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# PAPERLESS TRADING

BENEFITS TO APEC

The potential of the APEC paperless trading initiative



**FOREIGN  
AFFAIRS AND  
TRADE**

Ministry of Foreign Trade and  
Economic Cooperation

## About this report

At the 1999 Leaders Meeting in Auckland, APEC economies agreed on a voluntary basis to reduce or eliminate the need for paper-based documents in cross-border trade by 2005 in developed economies and 2010 in developing economies.

The ability of governments to manage trade administration online provides opportunities to integrate players in supply chains, such as banks, insurers, freight forwarders, carriers and governments. This holds the prospect of savings as a result of efficiencies in government and business. The initiative also holds the prospect of greater levels of transparency and timeliness in international trade.

This report, ***Paperless Trading: Benefits to APEC***, highlights the potential direct and indirect economic benefits of the removal of mandatory requirements for paper-based documents in international trade. This report also provides evidence of firms gaining access to new opportunities to participate in cross-border supply chains, agile production processes and innovation in new product design as a result of more efficient freight movements and trade administration arrangements throughout the region.

According to the United Nations Conference on Trade and Development, the average international transaction involves 27 to 30 different parties, 40 documents, 200 data elements (30 of which are repeated at least 30 times) and the re-keying of 60 to 70 per cent of data at least once. Obtaining the necessary permits for import and export can take weeks in some economies.

This report was drafted by the Australian Department of Foreign Affairs and Trade and the Chinese Ministry of Foreign Trade and Economic Cooperation and draws heavily on interviews with officials and business representatives from APEC member economies in June-August 2001.

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## KEY FINDINGS

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The APEC goal of reducing or eliminating the requirement for mandated paper-based documents in cross-border trade has the potential to revolutionise the conduct of trade within the region. Key features of the paperless trading environment that will emerge across the region in the medium term include the following:

- The removal of regulatory and institutional requirements for paper-based documents in cross-border trade is expected to create considerable efficiencies in intra-regional manufacturing supply chains. For example, a three per cent average reduction in the cost of imported items would involve gross savings of the order of US\$60 billion annually when extended to total intra-APEC merchandise trade. The initiative also enhances the efficiency of an economy's manufacturing sector through a dramatic reduction in time taken in gaining approvals for cross-border trade.
  - Traders will benefit from paperless trading through reduced cost of shipping goods across borders, through lower communications charges, lower paper handling charges, fewer errors and faster receipt of payments, reduced trade finance charges and lower inventories. In the case of sugar, paperless trading technology reduced the cost by US\$8 per ton, or 4.4 per cent of total value. Considerable savings also accrue to banks, insurers, carriers and governments in administering cross-border transactions.
  - Paperless trading will deliver substantial gains to all intra-APEC merchandise trade, rather than simply items supplied through the Internet. In this sense its impact will be more pervasive than e-commerce. Paperless trading also raises the prospect of greater participation by developing economies and small and medium sized enterprises in cross-border trade as traditional impediments (such as the cost and complexity of compliance with export/import requirements) become less important. The initiative could also lead to new markets emerging for smaller producers of perishable items as shipments are delivered faster and trade administration costs decline.
  - Governments with strong cross-agency coordination mechanisms are expected to make the most progress in removing these regulatory and institutional barriers to paperless trading. The key challenges to the take up of the paperless trading initiative are delays in repealing some legislation mandating the use of paper-based documents, passing domestic legislation to support electronic transactions, low levels of IT and telecommunications infrastructure in some economies and the cost and complexity of providing relevant government trade services online.
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# 1. Paperless Trading Systems in the Asia Pacific Region

## Efforts to promote paperless trading

The task of completing documentation required in cross-border trade has long been recognised as a costly and time consuming exercise. The experience of Singapore and Hong Kong, China demonstrate that these costs can be reduced and processes throughout the supply chain streamlined by the application of e-commerce in customs, quarantine, health and port services provided by government agencies to the trading community.

- For example, prior to the introduction in Singapore of TradeNet<sup>1</sup>, traders were required to submit up to 21 different forms to 23 different agencies, a process that could take 15-20 days to complete. Singaporean traders now enjoy the efficiency of completing two electronic forms through TradeNet and waiting 15 minutes to have all the necessary approvals granted by the Singaporean Government. According to the IBM Corporation, TradeNet saves Singapore traders around US\$1 billion per year in internal productivity savings.
- In Hong Kong, China, similar delays were experienced by traders until the government created a new agency, Tradelink Electronic Commerce Limited, to provide online trade administration services. Tradelink also provides value-added services such as electronic billing and payments, security and message authentication. These services increase the competitiveness of the local trading community.

The Singapore and Hong Kong, China systems were initially based on older Electronic Data Interchange (EDI) technologies. Recently they have been expanded to include Internet-based protocols, allowing the smallest firms to access services through a standard PC with Internet access.

Substantial productivity and manpower savings have been reported by users of these systems. In addition, governments have affected considerable savings in the administration of trade. However, the greatest benefits reported by users of the technology are the increased speed and agility in responding to customers' needs.

## How was this achieved?

A common theme in the approach of economies that have largely eliminated the requirement for paper-based documents in cross-border trade is government commitment and effective coordination arrangements between exporters, importers and government agencies. Singapore and Hong Kong, China have also been assisted by their relatively smaller size and single-tier system of government.

Early attempts to achieve paperless trading gains were also a reflection of broader efforts by these economies to boost their competitiveness in shipping and other trade-related services. In the case of Chinese Taipei (see Box 1), paperless trading capabilities are viewed as a key element in the future competitiveness of the export-oriented electronics manufacturing sector.

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<sup>1</sup> See [www.tradenet.com.sg](http://www.tradenet.com.sg)

**Box 1****Chinese Taipei: Paperless Trading Boosts International Competitiveness**

Chinese Taipei is an example of a medium-sized economy rapidly embracing paperless trading technology. Chinese Taipei has elected to participate in the paperless trading initiative, and is presently coordinating action among its agencies involved in cross-border trade.

Chinese Taipei boasts one of the most sophisticated information economies in the APEC region. The level of uptake of Enterprise Resource Planning (ERP) software and other productivity enhancing e-commerce applications throughout the business community is very high. Chinese Taipei also boasts a sophisticated information society - mobile phone ownership on the island stands at 80 per cent and 44 per cent of businesses use e-commerce.

Paperless trading services provided through TradeVan offer the local trading community an almost seamless connection with agencies involved in providing approvals for cross-border trade. Officials are now working to provide the remaining

paper-based document in cross-border trade - the import and export licences issued by the Board of Foreign Trade - in electronic format. These arrangements should be in place by 2003-04.

Officials see paperless trading technologies as an extension of domestic supply chain management projects that are designed to boost the competitiveness of the local manufacturing sector. Through officially sponsored projects such as TaiWeb (aimed at linking second tier suppliers and computer assembly firms such as Hewlett Packard and IBM), firms in Chinese Taipei are being encouraged to use e-commerce to integrate logistics services used by suppliers and assemblers.

Analysts believe the existence of these capacities boosts Chinese Taipei's competitiveness as a manufacturing location. The development of a regional air transport hub which puts local firms within 12 hours flying time of major customers in Europe and North America, further strengthens the competitiveness of firms.

