



**Electronic Intra-Port
Community Discussion Groups
Pilot Project**

PRELIMINARY ANALYSIS

**APEC TRANSPORTATION WORKING
GROUP
PROJECT TPT 01/2003T**

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1 INTRODUCTION

1.1 Purpose

The purpose of this project is to improve the information exchange in two selected port communities by establishing pilot *Intra Port Discussion Groups* (involving key port stakeholders such as port authorities, stevedores, container terminal operators, freight forwarders and customs agencies). It is expected that these groups will evolve into working committees dedicated to the ongoing improvement of the ports' operating efficiency. The project will include the provision of a generic (model) website tailored to suit each of the two selected port communities to enable the exchange and dissemination of information.

The project will be implemented in two stages:

- Stage 1 consists of research, analysis and evaluation of work already done; design and preparation of generic websites; visits to participating ports to convene inaugural meetings of the pilot Intra-Port Discussion Groups and launch the port community websites; preparation of a report on the implementation for the Transportation Working Group (TPT-WG); ongoing updates of the web sites; preparation of an evaluation report for the TPT-WG. Funding has been approved for Stage 1
- Stage 2 will consist of ongoing updates of the web sites and preparation of a final report for the TPT-WG. Funding has not yet been sought for Stage 2.

1.2 Purpose of this document

This document seeks to identify and discuss some of the factors that influence the success of port communities that have already implemented collaborative Information and Communication Technology (ICT) solutions and how these factors can be applied to other ports intending to adopt similar systems including the ports selected for this project (Callao, Peru & Saigon, Viet Nam). These Port Cargo Community Systems (PCCS), as they are sometimes called, are acknowledged to have brought about a range of benefits to the port community especially in the areas of improved efficiency and performance while reducing costs (see Section 3.1).

1.2.1 Document Structure

This document is structured as follows:

Section 1: Introduction

Provides an overview of this project, its purpose, the purpose of this document, the objectives of this project and the proposed methodology and timelines.



Section 2: Project Context

Describes the rationale behind this project and how it supports the APEC and TPT-WG objectives. This section also discusses how this project complements work performed under the APEC Paperless Trading Initiative.

Section 3: Impact of ICT on port communities

Previous APEC and non-APEC studies have provided overwhelming evidence of the importance of ICT to improving efficiency and effectiveness of the port logistics environment. This section summarises the key benefits of ICT in the marine freight industry. It also describes what a Port Cargo Community Systems (PCCS) consists of.

Section 4: Factors impacting ICT uptake at ports

Comprehensive port ICT implementations often take the form of Port Cargo Community Systems (PCCS). This section discusses some of the factors that appear to contribute towards the success of ports that have adopted Port Cargo Community Systems. These 'success' factors are drawn from previous APEC research and actual case studies.

Section 5: Case Studies

This section looks at two port community systems (Finnish Ports and Port Klang) and discusses how the factors identified in Section 4 apply to them. They are provided here to act as a template for other ports to evaluate conditions in their own port community with regards to collaborative ICT implementations.

Section 6: Outcomes of port visits

Tranztechnik's consultant recently visited the ports participating in this project (Callao, Peru and Saigon, Viet Nam) to explain the project in detail to the port community, set up communication structures with local coordinators and invite port community members to participate actively in their local Intra-Port Discussion Groups. Port community members at both ports were very receptive of the project and welcomed the expected benefits. All stakeholders contacted agreed to participate actively.

Section 7: Conclusions

This section summarises the key factors required to set up, manage and operate successful Port Cargo Community Systems or similar collaborative port ICT initiatives.



Section 8: Next steps

Based on this preliminary report and initial visits to participating ports, this section outlines what the next steps are to achieve the objectives of this project. The first step is to perform a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis on the participating ports to understand where they stand in regards to implementing a port ICT system. The second is to complete the online forum and website that will provide a platform for community members to exchange ideas. Thirdly, Tranztechnik will continue to support the local communities by providing expertise in team management as well as information on technical issues related to ICT issues in the port.

1.3 Project Management and Participating Ports

Tranztechnik has been selected to conduct this project under the guidance and oversight of the APEC Transportation Working Group (TPT-WG) with the Department of Transport and Regional Services, Canberra, Australia as Project Overseer.

The two ports that have been selected to participate in this pilot project are Callao Port, Peru and Saigon Port, Vietnam. Tranztechnik has appointed local coordinators to act as the main liaison between the project consultant and the local port communities (see Section 6)

1.4 Objectives

The objectives of the Electronic Intra-Port Discussion Group project are:

1. To act as a platform for communication between port stakeholders committed to simplifying and automating documentation procedures at their respective ports through the use of Information and Communication Technology (ICT).
2. To inform and guide port stakeholders in working collaboratively on ICT initiatives in order to achieve optimum efficiency in information exchange for the port community.
3. To provide information to port community members on the latest concepts and technologies related to Port Cargo Community Systems (PCCS).

Ultimately, these Discussion Groups are expected to expedite the uptake of collaborative ICT systems in the port environment.

1.5 Project Methodology and Timelines

The following diagram provides an overview of the proposed methodology and timeline for this project. These should be treated as indicative only as actual local conditions at the participating ports will influence how this project is conducted and the corresponding timeline.

