs. Business is keen to join new initiatives, for example, in CSI or similar systems, but they bring their supply chain perspective, and do not limit their view to a window on particular steps in the chain, which is a view that governments may take.²⁰

Conclusion: importance of facilitation principles

The discussion of the value of the APEC’s target of reducing transactions costs and of the next steps in APEC cooperation suggests a framework of principles to direct future work. These are in fact laid out already in

²⁰ APEC members have approved a set of Private Sector Supply Chain Security Guidelines. The guidelines are available from http://www.apecsec.org.sg/apec_groups/som_special_task_groups/counter_terrorism.downloadlinks.0011.LinkURL.Download.ver5.1.9. Under the US C-TPAT program, companies are invited to take a supply chain perspective. However, further discussion of the interaction between security related activities at different points in the chain would be worthwhile.

APEC's Facilitation Principles. Reference to each of those principles offers a way of presenting some of the key points from this Study, including the following (with reference to the relevant item in the Facilitation Principles in brackets):

- Governments should provide in the clearest terms as much information as possible on rules, procedures and enquiry points via their e-IAPs and other media (transparency)
- Authorities should strive to communicate and consult with business on the impact of the new arrangements (communication and consultations)
- Governments should cooperate with each other and in partnership with business to provide technical assistance, to contribute to capacity building and to exchange information on best practices, as well as to coordinate on security matters of common interest (cooperation)

Rules and procedures related to security matters should be:

- no more burdensome than necessary to achieve the legitimate objective of security in international trade (simplification, practicality and efficiency)
- applied without discrimination between like products or services or between suppliers (non-discrimination)
- applied in a predictable, consistent and uniform manner with integrity (consistency and predictability).
- harmonized as far as possible on the basis of international standards and employing mutual recognition arrangements for testing conformity (harmonization, standardization and recognition)
- kept under review and changed when new technology makes possible better options (modernization and the use of new technology)

Many governments of APEC have already established good information flows and strong consultative processes in bringing about change and APEC has played a significant role in facilitating that. Technical capacity building programs are being put in place but technology is changing so rapidly that overcoming human resource constraints will be a major ongoing challenge in both government agencies and in business.

The threat of terrorism has heightened the challenge of secure trade with lower transactions costs by bringing the cost of adjustment into a shorter time frame. Over time, the search for and implementation of new technologies to make trade more secure is likely to build a dynamic

element into facilitating trade which will have positive impacts on both government procedures and the wider supply chain.

Evidence shows that real benefits come through stepping up cooperation domestically, across borders and with business. Since these three areas are strongly related, APEC has the capacity to provide a continuing forum for this cooperation especially when it includes business as an integral part.

References

- APEC, 2003, 'Report to SOM Chair on Outcomes of the STAR Conference', Counter-Terrorism Task Force Meeting, Khon Kaen, May 26, 2003.
- Wilson, Thomas and Greg Hafer, 2003, "APEC STAR-BEST Project Cost-Benefit Analysis", Bearing Point, Houston.
- Binder, Monika, 2002, 'The Role of Risk and Cost-Benefit Analysis in Determining Quarantine Measures', Productivity Commission Staff Research Paper, AusInfo, Canberra.
- Department of Foreign Affairs and Trade, 2001, "Paperless Trading: Benefits to APEC", DFAT, Canberra.
- Department of Foreign Affairs and Trade, 2004, "Combating Terrorism in the Transport Sector – Economic Costs and Benefits", DFAT, Canberra.
- Hummels, David, 2001, "Time as a trade barrier", mimeo, Purdue University.
- Hertel, Thomas W., Terrie Walmsley, and Ken Ikatara. 2001. "Dynamic Effects of the 'New Age' Free Trade Agreement between Japan and Singapore." *Journal of Economic Integration* 24: 1019–49.
- Lim, Irvin, 2002, "Not yet all aboard...but already all at sea over container security initiative", Working Paper No. 35, Institute of Defence and Strategic Studies, Singapore, October.
- OECD, 2002, *The Impact of the Terrorist Attacks of 11 September 2001 on International Trading and Transport Activities*, Working Paper of the Trade Committee, Trade Directorate, OECD, Paris, March.
- OECD, 2003, *Security in Maritime Transport: Risk Factors and Economic Impact*, Maritime Transport Committee, Directorate for Science, Technology and Industry, OECD, Paris, July.
- Porter, Ian W (ed), 2003, Proceedings of the Symposium of Maritime Experts to Assist in Implementation of the Secure Trade in the APEC Region (STAR) Initiative, Australian APEC Study Centre, Monash University.
- Rahman, Shams , 2003, "Costs and Impacts of Maritime Security Measures on Global Supply Chains", presentation to the CSCAP Maritime Cooperation Working Group/PECC Meeting, Manila, 6-7 September.

- Rahman, Shams and Christopher Findlay, 2003, 'The impact of terrorism on cycle times in international supply chains', mimeograph.
- Walkenhorst, Peter and Nora Dihel, 2002, "Trade impacts of the terrorist attacks of 11 September 2001: A quantitative assessment", paper prepared for the Workshop on the Economic Consequences of Global Terrorism, Berlin, June.
- World Bank, 2003, "Reducing Trading Costs in a New Era of Security", chapter 5 in World Bank, *Global Economic Prospects 2004*, World Bank, Washington.

Appendix 1: The STAR Initiative

In their Los Cabos Declaration of 2002, APEC Leaders committed to work together to secure the flow of goods and people through the following measures²¹:

Protect cargo by

Implementing expeditiously a container security regime that would assure in-transit integrity of containers, identify and examine high-risk containers, and working within international organizations to require the provision of advance electronic information on container content to customs, port, and shipping officials as early as possible in the supply chain, while taking into consideration the facilitation of legitimate trade.

Implementing by 2005 wherever possible the common standards for electronic customs reporting developed by the World Customs Organization that provide data to target high-risk shipments and facilitate trade.

Promoting private-sector adoption of high standards of supply chain security, as developed by the private sector and law enforcement officials.

Protect ships engaged in international voyages by

Promoting ship and port security plans by July 2004 and installation of automatic identification systems on certain ships by December 2004.

Enhancing cooperation on fighting piracy in the region between APEC fora and organizations such as the International Maritime Bureau Piracy Reporting Center and International Maritime Organization (IMO).

Protect international aviation by

Improving airline passenger and crew safety by introducing, highly effective baggage screening procedures and equipment in all APEC international airports as soon as possible, and in any case by 2005; accelerating implementation of standards for reinforced flight deck doors for passenger aircraft by April 2003 wherever possible; and supporting International Civil Aviation Organization (ICAO) mandatory aviation security audits.

Enhancing air cargo security by promoting adoption of the guidelines developed by ICAO and the International Air Transport Association (IATA).

²¹ The STAR initiative also includes measures related to the financing of terrorism and to cyber security.

Protect people in transit by

Implementing as expeditiously as possible a common global standard based on UN EDIFACT for the collection and transmission of advance passenger information.

Adopting standards for application of biometrics in entry and (where applicable) exit procedures and travel documents such as those being developed by the ICAO and the International Standards Organization.

Assuring the highest possible integrity of all government officials who are involved in border operations.

Appendix 2: APEC meetings on Security

First STAR Conference²²

Key points reported to the SOM Chair from the first STAR conference in February 2003 included:

Successful implementation of STAR requires new partnerships between government and business

At the same time, capacity building is needed to strengthen the institutional capacity of governments, in the light of the different levels of development and financial resources among the member economies

The complementarity between law enforcement and trade facilitation was noted, 'as measures to increase security have the added benefit of increasing efficiency' (APEC, 2003).

STAR Symposium²³

The Melbourne Symposium focussed on the implementation of the International Security and Port Facility Security (ISPS) Code. There is a July 2004 deadline for its implementation and the meeting noted that there is considerable concern about whether many economies will fail to meet the deadline. Failure to do so could have a severe impact on those economies. Participants decided to propose to have APEC make representations to IMO to seek new deadlines or concessions.

Participants agreed that although implementation on time may not be attainable, the Code contained sound principles. Particular reference was made to the use of security assessments, which were seen as 'not only an extension of good risk management processes and good security planning but also good business practice'. Participants' concerns about the lack of clarity in the definition of a ship and a port facility were also noted. The observation was also made that the Code should be applied in the context of other supply chain security initiatives, such as those in APEC STAR. Participants identified a specific list of concerns some elements of which were the importance of:

Awareness of the consequences of failure to meet the deadline;

Identifying a lead agency for implementation;

Establishing an effective regulatory framework based in domestic legislation;

Identifying and allocating costs involved, with government taking a share, while looking for ways to reduce costs of implementation

²² This summary is based on APEC (2003).

²³ This summary is based on the 'Summary of Main Issues and Conclusions' in Porter (2003).

Carrying out risk assessments based on sound intelligence;

Sharing information at a national (inter-agency) and international (APEC region) level.

Consulting with the private sector, including with respect to divisions of responsibility;

Developing workable timetables for implementation;

Providing extensive training on implementation of the ISPS Code, risk assessment and risk management, and other areas

Identifying appropriate training organisations which could teach the syllabus being developed by the IMO

Determining appropriate standards and measures by which compliance with the Code would be judged.

Manila High Level Meeting²⁴

The Manila meeting reviewed the maritime security agenda, the progress in its implementation among APEC members and some issues in that process. It was observed that costs of implementation of new security measures would be lower in more open markets, including those shipping, port services, and complementary services, such as training, and in all modes of supply (cross border, FDI etc). Private participation helps deliver new technology as well as capacity to provide global standard services. Different models of private participation in ports have been tried, ranging from BOT arrangements to various types of contracting then full ownership. Further consideration of which model is appropriate in which circumstance is worthwhile. A program of work in this area would take into account opportunities for so-called mode 4 transactions, that is, the movement of people, which in this context means ship crew, maybe port crew. Many economies in the region have an interest in providing trained and certified staff familiar with new security systems. At the same time, as the private sector becomes more involved, and a larger number of new players emerge, the issue becomes one of accreditation.

APEC Smart Border Symposium²⁵

The symposium took place in Vancouver, British Columbia, Canada, from September 29-October 1, 2003. It featured presenters from a number of Canadian and U.S. federal government departments and the private sector and showcased various aspects of the Canada-US Smart Border Agreement in action with a view to providing APEC participants with innovative solutions on facilitating cross-border trade while increasing security. Sites

²⁴ This summary is based on commentary provided by PECC participants in the Meeting and on the report of the SCAP/PECC joint meeting on maritime security which preceded the Dialogue. This section will be amended after an official report of the High-Level Meeting is made available.

²⁵ See

http://www.apecsec.org.sg/apec/news_media/2003_media_releases/011003_can_innovative.html

visited by participants included: the port of Vancouver, the Vancouver Airport and the Pacific Highway/Blaine Border Crossing. Locations were chosen to give participants an overview of how the Smart Border Agreement has impacted on sea, air and land transportation and travel. Canada and the United States released the Smart Border Declaration and committed to a 30-point Action Plan on December 12, 2001. This blueprint for action has four pillars: the secure flow of people, the secure flow of goods, secure infrastructure and information sharing and coordination in the enforcement of these objectives. The Smart Border is based on the principle of risk management. By filtering intelligently and with the assistance of technology, resources can be concentrated on higher-risk people and goods, allowing low-risk movements to pass through.