**Barriers to uptake of paperless trading technologies**

It is widely recognised that larger APEC economies with more complex and disparate trade administration arrangements have historically found it more difficult than smaller island economies to offer trade-related services online. Larger developed APEC economies have struggled to provide complete paperless trading services due to the difficulties in coordinating the activities of various arms of government involved in the process of trade approvals. Some economies are also reluctant to abandon currently operating EDI systems.

The cost of implementing comprehensive strategies for delivering trade-related services online has acted as a major barrier to uptake of this technology in many developing economies. In addition, some member economies face major challenges in balancing the need to provide basic telecommunications infrastructure (telephones) with providing trade-related services which few companies can presently access. Other difficulties in implementing paperless trading technology more generally include:

- **Legal and authentication barriers:** the legal status of electronic transactions remains uncertain in many economies where domestic e-commerce legislation has not been passed. In addition, the lack of a standard method for positively establishing the identity of trading partners has limited the demand from the private sector for electronic trade-related services with global focus. This creates a

situation where players in cross-border trade may be unsure of the bona fides of potential trading partners identified on the Internet.

- **Differences in paperwork requirements:** the level of complexity in obtaining the clearances for goods traded throughout the APEC region is not uniform. Some economies require additional permits to be produced (such as import and export permits), phytosanitary clearances (in the case of agricultural commodities) or additional clearances from government for some specialised items (such as hazardous or controlled materials). Those additional layers of complexity add expense to cross-border trade. These differences also make the implementation of standardised electronic solutions for paperless trading across the region more difficult.
- **Standards:** there is considerable work underway by the United Nations and industry to develop business applications for the exchange of data over the Internet. Some developed economies such as Canada, the US, New Zealand, Australia and Japan have commenced using e-commerce technologies across government trade-related services (such as customs, quarantine and health certification). At present there is no standard or protocol used for this purpose across the various economies and this has created a situation where there is limited scope for individual traders to access the entire range of trade-related services through a single electronic window. In addition, different messaging codes and bar codes are used in various economies throughout the region, creating difficulties in achieving standardised descriptions of products.

Nevertheless, advances in technology will allow more firms from developing economies to participate in cross-border value chains that are increasingly dependent upon e-commerce in determining competitiveness. The possibility of developing APEC economies successfully leap-frogging older paperless trading technologies used in developed economies for the past 30 years is also greater than ever before. Recent advances in computer technology offer more powerful and affordable IT infrastructure. As well, the widespread adoption of United Nations Electronic Data Interchange for Administration, Commerce and Transport (UN EDIFACT) standards in the freight forwarding industry and government customs services, and the passage of domestic legislation to remove the ambiguity over the legal status of online transactions, facilitate the introduction of paperless trading by economies.

Developing economies will also avoid the costly investments made by developed economies in older legacy systems using EDI. Recent advances in software technology, particularly the agreement in May 2001 to adapt to an internationally recognised standard for the Internet-based XML protocol, mean that developing economies implementing programs to increase e-commerce usage in customs, quarantine and health certification will be more cost effective than would have been the case until recently. However, some APEC economies face considerable challenges in moving from an entirely paper-based system to a fully electronic environment by 2010.

It is also necessary for economies to realise that future success in the cross-border value chain is more complex than adopting e-commerce technology and creating a domestic environment conducive to online trade. To maximise the economic benefits, facilitating e-commerce should be combined with a package of domestic reforms covering competition policy, intellectual property rights, structural reform and improved corporate and financial governance.

## 2. The APEC Paperless Trading Initiative

The APEC paperless trading initiative now holds the prospect of efficiencies similar to those achieved by Singapore and Hong Kong, China accruing to other APEC member economies. Many observers expect the initiative to act as a catalyst for private sector traders to implement comprehensive re-engineering activities to ensure that their systems are integrated with those of banks, insurers, carriers and freight forwarders.

### Box 2

#### The Implications of the APEC Paperless Trading Initiative

APEC members agreed in 1999 to reduce or eliminate the requirement for paper documents needed for customs and other cross-border trade administration and documents and messages relevant to international sea, air and land transport, where possible, by 2005 for developed and 2010 for developing economies, or as soon as possible thereafter.

According to the United Nations Conference on Trade and Development, the average international transaction involves 27 to 30 different parties, 40 documents, 200 data elements (30 of which are repeated at least 30 times) and the re-keying of 60 to 70 per cent of data at least once. The submission of trade-related documents to government represents the final theoretical step towards the complete elimination of multiple paper documents and the re-keying of data.

The widespread adoption of UN EDIFACT standards by the logistics industry, the increasing overlap of data fields required in business-to-business (B2B) e-commerce transactions, and the higher use of EDIFACT consistent value-added networks offering access to all parties involved in cross-border transactions, suggests that greater opportunities exist for traders to file all documentation through a single entry window.

While integrating all the data required to process an international transaction is technically complex, the APEC paperless trading initiative ensures traders using value added networks or hubs achieve maximum efficiencies in removing cumbersome procedures and expensive re-keying tasks.

A number of developed economies are making progress towards implementing paperless trading systems ahead of time. Developing economies, such as Mexico, expect paperless services to be available to the trading community in 2004, well in advance of the APEC targets. This is largely due to extensive work carried out over the last four years to automate processes in the transport of manufactured components across the US-Mexico border.

It is now technically possible to eliminate entirely the requirement for paper-based documentation in the government trade approvals process. Most developed APEC member economies are publicly committed to the elimination of mandated requirements for paper-based documents. However, analysts believe there is a risk that some developing member economies may seek to reduce, rather than eliminate, mandated requirements for paper. Partial achievement of the initiative will considerably diminish the potential benefits of paperless trading throughout the region.

The initiative does not prevent economies from adopting a dual system of allowing the submission of trade-related documentation in electronic and paper-based form. This capacity could be important

where smaller enterprises in developing economies have limited access to the Internet. The initiative also recognises that economies may seek to retain certain paper-based trade documents for a limited number of strategic items.

### **Paperless trading will pervade intra-regional trade**

Paperless trading will deliver substantial gains to intra-APEC merchandise trade, rather than simply items supplied through the Internet. In this sense its impact will be more pervasive than e-commerce. To benefit from the initiative, firms need not be using the Internet to organise sales of their products online – that can still be done through traditional sales channels. The initiative has the potential to affect all the annual merchandise trade between APEC economies<sup>2</sup>.

Observers also expect the general trend towards higher levels of business-to-business e-commerce taking place throughout the region will support demand for paperless services as supply chains are increasingly integrated through the use of e-commerce technology.

Business will benefit from considerable efficiencies in intra-regional trade as processes are standardised and disparate systems integrated, rather than the present situation where the efficiencies are often only gained on one side of the transaction. For example, when goods are unloaded at their destination, cargo movements can be delayed as the mechanism for seamless data exchange between governments do not currently exist.

Under the initiative, the creation of an internationally interoperable, single entry window for all government trade-related services becomes possible for the first time.

### **China's Paperless Trading Goals**

China is an example of an economy that attaches great importance to the development of e-commerce. In order to achieve its goal of introducing paperless trading by 2010, China is developing a strategy to remove requirements for paper-based documents in cross-border trade. This involves providing e-government services to the trading community; passing supportive domestic legislation; formulating appropriate standards; establishing mediation mechanisms for resolving disputes arising from cross-border online transactions; and establishing international accreditation systems for the authentication of digital signatures. Other examples of the considerable progress China has made towards achieving its paperless trading goals include:

- In February 1996, the State Council officially established the Golden Gate Project, an information management project using IT and networking technology to streamline cross-border trade procedures. The objective of the project is to establish automated systems to manage electronic customs clearance, trade data processing and other functions in cross-border trade. By October 2001, the project had progressed to the point where the infrastructure for major information networks was operational and pilot projects commenced in some parts of China.