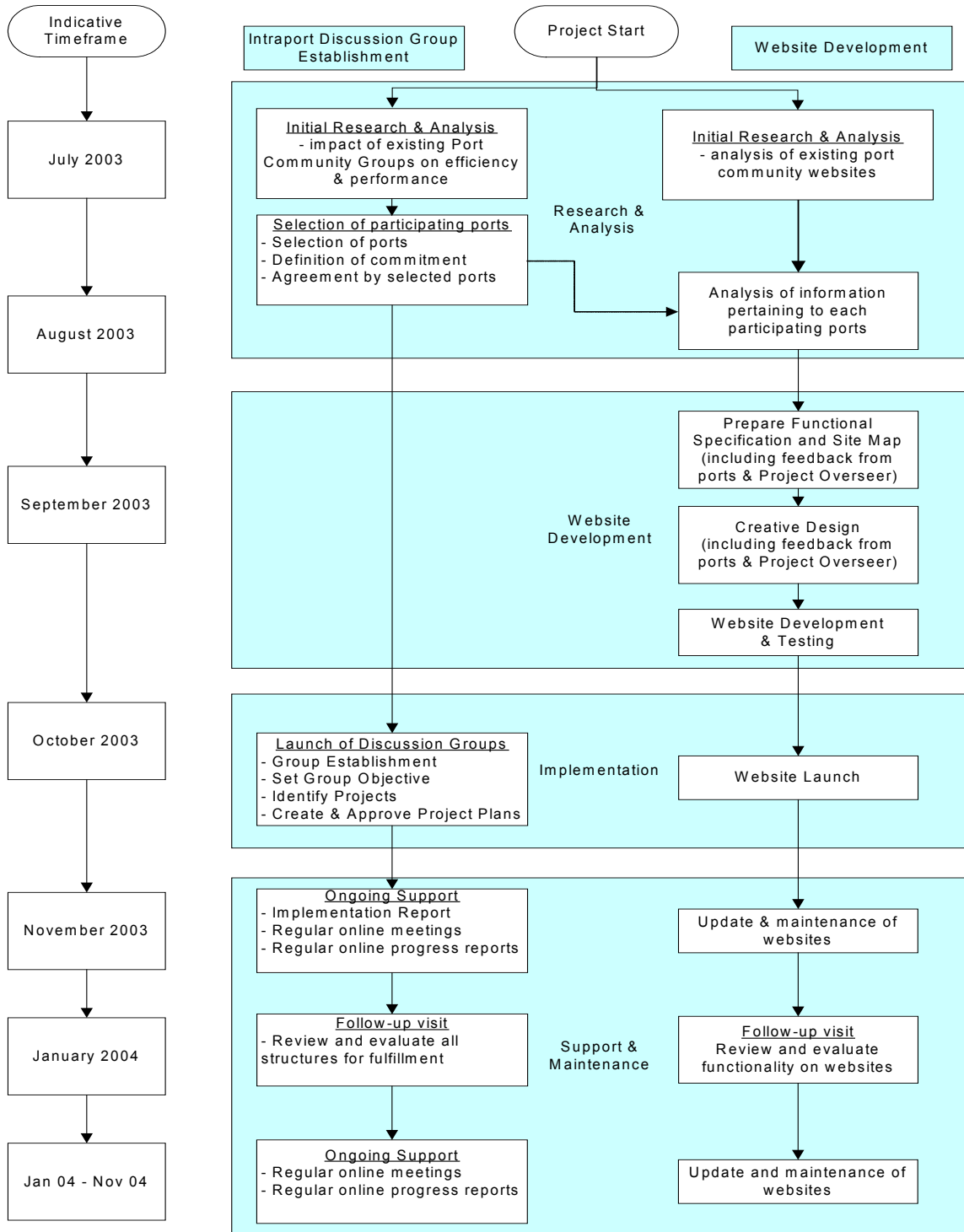


Figure 1: Proposed Methodology and Timeline



1.6 Glossary

APEC	Asia Pacific Economic Cooperation
CCSJ	Cargo Community System Japan
ebXML	Electronic Business XML
EDI	Electronic Data Interchange
EDIFACT	Electronic Data Interchange for Administration, Commerce and Transport
IT/ICT	Information Technology/Information and Communication Technology
PCCS	Port Cargo Community System
PKCS	Port Klang Community System
SME	Small to Medium Enterprises
SWOT	Strengths, Weaknesses, Opportunities and Threats
TPT-WG	APEC Transportation Working Group
VAN	Value Added Networks
XML	eXtensible Mark-up Language



2 PROJECT CONTEXT

This project was conceived out of the recommendations of another recent APEC Transportation Working Group (TPT-WG) research and training project, “Program to assist the implementation of Electronic Commerce for Commercial Messages (TPT 01/99T)”¹. This research demonstrated that the lack of suitable forums for port stakeholders to interact, communicate their views and discuss issues with each other was a key factor inhibiting the development and uptake of e-business and associated business processes in many port communities.

In many ports, participants in the supply-chain tend to work within their own silos without an understanding of how their activities affect other parties or how they are affected by the activities of others. One impact of this is that identical data is collected several times across one supply-chain. For example, in some ports, shipping lines send the port and customs authorities data that is very similar in content but as distinct Electronic Data Interchange (EDI) message types in separate dispatches. A closer level of interaction and understanding between these three parties may have helped identify the similarities between their data requirements and resulted in the elimination of duplicate data collection in this instance.

The final report of “Program to assist the implementation of Electronic Commerce for Commercial Messages (TPT 01/99T)” also lists the lack of ‘cross-community awareness’ as an area of particular concern:

“In most economies, there is insufficient awareness by community members of the complete Transportation Chain, or the fact that their ultimate ‘end customer’ is the shipper/consignee. Consequently, many eCommerce decisions are made with parochial views of ‘their part of the Transportation Chain’ without understanding the (perhaps much bigger) potential impact and benefit arising from other parts of the industry, or the view of their ultimate ‘end user’.”

Furthermore paragraph 2 under “Recommendations” talks about the need to provide “*information, encouragement and practical advice to local members of the Transportation Chain (particularly small-to-medium enterprises)*” on the impact of global eCommerce initiatives and technology advancements that are relevant to this industry.

The research found that even in economies that are most advanced in terms of the wide adoption of the Internet, e-commerce and e-business, a large number of Small-to-Medium Enterprises (SME) associated with the international transportation chain are not yet eCommerce-enabled. Even some port administrations in advanced economies have only basic ICT infrastructure. It was suggested that the first step to adoption of new technologies amongst SMEs is to educate the broader port community, and to identify the potential business benefits to each community member.

¹ http://www.iot.gov.tw/apec_tptwg/TPT/tpt-main/Steering-Committees/Competitive/Electronic-Commerce/tptwg-18-final-papers/phase1.DOC



In this regard, the research recommended as an educational service to the general port community, to establish a 'port community group', with its own website to gather, filter and disseminate e-commerce information and useful links to other e-commerce sites (within their economy and overseas). The key messages for promotion were efficiency, savings, affordability, interoperability, and the ease of installation, operation and use of e-commerce and e-business technologies. The subject matter covered by this group could include interoperability of systems and information standards between port stakeholders and with external entities, business process re-engineering and information flows, models for collaboration, impact of eCommerce on port security and the impact of technologies such as Web/EDI (Electronic Data Interchange) and eXtensible Markup Language (XML) on information exchange in the port environment.

This project responds to calls by APEC Leaders and Ministers that measures be undertaken to facilitate the ability to access and harness new technologies to improve the transportation system of the region.