Part II: Case Studies

*Maritime Counter-terrorism Measures in
Port Facilities: The Case of Sydney
Ports*

*The Singapore Report on
Implementation of Cargo Security
Measures*

*Security and Supply Chain
Management: Thailand Case Study*

*The Effect of the Bioterrorism Act on
Exporters' Logistics Costs: The Case of
Chilean Salmon*

*The New Security Environment and its
Impact on Trade in Manufactured
Goods: A Canadian Case Study*

*The Impacts of 9/11 on Supply Chain
Management: The Case of Two
Manufacturing Firms in the Philippines*

Presented by experts from each economy

1. Maritime Counter-terrorism Measures in Port Facilities: The Case of Sydney Ports

Shams Rahman and Sean Puckett²⁶

1.1 Background

This paper offers a broad case study of an Australian port facility (Sydney Ports) and the process it is taking to deter terrorist activity at or through the port. Port facilities worldwide have had to tighten security following the terrorist attacks in the United States on 11 September 2001. International shipping is a potential avenue for terrorism through either the use of hijacked vessels as implements, or via the smuggling of weapons or weapon materials in cargo.

While the legislation that has prompted port facilities to increase security is worldwide in scope, the avenues of implementation and enforcement are domestic in nature; that is, it is the responsibility of each country to ensure that its port facilities and ships have complied with the international mandate. The International Maritime Organization (IMO) developed global counter-terrorism measures for port facilities and ships in response to the terrorist attacks of 11 September 2001. The resulting security measures were adopted as amendments to the Safety of Life at Sea (SOLAS) Convention, 1974. The SOLAS Convention is international in scope, and Australia is a participating nation within SOLAS. The International Ship and Port Facility Security (ISPS) Code is associated with the amendments, which form chapter XI-2 of SOLAS (Dept. of Transport and Regional Services 2002). The ISPS Code was implemented via an industry-wide perspective, with recommendations and mandates for port facilities, ships and shipping firms (Dept. of Transport and Regional Services 2003).

The Maritime Transport Security Bill 2003 (MTSB) embodies the effective Australian implementation of the ISPS Code. Australia's compliance with the Code, via the MTSB, is motivated by two factors: (1) a reduction in the threat of maritime-borne terrorism; and (2) the avoidance of the loss of international commerce due to the refusal to accept cargo from Australian ports. On the latter point, the Australian body in charge of the implementation of the ISPS Code (The Department of Transport and Regional Services, or DOTARS) acknowledges that, should port facilities

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and ships fail to implement the ISPS Code by the IMO's deadline of 1 July 2004, the costs of business and the loss of ability to participate in international trade could be significant. As published by DOTARS, "individual business that are not compliant with the requirements of the proposed legislation should not expect to be able to operate in an international trade system." This applies to port facilities, as well, which must be able to ensure that any outbound international cargo is secure. Complying with the ISPS Code could be costly for individual businesses and port facilities; firms and facilities must weigh the costs of compliance with the Code against the value of the business they would have to forgo under non-compliance (Dept. of Transport and Regional Services 2003).

All Australian port facilities must comply with the MTSB, adhering to a deadline of 1 July 2004 (International Maritime Organization 2004). In accordance with the ISPS Code, DOTARS will conduct assessments of port facility security, with three components per assessment: (1) the identification and evaluation of vital infrastructure and assets, along with areas and locations whose damage may lead to substantial loss of life, or economic or environmental damage; (2) the identification of particular threats to the identified infrastructure, assets, areas and structures for the purposes of prioritisation; and (3), the identification of exploitable weaknesses in "physical security, structural integrity, protection systems, procedural policies, communications systems, transportation infrastructure, utilities, and other areas within a port facility" (International Maritime Organization, no date given).

Sydney Ports, which handles approximately 30 percent of all maritime containerised trade in Australia (Sydney Ports 2003b) is in the process of undertaking the steps required to comply with the MTSB, along with all other Australian port facilities. The history and activities of Sydney Ports are summarised in the following section. The discussion then proceeds to the subject of the maritime counter-terrorism measures being undertaken by Sydney Ports (which are mirrored Australia-wide) and the time constraints faced by Australian port facilities in the implementation of these security measures.

1.2 Sydney Ports

1.2.1 A Brief History of the Port of Sydney and New South Wales Maritime Administration

In 1901 the Sydney Harbour Trust was established. The Trust was founded with the objectives of optimal development and management of Sydney Harbour via the modernisation of privately-owned wharves. As stated in the Sydney Harbour Trust Act, the Trust's chief task was to "make the ocean gateway to the City more wholesome, attractive and efficient to meet the requirements of trade and, as far as practicable, provide for the future shipping and commercial needs" (Sydney Ports, no date given).

There were significant redundancies in the administration of maritime activities in New South Wales in the early twentieth century. In 1935 the Maritime Services Board was established, with the goal of eliminating redundancies across operations of the Sydney Harbour Trust, the Department of Navigation, the Reclamation Trust and the Dredges Branch of the Department of Public Works. The chief purposes of the Board were to manage and control all ports in New South Wales, and to manage maritime activity such as pilotage, navigation and conservation (Sydney Ports, no date given).

In 1995 the Sydney Ports Corporation was established. The Corporation focuses on commercial port operations, providing services to the shipping and cargo industries, and developing trade (Sydney Ports, no date given). Sydney Ports handles approximately A\$45.5 billion of international and domestic trade per annum (Sydney Ports 2003b). Total trade through Sydney ports in fiscal year 2002/2003 was 23,576,826 mass tonnes (mt), of which 18,432,726 was import volume (5,144,100 was export volume) (Sydney Ports 2003a).

The major exporting regions for shipments from Sydney Ports are (in twenty-foot equivalent units (TEUs) of full containers to the region for fiscal year 2002/2003, with chief trading partners listed correspondingly): North and East Asia (89,347; China and Hong Kong, Japan); Oceania (70,717; New Zealand, other parts of Australia); Southeast Asia (51,917; Indonesia, Singapore); North America (27,947; United States); and Europe (20,240; United Kingdom, Italy). The major regions from which Sydney-bound shipments originate are: North and East Asia (226,375; China and Hong Kong); Europe (115,923; Germany, Italy, Netherlands); Southeast Asia (101,875; Malaysia, Indonesia, Thailand); North America (62,390; United States); and Oceania (45,003; New Zealand, other parts of Australia) (Sydney Ports 2003a).

1.2.2 Economic Impact of Sydney Ports

The operation of Sydney's ports generated \$2.5 billion in direct and indirect activity in the NSW economy in fiscal year 2001/2002, with over 17,000 jobs tied to the Port. These workers earn a total of \$739 million per year. The direct effects are \$1.2 billion in output, another \$641 million in value added, 6,945 jobs yielding \$384.7 in household income (Sydney Ports 2003b).

The Port functions that yield the greatest economic impact are: land transport and storage (\$826.6 million in output in 2001/2), ship operations (\$614.8 million), ship loading and unloading (\$527.7 million) and cargo services (\$329.1 million). The types of cargo that yield the greatest economic impact are: containers (\$1.5 billion in direct and indirect effects), bulk liquids and gas (\$567 million), and motor vehicles (\$86 million) (Sydney Ports 2003b).

1.2.3 Characteristics of Goods Shipped through Sydney Ports

Non-containerised trade represents 56.9% of total freight traffic through Sydney Ports. Oils account for 80% of non-containerised trade by weight

(11,268,009 mt). Bulk oil represents 95% of oils carried, with bulk liquids and gases forming the rest. 1,507,844 mt of dry-bulk cargo went through the Port in fiscal year 2001/2002. The most prominent dry-bulk cargoes through Sydney Ports are: cement; gypsum; sand, soil and gravel; sugar; and salt (Sydney Ports 2003a).

Containerised trade reached an all-time high at the Port in 2001/2002, with 1,160,747 twenty-foot equivalent units (TEUs) traded. 586,899 TEUs of full container imports went through the Port, along with 293,777 TEUs of full container exports. The major containerised import commodities were: chemicals (954,277 tonnes), manufactures (807,563 tonnes), machinery (688,627 tonnes), paper products (622,669 tonnes) and non-metallic minerals (278,390 tonnes). The major containerised exports were: non-ferrous metals (527,257 tonnes), chemicals (422,483 tonnes), iron and steel (311,237 tonnes), paper products (277,199 tonnes) and meat (267,710 tonnes) (Sydney Ports 2003a).

The dangerous goods that are permitted through Sydney Ports are categorised as follows: explosives (Class 1.4); flammable gases (Class 2.1); non-toxic, non-flammable gases (Class 2.2); poisonous gases (Class 2.3); flammable liquids (Class 3); flammable solids (4.1); spontaneously combustible substances (Class 4.2); substances which are dangerous when wet (Class 4.3); oxidising substances (Class 5.1); organic peroxides (Class 5.2); poisons (Class 6.1); corrosives (Class 8); and miscellaneous (class 9). For reasons of immediate security (i.e., the avoidance of accidental, yet significant destruction), restrictions are in place with regard to the locations into and out of which these goods can be transported, as well as with regard to the length of time for which the goods may be docked in these locations (Sydney Ports 2000).

1.3 Maritime Security Measures in Australian Port Facilities

1.3.1 Time Constraint for Australian Port Facilities to Implement Increased Security Measures

Surveys have indicated that industry firms and port facilities have not achieved sufficient progress toward meeting the 1 July 2004 deadline for the implementation of the ISPS Code. The IMO acknowledges that, should firms and facilities fail to implement the measures on time, serious consequences will be felt by port facilities, ships, shipping companies and international ship-borne trade, in general. A grave contingency is that, due to firms struggling to meet the deadline, a multitude of firms will submit their security plans near 1 July, forcing a trade-off between the delayed approval of plans and the approval of plans without appropriate verification (International Maritime Organization 2004).

Furthermore, the time constraint could cause significant economic losses if port facilities, ships and shipping firms are unable to meet the deadline. The deadline is binding for the development of security plans, with the implementation of the plans to follow.

1.3.2 Costs of Implementation

The costs of implementing the new security measures clearly must be lower than the costs of non-compliance, otherwise the measures would not be adopted. However, the costs of implementation are likely to be significant. One estimate of costs to Australian port and shipping operators places the costs at A\$300 million (Kerin 2004). The Australian Government has committed funds to assist in the implementation of the measures, including \$15 million for improved X-ray facilities at Sydney, Melbourne, Brisbane, and Fremantle (Kerin 2004). Whilst the nature of the security measures is clandestine, making particular examples of security projects difficult to find, some other new security measures at port facilities include: water-side security measures, land-side exclusion zones and fencing, surveillance, and security patrols (Kerin 2004; Sydney Ports correspondence).

1.3.3 Procedure for Compliance with the ISPS Code and MTSB

Discussion with Sydney Ports has revealed that Sydney Ports is following the same steps as all Australian port facilities, in general, in order to comply with the ISPS Code, and its Australian manifestation, the MTSB. Sydney Ports is willingly acting in accordance with the MTSB under the acknowledgement that the effects of a terrorist attack using a port facility as a vector could be crippling in terms of lives lost, economic damage, and negative impacts on the marine environment. The Australian Government implemented the MTSB in order to mitigate such terrorist threats by means of increasing port and maritime security (Dept. of Transport and Regional Services 2003).

Sydney Ports is required to offer a security plan covering: (1) protection against the unauthorised possession in, or transport on board vessels into or out of, Sydney Ports; (2) prevention of unauthorised access into port premises, ships docked at Port facilities, and designated security areas within Port facilities; (3) response protocol and evacuation procedures for threats and breaches of security at Port facilities; (4) response protocol to any directions handed down from the Government; (5) development of drills and exercises corresponding to the security plan; (6) interaction protocol for port-to-ship security activities; (7) adaptability of the plan, should a change be deemed necessary; (8) reporting of instances in which the security of Sydney Ports has been compromised; (9) confidentiality of information within the plan; (10) steps required to maintain the security of cargo and cargo-handling equipment at Sydney Ports; (11) response protocol for times at which a ship's security alarm system is activated whilst in port; and (12) access and egress of crew and visitors (Commonwealth of Australia 2003).