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<sup>2</sup> In the year 2000 intra-APEC merchandise trade reached US\$2.3 trillion, according to Department of Foreign Affairs and Trade figures. In practice, the initiative could ultimately affect more than this value of trade, since many aspects of paperless trading are likely to be applied to all trading partners.

- In February 2001, China, in cooperation with Australia, hosted the APEC High-Level Symposium on Electronic Commerce and Paperless Trading. More than 250 participants from government agencies, academia and the business sector discussed various topics relevant to the development of paperless trading. The symposium provided a productive exchange of views on progress in implementing paperless trading initiatives by member economies.
- In May 2001, the Ministry of Foreign Trade and Economic Cooperation's Department of International Electronic Commerce Administration was established with the aim of promoting paperless trading and the formulation of relevant domestic legislation and standards.

### How will economies achieve the objectives under the initiative?

The agreed modality for member economies reporting their progress under the initiative is through the Paperless Trading Individual Action Plan (PTIAP) process. PTIAPs establish a framework for the identification and elimination of institutional and regulatory requirements for paper documents in cross-border trade (see Box 3).

#### Box 3

#### Paperless Trading Individual Action Plans

APEC economies have agreed to develop PTIAPs based on the following guidelines:

Recognising the enormous potential of paperless trading to expand business opportunities, reduce costs, increase efficiency, improve the quality of life and facilitate the greater participation of small business in global commerce, each APEC economy will:

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>(a) Establish a timetable for reducing or eliminating paper documents related to international trade;</li> <li>(b) Provide a favourable environment, including the establishment of a sound legal and</li> </ul> | <ul style="list-style-type: none"> <li>(c) Ensure that measures to replace paper documents for cross-border trade administration with electronic equivalents are secure and interoperable with and between all parties involved in the international supply chain of goods and services;</li> <li>(d) Note the important role the business sector plays in developing and using e-commerce technology, applications, practices and services; and</li> <li>(e) Co-operate with and enhance the capability of other APEC economies to implement paperless trading systems.</li> </ul> |
|---|---|

regulatory framework, for the delivery of paperless trading systems;

Source: APEC E-Commerce Steering Group

Through the PTIAP process APEC economies will, on a voluntary basis, work towards the elimination of paper-based documentation from customs and quarantine declarations, government import and export licences, collection of taxes and levies on traded goods and services, health certificates, certificates of origin and standards certification, insurance certificates, letters of credit, bills of lading and manifests to regulatory authorities. Box 4 outlines some of the many agencies and documents typically required for cross-border trade. Some economies have more complex mandated paperwork requirements than those indicated.

The PTIAP process is designed to ensure that documents required by governments for trade approvals can be submitted in electronic form throughout the region by 2010.

The APEC Ministers Responsible for Trade Meeting in Shanghai in June 2001 encouraged the voluntary submission of PTIAPs based on a template agreed to by APEC members. These PTIAPs are to be presented to the APEC Ministers Responsible for Trade Meeting in June 2002 for further consideration.

#### Box 4

#### Paper Documents Required for International Trade

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Insurance Certificate	Payment Order
Certificate of Origin	Remittance Advice
Letter of Credit	Debit Advice
Bill of Lading	Customs Clearance
Waybill	Purchase Order
Manifest	Invoice
Declarations	Forwarding Instruction
Sanitary (health/hygiene) and Phytosanitary Certificates	Stowage Plan/Bay Plan
	Arrival Notice Advice

Further information on the documents required in cross-border trade are available at [www.acs.gov.au](http://www.acs.gov.au)

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### 3. The Building Blocks of Paperless Trading: Domestic e-Commerce Legislation, Authentication and Security

Uncertainty about the legal status of contracts entered into on the Internet, the security of online transactions and authentication issues are potential barriers to the development of e-commerce and paperless trading. A uniform legal framework is central to reducing the risk and uncertainty associated with e-commerce, and to promoting stability and growth in the sector. Work in this field is progressing on several fronts.

In 1998, the UN General Assembly adopted the United Nations Commission on International Trade Law (UNCITRAL) Model Law on Electronic Commerce<sup>3</sup>, a framework of international rules and principles which sets out a common means of modifying domestic laws to resolve legal uncertainties in the electronic environment.

The Model Law applies to any kind of information in the form of a data message used in the context of commercial activities. Its provisions focus on core areas in e-commerce, including requirements for writing and signatures in electronic transactions, and the admissibility of electronic transactions as evidence. The Model Law's provisions become law when they are enacted as domestic legislation in individual economies.

E-commerce laws based on the UNCITRAL Model Law and covering a range of issues are being introduced across the Asia-Pacific region. The Malaysian Digital Signature Bill (1997), the Singapore Electronic Transaction Act (1998) and the Japanese Law Concerning Electronic Signatures and Certification Services (2000) ensure the status of contracts concluded electronically, while the Federal US Electronic Commerce Model Law gives electronic records and signatures the same legal status as signed hard copy documents.

Other economies are moving to implement laws supporting the legal validity of online transactions and allowing government trade-related services to be accessed through electronic means. These new laws aim to establish a secure legal framework under which the expansion of services to the local trading community can proceed. Examples include the Thai Electronic Transaction Act and the Electronic Signature Act, which are expected to enter into force in 2002.

The Hague Conference on Private International Law is also working to create a consistent set of e-commerce rules, and has been developing a new international Convention on the jurisdiction, recognition and enforcement of judgments in civil and commercial matters since 1996. If adopted, the Convention would establish when parties may sue, and determine questions of civil jurisdiction and enforcement of judgments in commercial matters. The Convention's application to e-commerce is currently under debate.

#### Promoting secure transactions between business

Another key enabler for e-commerce is the establishment of a framework for acceptance of digital signatures, which allows for the identification of trading partners and assists in the non-repudiation of online transactions. Promoting secure environments and certifying the authenticity of parties to a transaction are essential to a climate of trust for the purchase and sale of products over the Internet.

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<sup>3</sup> For further information see [www.uncitral.org](http://www.uncitral.org)

The creation of increasingly secure and reliable electronic transmissions through public key infrastructure (PKI) provides governments a means of potentially allowing offshore lodgement of electronic trade documents. PKI is presently the only authentication technology which provides for the non-repudiation of online transactions. However, at present, some governments are concerned that different standards are applied in identifying parties issued with digital certificates across the world. Work underway within the World Customs Organisation (WCO) and APEC is designed to explore the potential for cross-border recognition of PKI.

In the meantime, a number of private sector PKI providers are offering digital certification solutions to business. These include services such as Identrus<sup>4</sup>, a PKI initiative established by the banking sector, which offers traders with an opportunity to establish online cross-border trading relationships ahead of any formal agreement to secure broader recognition of government issued digital certificates.

The widespread availability of encryption software capable of protecting the integrity of information communicated between businesses and authorities involved in regulating cross-border trade plays an important role in allaying concerns about the security of online transactions.