This project would also complement work performed under the APEC Paperless Trading Initiative, which is a commitment by all APEC economies to reduce or eliminate requirements for paper documents by 2005 (developed economies) or 2010 (developing economies) or as soon as possible thereafter. This goal has been endorsed by Leaders in 1998 and was included in the APEC Blueprint for Action on Electronic Commerce.

Further details on relevant ministerial directives, responsive measures and linkages are at Attachment 1 of the RFP document for this project available through the APEC secretariat website (www.apecsec.org.sg).

2.1 Expected Outcomes

The key expected results from this project are:

- establishment of Discussion Groups in two participating ports;
- establishment of two informational web sites to support these Discussion Groups;
- improved information sharing through the Discussion Groups; and
- ultimately improved port operation efficiency through the described processes.



3 IMPACT OF ECOMMERCE ON THE PORT COMMUNITY

As identified in Section 2 “Project Context”, one of the key drivers behind the proposal to set up Intra-port Discussion Groups was to use these groups as a platform to promote the uptake of eCommerce amongst port communities. This section provides an understanding of how eCommerce impacts port community and supply/logistics chain efficiency.

3.1 Benefits of eCommerce to the port community

A recent APEC TPT-WG research project entitled “Electronic Ports Manifest (TPT 02/2001T)” documented some of the key benefits of adopting eCommerce to the port community. These include:

- Significant reduction in vessel turnaround times, paperwork processing and clearances thus making ports more efficient.
- Consistency of approach with customs and other agencies will result in improved vessel movements and more competitive freight rates.
- Importers and Exporters will accrue benefits through greater confidence and efficiencies in time for document lodgement and scrutiny.
- Increased knowledge of available technology will flow through into many areas of activity within the economy.
- Advanced electronic submission of manifest information to customs is still considered the best way to address security concerns and still allow expedited release of legitimate freight.
- Increased efficiency and speed in processing inward cargo because of the reduced amount of re-keying in of manifest data by port authorities, customs and other permit issuing agencies (PIA).
- Reduced errors and associated problems - staff can be redirected to services that increase value.
- Convenience – Import declaration can be submitted at anytime from any Internet-connected PC (by the customs brokers/freight forwarder/consignee).
- Reusability of data - Easy gathering of statistics for distribution to government agencies and trade organizations.
- Availability of management reports to help monitor operation and aid in decision making.
- Automated customs processing including calculation of duties results in reduced manpower requirements. Also results in reduced opportunity for fraud



3.2 Port Cargo Community Systems

The uptake of ICT in a port environment ultimately manifests itself as a comprehensive system linking all the key stakeholders. These systems are often known as Port Cargo Community System (PCCS).

A formal definition of such a system covering sea freight is difficult to establish because no two systems are alike in either function or technology. For the purpose of this document we will define Port Cargo Community Systems as:

“A system that enables the exchange of freight information electronically between port stakeholders in a timely fashion such that port users can perform their functions efficiently”.

These systems share some or all of the following characteristics.

- It requires collaboration between the majority of port stakeholders.
- It facilitates the exchange of information and documents electronically between port stakeholders.
- For port users, it provides a single interface/system that integrates data from various government and non-government entities.
- It acts as a single administrative desk for authorities and service providers to the users.
- It helps the community members to extract the most value from the ports infrastructure by ensuring that goods and services are handled at an optimal rate.
- It helps the port community to eliminate inefficient practices and improve transparency.
- It is implemented in such a way that the autonomy, security and confidentiality of each participating system is not compromised.
- It ensures that the integrity and security of information exchanged through the system is not compromised.

3.2.1 Examples of Port Cargo Community Systems:

MCP, Port of Felixstowe
Port Authority of Genoa
Port of Barcelona
Valparaiso Logistics Trade
DEBIS, Port of Rotterdam
Dakosy, Port of Hamburg
Seagha, Port of Antwerp

www.mcpplc.co.uk/html/index.html
www.porto.genova.it/uk/ccs/intro/ccs.htm
www.portic.net/portic_eng/home.htm
www.vlt.cl
www.portofrotterdam.com
www.dakosy.de/en/index.html
www.seagha.com

4 FACTORS IMPACTING ADOPTION OF ICT AT PORTS

This section aims to identify some of the factors contributing to the success of Port cargo Community Systems. As each port has a different set of local circumstances and conditions, this project does not intend to be prescriptive in recommending solutions to the participating ports. However, it is expected that participating ports will be able to use this analysis to identify what their own strengths, weaknesses, opportunities and threats (SWOT) are in regards to the implementation of collaborative ICT initiatives.

How to use this analysis

Ports and other bodies that are interested in setting up their own Port Cargo Community System are advised to use the factors listed below as a checklist to perform a SWOT analysis (see Section 5). A favourable comparison indicates a higher likelihood of a successful PCCS implementation. Where a port finds itself with a less favourable situation, an action plan should be devised to address this situation.

Take for example the situation where the level of ICT-literacy amongst port management is low. That is, they are not aware of the importance ICT in improving efficiency and how it can be used strategically to extract more value from their existing infrastructure. Instead they focus their efforts only on hard infrastructure such as building more terminals, dredging deeper channels and building more access roads and berths. With regards to any initiative to implement ICT systems in this port, this situation would be considered a weakness. To address this situation, a series of educational seminars could be organised to illustrate ICT utilisation at leading international ports. Actual visits to these ports will also help this management think more openly and appreciate the critical role ICT play in port logistics. They will then be empowered to identify opportunities to utilise ICT in their own environments.

4.1 Willingness to Work Together - a Culture of Collaboration

The idea that working together as a team can produce greater results than the sum of it's individuals may sound simple enough. However, the reality is that collaboration between port stakeholders is rare. Consequently, stakeholders have continued to invest in their own systems and processes that have created a series of fragmented silos that are not interoperable and cause bottlenecks in the flow of information and cargo.

The lack of collaboration between stakeholders is an important factor slowing down the uptake of electronic business at many ports. Major efficiencies in the movement of cargo and other core functions can be achieved when two or more stakeholders commit to constructive discussions on information sharing and other creative ways to improve performance through the use of ICT.

One factor inhibiting collaborative initiatives could be that organisations consider them to be risky because sharing information with other stakeholders could lead to the loss of competitive advantage. In reality, technological solutions to prevent unauthorised access of data within systems have been widely available for some time.



Another reason why companies find it difficult to justify the investment of time and money into collaboration is because of the high dependency on other organisations for the success of these ventures. It is far easier for companies to concentrate on developing systems to streamline their own internal processes.