Should Sydney Ports establish a restricted zone on land, the security plan must include: (1) a justification for the establishment of the zone; (2) the physical boundaries of the zone; (3) any corresponding temporal boundaries (i.e., times during which the zone is in effect); (4) the steps to be taken to restrict access of people, vehicles and goods into and out of the zone; (5) the procedure by which people will be informed that the zone is in effect and that unauthorised entry will be punished; (6) the identity of

the person or people responsible for the steps and procedure in parts (4) and (5); and (7) the steps that will be taken to detect and to deter unauthorised entry into the zone (Commonwealth of Australia 2003).

1.4 Concluding Remarks

It is apparent from the above criteria, coupled with the 1 July deadline, that Sydney Ports does not face a simple task in the development of its security plan. Port facilities wishing to comply with the ISPS Code not only face significant costs in the development and implementation of maritime security plans, but also must devote significant resources to the timely development of such plans. The motivation for the development of counter-terrorism measures is the desire not to forfeit valuable international trade. However, for the port facilities involved, the costs may be significant whether complying with the ISPS Code or not. As DOTARS stated, the costs of compliance are the costs of conducting international business in an uncertain world. The fact that Sydney Ports -- and port facilities Australia wide -- are willing to adopt these measures shows that, despite the potentially high price tag, these costs are worth bearing.

References

- Commonwealth of Australia. (2003) Maritime Transport Security Bill 2003 Commonwealth of Australia Gazette.
- Department of Transport and Regional Services. (2002) International Maritime Organization: International Ship and Port Facility Security Code (ISPS Code) http://www.dotars.gov.au/transsec/imo_isps_info.aspx.
- Department of Transport and Regional Services. (2003) Australia's Implementation of the International Ship and Port Facility Security Code. September 2003, Canberra http://www.dotars.gov.au/transsec/International_ship_and_port_facility_code.aspx.
- International Maritime Organization. (2003) Early Implementation of the Special Measures to Enhance Maritime Security. MSC/Circ. 1067, 28 February 2003. London.
- International Maritime Organization. (2004) Implementation of SOLAS Chapter XI-2 and the ISPS Code. MSC/Circ. 1104, 15 January 2004.
- International Maritime Organization. (No date given) IMO Adopts Comprehensive Maritime Security Measures: Conference of Contracting Governments to the International Convention for the Safety of Life at Sea, 1974: 9-13 December 2002. http://www.imo.org/Newsroom/mainframe.asp?topic_id=583&doc_id=2689.
- Kerin, John. (2004) Security Deadline for Ships. The Australian, 3 January 2004.
- Sydney Ports. (2000) Containerised Dangerous Goods Procedures, 1 February 2000 Sydney Ports Corporation Memorandum.

Sydney Ports. (2003a) Commerce and Logistics Review 2002/2003. Sydney Ports Corporation Publication.

Sydney Ports. (2003b) Understanding the Economic Value of Sydney's Ports. Sydney Ports Corporation Publication.

Sydney Ports. (No date given) First Port, Future Port: Celebrating 100 Years <http://www.sydneyports.com.au/Mediaroom/FirstPort/index.htm>.

2. The Singapore Report on Implementation of Cargo Security Measures

Chia Lin Sien²⁷

2.1 Introduction

Singapore was the earliest port to implement the Container Security Initiative (CSI), which was initiated by the US Customs to screen US-bound containers before they reach the US. The CSI involves identifying high-risk containers for screening, and not indiscriminate screening of every US-bound container. The port of Singapore was one of 20 largest ports around the world selected for the CSI Phase I implementation.

There are two VACIS (X-ray) scanners deployed in Singapore under the CSI, one (which is relocatable) at Tanjong Pagar Terminal and one mobile scanner at Pasir Panjang Terminal. The former requires 2 offices to operate and the latter requires 3. The latter can also be deployed to other terminals or the Woodlands/Tuas checkpoints if necessary. The first scanner at Tanjong Pagar began operations in March 2003, while the mobile scanner became operational in September 2003. The VACIS scans containers for both security and revenue purposes. The scanners cost about \$S3.2m (\$US1.9m) each and training is included in the purchase price.

Six US Customs and Border Protection (CBP) officials are stationed at Pasir Panjang Terminal, to screen US-bound containers. However, they do not operate the scanners; that responsibility lies with the Immigration and Checkpoints Authority (ICA).

2.2 Security Measures

As of end 2003, Singapore's shipping registry had a total of 3,063 ships accounting for, 25.6 mil. gross tons of ships. Singapore ranks among the top ten shipping nations in the World. In 2003, the port of Singapore had a total of 135,386 vessels of over 75 gross tons ship arrivals including 16,155 container ships. Total number of containers came to 18,410.5 million TEUs (Table 1). Together with Hong Kong, the Port of Singapore is the world's top two container ports. Transshipment cargo remains a very large proportion of the containers handled through the port.

²⁷ Academic Advisor, Singapore Chinese of Chamber Institute of Business (SCCIOB)

Table 1: Singapore – Container Throughput, 1999-2003

Year	Total Ship Arrivals (No.)	Container Ships (No.)	Container Throughput ('000 TEUs)
1999	141,523	16,706	15,944.80
2000	145,383	16,971	17,086.90
2001	146,265	17,049	15,571.10
2002	142,745	16,418	16,940.90
2003	135,386	16,155	18,410.50

Source. Maritime and Port Authority, Singapore.

[<http://www.mpa.gov.sg/homepage/portstats/>]

As an island nation heavily dependent on external trade, Singapore regards shipping as its lifeline and, as a consequence, the country is also highly vulnerable to any acts of terrorism involving its ports. For this reason, Singapore has already put in place sophisticated port security facilities including:

1. A multi-layered shore-based tracking system, the Automatic Identification System (AIS), of overlapping radars to monitor every ship that comes within and beyond its port waters to cover the Singapore Strait to guard against terrorist attacks.
2. An Electronic Chart Display and Information System (ECDIS) based on the use of Electronic Navigational Charts (ENCs) to ensure safety of navigation in constricted waterways and busy port areas. The MPA has already invested about S\$500,000 in developing the Singapore ENC. It has also set up the necessary supporting infrastructure such as the Differential Global Positioning System (DGPS) broadcast service for use in conjunction with the ECDIS.

In addition to the above, Singapore considers maritime and port security as a matter of high priority. The country has conducted risk assessments of its maritime transport sector and introduced various measures to heighten security. Among these measures are (1) increased patrols by the Police Coast Guard in the nation's waters, (2) prohibited zones in port waters around vital installations such as petro-chemical installations were established and (3) random naval escorts by the Singapore Navy of high-valued merchant ships through the Singapore Strait.

Singapore is one of several key Asian ports that has a large volume of containerized cargo flows with three busiest ports in the US, namely, Seattle/Tacoma, New York/New Jersey and Los Angeles/Long Beach.²⁸ The concern is how to monitor what is going into the US, and what is passing through the port. Ideally, it will be necessary to analyse the

²⁸ PSA Corporation is undertaking a Singapore to Los Angeles/Long Beach supply chain study to identify vulnerabilities to terrorist acts.

cargo's passage from their origin, identifying security points along the way, and to provide recommendations on how to minimize risks.

Efforts will need to be made to discover procedures at the point of origin in terms of how the manufacturer is going to maintain custody control of the loaded containers. It will be necessary for containers to install smart locks and electronic seals to prevent tempering the box.

In Dec 2002, at an IMO Diplomatic Conference, amendments were made to include specific measures to enhance maritime security contained in to the International Convention for the Safety of Life at Sea(SOLAS).²⁹ This was also done to the International Code for the Security of Ships and Port Facilities (ISPS Code).³⁰

These amendments are wide ranging and include accelerated implementation of the carriage of automatic identification system (AIS), mandatory carriage on ships of a continuous synopsis record (CSR), and installation of ship security alert systems onboard ships. Also ships and port facilities will be required to carry out security assessments and formulate security plans. Ships will also be required to carry an international Ship Security Certificate (ISSC).

In response to these new requirements, Singapore has already begun work to implement these recently instituted maritime security measures to enhance security of the country's port and ships. The Port has accelerated implementation of AIS tracking of ships, and restricted access to key areas such as the waters around the offshore oil terminals. MPA works closely with security agencies to ensure the security of our port installations and ships. MPA will be installing Gamma-ray scanners to screen containers. In addition, MPA has implemented an enhanced export control system to bring in line with requirements of the US Container Security Initiative (CSI).

It has become clear that the security system must necessarily extend beyond ships and port to the larger transport and logistics industry. The task must extend to educating not just port operators, and shipowners but also other players in the logistics supply chain. Also, the task of ensuring security in the wider transport and logistics industry requires cooperation of countries as well as all players in the entire global supply chain. For this

²⁹ Key SOLAS Amendments include:

1. Accelerating installation of Automatic Identification Systems,
2. Requiring a ship to shore alert system to signal emergencies,
3. Requiring a continuous synopsis record to improve transparency of ownership,
4. Requiring security measures to counter threats to ships and port facilities, and
5. Enabling a strong port state control regime to enforce ship and port facilities security.

³⁰ The ISPS Code requires ships on international voyages and port facilities serving these ships to

1. Conduct a security assessment,
2. Develop a security plan,
3. Designate security officers,
4. Perform training and drills, and
5. Take appropriate preventive measures against security incidents.

reason, the IMO and the World Customs Organisation (WCO) have signed an MOU to cooperate on security of the multimodal transport chain.

2.3 Capacity Building

In a thorough-going system, Singapore would develop security protocols, business procedures, and install a supply chain security and tracking solution. In addition, it will be necessary to building capacity to train shippers, port operators, and public officials in the new systems and procedures. These efforts will require both time and resources.

MPA has conducted a number of seminars and workshops starting with the Maritime Security Seminar held on 5 May 2003. MPA also held a second half-day Maritime Security Seminar on 22 October 2003 for the local shipping and port community. These seminars are intended to familiarize the maritime community the requirements of the maritime security measures adopted by the International Maritime Organisation (IMO) in December 2002, and the responsibilities of the community in implementing these measures. Steps would have to be taken by parties concerned to comply with the IMO measures when they enter into force on 1 July 2004.

MPA has authorised eight classification societies as Recognised Security Organisations (RSOs) on a provisional basis. The RSOs will act on behalf of MPA to verify the compliance of Singapore-flagged ships with the ISPS Code. Upon verification, the ships will be issued with Certificates of Compliance for the interim period. These would be eventually upgraded to the International Ship Security Certificates.

In order to facilitate the implementation of these new requirements, MPA has also appointed another seven organizations to serve as RSOs for port facilities. Owners/operators of port facilities will be able to engage these organisations to conduct or endorse Port Facility Security Assessments (PFSAs), which are required under the ISPS Code to serve as the basis for the formulation of Port Facility Security Plans (PFSPs). Both the PFSA and PFSP are required to be submitted to the MPA for approval. When both have been approved, a port facility will be issued with a 'Statement of Compliance of a Port Facility' (SoCPF), which will be valid for five years.

In the area of training which is regarded as critical for the successful implementation of the security measures, MPA endorsed three training institutions to conduct courses for Company and Ship Security Officers (CSOs and SSOs). These do not prevent other organizations from applying to the MPA for endorsement for their training courses, including courses for Port Facility Security Officers (PFSOs).