### **Secure communications between governments**

For customs and quarantine agencies, the move to electronic document transmission has previously raised concerns about the possibility of fraudulent declarations being made by traders to make tracking the origin of the document difficult. In many jurisdictions, prosecution of cases involving the submission of fraudulent documentation is not possible without laws recognising the legitimacy of electronic signatures. Some economies have been unable to implement meaningful e-commerce initiatives until supportive domestic legislation has been passed.

However, the long term success of cross-border paperless trading systems depends upon being able to clearly identify parties seeking to deal with governments electronically. Traders and governments must be confident that the digital certificates are authentic, and that minimum standards of identification and verification have been upheld in establishing identity.

Recent advances in digital certification and security suggest that government authorities with responsibilities for issuing import and export clearances will be able to deal directly with overseas traders and accept offshore lodgement of trade documentation.

The interoperability of paperless trading systems is enhanced by the secure transmission of important trade-related information between governments, such as sanitary and phytosanitary certificates (SANCR) required for the clearance of animal, agricultural and fish products. Due to the technology involved, SANCR provides more secure and timely communications between governments and offers considerable quarantine, public health, food safety and trade facilitation benefits. The system communicates health certificates on an agency to agency basis and reduces the possibility of tampering or falsification of data – which occurs under the paper regime. Since 1998, the Australian Quarantine and Inspection Service has issued annually some 38,000 electronic health certificates for meat exports to Japan to the Japanese Ministries of Health and Welfare and Agriculture, Forestry and Fisheries.

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<sup>4</sup> For further information see [www.identrus.com](http://www.identrus.com)

## 4. Private Sector Initiatives

The requirement for paper-based documentation has traditionally been built into the work practices of banks, insurers, logistics providers and port authorities involved in cross-border trade. In many cases, these institutional requirements have developed over hundreds of years of custom and tradition. These requirements are primarily related to the issue of ownership of goods while in transit.

There are many private sector activities currently underway to remove the need for paper in trade finance, logistics and port management agencies. These activities support the extension of the initiative to the trading community through offering access through relatively simple PC-based technology such as eXtensible Markup Language (XML).

### Box 5

#### An Electronic Bill of Lading

The Bill of Lading is an important document establishing the title of goods that has traditionally been presented in paper-based format. Recent developments have seen the widespread acceptance of an electronic Bill of Lading throughout the banking and logistics sector. This allows freight to be moved through customs

clearance processes and letters of credit to be settled on the basis of an electronic document. Analysts consider the broader use of electronic Bills of Lading as an important element in demonstrating the potential application of paperless trading technologies to re-engineer processes operating in the private sector.

Many private sector players in the process of cross-border trade have embarked upon extensive e-commerce strategies that incorporate paperless trading technologies. These services, in many cases, are limited in their effectiveness due to the inability of some governments to accept documents electronically. For example:

- **Trade-related financial services:** A number of banks and insurers are now offering their trade-related services through the Internet. This allows pre-qualified customers to draw down on letters of credit or arrange insurance without the need to lodge paper-based documents. The impact of this change is that traders are able to organise their trade finance in less time than previously was the case. An important recent breakthrough has been the acceptance by industry of electronic Bills of Lading (see Box 5), which allows the key elements of trade finance and insurance to move to an electronic format.
- **Freight forwarders, sea and air cargo carriers:** Many firms involved in the movement of freight across borders by sea, air and land are using e-commerce technology to provide their customers with details of shipping movements, scheduling and tariff rates. Cargo carriers are using e-commerce technology to advise port authorities of the location within cargo bays of hazardous goods. Some cargo carriers now sell excess cargo space directly to customers through the Internet; this reduces the cost of booking freight space. Throughout the freight forwarding industry firms are integrating their information technology systems with those of cargo carriers to ensure freight is delivered to end users in a timely fashion.

- **Port authorities:** A number of regional port authorities have begun to offer services to advise traders of the arrival of ships at port through Short Messaging Service (SMS) messages on mobile telephones. The technology is also used to streamline the provision of port services such as tug boats and re-provisioning of fuel and food. This provides the trading community with more accurate information about the arrival time of vessels, which in turn reduces delays in clearing and collecting cargo. These services allow vessels to move through ports quickly, thus reducing shipping time.
- **Private value-added networks:** Some private firms are moving to provide streamlined paperless trading services which provide the trading community with Single Entry Window access to government trade-related services (such as customs, quarantine and health clearance). These services are well established in Singapore, Chinese Taipei, Korea and Hong Kong, China. Similar services are also being developed across many developing economies in the APEC region. Other private sector document integration services, such as Bolero, have been established on a global basis. Other business-to-business platforms focus on offering hub-type access to a number of entities in the supply chain. These services hold the prospect of end-to-end solutions for paperless trade both within the APEC region and between APEC economies and the rest of the world.

## Box 6

### A Vision of Integrated Value-Added Networks in International Trade

A number of value-added networks provide traders with an electronic interface with governments. These services provide the capacity for firms to integrate their management systems with logistics firms, financiers and governments. These networks operate using EDI messaging protocols, and more recently, Internet-based protocols.

**TradeNet** – established by Singapore in 1988 and operated by Singapore Network Services (SNS), TradeNet allows local traders to file trade-related documents with the 23 separate agencies involved in international trade through a single entry window. This results in considerable time and cost savings. SNS is now offering traders value-added services which handle procurement, inventory tracking, freight management, cargo insurance and applications for an electronic certificate of origin. (See [www.tradenet.com.sg](http://www.tradenet.com.sg))

**TradeVan** – established by Chinese Taipei in 1990 as a customs clearance network to speed up the movement of inward and outward sea and air cargo. The system resulted in a reduction of processing time for customs clearances from

4 hours to 15 minutes, the online payment of duties and a facility to submit inquiries regarding the clearance processes. TradeVan processed 9 million customs declarations in 2000. (See [www.tradevan.com.tw](http://www.tradevan.com.tw))

**Trade Siam** – is a joint venture EDI gateway between government and non-government Thai agencies to create a value-added network for the trading community. The service enables trading partners to submit customs declarations, import certifications, export/import licences and electronic funds transfer in an EDI format. (See [www.tradesiam.com](http://www.tradesiam.com))

**Bolero** – is an example of a value-added Internet-based network focused on global, rather than national trading opportunities. Bolero is an initiative by the banking and logistics industries, supported by seven of the top ten banks in the world. For importers and exporters, the benefit is in providing support for customs processing. It is claimed that this system could reduce the processing time for trade documents from up to 25 days to just under 24 hours. (See [www.boleroitd.com](http://www.boleroitd.com))

A Pan-Asia E-commerce Alliance has been formed between several value-added networks to foster interoperability between systems in order to create end-to-end solutions in cross-border trade. These operators include SNS (Singapore), Trade Link (Hong Kong, China), TradeVan (Chinese Taipei) KNet (Korea) and the China International Electronic Commerce Center (China). Formal arrangements to extend interoperability to other member economies are likely to emerge in the near future. For example, value-added networks in Malaysia and Korea have formed an agreement to exchange electronic trade documentation.

Various national, global and company specific trading initiatives are supported by private sector standardisation initiatives across the manufacturing sector, such as RosettaNet<sup>5</sup> and Trade EDI (TEDI). The broader adoption of standards consistent with the requirements of UNEDIFACT will increase opportunities to utilise the benefits of interoperability in establishing new cross-border supply chains. Adopters of RosettaNet standards are among the largest multinational manufacturers operating in the APEC region. Many of these firms have extensive manufacturing operations in developing regional economies and expect that the ability of customs agencies to accept paperless trade documents will create new opportunities to streamline cross-border supply chains.