4.2 The presence of Drivers for Change

For change to occur, there needs to be one or more drivers impacting on the port community. Ports stakeholders must identify what the key drivers for change are. That is, they must identify the need for change as well as what the consequences of not changing are. The stakeholders must then see how these drivers impact their individual position. Only when individual community members can see a benefit in changing or a threat in not changing for themselves, will there be widespread support for the initiative.

The presence of a common threat is often the driver needed to encourage port stakeholders to start thinking collaboratively. One common driver for change has been competition from neighbouring ports. However when the same players operate in these competing ports the effect of this kind of competition is minimised. Another common driver in some city-ports is the need to improve the flow of trucks around the port because truck operators, local authorities and residents were no longer willing to tolerate the traffic congestion and related problems which have a high financial and environmental cost.

4.3 Information & Communication Technology Awareness

Operating in an environment where there is a high awareness ICT will help any port ICT initiative to succeed. In Malaysia, for example, the government has had a national agenda to increase the utilisation of ITC for several years. The development of a Community System for Port Klang was one of the initiatives inside this national agenda. The Malaysian government also maintains a think-tank known as the National IT Council whose purpose is to provide the framework for the utilisation of information and communication technology towards creating a value-based knowledge society.

Education is an important factor contributing towards ICT awareness in an economy. This includes both formal university education in technical ICT skills as well less formal education for the general public through the media and other channels of information dissemination. An analysis on the state of ICT in developing nations written by Daniel Oost² further illustrates the importance of education in ICT utilisation.

² <http://vlsm.org/etc/indochile.pdf>

4.4 Information & Communication Technology Infrastructure

Although today's Internet-based port community systems have lower communication costs than traditional Value Added Networks (VAN), the feasibility of using the Internet is dependent on the quality of the communications infrastructure in the particular region. Poor infrastructure usually equates to higher costs and this makes the Internet inaccessible in some regions.

While the bandwidth and general accessibility of the Internet is expected to rise in all economies, poor infrastructure will directly impact the take-up of any new system at some locations today. This is particularly true for smaller ports including inland ports where the reliability of even basic infrastructure cannot be taken for granted. The lack of access to the Internet is usually accompanied with an ICT-illiterate workforce and this is a further impediment to uptake of ICT systems.

Another consideration when using the Internet for exchanging trade and transport information is security. Although the tools to make the Internet secure are available, they are not always used because they generally involve a higher level of complexity and consequently cost more than simple bare-bone implementations.

4.5 Local Leadership

The single most important factor to bring about collaboration is strong leadership. Ideally this leadership should come from within the community. Government agencies such as the maritime administration or government-owned entities such as port corporations are often considered to be most suitable to provide leadership in collaborative ICT initiatives.

One reason why governments are well placed to take these leadership roles is because they are generally considered to be neutral and have a vested interest in considering the interests of the whole port community including the SME's.

Large port stakeholders are capable of bringing about major improvements in the way information is shared between port stakeholders. However they are unlikely to provide the leadership required for these changes because they may already benefit from the status quo and therefore have no incentive to change anything.

Port Cargo Community Systems have also been created out of the tireless work of smaller organisations working together to bring the benefits of ICT to whole community especially the SME's. This is no small feat given that such initiatives require a significant mind shift from the status quo and that alone can discourage many organisations from supporting it.



4.6 Financial Investment

While the private sector companies in ports are most likely to be the biggest beneficiaries of Port Cargo Community Systems, it is unlikely that they will make large investments into community initiatives that have a high level of external dependencies. Companies are expected to show good short-term shareholder returns. Therefore even if an investment made good sense in the long-term, it would be impossible to justify this especially if the system ended up being beneficial to others, including their competitors.

So the role of government in providing the initial capital for such a system is critical. Properly managed Port Cargo Community Systems can result in significant economic growth for the port community and the economy. This does not imply that this investment will not be profitable in its own right over a longer period. Once the system is operational and the user-base achieves a critical mass with a fixed operating cost, the system may operate as a profitable business in its own right. An example of a profitable Air Cargo Community System that originally was a government initiative but was eventually privatised is TradeVAN in Taiwan³.

Another model for managing the finance required to build a Port Cargo Community System is to set up an independent organisation with some seed-capital from the government and/or the community and then to commission this entity to develop the system and operate the system on behalf of the community for an agreed period (for example DagangNet in Port Klang).

Other financial models must also be considered before selecting the one suited to the local situation.

4.7 Neutrality

One of the objectives of a Port Cargo Community System is to provide each stakeholder in the supply chain with accurate information such that goods and services flow through the chain unimpeded at the optimum rate. To achieve this effectively the system (and its operators) will require access to potentially competitive information from different stakeholders. Hence it is very important that the operators of the system are perceived by the community to be free from any inappropriate association or other conflicts of interest with stakeholders. They must also not be in competition with other stakeholders. The system itself must employ the level of security considered appropriate for these kinds of transactions.

³ <http://www.tradevan.com.tw/>

Port Cargo Community System initiatives that are not perceived to be neutral generally only gain limited participation from the community. This was the case with the Air Cargo Community System in Japan prior to 1999 when it was a single airline entity. Once it was transformed to a multi-stakeholder owned system in 1999 it was considered to be more neutral and the number of users and stakeholders grew significantly. The new organisation called Cargo Community System Japan (CCSJ) was jointly established in 1999 by all major Japanese Airlines and 22 other carriers and forwarders⁴.

Once again, government entities tend to be perceived as neutral (although this is not always the case) and consequently initiatives led by them tend to have broad support. Alternately, government entities can play an important role in facilitating the creation of cooperative bodies mandated to establish a Port Cargo Community System that is representative of the whole port community. The structure of this body must include sufficient checks and balances to prevent any particular member or group of members from imposing undue influence over other less powerful stakeholders.

4.8 Technology

Many technologies are available today to implement comprehensive ICT systems for the exchange electronic documents in the port environment.

Large organisations have successfully exchanged messages using EDI (EDIFACT, ANSI X.12) for many years. However, traditional EDI systems are considered expensive to implement and maintain. For a community system to be successful today, it must be easily accessible even to small organisations. Two relatively new technologies that appear to be well suited to environments with a high volume of documents such as ports are Web Services and Electronic Business XML (ebXML). These technologies are open, flexible and well-suited for communication over the Internet and Intranet. They are also relatively lower in cost to implement than traditional EDI systems.