MPA went to some effort to organize an International Maritime and Port Security Conference, held during 21-23 January 2003. The conference involved the participation of IMO and the US Coast Guard. Attention was also given to economic and policy implications of the programmes to enhance maritime and port security, particularly the need to balance

security requirements with maintaining the efficiency and cost-effectiveness of maritime transportation, as well as the impact on maritime insurance and legal practices. A special panel discussed the rationale, impact and implications of the US Customs' 24-Hour Advanced Cargo Manifest Rule on the maritime and shipping industry.

2.4 The Cost of Implementing the CSI scheme

Enhanced measures will increase costs. Some countries will find it difficult to adopt the maritime security measures by July 2004 when they come into force as required by the International Maritime Organization.

The cost of the electronic container seals ranges from US\$150 to US\$400 per device and this will come to a very substantial sum when considering that several million containers are moved to US port in a year (Anon 2003).

Questions have been raised on who will pay for the security measures and how it might change cargo and trade flows and affect crews. In the shipping and port industry with its emphasis on productivity, cost reduction, responsiveness and speed, there are serious concerns about maritime and port security measures might not be compatible with this emphasis.

There needs to be better coordination of requests by various US government agencies in addition to those that come from the US Coast Guard and the newly created Department of Homeland Security.

A final point to note is that the Singapore National Shippers' Council (SNSC)(2003) reported that shipping lines are imposing a surcharge on shippers referred to as the Advance Manifest Compliance Charge. SNSC noted that shippers and logistics service providers are bearing the costs associated with the implementation of the enhanced security measures. The Singapore Customs pays for the cost of inspection and the purchase of gamma-ray screening machines, while the terminal operator, the PSA Corporation, have done its part to facilitate the transmission of information between the terminal, customs, integrating scanning processes into its operations processes. As the MPA notes, it is important to share costs equitably.

References

- Anon (2003) 'Leading international experts to speak on the changing landscape and new challenges in maritime security', press release, 13 Jan 2003.
- Anon (2003), 'Thai govt urged to pay for box security system', Shipping Times 22 Oct 2003.
- Chen Tze Penn, (2003), 'challenges to maritime and port security – a Singapore Perspective', keynote address, International Maritime and Port Security Conference on Maritime Security – Changing Landscape and New Challenges, Singapore, 21-23 January 2003, org. by Maritime and Port Authority (MPA), Singapore.

Maritime and Port Authority (MPA), 'MPA organises 2nd maritime security seminar to update maritime community on implementation of maritime security measures', press release, 22 Oct 2003.
<http://www.mpa.gov.sg/homepage/pressreleases/031022.html>

Singapore National Shippers' Council (2003), 'Maritime security', paper presented at the Tripartite Shippers' Meeting, 11-13 September 2003, Margaux, France.

Urquhart, Donald, 'Studies undertaken to probe supply chain security', Shipping Times, 5 Oct 2003.

Yeo Cheow Tong, Minister of Transport and Communications, Singapore (2003), keynote address, International Maritime and Port Security Conference on Maritime Security – Changing Landscape and New Challenges, Singapore, 21-23 January 2003, org. by Maritime and Port Authority (MPA), Singapore. Opening Address by Ministry of Transport.

3. Security and Supply Chain Management: Thailand Case Study

Deunden Nikomborirak³¹

3.1 Introduction

This paper provides a case study of a Thai company which is a large frozen seafood exporter with annual sales in 2003 of approximately 1.2 billion baht. The company has approximately 1500 employees. The main item exported to the United States is frozen shrimps. Exports to Japan and EU include frozen squids as well.

The company procures fresh shrimps from several local shrimp farms. The shrimps are then transported from the farm to the factories. The containers are stuffed and sealed at the factories under the supervision of a custom officer. The containers are then loaded onto the container trucks operated by the carrier. Containers destined for the United States depart from the Laem Chabang SeaPort, which is the venue of the APEC STAR (Secured Trade in Asia-Pacific Region) project, which is discussed in detail in section 3.4.

3.2 Adjusting to Security Requirements

The company is currently enrolled in the C-TPAT program. Most of the required data or information -- i.e., 5 year retention of data on every shipment to the US -- is readily available since, according to the requirement of the Revenue Department, records of every shipment must be kept in filing for 10 years before they can be destroyed. However, compliance requires the company to compile and organize the requested information in electronic form that is easily handled and analyzed. The company transfers the information on-line to the Shipping Company, which then forwards it to the US Customs. The company needs only to make a one-time investment in a computer, which costs 40,000 baht (about US\$1,000). The company did not need to hire additional personnel. A lot of time went into setting up the system but, once established, compliance does not impose any additional costs.

To ensure compliance with the C-TPAT recommendations concerning access control, the company has installed closed-circuit video cameras in all factories in order to record every arrival and departure to and from the manufacturing premises. Details of the one time cost incurred are not available. It should be noted that the security guideline does not require the

³¹ Research Director – Economic Governance, Thailand Research Development Institute.

installation of cameras. It merely suggests that access controls should include positive identification, recording and tracking of all employees, visitors and vendors, and manual entries of the information are acceptable. However, the company prefers to install the cameras, as they are more effective and practical.

The company does not face any problem complying to the 24-hour Manifest Rule since the company already employs just-in-time (JIT) systems, where the timing of the arrival of raw materials and production is made precise in order to minimize inventory. Like any other large exporter, the firm was able to bargain with the shipping company to obtain a waiver for both the US\$25 fee per B/L that the shipping liner normally charges shippers for the AMS service.

The Bio-terrorism Act (BTA) requires food manufacturers that export their products to the US register with the FDA. The BTA requires vessels to submit Prior Notice (PN) Data 8 hours before the vessel's arrival at the US port.³² Moreover, shippers are required to have a "US Agent" that can supply concerned authorities with information regarding the cargoes en-route to the US should new securities concerns arise at any time. The cost of having a US agent varies depending on the volume of trade. Small exporters may employ Thai students studying in the United States as their agent. The Department of Foreign Trade has stepped in to help small and medium exporters in finding an agent at a reasonable cost.

3.3. Effects

This section reviews the impacts of the security requirements on a number of aspects of the firm's business.

Inventory

While the 24-hour Advance Manifest Rule may require early submission of shipment and cargo information, resulting in more precision in the timing of deliveries throughout the entire supply chain, the struggle to minimize inventory costs by both exporters and importers is independent of the new security rules. Large US importers, such as Walmart, do not maintain large warehouses. To minimize their inventory costs, they demand just-in-time arrivals of all supplies delivered. Cargoes arriving at the port are immediately distributed to various destinations. Suppliers have already had to take steps to manage their supply chain in order to meet such demands.

This company has employed JIT production systems since 1999. This allowed the company to expand its business without having to increase the warehouse space in the past 4 years. For example, it used to buy cartons in large volumes in order to obtain a discount. But it found that this only contributes to higher storage costs and the stored cartons had to be cleaned

³² The required PN Data includes information on product (by FDA product code), manufacturer/shipper/grower, country of origin, country from which the product is shipped, anticipated port of arrival, anticipated date of arrival, ACS entry type and date and Bill of Lading

when retrieved for packaging. Now, the company procures just enough cartons for each shipment.

The next step for Thai manufacturers to improve their supply chain would be to employ Vendor Management Inventory (VMI), which will allow them to be linked on-line with retailers overseas. With VMI, the manufacturer will be instantaneously informed, for example, about the model, color and size of a shirt that is sold overseas so that it can properly plan its production. Hong Kong and Singapore firms have already employed the VMI.

Insurance Cost

Thai exporters are not expected to benefit from a potential reduction in insurance premiums. This is because 95% of exports are fob.

Management of the Supply Chain

Various security requirements have prompted many Thai exporters, including the company which is the focus here, to introduce IT systems into management. Some managers may have benefited from more organized and efficient record keeping and information management.

Transit time

With its good track record, the company has never experienced any delay in customs clearance before or after the new security regulations.

Pilferage cost

Since the company, like most other Thai exporters, ships its products fob, it is liable for losses or damages to the products only until the containers are loaded onto the ship. In order to guard against pilferage during the transit from the factory to the port, containers are sealed with the company's seal. The time taken for the containers to arrive at the harbour is also used as an indicator to monitor against possible pilferage. If a delivery takes longer than usual, the company may inspect the cargoes upon arrival at the port before loading them onto the ships.

Tracking goods shipped

As mentioned above, since the company ships its products fob, it need not track the containers once they are loaded on to the ships. Besides, certain container trucks operated by shipping liners that haul the stuffed containers from the factories to the Laem Chabang seaport are equipped with GPS.

To conclude, the new security regulations helps usher in an earlier introduction of IT into the management of the supply chain and makes control of the security and integrity of the supply chain mandatory. While competitive pressures are already pushing exporters in the same direction, by making these adjustments mandatory rather than voluntary, the new regulations have forced many Thai exporters to undertake the adjustment earlier than they would otherwise have done. Considering that the interest rates on loans are at historically low levels coupled with an ample supply of funding for small and medium exporters, the timing of the adjustment is favorable.

It should be noted, however, that smaller exporters have had to bear higher costs as a result of the new series of regulations, compared to larger companies. To begin with, they do not have the bargaining power to obtain a waiver of the US\$25 fee freight forwarders and the US\$ 11 document fee shipping liners charge for entering the information submitted by the manufacturer/exporter into the computer and transferring the data on-line to US Customs. The cost can be quite high for shippers that ship products LCL (less than container load). This is because the CBP does not allow for multiple shippers or multiple consignees on one B/L. For every shipper/consignee relationship, a separate B/L must be created.

3.4 The APEC STAR-BEST project

'STAR-BEST' stands for the Secure Trade in the APEC Region (STAR) - Bangkok Laem Chabang Efficient Secure Trade (BEST) project. It is a pilot project uniquely initiated and developed through APEC to test the feasibility of an end-to-end supply chain security solution by using electronic seals owned by Savi Technology of the United States. The project is implemented at the Laem Chabang Port, which is ranked 20th in terms of cargo volume shipped to the United States. The solution employs the RFID (Radio Frequency Identification) tag that can track movement of containers through the entire supply chain from where they are stuffed and sealed at the exporter's facility to distributors' premises in the United States. Those that advocate the adoption of the technology believe that, although compliance to the CSI does not require the use of electronic seals³³, the adoption of the technology will provide security officials more confidence and allow shippers to identify inefficiencies in the supply chain that can help cut costs. Three companies and 30 containers were involved in this pilot project.

According to company's view, which is also consistent with that of the Director General of the Thai Customs Department³⁴, the use of an e-seal will impose additional costs on Thai exporters with no obvious benefits. The cost, which is recurring, is expected to be approximately US\$ 50 per container: US\$ 25 for the e-seal and the remainder for the airtime fee for the satellite tracking services (GPS). Since roughly 2 million containers are shipped from Thailand to the Ports of the United States in 2003, the adoption of the e-seal technology would cost Thai shippers approximately US\$ 100 million.

As for potential benefits, there is little evidence of cost savings or efficiency gains above and beyond what could have been achieved through compliance to the rules and regulations supporting the CSI, as elaborated below:

³³ The CBP (Customs and Border Protection) recognizes that sealing of containers is an essential element of the supply chain and remains a critical part of a carrier's and a shipper's commitment to C-TPAT. It does not specify what type of seal is required. That is, a company's or a carrier's seal will suffice.

³⁴ Matichon Daily New Paper, November 5, 2004, page 8.

Inventory Cost

As mentioned earlier, better inventory management comes naturally through competitive pressures in the global market. Various techniques and technologies aimed at improving the efficiency of the supply chain such as the VIM mentioned above allow for enhanced integration of store inventory and purchasing systems with procurement and logistics to track assets more closely. Tracking of containers through e-seals is only one of the many methods of reducing inventory costs.