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<sup>5</sup> For further information see [www.rosettanet.org](http://www.rosettanet.org) and [www.ecom.jp](http://www.ecom.jp)

## 5. Progress Toward the Removal of Regulatory Requirements for Paper Documents in Cross-border Trade

Progress towards the removal of requirements for paper-based documents in cross-border trade and the introduction of online services varies throughout the APEC region. Economies successfully eliminating the requirements for paper-based documents tend to adopt a whole-of-government approach to identifying and coordinating activities among agencies responsible for cross-border trade.

**Chart 1**  
Progress Towards Removal of Mandated Paper-based Documents

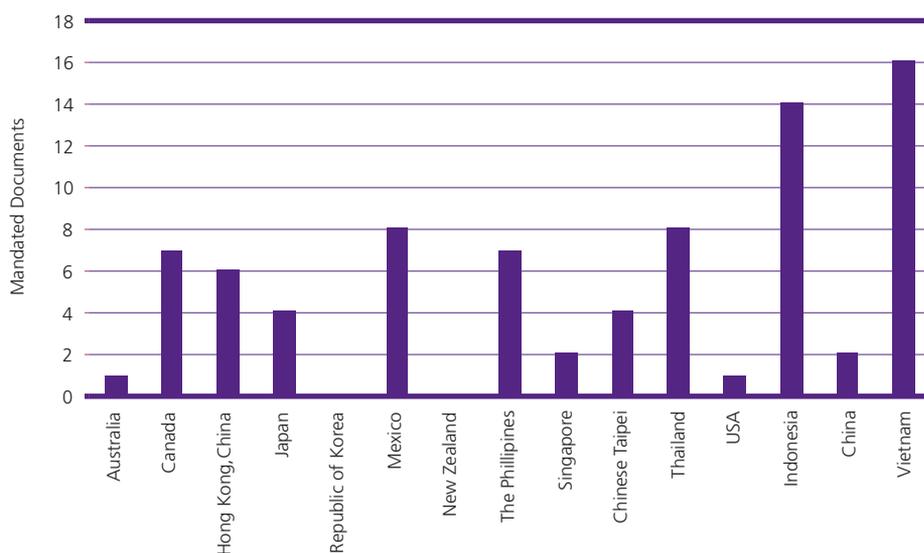


Chart 1 shows the progress APEC economies have made in reducing requirements for paper-based documents in cross-border trade.<sup>6</sup> Some developing economies have experienced delays in implementing reforms due to uncertainty over the validity of online contracts (see Box 7). The efforts of other developing economies have suffered from domestic legislation mandating the physical inspection of all cargo by customs authorities.

Despite the difficulties, most developing economies in the APEC region are expected to implement paperless trading systems before 2010. Some economies face the prospect of moving from an entirely paper-based system for obtaining trade approvals, with low or non-existent use of information and communication technology by trade officials. This will require a major investment in skills, computer equipment and software integration.

<sup>6</sup> The chart above represents an index of paper-based documents required for international trade among selected APEC member economies. The source of the index is an APEC Transport Working Group survey last updated in 1999.

### Box 7

#### Thai Customs Service Online by 2002

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The new Thai government has instructed its customs service to allow the trading community to access the Trade Siam EDI gateway through the Internet as a matter of high priority. At present these services can only be accessed by a limited number of traders with access to the EDI gateway.

Allowing broader access from the trading community to these services through an Internet interface presents a number of challenges to the customs service. Considerable investment in

training, hardware and programming needs to be made before paperless trading becomes a reality in Thailand. In addition, the absence of domestic legislation supporting e-commerce creates uncertainty about the legal status of transactions initiated through the system.

Despite the difficulties, analysts expect that these services will be available to the broader trading community by the end of 2002.

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Observers expect that the process of removing additional barriers to paperless trading through the PTIAP process will allow broader application of the paperless trading systems already in use throughout the region. In particular, the possibility of end-to-end paperless trading solutions for cross-border trade will emerge in most APEC economies.

By 2005 the paperless trading systems in operation throughout developed APEC economies should have a degree of interoperability. It is estimated that UN EDIFACT data elements required for trade documents have an 85 per cent commonality with those required by the logistics sector. This commonality enhances the prospects for interoperability among B2B platforms and systems operated by governments to facilitate the submission of trade documents.

#### **Government procurement online: a catalyst for the uptake of paperless trading technologies**

The broader trend towards the adoption of paperless trading is supported by attempts to move government procurement processes to a more transparent Internet-based format. This can also promote the use of less costly paperless trading technology by business, particularly SMEs.

The experience of provincial governments in Canada requiring suppliers to deal with them through the Internet when tendering for government business has left a legacy of large numbers of smaller businesses with the capability to deal with government electronically. Using the same technology to deal with government on tendering matters, firms can also access single entry window services for dealing with trade-related documentation.

**Box 8****Hong Kong, China Electronic Tendering System**

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The government of Hong Kong, China has introduced an Internet-based electronic tendering system to streamline government procurement processes. By August 2001 some 30 per cent of government suppliers had signed up to use the system and 12 per cent of tenders were received

electronically. The system facilitates the dissemination and submission of tender documents through an encrypted network. For an annual subscription of approximately US\$100 suppliers are provided with a secure digital certificate to access systems.

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**Impact on larger firms**

Larger firms adopting e-commerce strategies are expected to be among the primary beneficiaries of moves to exchange documentation electronically between the finance and logistics sectors and government agencies involved in cross-border trade. For these businesses, efficiencies are maximised by adopting ERP software. At present, the use of ERP software by enterprises is very low. This reduces the potential benefits of the initiative. As governments reduce the requirement for paper-based documents in cross-border trade, it appears that some firms will have a limited capacity to take full advantage of the resulting opportunities to streamline operations.

The case for removing the regulatory and institutional requirements for paper-based documents in cross-border trade would be strengthened by further case study examples demonstrating the benefit of these technologies on an economy-wide and individual firm level. In the case of Chinese Taipei, demonstration projects throughout the electronic components industry have shown some firms can improve their profitability by several percentage points, as well as creating more responsive production networks.

Further demonstration projects in the private sector, and pilot projects in the public sector would reinforce the value to government and business leaders of ensuring paperless systems are adopted throughout the region.

## 6. The Cost of Paperwork in Cross-border Trade

The cost of providing paper-based documents for cross-border trade is a major expense to traders. Complex documentation can also be intimidating and discourages many small firms from participating in cross-border trade. Removing the requirement to produce paper-based documents for trade in the APEC region is expected to lead to considerable economy-wide savings, direct savings to traders in the form of lower compliance costs and a number of indirect, and less easily definable savings, such as the ability to move goods faster, the opportunity to participate in agile production networks and lower inventory costs.

### What magnitude of savings to business are realistic?

A study by the Australian Productivity Commission in 1996 found that the cost to business of border delays and from preparing and handling documentation to move goods across borders adds several percentage points to the landed price of goods. Other estimates, such as those of the US government suggest that the total cost of paperwork and procedures could amount to 10-15 per cent of the value of goods traded (UNCTAD 1998).

Estimates of the potential savings from paperless trading vary according to the type of goods traded and the relative efficiency of logistical services of the economies involved in the transaction. Based on calculations from users of early paperless trading systems, savings of between 1.5 to 15 per cent of the landed cost of an imported item are possible (see Box 9 below).