The following links provide an overview of ebXML and Web Services:

http://www.vrtpj.com/content/istandards/ebxmlguide_en.html - A guide to the ebXML initiative.

<http://www-106.ibm.com/developerworks/xml/library/x-ebxml/?dwzone=xml> - Understanding ebXML

<http://www.ebxmlforum.org/#art3> - Discusses an ebXML application involving dangerous goods notification sent to Hong Kong Port.

<http://www.webservicesarchitect.com/content/articles/irani03.asp> - ebXML and Web Services: The way to do business

⁴ www.ccsjapan.co.jp



4.9 Message Standards & Interoperability

The marine freight industry does not appear to have a unified, enforceable, global set of standards for the exchange of freight documents. While several standard setting organisations do exercise authority over a myriad of standards across a variety of different areas in marine freight, they are fragmented and not entirely enforceable.

Any initiative to implement a Port Cargo Community System must be flexible and must support a wide range of standards in order to ensure a high level of interoperability. At the data level, port systems must support EDIFACT and XML as a minimum⁵. The standards supported must be periodically reviewed to ensure new requirements and new stakeholders are catered for.

Having a standards management process will ensure a high level of interoperability between community members and between the community and external organisations.

4.10 Legal Framework & Security

A problem faced by some port communities looking to implement ICT is the lack of the legal infrastructure for eCommerce. Existing laws have mandatory requirements for paper-based manifest, bills of lading, customs declaration, dangerous goods and other government authority permits.

This absence of e-Commerce laws, consumer protection laws and amendments to a whole range of existing laws to cover digital transactions is a powerful barrier to adoption of eCommerce. Furthermore proper authorities to manage public key infrastructure and digital certificates are also needed to create a safe, reliable and predictable environment for trading electronically.

⁵ Note: As yet there are global XML standards for freight messages



4.11 Critical Mass

The success of any port system is dependent on its ability to achieve a critical number of users within an acceptable period of time. A high uptake is necessary from an economic perspective i.e. a minimum number of users or transactions may be needed to pay for fixed costs associated with operating the system. A high rate of user take up is also needed to maximise efficiency gains intended by the introduction of the system.

Take for example an organisation that currently processes documents manually (paper) but is willing to participate in new electronic initiatives because it promises improved efficiency and productivity. However if the electronic process does not completely replace the manual process, these companies will find themselves supporting two systems i.e. the manual and the electronic system. This is one of the reasons why it is important to get wide support and commitment for any new system even before it is developed.

An important factor in ensuring a high-level of user-uptake is by making the new system accessible. This includes training users on how to use the new system, setting up centres for SME's to use the system without having to purchase hardware or Internet connections and relaxing institutional requirements for paper documents where electronic alternatives are available.

5 CASE STUDIES

The two case studies below are provided to show how the factors discussed in Section 3 can impact the success of the port ICT initiatives described. While only the 'strengths' are discussed here, ports that are considering the establishment of their own Port Community System should perform a complete SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis to gain a better understanding of how to make their initiative a success. This is further discussed in Section 5.

Note that the factors discussed in Section 3 are not exhaustive. There will be other factors specific to the local environment that must also be taken into consideration.

5.1 Finnish Ports - PortNet

5.1.1 Overview

PortNet is a virtual port community system for the Finnish ports. The following functions/services are available through this system:

- ship time tables, including preliminary and advance notices
- all cargo information, including hazardous materials and dangerous goods
- statistical ship data on ships that have previously visited Finland
- service orders such as piloting and towing
- data on paid fairway and exemptions
- various drop-down tables and statistics

It provides a single administrative desk for entering information required from the shipping lines and ship agents. It also represents a single interface for retrieving the information for the port authorities, customs and the maritime administration. The system is also integrated with the other maritime administration systems. The new version of the system was introduced in 1999 and named Port@Net because it was entirely browser-based. Since then the system has been renamed PortNet.

PortNet replaces separate vessel and cargo notifications with one electronic document (electronic manifest). The electronic manifest is delivered to the PortNet system by using CUSCAR, CUSREP and IFTDGN messages. The content of the manifest is mainly related to customs issues and dangerous cargo but it also provides information for invoicing and statistical needs. The PortNet solution offers XML and EDIFACT data-transfer and retrieval.

5.1.2 Background

5.1.2.1 The PortNet Community

The Community was founded to gather together all those who had a common desire to resolve the traffic reporting problem in ports. The PortNet system is only an expression of this idea. The Community was founded in 1992 but became a more formalised organisation in 1998, after the common goals were set in a signed common protocol. Strictly speaking, PortNet Community is still not a legal entity but owns the application.

5.1.2.2 How it started

The PortNet Community was originally formed in the early nineties as a result of a collaboration between The Ministry of Transport and Communication, 20 port authorities, the Finnish Ship brokers Association, the Finnish Maritime Administration and the National Board of Customs. The goals of PortNet were:

- Simplification of current procedures within the port communities
- Unified and harmonised procedures for all maritime related parties
- Joint IT system

Before PortNet, the port community was filling 4 – 7 forms with roughly the same information for each arrival/departure. Apart from the time it took to perform this exercise, it also increased the risk of errors being introduced. The community decided to streamline the ports processes and managed to reduce the number of forms to 2 (because customs still required their own format). It was decided then that electronic collection and reporting of information was required. Further, it was realised that the most benefits would be achieved if advanced information about arrival and departures were available to the authorities.

5.1.3 Key Strengths

Willingness to work together	Although competition between ports and port stakeholders was very intense Finnish stakeholders were willing to work together. They realised that there were longer term benefits of lower costs, better profitability and revenue.
Drivers	The existing way of collecting information became to cumbersome for some stakeholders. Finnish ports faced competition from other lower-cost ports in the Baltic. The PortNet system was one way to lower cost, improve efficiency and attract more business.
ICT Awareness	Finland has a very high level of ICT awareness and utilisation
ICT Infrastructure	Finland has modern and comprehensive ICT infrastructure

Local Leadership	Both private sector and government organisations took responsibility of turning out the project. One of the key players was the Finnish Maritime Authority (FMA).
Financial Investment	The system's main financiers were the ports and the FMA. Private sector companies were the biggest beneficiaries.
Neutrality	The system is administered by the FMA and operated by a third-party IT service provider.
Technology	Internet/Extranet-based solution with both thin and thick client interfaces. Highly accessible to users in Finland/Baltic. Java/J2EE environment, any-to-any translation supporting WML, HTML, XML with open integration architecture for scalability, extendibility.
Message standard and Interoperability	Multiple message formats are available including EDIFACT and XML which ensures it is open and flexible and easily interoperable with other port systems.
Legal Framework and security	Finland has a very stable legal framework for electronic transactions. The security infrastructure is also very mature and reliable. An analysis of the statutes that cover electronic commerce in Finland is available at: http://www.ficora.fi/englanti/tietoturva/kaupankayntilaki.htm .
Critical Mass	The PortNet system achieved a critical user level very soon after implementation because it had broad-based support from large portion of the port community right from the beginning.