Insurance Cost

Thai exporters do not benefit from the potential reduction in insurance premium because 95% of exports are FOB.

Transit time

As a member of the C-TPAT, the company has never been a target of inspection. The same applies to other Thai shippers that have already complied with the 24-hour advance manifest rule and other regulations. Thus, the employment of e-seals is unlikely to lessen transit time or its variance.

Pilferage cost

Container theft comes in various forms. Some thieves use powerful levers to lift the doors, and others cut up the roof. Thus, sealing the doors cannot guarantee against pilferage. Moreover, in order to guard against potential liabilities arising from cargo damage or loss arising from pilferage, both shippers and carriers already employ own seals. This is especially true for carriers and shippers that participate in C-TPAT as item 13 of the Agreement to Voluntarily Participate stipulates that sea carriers are expected to "ensure high security seals or locks affixed on all loaded containers".

Tracking goods shipped

As mentioned above, since the company ships its products fob, it need not track the containers once they are loaded on to the ships. Besides, vessels already use the GPS system. It is therefore unnecessary to track the individual container on vessels at sea.

In short, compliance to the various rules and regulations supporting the CSI already adds to security in the supply chain. Other non-security benefits that may arise from employing the e-seal technology are likely to accrue to US importers rather than to Thai shippers or manufacturers.

4. The Effect of the Bioterrorism Act on Exporters' Logistics Costs: The Case of Chilean Salmon

Rodrigo A. Garrido³⁵

4.1 Introduction

The events of September 11, 2001, reinforced the need to enhance the security of the United States (US). The US Congress responded by passing the Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (known as the Bioterrorism Act), signed into law in June 12, 2002. The Bioterrorism Act imposes several operational restrictions to the logistics of exports to the US that may have a significant impact on the final total costs. These costs have not been studied in detail. Knowing the possible costs associated to the Act is beneficial for both the US Government and the shippers/carriers involved in exports to the US. On one hand, the US Government may be interested in assessing how effective this Act will be (the extent to which the Bioterrorism threat is decreased by the Act against the extra unwanted costs that the Act will generate on the economic system). On the other hand, the shippers/carriers may be interested in assessing the market prices that the exports would reach after the Act and consequently, the profits that they could expect after the Act's implementation.

The production, harvesting, processing and posterior transport of fresh salmon in the Chilean industry is analyzed here. In the analysis, the different stages through which the fresh salmon passes before reaching the US market are identified and the potential vulnerability with respect to what is imposed by the Act is discussed. Thus, this document presents a brief description of the logistics chain of Chilean salmon production and exportation processes: direct links between what is mandated by the Bioterrorism Act and what are its possible impacts on export logistics are identified.

Box 1 includes some key dates in the implementation of the Act. The most relevant portions of the Bioterrorism Act to the Chilean salmon exports are:

- The Prior Notice requirement, which imposes a previous communication from the shippers/carriers to the Foods and

³⁵ Head of the Transport Engineering Department, Pontificia Universidad Católica de Chile.

Drugs Administration (FDA) indicating the exact content of any shipment;

- Section 303 which establishes an administrative detention procedure and defines the characteristics of perishable food; and
- Section 306 which indicates the establishment and maintenance of records to allow the identification of immediate previous sources and immediate subsequent recipients of food, including its packaging.

These portions of the Bioterrorism Act may have a tremendous monetary impact on the salmon export logistics. In fact, exporters will have to incorporate expensive technology and managerial procedures strictly directed to comply with all the imposed rules rather than using those resources to improve technical or administrative aspects of their business itself.

Box 1: Key Dates for implementation of the Bioterrorism Act

2003

Feb 3: FDA and CBP published proposed rule with 60 day comment period

Oct 10: FDA and CBP published interim final rule

Oct 28: Public meeting via satellite downlink to domestic and international sites

Dec 11: FDA publishes a Compliance Policy Guide (CPG) which provides guidance on FDA's and CBP's strategy for enforcing and otherwise achieving compliance with the requirements of the interim final rule for submitting the prior notice.

Dec 12: Interim final rule takes effect and prior notice systems becomes operational.

Dec 24: Comments due on interim final rule (comment period will reopen in March 2004)

2004/5 (Revised)

FDA and CBP announced in Aug 2004 the following revised plan, which it intends to implement in Nov 2004:

- **Nov 1, 2004, to Jan 3, 2005, plan to assess existing procedures and staffing needed to receive, review, and respond to the prior notices submitted in accordance with the Prior Notice IFR**
- **Jan 4, to Feb 3, intend to identify what changes to work practices and staffing would be necessary to determine if FDA could continue to receive, review, and respond to all prior notice submissions with reduced timeframes**
- **Feb 4, to May 3, plan to implement necessary changes and make appropriate adjustments to ensure we could receive, review, and respond to all prior notice submissions with reduced timeframes.**
- **June 2005, intend to issue a prior notice final rule that responds to the comments received on the Prior Notice IFR, including this plan, during the two open comment periods**

4.2 The Logistics of Salmon Exports

The Chilean producers export two salmon products:

- Frozen salmon: transported by sea and it corresponds to the 25% of the total volume.
- Fresh salmon: transported by air, and it corresponds to the 75% of the total volume. 90% of the fresh salmon is exported as fillets.

1,600 tons of fresh salmon are exported to the US each week. The producers distribute this number by mode, according to the expiration date of the product and the airline availability (plane capacity and frequency).

The export cycle begins with the salmon harvest in the tanks in the southern city of Puerto Montt. The number of harvested fish depends on the predefined number of daily shipments. The harvest takes place either the afternoon or the night before the processing stage, depending on the distance from the tanks to the processing plants.

After the harvesting the product is transported in trucks to the plants where the product is cleaned, then it receives a cold shot and is packed in expanded polystyrene foam bins covered with ice or frozen gel packs. The bins are consolidated into 20 ton trucks that travel directly to Santiago's airport. The whole processing stage takes about 7 hours. Therefore, the trucks are usually ready to depart around 3pm. The average travel time between Puerto Montt and the airport is 15 hours. Therefore the trucks arrive to the airport the day after the product entered the processing stage.

The product is held in cool rooms before being palletized. Then the pallets are loaded onto the airplane. The airplanes (typically Jumbo freighters) have an average capacity of 100 tons and each truckload must often be loaded onto more than one airplane. Following the chain of operations previously described, the carrier and exporter know the actual shipment information at about 7 pm. The airplanes usually depart between 9 pm and 10 pm every night, leaving for Miami, arriving there between 5 am and 6 am.

4.3 Impact of the Prior Notice Requirement

The Bioterrorism Act requires that FDA receive prior notice of food imported into the United States. Most of the prior notice information required by the interim final rule is data usually provided by importers or brokers to the Bureau of Customs and Border Protection (CBP) when the goods arrive in the United States. Now, the Bioterrorism Act requires that this information also be provided to FDA in advance of arrival to the United States. FDA will use this information in advance of the arrival to review, evaluate, and assess the information, and determine whether to inspect the imported food.

Given the timing for the export stages, this rule of prior notice makes the logistics chain vulnerable. Indeed, the timing is rather fixed with low tolerance, and the possibility of error in the written notice might result in a detention that would ruin the merchandise. Any detention for more than four hours would lead to serious deterioration of the fresh salmon quality. Such a detention is a potential danger because the possibility of making a mistake in any of the required data is high. In fact, if any of the following require information changes after confirmation, then a new prior notice must be submitted:

- Identification of the submitter, including name, telephone and fax numbers, email address, and firm name and address
- Identification of the transmitter (if different from the submitter), including name, telephone and fax numbers, email address, and firm name and address
- Entry type and CBP identifier
- The identification of the article of food, except the estimated quantity
- The identification of the manufacturer
- The identification of the grower, if known
- The FDA Country of Production
- The identification of the shipper
- The country from which the article of food is shipped or, for food imported by international mail, the anticipated date of mailing
- The US recipient (name and address) if the food is imported by international mail
- The identification of the importer, owner, and consignee
- The identification of the carrier and mode of transportation
- Planned shipment information unless the food will not be imported

4.4 The Effect of Section 303

The Bioterrorism Act authorizes the FDA to detain an article of food for which there is credible evidence that such article presents a threat of serious adverse health consequences or death to humans or animals. The Act also requires FDA to provide by regulation procedures for instituting on an expedited basis certain enforcement actions against perishable foods subject to a detention order.

The FDA, in this section, proposes to define “perishable food” as food that is not heat-treated, not frozen, and not otherwise preserved in a manner so as to prevent the quality of the food from being adversely affected if held longer than 7 days under normal shipping and storage conditions. The “7 days” period is excessive for the fresh salmon, because after only four days the quality and properties of the fresh salmon begin to deteriorate rapidly. Therefore any detention of a shipment for four days or more may significantly damage the product.

Section 303 gives power of detention to the District Director of the district where the detained article of food is located, or an official senior to such director. This detention may last up to 30 days. Clearly, a detention that long would imply a total loss.

The shipper (or other authorized person) can appeal any detention. However, the FDA may issue a decision on an appeal within 5 calendar days after such an appeal is filed, to confirm or terminate the detention order. Unfortunately, that timing is excessive for the fresh salmon, because independent on what the decision be, the product would be deteriorated.

4.5 The Effect of Section 306

According to Section 306, all foreign facilities that manufacture, process, pack or hold food intended for human or animal consumption in the US must establish and maintain records of their operation for up to two years. These records are those that are needed for inspection to allow the Secretary of Health and Human Services to identify the immediate previous sources and immediate subsequent recipients of food, including its packaging, to address credible threats of serious adverse health consequences or death to humans or animals.

The records would have to identify the immediate non-transporter previous sources and subsequent recipients of all foods received, including the name of the firm and the responsible individual; address; telephone number; fax number and e-mail address, if available; type of food, including brand name and specific variety; date received; lot number or other identifier if available; quantity and type of packaging; and the name, address, telephone number--and, if available, fax number and e-mail address--of the transporter who brought it. The records must include information that is reasonably available to identify the specific source of each ingredient that was used to make every lot of finished product.

For transporters, the records for each food transported would have to include the name of the firm and the responsible individual who had the food before and immediately after the exporter, with their address, telephone number, and, if available fax number and e-mail address, and the date of reception, as well as the type of food, including brand name and specific variety; lot number or other identifier if available, quantity, and type of packaging. Each and every mode of transportation used must be identified and the individual responsible from when the food was first received until it was delivered.

Considering that 1,600 tons of fresh salmon are exported to the US each week, and the fact that several production and packing facilities (spatially separated along the Chilean geography), two years of records would imply several terabytes of information to allow the traceability of near 170,000 tons of fresh salmon. These large data banks must be maintained in an adequate data warehouse system to allow its management. The implementation of a data warehouse system of this magnitude implies not only the acquisition of the technology and support (hardware, software and human resources) but also a security system. The security system may become extremely costly for spatially distributed operations like those in the salmon exportation industry. Indeed, the data warehouse must be accessible (or at least a portion of the data base kept) from every facility where the activities covered in the records occurred (onsite) or at a reasonably accessible location.

Technology adoption may also become significantly expensive due to the time period allowed by the FDA to respond any of their requests. Indeed, Section 306 establishes that any records or other information to which FDA has access must be available for inspection within 4 hours if the request is made between 8:00 am and 6:00 pm, Monday through Friday, or within 8 hours if the request is made at any other time. This requirement imposes a hard technical restriction over the information system, because that period includes several stages involved in the generation of the required records (communication to the administrator, access to the corresponding data bases, generation of the data base requests, filtering, report production and communication to the FDA). Data bases with several terabytes of information, like the one need for the salmon exports case, would need highly expensive software/hardware to satisfy these demands in a timely manner.