When paperless trading technologies are fully extended to all intra-APEC merchandise trade, the cost savings are likely to be substantial. For example, a three per cent average reduction in the cost of imported items (which appears to be a conservative estimate) to intra-APEC trade would involve gross savings in excess of US\$60 billion when extended to total intra-APEC merchandise trade. Achievement of this figure is dependent upon the uptake of value-added network technologies throughout the private sector. Analysts estimate these network integration tasks involve considerable fixed costs and turnover-based costs approaching 25 per cent of total savings from paperless trading systems.

### Box 9

#### Potential Paperless Trading Savings

Coal	(bulk by sea)	1.5 per cent
Rice	(bulk by sea)	2.2 per cent
Machine Parts	(containerised by sea)	3.1 per cent
Sugar	(bagged by sea)	4.4 per cent
Fresh Asparagus	(palletised by air)	15 per cent

Source: Department of Foreign Affairs and Trade<sup>7</sup>

<sup>7</sup> Based on Australian Department of Foreign Affairs and Trade estimates calculated on the basis of discussions with traders using current paperless trading systems with limited capacity to implement end-to-end savings. These figures are conservative and are likely to be revised upwards when end-to-end solutions become available throughout the region. See the technical note for an explanation.

These calculations suggest that savings are highest for smaller shipments rather than bulk shipments. This is due to the high fixed cost of completing paperwork requirements manually. These costs are estimated by traders at between US\$75-US\$125 per transaction, irrespective of the size of the transaction. Savings are also projected to be higher for perishable food items due to the need for additional health certification or phytosanitary certification. Savings for smaller quantities of perishable items are of such magnitude as to create new areas of cross-border competitiveness for some producers of selected food items.

Apart from the direct savings accruing to traders, there are also savings to logistics and finance providers involved in cross-border trade that will ultimately affect cross-border transaction costs.

- Banks using current versions of paperless trading systems report a saving of approximately US\$95 in the cost of opening a letter of credit. This is due to reduced keying errors that create delays in the settlement of cross-border trades.
- Logistics firms using paperless trading systems report savings of up to 40 per cent in the cost of amending paperwork.

Savings achieved by current paperless trading systems relate mostly to timeliness – as goods move faster, working capital and financing costs decline – and from freight changes as systems are integrated and errors reduced (Box 10). The labour-related savings and lower communications and administration costs appear to be less significant.

## Box 10

### Case Study Example: Paperless Trading in the Sugar Industry

Communication Savings	7.5% or US\$0.60 per ton	Accruing through the reduced need to use couriers to transmit hard copies of trade documents such as Bills of Lading and a reduced need to use fax and telex services for relaying variations to trade documents.
Handling Time	22.3% or US\$1.78 per ton	Accruing through higher productivity of staff formerly engaged in handling paper-based documents.
Discrepancy Savings	6.8% or US\$0.54 per ton	Accruing through the elimination of keying errors on trade documentation that can result in expensive delays. This achieves greater time savings.
Faster Payments	17.9% or US\$1.43 per ton	Faster settlement of Letters of Credit (through faster presentation of receivables) resulting in reduced trade finance costs and lower working capital expenses. Average collection time can be improved by 7 days.
Shipping Savings	21.3% or US\$1.70 per ton	Resulting from lower freight costs accruing from systems integration savings which leads to less work amending orders and fewer errors.
Fixed Cost Savings	24.2% or US\$1.94 per ton	Due to reduced re-keying of documents, greater utilisation of current information technologies and lower administrative charges.
Annual Net Savings	US\$8 per ton	

Source: Bolero

On the basis of the figures provided above, a shipment of sugar organised through a private paperless trading system resulted in gross savings of US\$8 per ton (or 4.4% of the value of goods traded)<sup>8</sup>. Analysts expect that higher levels of data commonality, system integration and cross-border exchange of trade-related information by governments will result in savings of up to 40 per cent more than seen in current paperless trading systems.

### Firms' motivation for using paperless trading systems

The motivation of firms using current versions of paperless trading technology appear to have more to do with the indirect efficiencies the system affords, rather than direct cash savings from lower labour requirements. As can be seen from the comments of traders using paperless trading systems (see Box 11) time savings and competitiveness are often more important than labour cost savings.

#### Box 11

### Comments on Paperless Trading from the Business Community

*Our staff handling the movement of goods through the port can now handle an average of 5 times more shipments per operator by using electronic document management systems.*

Electronics Exporter, Chinese Taipei

*The major benefit of using paperless systems is in meeting customer expectations to use e-commerce. We are now able to trade with larger supermarket chains because we have the capacity to receive and fulfil orders electronically. The paper handling savings are incidental.*

Fruit and Vegetable Grower Cooperative,  
Australia

*Obtaining all the quarantine, customs and health approvals electronically allows us to invoice our customers faster. This means that we get paid faster and pay less for insurance and trade finance. That saves a lot of money.*

Major Dairy Exporter, South East Asia

*Up to 30 per cent of our transactions are subject to late payment as sometimes the bank or the buyer will reject payment on a letter of credit because a full stop is out of place in our paperwork. Using electronic paper handling systems virtually eliminates the possibility of rejection, helping our cash flow position and lowering bank charges.*

Auto Components Manufacturer, Thailand

*The ability to quickly move our computer components to buyers across East Asia and North America through paperless trading gives us a major competitive edge in participating in just-in-time supply chains. Without our paperless system, there is a chance our buyers will look for suppliers located closer to their assembly plants.*

Contract IT Manufacturer, Singapore

*The integration of our supply chain management system, procurement and design functions creates new opportunities to identify potential suppliers across the APEC region.*

Textile Manufacturer, Hong Kong, China

<sup>8</sup> These figures are derived from an annualised average of savings on a ton of sugar valued at US\$ 181.72. Estimates of system integration costs average around US\$2 or 25 per cent of the total savings from using electronic systems.

## Savings to government

There are significant savings to governments as a result of adopting paperless trading systems. Early examples from customs agencies across the region which have successfully implemented paperless systems suggest that labour requirements for terminal operators previously involved in re-keying data fields for trade documentation are reduced considerably. The technology associated with paperless trading also assists customs authorities to improve risk management by better targeting cargoes requiring physical inspection. This allows customs agencies to focus their limited inspection resources on suspicious cargo.

Paperless trading systems also allow customs authorities to dramatically reduce the time taken to clear and release cargo. For example:

- In Japan, customs officials expect the average time taken to clear cargo will fall from 400 minutes to 15 minutes through using paperless technologies;
- In Chinese Taipei, clearance times have declined from 330 minutes to 90 minutes;
- In Mexico, clearance times have fallen from 730 minutes to 65 minutes.

Some customs services are using paperless technologies to transfer details from the cargo manifest of vessels at sea to customs agencies. In Singapore, cargo can be cleared up to 8 hours before a ship arrives in port, allowing the cargo to be transferred directly to a truck and released. Pre-clearing of cargo prior to arrival also allows customs and quarantine agencies to manage their inspection resources more efficiently.

These faster processing times and more efficient handling procedures suggest fewer government resources will be required to bond, store and inspect inwards cargoes. Some customs authorities in member economies have reduced clearance times to a few minutes. Analysts recognise that this reduction in resources for customs authorities could diminish support for the proposal in some developing economies. In some instances, staff formerly involved in manual processing have been successfully retrained to work in audit and compliance roles.