Figure 2: Review of Finish PortNet system against key success factors



5.2 Port Klang, Malaysia

5.2.1 Overview

The Port Klang Community System (PKCS) is an e-Commerce messaging system that was first launched in 1993. The key participants in this system are the port authority, customs, port operators, shipping agents, forwarding agents, freight forwarders, banks and technology providers.

The primary objective of the system was to streamline the documentation procedures, eliminate duplication and redundancies and, where possible, to capture information at source and propagate it across the supply chain to all parties concerned.

PKCS started out supporting only the port's shipping and forwarding agent communities. PKCS is today part of the DagangNet network serves an extensive chain of trading parties that overlap into the logistics/transportation, importers and exporters, Customs and government agencies in Port Klang, KLIA and Johor, numbering about 2,500 in total⁶.

5.2.2 How the group worked

As part of a national initiative to accelerate the implementation of eCommerce in Malaysia, Port Klang was chosen as a model for the port sector.

The Port Klang Community System Implementation Committee (PKCS_IC) was formed with the CEO of Port Klang Authority as its chair. This committee in turn had representatives from all the port's stakeholders such as customs, port operators, forwarding agents, shipping agents & banks as members.

In the initial stages of implementation this committee met on a weekly basis (now it meets once every two months). This committee is responsible for policy decisions and resolving business issues pertaining to implementing a port community eCommerce system. Under the PKCS_IC is the PKCS technical committee. This committee was represented by technical staff from all stakeholder parties. This committee was responsible for evaluating the information requirements of each stakeholder and designing and implementing an electronic system that caters to these needs.

Using this two-tiered structure, the PKCS_IC with the commitment of all its members was able to design and implement a sophisticated port eCommerce system.

⁶ Computerworld Malaysia - Vol_2 Issue No_ 5, 1 - 31 March 2002 - Casting a trading net

Today the PKCS facilitates the exchange of a wide range of electronic cargo documents covering all stages of the supply-chain by connecting members of the supply chain using EDI and Internet technologies. The level of electronic messaging is 100% for many commonly used documents and the list of paper-based processes being converted to electronic form continues to expand.

A key point to be noted about this case study is that the system was developed by an experienced team derived from all entities in the port community for the community. This ensured that system addressed the needs of the community and had broad support from its inception.

This provides strong evidence in support of establishing port discussion groups because of its collaborative and inclusive nature, their effectiveness at creating and owning projects that benefit the whole port community and their willingness to champion these initiatives to ensure their success.

(Other factors attributed to the success of the Port Klang Community system are documented in the APEC TPT-WG Report “Electronic Ports Manifest”⁷⁾

5.2.3 Key Strengths

Willingness to work together	Port stakeholders understood the importance of working together in order to create a modern and efficient port. There was also first-hand evidence of how collaborative ICT initiatives can produce outstanding results in neighbouring ports.
Drivers	The need to match efficiencies gained by successful neighbouring ports in order to maintain its relevance as a major port, the desire to participate in the national campaign to increase ICT utilisation.
ICT Awareness	At the time PKCS was first introduced, the Malaysian government was embarking on an aggressive campaign to transform Malaysia into an information-based society. Many education and training programs were launched to improve ICT awareness.
ICT Infrastructure	Malaysia has excellent ICT infrastructure provided with high quality fibre optic network at highly competitive rates by local telcos. Internet access is widely available and affordable.
Local Leadership	The key leaders of this project were the Malaysian government and the National Chamber of Commerce and Industry ⁸ . In addition the Port Klang Authority, Customs Department and the private-sector service provider played key roles in making the project a success.

⁷ http://www.iot.gov.tw/apec_tptwg/TPT/tpt-main/Archives/tpt-wg21/Ec/Eport.pdf

⁸ <http://www.un.org/Depts/escap/itecd/hrd/esc6.htm>

Financial Investment	In 1989, the Malaysian government awarded a 15-year concession to DagangNet Technologies, a private eCommerce service provider to build and operate the national electronic trade infrastructure of which PKCS was the key component.
Neutrality	The system was built and administered by an independent third-party organisation, DagangNet. DagangNet is reputed to be a reliable, neutral provider of eCommerce services in Malaysia.
Technology	PKCS is connected to the private network of DagangNet, the National EDI Network and Clearing House. DagangNet's other nodes include the KL International Airport Community System. Internet and Intranet access ensure the system is highly accessible.
Message standard and Interoperability	The PCKS system supports a wide range of EDIFACT messages that are used by most international carriers. Additionally, Web Interfaces and mobile phone interfaces have also been established to increase the reach and accessibility of the system. They are slo involved in XML and ebXML initiatives.
Legal Framework and Information security	<p>Since 1997 Malaysia has had a comprehensive framework of societal and commerce-enabling laws covering eCommerce.</p> <p>The Port Klang Community system is based on the DagangNet network which is a fully secured private network. Secure Internet Access is also available to access the system. The public key infrastructure in Malaysia is well established.</p>
Critical Mass	Critical mass was achieved within a short period of time because of effective education policies, government support and easy access to the system's functionality. For example, EDI shops were established in the early stages for SME's to ensure all users had access to the systems. The system was developed by the port community for the community ensuring broad-based support.

Figure 3: Review of Port Klang Community System against key success factors

6 OUTCOME OF VISITS TO PARTICIPATING PORTS

6.1 Callao Port, Peru

Mr Arnold Miranda from Tranztechnik visited Callao Port from September 11th – 17th, 2003 to meet with the local port community to convene the inaugural Intra-Port Discussion Group meeting.