The high costs of technology adoption for data warehousing and its security would have to be paid by the Chilean salmon industry, because the Bioterrorism Act makes failure to establish and maintain the required records or failure to make them available to FDA a prohibited act, and consequently the Federal US government can bring a criminal action in Federal court to prosecute the exporter who failed to comply with this condition.

4.6 Conclusions

The logistics of Chilean fresh salmon exports are highly vulnerable to some of the Bioterrorism Act sections and requirements. In fact, the spatial distribution of production and processing plants, and the long distance between the shipments origin and the consumption market make the logistic chain considerably rigid as far as the timelines are concerned. In addition, any delay in the export process for more than four hours may deteriorate the shipments.

The rule of Prior Notice represents a threat to the continuity of the exportation process, because it implies the possibility of long detentions as a result of administrative problems. Similarly, Section 303 establishes the

Administrative Detention, where “perishable food” is defined as food that is not heat-treated, not frozen, and not otherwise preserved in a manner so as to prevent the quality of the food from being adversely affected if held longer than 7 days under normal shipping and storage conditions. 7 days is longer than the time that fresh salmon can be stored preserving the quality of the food. Therefore, this particular case is more sensitive than other perishable foods considered in this section of the Act. Under some circumstances, this section allows the FDA to hold the food for up to 30 days, which is clearly much longer than its edibility allows.

Finally, Section 306 imposes an enormous cost from the technological viewpoint. Indeed, it requires all foreign facilities that manufacture, process, pack or hold food intended for human or animal consumption in the US to establish and maintain records of their operation for up to two years. These records are those needed to identify the immediate previous sources and immediate subsequent recipients of food, including its packaging. In addition, this information has to be kept with a data warehouse that allows a quick access and posterior reporting of questions formulated by the FDA. These conditions force the producers/shippers to incorporate expensive hardware and software to handle these requirements as well as maintaining a high security standard.

5. The New Security Environment and its Impact on Trade in Manufactured Goods: A Canadian Case Study

Yuen Pau Woo and Marguerite Luong³⁶

5.1 Introduction

Rimex Supply Ltd is a Vancouver-based, privately-owned custom manufacturer of off-highway wheels and rims used in industrial equipment, in particular, loaders and haul trucks operating in open-pit mining. The company has been active in the industry for over 25 years, employs 175 people worldwide and generates revenues of CAD\$25 million per annum. Although Rimex's logistical centre is located in Langley (in the Greater Vancouver Regional District), the company enjoys a wide international presence, with two factories located in the People's Republic of China in addition to its two factories in Canada. Moreover, in addition to its five outlets in Canada, Rimex has established four distribution branches in the United States, three in Australia, two in Indonesia, one in Chile and one in South Africa. The United States is Rimex's top export destination, representing about 65% of the total volume of exports, followed by Australia, Chile, South Africa and Indonesia.

This case study of Rimex Supply Ltd focuses on the firm's response to the new security environment and government regulations in the aftermath of the terrorist attacks of September 11. It is based on a review of Rimex's corporate literature and interviews with senior managers of the company.

5.2 Supply chain for exports to the US before September 11, 2001

Rimex sources its raw steel from steel manufactures from various locations: Rimex's factories in China source their raw materials from within China, while factories in Canada (located in Langley and Agassiz, British Columbia) buy their raw steel from steel manufacturers in the United States and elsewhere. Rimex's factories in China manufacture two of the five wheel components produced by Rimex. These components are then shipped to Vancouver where the engineering, design, finishing and delivery of the full wheel take place. Typically, Rimex's supplies are shipped inbound through the port of Vancouver. On very rare occasions, and depending on the steamship line's route, shipments from Asia are sent

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to Seattle or Tacoma, WA and then transported by truck to Vancouver for value-added.

Rimex receives three to four shipments from Asia on a monthly basis, amounting to approximately fifty shipments per year, usually packed in forty-foot all-steel and fumigated containers. The time between arrival at the port of Vancouver and delivery to the Langley factory usually does not exceed 24 hours. Rimex has not expressed any significant reservations regarding this guideline (pre or post-September 11), as customs clearance in Vancouver has never been a problem. Documentation is usually transmitted in advance to Customs Canada using an online system and is usually processed within four to six hours. Upon arrival in Vancouver, the shipment is automatically cleared and the merchandise delivered to the factory.

The main points of exit for Rimex's exports are the Canada-US land crossings at Pacific Highway and Sumas. Customs clearance at these points of exit is usually an easy process and Rimex's carriers crossing the land border to the United States are seldom subjected to physical examination. Over the next year, Rimex will implement the Pre-Arrival Processing System (PAPS), a new version of the system currently in place that uses the same barcode technology as its predecessor. PAPS is a US Bureau of Customs and Border Protection border cargo release mechanism for commercial shipments. Each PAPS shipment requires a unique barcode label. The system requires Rimex to send information in advance to the US customs broker in order to obtain a barcode for the particular shipment. This code is attached to the invoice and presented on arrival at the border. A customs agent scans the barcode to retrieve the information, and if no examination is required, the carrier can cross the border without additional formality. Rimex does not anticipate any disruption from the implementation of this new procedure.

5.3 New supply chain for exports

Broadly speaking, the events of September 11 and the ensuing introduction of new security measures did not alter Rimex's supply chain in a significant way. However, the company does anticipate several forthcoming changes in order to conform to the new rules and regulations imposed by governmental agencies in Canada and the United States. Rimex is currently in the process of obtaining certification for the Customs-Trade Partnership Against Terrorism (C-TPAT) program and plans to complete the process within the next year.

As would have been expected, the immediate impact of 9/11 was reflected in additional transportation time for both and air shipments through inspections and longer waiting and clearance times.

In addition to delays, Rimex, along with all other Canadian importers/exporters, was subjected to various security fees imposed on sea, air and land travel in the post 9/11 period. For land carriers, a security fee averaging \$12 per carrier was imposed and eventually passed on the

company. For ocean containers, a security fee of \$120-\$140 per container was imposed as well. Airlines and airports have increased their security fees to cope with new security requirements, a measure that not only affected (and continues to affect) importers/exporters but all air travellers. However, in the aggregate, Rimex does not perceive these changes as particularly cost prohibitive or hurtful to its business operations.

Today, Rimex is in the process of subscribing to the C-TPAT program. The C-TPAT program is a joint initiative between US Customs and business and aims at enhancing cargo security and a safe and secure supply chain. Although currently a volunteer program, several thousand companies have officially enrolled in the program to this day. There is no cost associated with C-TPAT membership, but firms may have to invest in new technology or procedures in order to fully qualify for the program. Rimex does not anticipate any onerous expenses related to C-TPAT compliance as it already fulfills the majority of C-TPAT's requirements.

However, Rimex will soon have to introduce two new measures to be fully qualified. First, as part of the personnel security requirements, Rimex will have to conduct background checks (in collaboration with the Royal Canadian Mounted Police) on all personnel coming in contact with the freights. US customs will subsequently approve and certify the employees. For these background checks, a \$20-fee per person will be passed on to the company, an expense however deemed minimal by Rimex. Second, Rimex will have to install several security cameras on its factory's property, with special attention to the loading areas. Overall, these C-TPAT-related investments do not represent a major expense; the company estimates a one-time investment ranging between \$3000 and \$4000 over the next year.

Finally, an important modification to Rimex's supply chain in response to C-TPAT requirements is its choice of carriers. After obtaining C-TPAT accreditation, Rimex will need to use C-TPAT-credited carriers in order to fully benefit from the program. Rimex is currently in the process of studying the use of alternate carriers, prioritizing on those already enrolled in the program.

The relatively small cost imposed by new security requirements in the post-9/11 era does not mean that compliance with new regulations is an easy endeavour. In addition to C-TPAT compliance, the introduction of the Canadian Customs and Revenue Agency's Administrative Monetary Penalty System (AMPS) provides an incentive to comply with new security regulations. The APMS program is a penalty regime for infractions against Customs' regulations and requirements. Canada is bound through an international treaty to supply the United States with accurate trade data and the AMPS program will ensure the accuracy of this data. Indeed, under the AMPS program, Canadian exporters to the United States or elsewhere (if the vessel passes through the United States) will have to describe in very specific terms, the content of these containers. Declaration forms have to be submitted to the steamship line 24 business

hours prior to the vessel sailing. Failure to do so will result in containers being held back and missing their ships.

5.4 Cost and benefits of new initiatives

Overall, compliance to these new programs does require extra attention and time spent in understanding and implementing new rules and procedures. However, the recent transition to online operations has greatly facilitated the process of official documentation and paperwork. Workload and responsibilities may have increased but operations have been streamlined accordingly.

Rimex perceives that the benefits gained with C-TPAT certification will ultimately outweigh its costs and opportunity costs, and believes that the new measures associated with C-TPAT requirements (such as personnel background checks and security cameras instalment) are valuable initiatives regardless of government regulations and will bring long-term benefits to the company's safety. The costs associated with these new measures, estimated to a few thousand dollars, will most likely not be passed on to customers. For Rimex, C-TPAT certification may actually result in lower carrier rates for certified (and therefore low-risk) companies.

However, carrier companies, who face the same challenges of the new security requirements, also have additional expenses imposed on them depending on future rules imposed by custom agencies. These costs may then be passed on to the importer/exporter. A study of supply chain management in the post 9/11 era may include the crucial role played by land, ocean and air carriers.

6. The Impacts of 9/11 on Supply Chain Management: The Case of Two Manufacturing Firms in the Philippines

Adelardo C. Ables and Ma. Joy V. Abrenica³⁷

6.1 Introduction

The terrorist attack in New York on September 11 spawned grave concern about the security of commerce in the US. A new US Department of Homeland Security was created to address threats from terrorist attacks, which may be accomplished by smuggling hazardous and materials of mass destruction into US territory, or by contaminating legitimate exports to the US. New regulations, aimed at securing incoming cargo, were promulgated to ensure that goods coming in could be physically examined outside of US ports. These regulations affect the supply chain and operating costs of companies exporting to the US. This paper attempts to determine such impacts through an analysis of the supply chain of two manufacturing firms exporting auto parts and tuna products to the US.

6.2 Yazaki-Torres Manufacturing, Inc.

Yazaki-Torres Manufacturing, Inc. (YTM) is a leading export firm in the Philippines. A joint venture between Japanese investors and Filipino entrepreneur Feliciano Torres, YTM was organized in 1973 to manufacture wiring harness for the automotive industry. It also manufactures battery cables, automotive instruments and vinyl tapes albeit on a smaller scale. It is part of the Yazaki group, a global network of 138 companies, and is considered a “tier one” supplier to automotive industry. Globally, there are there are 14 other MNCs in the wiring harness business. When Yazaki Corp. of Japan, the mother corporation, obtains a job contract from an auto assembler, it chooses from among its affiliate manufacturers who will serve the contract. Thus, YTM competes with 137 affiliates for orders placed through its mother corporation. On this set-up, almost all of YTM’s production is exported.

There are two other companies operating alongside Yazaki-Torres in its 14-hectare plant south of Manila, a manufacturing complex classified as an export-processing zone. These subsidiary firms, Yazaki-Torres Parts Manufacturing Corp. and YTM Components, Inc., supply component parts

³⁷ Society for the Advancement of Technology Management in the Philippines.

used in the production of wiring harnesses. The former supplies some of the parts while YTM Components produces automotive low-tension wires.