## 7. Implications for Regional Trade

The initiative is likely to result in lower transaction costs for cross-border trade conducted throughout the APEC region. Reduction in transaction costs are primarily brought about by:

- lower charges for freight movement throughout the region as administrative charges involved in freight management are reduced;
- cheaper trade finance and insurance changes due to faster merchandise transit times and the elimination of keying errors causing settlement failure;
- lower administrative costs for firms managing the paperwork process in cross-border trade.

### Smaller shipments more cost effective

These cost savings suggest that the global competitiveness of some economies could be enhanced by meeting commitments under the initiative earlier than previously agreed. This could lead to emerging complementarities in intra-regional trade, particularly where high transaction costs make decisions to purchase goods across borders uncompetitive. For example, growers involved in the fresh vegetable, fruit and speciality flower trade throughout the region expect that smaller shipments of fresh produce will become more cost effective for buyers as transaction costs fall through the use of paperless systems.

Component manufacturers in the electronics, automotive, plastics and light manufacturing sector expect that their ability to compete in cross-border supply chains involving smaller production runs will be greatly enhanced through the initiative. In some situations, the requirement to buy large volumes of components leads to intolerably high inventory costs for some firms, particularly those involved in build-to-order production chains. Reducing the size of shipments can thus lead to considerable efficiencies for buyers through lower inventory and storage costs.

### Impact on SMEs

The experience of Singapore and Hong Kong, China in implementing paperless trading technologies demonstrates the potential of the technology to internationalise the operations of smaller firms. The use of paperless trading by SMEs in Hong Kong, China has been boosted by the provision of a single entry window which allows smaller firms to access paperless trading services through a standard PC and relatively simple off-the-shelf software. In Singapore, the number of SMEs accessing paperless trading services has grown by 28 per cent per annum since 1997, a reflection of the value small local traders see in the ability of TradeNet to confer competitive strength.

A number of private value-added networks providing single entry window access into government, logistic and banking services online are creating services directed at removing the uncertainty involved in cross-border trade. Some networks offer services designed to assist SMEs to assess the credit-worthiness of potential trading partners. Others offer mediation services to assist in instances where costly cross-border legal action would have been the only way to resolve trade disputes. The result of these initiatives is a SME sector with increasing capabilities to internationalise their operations at a lower cost.

**Box 12****Comments from Business**

*We expect the APEC paperless trading initiative will help streamline our supply chains throughout the region and cut down the time taken to move goods in and out of developing APEC economies. This will lead us to source more of our supplies from within the region, particularly Malaysia, Thailand, Indonesia and the Philippines.*

Multinational PC Assembler, Singapore

*A single entry window for obtaining approvals for international trade will create substantial efficiencies in shipping smaller consignments of products to a wider range of markets.*

Micro-exporter, Processed Foods, Australia

*Approximately 40 per cent of international transactions fail to settle on time. This is more likely to be the case with customers placing orders over the Internet. Paperless trading will reduce the scope for customers to withhold payment and cause us expensive delays and penalties as well as additional costs associated with finding a new customer.*

Animal Protein Trader, Korea

**Seamless supply chain management for larger firms**

The development of systems integrated into ERP software designed to create end-to-end solutions between economies for paperless trading is the next logical step in the evolution of the initiative. Analysts expect this will create major efficiencies for larger enterprises involved in cross-border supply chains across the APEC region. Large multinational manufacturing enterprises, which account for as much as 30 per cent of cross-border trade, are expected to source an increasing level of their supplies from within the region as trade facilitation gains are realised.

Higher levels of cross-border business-to-business e-commerce transactions are also expected as a result of the initiative. Some analysts believe that up to 70 per cent of total global online trade is conducted within the borders of the US and relatively little is traded online within the APEC region outside the developed economies.

This low level of cross-border B2B uptake is partly a result of the historical inability of B2B platforms to arrange the fulfilment of orders taken from foreign buyers due to difficulties with establishing a standard format for data presentation to governments.<sup>9</sup>

<sup>9</sup> A discussion of trends in business-to-business E-commerce in the Asia Pacific region is at page 55 of *Australia's Trade: Influences into the New Millennium* at [www.dfat.gov.au/reports/newmillennium](http://www.dfat.gov.au/reports/newmillennium).

Many larger firms are looking to paperless trading to help streamline their cross-border supply chains in conjunction with broader productivity enhancing software to create efficiencies in internal operations. In sectors of the regional economy that are already traded extensively across borders, such as chemicals, automotive and electronic components, minerals, fuel and agricultural commodities, the impact of the initiative is expected to be greatest. For example:

- Western Mining Corporation (Australia) sells mineral products such as nickel and cobalt through an Internet-based portal. The company expects that all export sales will be conducted online in the future. The firm is seeking to improve efficiencies in sales of minerals products to export customers by introducing paperless technologies to streamline order taking, inventory control, production, fulfilment, trade paperwork and billing.
- The Japan Automotive Network Exchange is a procurement portal which links suppliers and assemblers across the Japanese automotive industry. The exchange is looking to link its procurement system with automotive exchanges serving suppliers in North America, Australia and Europe in order to maximise the potential supplier base available to Japanese manufacturers operating in various parts of the region. Managing fulfilment of orders initiated online is presently a major challenge for suppliers using these services.

### **Developing economies benefit through lower shipping costs**

Paperless trading is likely to lead to greater efficiencies in developing economies than developed economies because of higher freight charges paid in developing markets. For example, UNCTAD estimates the total freight costs as a percentage of the value of imports on a cost-including-freight (CIF) basis in developed economies in 1996 was 4.2 per cent. The figure for developing Asian economies was 8 per cent, suggesting considerable potential exists for e-commerce to streamline processes involved in shipping goods across borders.

The ultimate impact of the initiative should be higher levels of intra-regional business-to-business e-commerce as barriers to the transfer of data digitally at domestic borders are reduced.

The savings in intra-regional transactions suggest that ultimately the pattern of trade between economies could be affected. There is a possibility that some trade will move to economies where complementarities are high and trade facilitation gains through e-commerce technology are maximised.

## 8. Impact on Competitiveness and Innovation

Internet-based paperless trading technologies used throughout the global manufacturing sector have already demonstrated their effectiveness as supply chain management tools. The global manufacturing sector uses e-commerce technology to more effectively manage cross-border supply chains. The success of these arrangements relies on manufacturers being able to rely upon their suppliers located in distant jurisdictions to deliver components to the production line on time. Many manufacturing firms have been able to achieve substantial inventory savings on the basis of creating just-in-time supply chains organised through e-commerce technology.

An emerging area of competitiveness for contract manufacturers located in developing economies is to participate in these just-in-time manufacturing supply chains. This requires them to reliably replenish inventory supplies at overseas assembly plants in a timely fashion. However, it also makes it more important for governments of developing member economies to provide trade-related services online.

This is particularly the case in automotive and computer industries where contract manufacturing and just-in-time supply chains are well established.

### Increased agility

The increased agility afforded to firms using paperless trading provides opportunities to participate in just-in-time supply chains and, ultimately, provide higher value added engineering services for new product design. In some cases this is leading to greater opportunities for manufacturers in developing APEC economies to participate in the supply chains of larger regional manufacturing firms.