The following outcomes were achieved from this visit:

- Commitment from Mr. Rafael Farromeque, Director General of the Planning and Budget Office at the Peruvian Ministry of Transport and Communication (MTC) to support the project and to provide appropriate resources as required.
- Tranztechnik provided detailed explanation about all aspects the project to MTC staff to enable them to carry on the function of local coordinator and project champion.
- Appointment of Mr Guillermo Acosta of the Ministry of Transport as the local coordinator of this project.
- Agreement from the majority of the Callao port community to form an Electronic Intra-port Discussion Group based on the expected benefits and methodology presented by Tranztechnik. Participating stakeholders include:
 - Ministry of Transport and Communications
 - ENAPU (National Port Administrator)
 - SUNAT (National Customs Authority)
 - CONUDFI (National Council of Port Users for Cargo Physical Distribution)
 - Maritime Association of Peru
 - TRAMARSA (Port Services Provider)
 - NEPTUNIA (Port Services Provider)
 - Lima Chamber of Commerce

6.1.1 Issues Raised

These are some of the issues raised during meetings with port community members:

- The importance for the Intra-Port Discussion Group to be administered by a neutral party such as the Ministry of Transport and Communication.



- Several community members pointed out currently there are no channels of communication between port users and authorities such as the Port Administrator and Customs Authority.
- Port user representatives discussed the issues of port charges that were not accounted for (hidden charges). They would like to see a higher level of transparency in order to eliminate charges or services that did not add value to supply-chain.
- It also became clear that although some authorities had develop sophisticated systems to improve effectiveness and efficiency, there had not been sufficient consultation with other port stakeholders to optimise the benefits generated.
- Port service providers discussed the need for more for information sharing.
- Port service providers also discussed issues related to slow turn around of containers, congestions on port access roads and how these could be addressed.

6.2 Saigon Port, Viet Nam

Mr Arnold Miranda from Tranztechnik visited Saigon Port from September 29th – October 3rd, 2003 to meet with the local port community to convene the inaugural Intra-Port Discussion Group meeting.

The following outcomes were achieved from this visit:

- Commitment from Mr. Le Cong Minh, Director General, Saigon Port to support the project and to provide appropriate resources as required.
- Appointment of Mr Ho Kim Lan Saigon Port as the local coordinator of this project.
- Commitment from the following port community stakeholders to support the formation of the Saigon Intra-Port Discussion Group was achieved:
 - Saigon Port
 - VINATRANS (Freight Forwarding Agency)
 - Zim/Gold Star Line agency (Shipping Line Agent)
 - Saigon Steel Corporation (Importer/Exporter of Steel through Saigon Port)
 - VITRANSCHART (Viet Nam Sea Transport and Chartering)
 - VINAFOOD II (Viet Nam Southern Food Corporation)



6.3 Issues Raised

These are some of the issues raised during meetings with port community members:

- The need for the Intra-Port Discussion Group to produce some tangible results in the short-term in order to show other stakeholders the benefits of participating in the Discussion Group. These should include some real eCommerce applications where the benefits are measurable.
- The need to keep discussion fresh and interesting to maintain a high level of interest in the discussion group.
- The need to obtain the support of the Vietnamese Ministry of Transport. This will encourage stakeholders to participate actively in the Discussion Group's activities.
- Stakeholders acknowledged that the effectiveness and efficiency of Saigon port could be significantly improved by utilising ICT.
- Port stakeholders discussed the need for more information sharing, especially by authorities that have this information.
- It was acknowledged that educating the port community on ICT should be part of the Discussion Group's agenda.



7 CONCLUSIONS

Based on the preliminary research and consultations carried out thus far in this project, the following conclusions can be drawn:

1. The benefits of collaborative ICT systems in ports are well documented and can be applied to any port community.
2. The lack of suitable forums for port stakeholders to interact, communicate their views and discuss issues with each other is a key factor inhibiting the development and uptake of e-business and associated business processes in many port communities.
3. Several factors have been shown to play an important role in likely success of any collaborative ICT initiative at ports. These include:
 - a. The willingness to work together including private-public partnerships.
 - b. The presence of drivers for change
 - c. The level of ICT awareness amongst the community
 - d. The maturity of the ICT infrastructure in the economy
 - e. The willingness of the local community to assume leadership and ownership of the project. Often government entities are most suited to take on the leadership of these initiatives.
 - f. The availability of suitable finance to investigate and develop collaborative ICT solutions is a prerequisite. Once initial funding is achieved, the ongoing management and ownership of the system will also influence community support. Port ICT systems can be profitable in its own right.
 - g. The need for any community ICT initiative to be perceived to be neutral and representative of the whole community.
 - h. The use of open, flexible technologies that have wide user base and is easily accessible by both small and large organisations is likely to be widely accepted by the community. The interoperability features of the technology must also be considered.
 - i. Any collaborative ICT system must support all the widely used messages standards such as EDIFACT and ebXML and be flexible enough to support proprietary standards used by stakeholder organisations.
 - j. The existence of a comprehensive legal framework for conducting electronic business is essential for the success of any port ICT system.



- k. The success of the port community system is dependent on achieving a critical mass of community uptake. Early discussions about the interests of a wide cross-section of the community will ensure broad-based support for the proposed system.
4. Port communities participating in this project have acknowledged the importance of the Intra-Port Discussion Groups. They have shown their support and their commitment to achieving the objectives of this project by actively participating in the Discussion Groups at their ports.

8 NEXT STEPS

Based on the preliminary research and initial visits to participating ports (Callao and Saigon), Tranztechnik will take the following steps in order to consolidate the achievements thus far and set up structures to ensure the successful achievement of the project's objectives. Action will be taken in the following areas:

1. Perform SWOT Analysis on participating ports with regards to implementing collaborative ICT systems
2. Implement Port Community Websites and Online Forums where port stakeholders for Callao and Saigon port communities.
3. Provide local communities with encouragement and support to participate in the Intra-port Discussion Groups

8.1 SWOT Analysis

A SWOT (Strengths, Weaknesses, Opportunities and Threats) Analysis allows an organisation (or in this case a port community) to take stock of where they stand when considering how best to achieve a particular outcome. The process consists of identifying the organisation's current situation in the form of its strengths and weaknesses and how these could impact the desired outcome. It also looks at the future state by identifying potential opportunities and threats. One of the advantages of the SWOT analysis is that it looks at both the organisation's internal state and also at various factors in the environment such as what the competitors are doing, market trends and macro-economic issues.

In order for the SWOT analysis to be meaningful, it needs to be done against a particular outcome or set of outcomes that the community has a desire to achieve. In this discussion one of these outcomes is to set up a collaborative ICT system (or Port Cargo Community System, PCCS) that facilitates the exchange of electronic data between stakeholders.