As testimony to its exemplary performance, YTM has several quality and ISO Certifications in its portfolio: ISO 9001, ISO 14001, ISO 9002 and QS 9000. It has been a recipient of numerous awards including Best Employer Award, Outstanding Family Welfare Program Award, the Top Healthy Workplaces Award, and Investor Award for Best Employer. The company has received several supplier quality performance awards from Toyota, Nissan, Mitsubishi and Honda car manufacturers. In 1992, it was cited as an Outstanding Quality Company; and in 1998, it received the 1998 Philippine Quality and Productivity Award. Mr. Torres is the first CEO to receive the Walter Hurd Executive Medal for contributions to the advancement of the quality and productivity movement in the Philippines and the Asia Pacific. For exporting more than US\$100 million, YTM has been named one of Top Export Performers in 1998, 1999 and 2001.

6.2.1 Product and Market

Yazaki is an original equipment manufacturer (OEM), and has proprietary right over its design of the wiring harness. The production of wiring harnesses involves several processes, 70 percent of which is labor-intensive. The basic raw material is copper wire that makes up about 60 percent of the product; the rest are PVC and other forms of plastic. These wires undergo several drawing processes for conversion into very fine wires in the Yazaki-Torres plant. They are coated with plastics for insulation, and fitted with connectors and terminals. The manufacturing process involves about 300 circuits per product requiring manual dexterity in the assembly of parts. It is estimated that the value added in wiring harness manufacture amounts to 35%, considered a significant amount relative to the contribution of other export firms in the Philippines.

In 2001, YTM ranked 72nd in the Philippines Top 1000 corporations with gross revenues of P9.2 Billion (US\$184M). Currently, it employs 5,029 workers. Wiring harnesses were mostly exported to Yazaki affiliates in the US (50%), Japan (30%) and Europe (20%).

6.2.2 Supply Chain

Figure 1. Yazaki-Torres Manufacturing, Inc.
Supply Chain

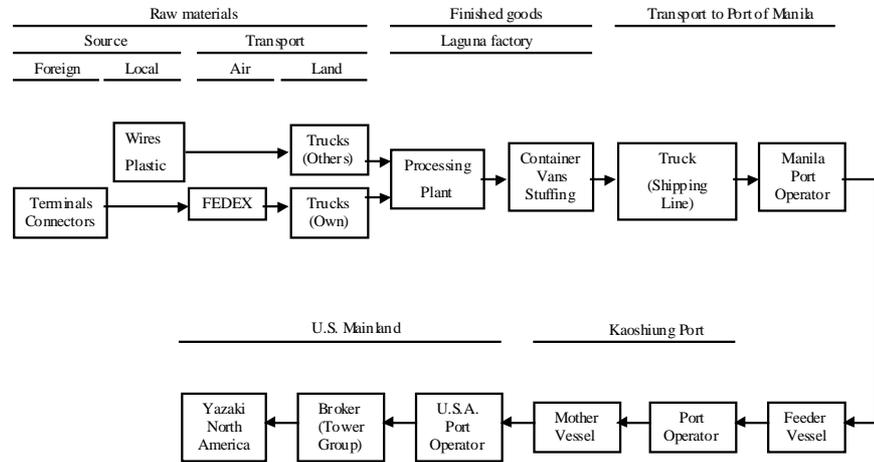


Figure 1 shows YTM's supply chain. Its raw copper wires are sourced from a local manufacturer. These are drawn into fine wires and then coated with plastic. The connectors and terminals are shipped by air from Yazaki affiliates abroad on a just-in-time system. On average, it takes a day for these parts to arrive in YTM's Laguna plant.

Imported components such as connectors and terminals are processed for release at the Philippine Bureau of Customs by an in-house unit, i.e., no customs brokers are employed. In-house processing gives the company better control of logistics while minimizing costs associated with clearing of imports from customs and port operators. Airborne shipments are processed through the E-connect service of Fedex which by special arrangement accorded to Philippine exporters are released immediately upon arrival.

Finished wiring harnesses for export are stuffed in container vans brought to the factory. These vans are owned by the shipping lines and are provided free of charge for a number of days to load (or unload). Exports of wiring harnesses are shipped on weekends; thus shipping documents are usually prepared on regular weekdays.

YTM's export documentation includes preparation and processing of: (i) export declaration, (ii) FOB invoice with detailed packing list that shows units, weights, volume and value, (iii) the Philippine Economic Zone Authority tally which shall be that basis for the boat note. These documents are processed in a one-stop-shop located at the PhilExport

offices³⁸, and then forwarded to the Philippine Bureau of Customs and subsequently to the port handler, which takes custody of the container van for loading to the feeder vessel. The processing of documents from filing at the PhilExport to the port handler takes one day.

Container vans from the Philippines bound for the US have to be transported by feeder vessels (1500 TEU capacity) to Kaoshiung for reloading to bigger vessels (5000 TEU). This is made necessary because bigger vessels do not usually dock in Manila for two reasons: (i) the water at the Manila pier is too shallow; and (ii) scale does not justify calling on Manila port, i.e., not enough container vans. (However, big vessels can unload onto small vessels offshore.)

Upon reaching the US port, YTM products are handled by a brokerage firm, Tower Group International. This broker takes charge of the inland delivery to the Yazaki affiliate, which ultimately deals with the car assembler customer.

Since YTM's import and export operations are mostly confined to Yazaki affiliates, its supply chain system has been insulated from major changes that could occur with having to deal with different companies. However, just like other exporters to the US, it is not exempted from making the necessary production and administrative adjustments to comply with the new security arrangements that arose from the 9/11 incident.

6.2.3 Changes Arising from 9/11

US Regulations

The most significant change affecting YTM is the imposition of the 24-hour advance vessel manifest rule by the US Customs. This rule is a component of the Container Security Initiative (CSI) promulgated by the new Department of Homeland Security, Customs and Border Protection.³⁹ It requires submission of the vessel's cargo manifest to the US Customs 24 hours before the cargo is laden at the foreign port. (NYK Shipping line, one of YTM's shipping companies, has an internal deadline of 28 hours.) US Customs has started accrediting a number of major ports worldwide as CSI ports, where US Customs personnel are assigned to assist local customs and law enforcement personnel secure container vans destined to the US. Manila is not a CSI port but Hong Kong and Singapore are now operating as CSI accredited ports. According to the US Customs representative stationed in Manila, the port of Kaoshiung has yet to obtain CSI-accreditation.

³⁸ A non-profit private organization that was given authority by the Philippine Bureau of Customs to process export documents for its behalf.

³⁹ Other new regulations include APIS or Advance Passenger Information System, which the US Aviation Transportation Security Act of 2001 and the Enhanced Border Security and Visa Reform Act of 2002, mandate the electronic transmission of passenger and crew manifests for inbound and outbound commercial air and commercial sea carriers to the APIS system. Also part of the new security initiative is C-TPAT or Customs-Trade Partnership Against Terrorism which aims to develop, enhance, and maintain effective security processes throughout the global supply chain. Yazaki-Torres has submitted to the process to be C-TPAT accredited.

Since the new US regulation requiring 24-hour advance submission of manifests is reckoned on the last port of call prior to the US ports, exports documents from the Philippines may still be amended by the shipping lines before the containers are loaded in Kaoshiung. The set up allows exporters to do last-minute changes even after the feeder vessel has left Manila, albeit such change is subject to US\$40-fine per bill of lading imposed by the shipping line. Security arrangements can thus be complied with at the last transshipment port.

NYK Shipping, one of several handlers of YTM shipments, requires hard copies of shipping documents to be submitted in its Manila office not later than 5 p.m. Thursday, although electronic submission can be filed until 5 p.m. Friday. This gives NYK Shipping a 96-hour window to finalize documents before the mother vessel leaves Kaoshiung for the US. Such period may be considered “too long”, but according to NYK personnel, they have to impose an early deadline given the propensity of Philippine exporters to submit the required documents at the 11th hour.

Shipping Changes

The new regulations allow the US Customs to pre-screen containers at the earliest possible point away from the US perimeter. The US Customs can issue a No-Lade Decision⁴⁰ if vans are suspected of carrying weapons of mass destruction or hazardous cargo. Suspected vans can then be examined more thoroughly prior to loading in the vessel.

Violations or any alterations on the shipping documents made after the 24-hour rule would subject the shipping line to a maximum fine of US\$ 5000 for the first offence and/or the domestic value of the goods for subsequent violations. To enforce discipline on traders, shipping lines are imposing a US\$40 fine on Philippine exporters for every correction on bills of lading made after the local cut-off. In the case of the YTM, this forces the company to complete the processing and submit by email the shipping documents by Friday afternoon (against the previous practice of “final documents to follow” on Monday).

NYK Shipping must ensure that goods being shipped are properly described—in detail. Previous practices of describing goods as “one lot”, “a set of”, or any mass or generic description are no longer allowed. While document inspection is a standard procedure at NYK prior to 9/11, the new review process has been made more meticulous and thorough. Additions to personnel are necessary to ensure that the documents are thoroughly reviewed. NYK reveals that the cost increment arising from these security arrangements is not easy to identify but is nonetheless passed on to CIF shippers. (YTM ships on FOB basis).

Production Rescheduling

Aside from advancing the processing of shipping documents, the new US regulation affected YTM’s production scheduling. YTM was given a two-month advance notice to modify production schedules and adjust lead-time

⁴⁰ The Bureau of Customs and Border Protection reports that since December 2002, 7 million Bills of Lading have been received and only 600 Denials of Lading have been issued.

by a week, from 30 days to 23 days. This means that shipments that have to be in the US on the 30th day must arrive on the 23rd day to accommodate possible delay, hold order or inspection at the US port. The one-time change was accomplished by YTM without any problem.

Cost changes

Since YTM ships to its affiliates in the US, the latter absorbs all costs on freight including new charges imposed by the shipping lines. The only possible cost to YTM is a US\$40 fee charged by the shipping line for every correction to the bill of lading. But even such expense could be avoided. The YTM management perceives that an unintended consequence of the new security arrangements is that it compels Filipino exporters to meet deadlines and be more thorough in their documentation.

6.3 Philbest Canning Corporation

Philbest Canning Corporation is one of 27 business units under the RD Corporation, a fast growing and probably the largest Filipino-owned conglomerate⁴¹ in Southern Philippines. Philbest has the only fully integrated tuna cannery in the country. Its plant, located on a 25-hectare site in General Santos City⁴², has the capacity to process 120 metric tons per day of tuna raw materials for its growing international customers. From a modest beginning in 1999, Philbest has grown into a 1500 strong workforce coming from diverse culture and educational background. A subsidiary tuna factory operates in Papua New Guinea.

6.3.1 Product and Market

Increasing concern for health and nutrition is shifting dietary preference to less fatty foods. International trade on tuna has grown to US\$2.2 Billion in 2001; Philippine exports have more than doubled within a period of four years, i.e., from US\$164.6 Million in 1997 to more than US\$330 Million by 2001. Growing demand for fish products has propelled tuna as a major issue in US trade negotiations between Asian and South American exporters, as well as a contentious issue between fish catchers and environmentalists. There are also side issues on patents on tuna products such as smoked filtered tuna for which Philippines is well known.⁴³ Amidst these developments, Philbest is in a strategic position to take advantage of the growing demand for tuna products.

Philbest depends on three sister companies for its supply of fresh tuna. Together, the group owns 98 fishing vessels of various capacities that operate mainly in Asia's fishing grounds. These vessels are equipped with refrigeration facilities that can freeze fresh tuna while offshore. Whilst sister companies provide raw material supply, the increasing trade on fresh tuna in the international market coupled with the volatility of commodity prices may induce diversion of fish supply to the more lucrative fresh

⁴¹ RD's interests include real estate, banking, finance, insurance, hotel, tuna fishing and canning.