Examples include:

- Hewlett Packard, (United States) a multinational computer assembler which produces electrical equipment across the APEC region, expect the APEC paperless trading initiative will result in more assembly tasks being contracted out to suppliers in developing member economies as bottlenecks in customs clearance are eliminated through the application of paperless trading technology.
- Li and Fung, (Hong Kong, China) integrates spinners, dyers, knitters, weavers, finishers, sewers and printers, as well as wholesalers across the East Asian region. The firm is able to create agile production networks between disparate production sites through the integration of ERP software between suppliers. This has also allowed an increased level of collaboration and participation in design of Li and Fung's products in China and Thailand.

Analysts believe the ability for developing economies to benefit from this increased cross-border competitiveness is directly related to progress made to automate processes within customs agencies, an area which has been seen in some economies as a factor acting against the smooth movement of goods in and out of economies.

Throughout the global manufacturing sector, the ability to create agile production chains through the use of e-commerce technology is seen as a key facet in maintaining competitiveness. The use of Internet-based paperless trading technology is also boosting the competitiveness of contract manufacturers in developing economies (see Box 13).

Contract manufacturing is well established in the automotive and electronic component industries,

### Box 13

## Opportunities for Innovation in China

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Inventec is one of Chinese Taipei's largest producers of notebook computers. The firm has implemented a comprehensive e-commerce strategy covering factory automation, enterprise resource planning, supply chain management and knowledge management. One of the key elements of Inventec's strategy is to improve coordination of processes taking place between customers and suppliers. This has created internal efficiencies in the form of reduced inventories, faster order cycle times and better customer responsiveness, while at the same time increasing product orders and profitability.

As part of its strategy to improve links between suppliers, Inventec has integrated information systems with 235 suppliers and 25 forwarders involved in the supply chain. New supplier relationship management technologies have allowed Inventec to increase collaboration with existing and potential suppliers in the new product design process. This allows contract manufacturers located in China to gain approval to manufacture components for Inventec's supply chain more quickly through electronic transfer of product design specifications and faster qualification as an accredited supplier.

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where large manufacturers have well established means for coordination between a disparate supplier base. In many industries throughout the APEC region, these contract relationships entail a greater level of collaboration in new product design and innovation than would have been the case previously.

A major feature of modern production processes is the willingness of first tier manufacturers to share information on inventory levels, design specifications and other sensitive information to second and third tier suppliers. These collaborative supplier relationships are well established throughout many APEC economies. The ability of firms to participate in these collaborative arrangements will increasingly depend on the availability of efficient cross-border paperless trading services. This is particularly the case for contract manufacturers from developing economies that derive competitive strength from the ability to take orders and fulfil them electronically.

## 9. Towards a Vision of Seamless Paperless Trading in APEC

The APEC paperless trading initiative provides the potential for domestic efficiencies in supply chain management brought about by e-commerce to be extended to the management of cross-border supply chains. Analysts believe that seamless cross-border paperless trading systems will emerge on a region wide basis in the period 2003-2010. The speed with which these paperless systems will establish themselves depends upon the following factors:

- **Uptake of B2B technology across the region:** such as portals to manage sales of commodities, manufactured products and value-added networks. These portals will require governments to accept trade documentation lodged electronically before the ability to streamline cross-border delivery is possible. When cross-border transfers of trade documentation is available, these business-to-business portals are likely to become a mainstream tool in cross-border supply chains.
- **Improvements in telecommunications infrastructure:** such as high speed optic fibre networks, lower cost Internet services and broader access to the Internet by businesses support greater demand for paperless trading services throughout the developed economies. Improvements in Internet access and infrastructure in developing economies, particularly for SMEs, are required to ensure that all participants in cross-border trade have equal opportunity to benefit from the initiative.
- **Strong support from governments:** such as through coordinating the removal of mandated requirements for paper-based documents, passing domestic legislation to support electronic transactions, and in some cases, penalising traders that seek to lodge documents in paper form.
- **Advances in standards:** such as the convergence of data requirements for cross-border trade through the UN EDIFACT standard in the banking and logistics industry. This makes the creation of a single entry window based on Internet protocols a reality. These standards now need to be applied to the government trade documentation systems of APEC economies.
- **The demonstrated benefits of paperless technologies:** pilot projects that highlight the benefits to firms and economies from paperless trading are expected to increase uptake of productivity enhancing enterprise software. Demonstration projects involving the developing, rather than developed economies, would assist to lift the uptake of ERP software in these economies.

The process of developing and coordinating progress in Paperless Trading Individual Action Plans is likely to become a higher priority for APEC economies over 2002-03. The APEC paperless trading work agenda will form a major part of the process of informing member economies of successful approaches to achieving the paperless trading initiative's goals. The process will help APEC member economies to share experiences and assist developing economies to access emerging areas of expertise on paperless trade among member economies.

There is a risk of a divide emerging in the region in which developed economies that embrace paperless trading begin to trade with each other more intensively as electronic transactions become seamless. This would affect negatively the interests of developing economies that may have difficulties introducing paperless trading systems. This would also impose higher costs to business in developing economies and make them less able to participate in the global economy.

## Technical Note

### Schedule of savings by product estimated from use of paperless systems

Item	Volume	Value (CIF)	Saving Estimate
Coal – bulk by sea	10,000 tons	US\$520,000	US\$7,800 or 1.5 per cent
Rice – bulk by sea	1,500 tons	US\$810,000	US\$17,820 or 2.2 per cent
Machine Parts – by sea	20 foot container	US\$175,000	US\$5,425 or 3.1 per cent
Sugar – bagged by sea	1,500 tons	US\$273,000	US\$12,012 or 4.4 per cent
Fresh Asparagus – by air	45 kg	US\$1,370	US\$206 or 15 per cent

Based on calculations derived from interviews with traders using existing versions of paperless trading systems. Value of products includes typical freight charges (based on shipping costs over 5,000 km), insurance and trade finance charges.

## Glossary

Data Commonality	Increased levels of commonality between data elements required by customs, quarantine and health agencies, along with the financial and logistics industries, mean that a single electronic form that satisfies the requirements of all parties involved in regulation of cross-border trade can be filled in by a trader. Where data commonality is high, a single form can be forwarded into the information systems of a number of separate organisations without the need for re-keying.
EDI	Electronic Data Interchange (EDI) is computer-to-computer communication of business messages in standard codes and formats. These systems allow the direct, automatic and instantaneous input of messages to transaction processing machines without the need for re-keying. EDI systems, used extensively for contracts, invoices and ordering between component suppliers and manufacturers, are being extensively integrated within e-commerce models converging around the Internet.
ERP	Enterprise Resource Planning (ERP) software is typically used by larger businesses to manage production scheduling, inventories, warehousing, supply chain management, knowledge management, accounting and financial management functions. Many ERP solutions are based on Internet protocols. However, many ERP packages in use throughout the APEC region are legacy EDI systems which offer a greater degree of enterprise-specific functionality, without the interconnectivity afforded by newer Internet-based versions of the software.
Single Entry Window	A single entry window (SEW) is an Internet-based means for entering data into a single electronic form that is routed to the information systems of customs, quarantine and health authorities. In many instances, single entry windows comprise sophisticated messaging gateways capable of converting inputs through Internet-based systems to older EDI systems operated by government agencies.
XML	eXtensible Markup Language (XML) is a markup language for describing and structuring data that has become an Internet-based protocol gaining acceptance in the global logistics business. Work by the WCO to develop a Customs Data Model and 'Core Components' for a global XML Common Business Library contributes to interoperability between systems operated by industry and government.

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