Tranztechnik will use the SWOT analysis to see where the participating port communities stand with regards to adopting a PCCS. Options that will capitalise the port's Strengths and Opportunities will be explored. Likewise options to eliminate or minimise the impact of Weaknesses and Threats will also be explored.

The factors discussed in Section 3 can be used as a basis for discussing strengths and weaknesses. For example strong government leadership is a strength in ports where it is present and a weakness where it is absent. Opportunities and threats are very specific to each port and must be explored by looking at the internal and external operating environments of the participating ports.

The following questions are provided to further assess the significance of each Strength, Weakness, Opportunity and Threat identified:

8.1.1 Strengths

- Will this strength deteriorate over time if the community doesn't capitalise on it?

Example: This port is currently the leading port in the region and stakeholders are willing to invest in implementing a Port Community ICT system here. However, other competing ports are fast catching up and stakeholders may chose to move their business and their ICT investment to the competitors.

- Do the ports competitors have an equivalent strength?

Example: The port's main competitor also has an active Port Community Discussion Group and is currently developing a Cargo Community System for their port.

8.1.2 Weaknesses

- How can this weakness or the impact of this weakness be reduced or eliminated?

Example: If the weakness is lack of computer literacy, then a series of seminars to educate the community may be the first step.

- How critical is this weakness to the aims of the community?

Example: The legal framework for eCommerce in the port environment either does not exist or is insufficient to carry out electronic business – very critical to electronic financial transactions.

8.1.3 Opportunities

- Is the opportunity limited by time or will this opportunity continue to exist in the reasonable future?

Example: Recent restructure in port laws have prepared the community for change. The community may now be more open to discussing the introduction of electronic system. But the excitement may fade if action is not taken soon.

Example: The selection of this port to be part of the APEC Intra-port Discussion Group has created some urgency and willingness to work together. Again, the enthusiasm may wane if we don't strike while the iron is hot.

8.1.4 Threats

- Is this threat likely to undermine the community's plan in the short-term, medium-term or long-term?

Example: Upcoming general elections may be seen as a short-term threat because stakeholders may adopt a wait-and-see attitude.



- Can this threat be turned into an opportunity?

Example: The presence of a competing port in the region could be used as a driver to unite all the stakeholders to work together.

8.2 Implementation of Community Website and Online Forum

The Community Website and online forums will be a central platform through which community members can discuss issues concerning the uptake of eCommerce as well as plans to implement a comprehensive Port Cargo Community System.

The following principles will be taken into account for the design of the website and online forum:

- Simplicity, clarity and user-friendliness will be guiding principals in the design of the website.
- The website will differ from the *status quo* by the incorporation of features that encourage the Intra-port Discussion Groups members to participate in its activities. These features include an easily readable calendar of activities, email reminders to members participating in particular activities and email prompts to members of specific discussion threads whenever a new item has been posted. These features are designed to elevate the level of participation of members in the activities of the Intra-port Discussion Group.
- The websites will allow both general access for information relevant to the whole port community as well as closed-user groups for information and discussions pertaining to specific sub-committees.
- The website will be easily maintainable by non-technical staff. Local administrators will be given access and training to update some website content. This will ensure that the website's life will extend well beyond the life of this project.
- Security of the site will be managed at two levels – Administrator and User using login id and password verification.

8.2.1 Progress of online forums

The online forums in Spanish (for Callao) and Vietnamese (for Saigon port) have been completed. They are currently undergoing testing by the respective local coordinators.

The online forums can be found at http://saigon.portcommunity.info/forums_vi/ and http://callao.portcommunity.info/forums_es/.



Home pages for Saigon and Callao port communities are currently being designed in consultation with the respective local coordinator. Each port community's website will be identified by its own homepage. For example, Saigon Port's home page will be: <http://saigon.portcommunity.info> and Callao's home page will be: <http://callao.portcommunity.info>. These are currently under construction.

8.3 Ongoing support to participating communities

Tranztechnik will provide local coordinators and other community members with support and encouragement to actively participate and take ownership of the Discussion Groups. One area that will be discussed are the ground rules of the Discussion Groups that Tranztechnik considers to be critical to the success of the project. These ground rules include:

- That the community owns the forum – that is, it is not the Local Coordinator's Forum. The Local Coordinators have agreed to facilitate the project because they see the benefits for the whole community. It is important that the community supports them to perform their role.
- It is critical that participants always state the facts, be objective and constructive in their criticisms not allow the Discussion Group to blame any particular organisation for the any situation.
- Each stakeholder is responsible for the success of the Discussion Group.
- Stakeholders are encouraged to be proactive and show leadership rather than take a "Wait and See" approach

APPENDIX A - PORTS SYSTEMS CONSULTED

The following ports or port systems were either consulted directly or evaluated using other resources to complete this report:

- Sydney Ports, Australia
- Port of Melbourne, Australia
- Vancouver Port, Canada
- Valparaiso Logistic Trade System & Isadora System , Port of Valparaiso, Chile
- Tianjin Port, China
- Hong Kong, China
- PortNet System, Finland
- Port Klang Community System, Malaysia



- Port of Tanjung Pelepas, Malaysia
- Callao Port, Peru
- TradeVan, Taiwan
- Bangkok Port, Thailand
- Felixstowe Cargo Processing System, Felixstowe, UK.
- Saigon Port, Viet Nam



APPENDIX B – REFERENCES

Program to assist the implementation of Electronic Commerce for Commercial Messages (TPT 01/99T). http://www.iot.gov.tw/apec_tptwg/TPT/tpt-main/Steering-Committees/Competitive/Electronic-Commerce/tptwg-18-final-papers/phase1.DOC

Electronic Intra Port Community Discussion Groups (TPT 01/2003T) – Request for Proposal. www.apecsec.org.sg

APEC Electronic Ports Manifest Project Final Report (TPT 02/2001T) http://www.iot.gov.tw/apec_tptwg/TPT/tpt-main/Archives/tpt-wg21/Ec/Eport.pdf

An investigation into the state of Information Technology in Chile and Indonesia. Daniel Oost. <http://vlsm.org/etc/indochile.pdf>

TradeVan, Taiwan. www.tradevan.com.tw

Cargo Community System Japan. www.ccsjapan.co.jp

Finland: Legislation on Electronic Commerce. <http://www.ficora.fi/enqlanti/tietoturva/kaupankayntilaki.htm>

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ESCAP EDI course. <http://www.un.org/Depts/escap/itecd/hrd/esc6.htm>