⁴² Gen. Santos City, dubbed the Tuna Capital of the Philippines, exported US\$333 million worth of tuna products last year.

⁴³ Filipino businessmen have raised complaints against an American for filing patent registration in the US and the Philippines on the processing technology for smoked filtered tuna, which was developed by a Japanese person in Gen. Santos City in 1985.

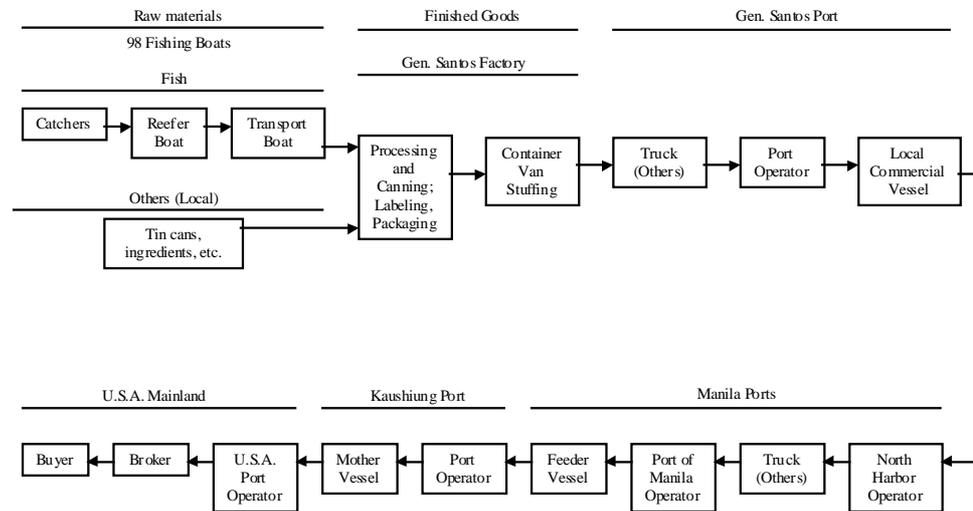
market. Such a diversion would limit Philbest's raw material for its canning operations. Nonetheless, being vertically integrated, Philbest enjoys a distinct competitive advantage over other tuna canning operators in the country.

Tuna canning is a year-round operation. Fresh tuna, caught in the high seas is shipped to the cannery in General Santos City in the southern part of the Philippines. Philbest export about 100 TEUs of canned tuna monthly to the US, Europe, Japan and Papua New Guinea. The United States represents Philbest's major market, consuming 80% of its tuna exports. Europe and Papua New Guinea are the next major markets (15%) while shipments to Japan average about 5 TEUs per month. Recently, Philbest launched its local canned tuna product under the brand name "Diana" in six flavoured variants.

6.3.2 Supply Chain

Philbest's supply of fresh tuna depends on what is left of stock for the international fresh/frozen market. Catcher ships bring the fish to reefer vessels where they are frozen, and taken by transport ships to the cannery in General Santos City. Canned tuna products, packed either in retail packs or in foodservice packs, are loaded on commercial freight vessels in General Santos City for transport to the North Harbor, the domestic port in Manila. The General Santos-Manila trip takes a few days depending on the local ports of call. At the North Harbor, the containers are loaded on trucks for the short trip to the South Harbor or Port of Manila, where the containers are loaded unto feeder vessels bound for Kaoshiung. At Kaoshiung, the containers are loaded in mother vessels for the last leg to the US, where they are eventually handled by buyers/consignees (see Figure 2.) Other raw materials such as tin cans, oil and ingredients including labels, and carton packaging are all purchased from local sources.

Figure 2. Philbest Canning Corporation Supply Chain



6.3.3 Changes Arising from 9/11

The new regulation on the 24-hour advance submission of manifests applies to all types of goods exported to the US. Philbest thus undergoes similar document processing as YTM in the foregoing case. But while YTM exports on FOB basis, Philbest ships on C&F basis (cost and freight). This difference accounts for the additional cost to Philbest for which YTM is spared. Moreover, as food exporter, Philbest is subject to other requirements beside those followed by other manufacturers.

For one, the threat of biological and chemical hazards from shipments of food and agriculture products has spawned more stringent requirements to food manufacturers and traders. By 2004, the US is expected to require all food exporters to secure a Hazard Analysis and Critical Control Point (HACCP) certification. The Food and Agriculture Organization, the World Health Organization and the Codex Alimentarius Commission have reportedly adopted HACCP as the international standard for food safety.

HACCP certification is not new. It was developed 30 years ago for astronauts to keep food safe in outer space. The US FDA adopted the HACCP safety program for the seafood industry in December 1995 and for the juice industry in January 2001. The FDA intends to use the program for much of the US food supply.

HACCP aims to minimize and control the biological and chemical hazards in food by identifying potential sources of risk in food production, from the sources of raw materials to the production process and distribution. The HACCP certification would cover food manufacturing, food catering

and other services, food packing materials, and medical devices. Trade in tuna is covered by the new product certification.

Among the risks that threaten food safety are the presence of pathogens, bacteria, virus, yeast and mould, parasites, pests and insects. Other risks include the cross contamination of raw and cooked foods during transport, storage, preparation and cooking; inadequate cleaning of equipment; poor standards of personal hygiene; and insufficient cooking. HACCP's goal is to secure the supply chain for food products. This requirement is aligned with the Customs-Trade Partnership Against Terrorism (C-TPAT) program, implemented by the Department of Home Security, Customs and Border Protection.

Besides HACCP, the US Food and Drug Administration, by virtue of the Public Health Security and Bioterrorism Preparedness and Response Act of 2002, requires all food exports to the US to obtain Food Facility Registration Number (FFRN) by registering their facilities (factory, warehouse, establishment, importers) not later than 12 December 2003. An exporter is required to quote its FFRN in all documents. This is imposed for ease of tracing a shipment to a particular exporter.

Registration is on per facility and per location basis. An exporter is also required to designate a contact person based in the US with whom US authorities may liaise and inquire as to the origins of each ingredient of an imported food product, whenever deemed necessary. Moreover, the Bioterrorism Act also stipulates that complete information for each US-bound shipment must be submitted to the US FDA not later than five days before the food arrives at a US port of entry.⁴⁴ This prior notice must include among others, a description of the article, the manufacturer and shipper, the grower, country of origin, the country from which the article is shipped, and the anticipated port of entry. Incomplete information in the shipping manifest or their late submission will serve as grounds to detain the shipment. Shipments may be detained for 20-30 days.

A strict penalty is to be imposed on habitual transgression of the requirements of the Bioterrorism Act. The Act stipulates that the violator could be barred from exporting to the US or slapped a criminal case.

Food exporters are also required to archive records about their immediate sources and immediate subsequent recipients of their products for a minimum of one year in the case of perishable goods and two years for others. These provisions apply to those entities that manufacture, process, pack, transport, distribute, receive, hold or import food.

In view of these new regulations, Philbest and other food exporters in the Philippines anticipate that they would have to institute significant adjustments in their production to comply with stringent information requirements of US FDA.

⁴⁴ The final regulation of the Public Security Health Act has yet to set the exact period when prior notice is due. Current guidelines on the Act indicate that the period of prior notice may be between 8 hours and five days.

Cost changes

The Philippine Department of Agriculture estimates that the cost of securing HACCP certification is about US\$3,000, although this estimate remains invalidated.⁴⁵ Philbest obtained its HACCP certification before 2001 when it acquired its factory in General Santos whose previous owners secured a HACCP certification for the plant. The cost of the certification is included in the purchase price of the factory.

The costs of complying with the Bioterrorism Act are also not yet known since it will only take effect only in mid-December. However, in preparation for its implementation, Philbest has paid a US\$300 fee to obtain a Food Facilitation Registration Number. It hired TechniCAL, Inc., a private outfit in the US that assist companies obtain proper documentation for the FFRN requirement. TechniCAL also serves as liaison of Philbest in the US, in compliance with the Act.

On top of the usual US\$20 documentation fee charged on shippers, the shipping lines now charge a “cargo declaration data charge” for all shipments bound to US. The fee is US\$25 for every hard-copy submission of bill of lading. It is lower for EDI-submission, i.e., US\$10 per bill of lading, because it eliminates the need for the shipping line to encode the details of the document and also reduces errors in typing. This fee is borne by either the shipper or consignee depending on the arrangement between the two parties. However, Philbest and other Philippine exporters shipping on C&F basis usually pay for this charge.

As discussed above, violation of the 24-hour advance manifest rule subjects the shipping line to a maximum fine of \$5000 imposed by US Customs. To ensure that the manifest can be prepared on time and thus avoid the penalty, the shipping line imposes a \$40 fine to shippers for every change they make on the bill of lading.

The shipping lines justify these charges since they claim they have to hire additional personnel to check on the documents submitted by exporters. Shippers on FOB basis have been spared by shipping lines from sharing the additional costs arising from compliance with new US regulations. But shippers like Philbest shoulder these costs on a C&F basis.

Shipping changes

All shipping documents of Philbest now cite the FFRN. The shipping lines also monitor compliance to this requirement since the shipping company can be penalized for such omission.

The 24-hour advance manifest rule has similar impact to Philbest as in YTM. Bills of Lading have to be finalized for electronic submission by Friday afternoon in time for the voyage to Taiwan. In contrast to YTM, however, Philbest’s shipping documents have been finalized upon loading at its factory in General Santos, and this gives the company enough time to communicate with its shipping line in Manila. The feeder vessel aims to

⁴⁵ “Food exporters told to upgrade manufacturing facilities, systems,” *Philippine Daily Inquirer*,

reach Kaoshiung 48 hours before the mother vessel loads up in the international port.

Production Changes

To minimize entry of poisonous substances, US FDA's regulations now impose more stringent measures. These measures are further supplemented by buyers' audits, which include identification of sources of raw materials, screening of plant personnel and the audit of processing facilities.

Philbest's buyers conduct audit of supplier's facilities not only as routine business practice but also to ensure conformance to the provisions of the Bioterrorism Act. Just within this year, different buyers have subjected Philbest to five audits. Aside from inspection of factory facilities and production processes, the US buyers also required information on the religion, health history and changes in domicile of employees.

Philbest has not measured the cost effects of these regulations yet. Nonetheless, the company incurs costs in terms of administrative and operational compliance.

6.4 Conclusion

YTM and Philbest differ in the nature of their production processes. YTM's manufacturing process is more stable since the availability and delivery of its raw materials and thus its inventory levels can be scheduled with relative certainty.

In the case of Philbest, the production process in tuna canning operation depends on a number of factors: availability and volume of fish catch, international prices and demand, and the decision of fish catchers to supply fresh fish to canning operation. Moreover, there is also trade in tuna parts (belly, tail, head) and other processed products⁴⁶, which have their own supply-demand-price variability. The variability in supply and demand conditions in tuna operations makes compliance to the advance submission of bill of lading and other documents more difficult for Philbest than it is for YTM.

The effects of 9/11 on the supply chain therefore vary depending on the nature of a company's operations. YTM's supply chain management has remained substantially the same while Philbest has to adapt to more security regulations affecting food processing. Depending on the capacity utilization of firms, 9/11-related regulations will have different impact on the manufacturing operations. For those with resources, adjusting to shorter lead times, and bearing additional administrative expenses would not pose problems; this may not be so for firms with tight production schedules and small to medium-scale operations.

⁴⁶ Exports of smoked filtered tuna to the US in 2002 amounted to 1.2 million metric tons valued at US\$2.3million.