

THE PROGRESS OF PAPERLESS TRADE IN ASIA AND THE PACIFIC: ENABLING INTERNATIONAL SUPPLY CHAIN INTEGRATION

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The Progress of Paperless Trade in Asia and the Pacific: Enabling International Supply Chain Integration

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This working paper discusses on how to facilitate integration of international supply chain using paperless trade in the Asia-Pacific Region. The paper defines paperless trade and describes how paperless trade can improve efficiency of international supply chain. Based on the review of paperless trade initiatives and assessment of paperless trade readiness of economies in the Asia-Pacific Region, the paper identifies critical challenges in facilitating cross-border paperless trade and elaborates on how those challenges can be lessened.

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Contents

Abstract	iv
1. Introduction	1
2. Description of Paperless Trade	3
2.1 Paperless Trade and the Efficiency of International Supply Chains	3
2.2 Three Levels of Paperless Trade Initiatives: National, Bilateral, and Subregional	6
3. Review of Current Status	9
3.1 Status of “Paper-less” Trade	9
3.2 Assessment of Paperless Trade Implementation in the Asia and the Pacific	12
4. Five Critical Challenges in Cross-Border Paperless Trade	13
4.1 Challenge 1: Use of Common International Standards	14
4.2 Challenge 2: Harmonization of Different Legal Frameworks	14
4.3 Challenge 3: Capacity Gaps among the Parties	15
4.4 Challenge 4: Cooperation between the Public and Private Sectors	15
4.5 Challenge 5: Lack of Coordination Mechanisms for Cross-Border Data Exchange	16
5. Cross-Border Paperless Trade Implementation	16
5.1 Pan Asian e-Commerce Alliance	16
5.2 Electronic Certificate of Origin between the Republic of Korea and Taipei,China	20
6. Policy Discussions	23
7. Possible Solutions	24
8. Conclusion	25
References	26
ADB Working Paper Series on Regional Economic Integration	27
Figures	
1. UN-CEFACT Buy-Ship-Pay Model	1
2. Three Types of Flows in an International Supply Chain	2
3. Regional Mix of BMW Group Purchase Volume in 2012	4
4. List of Documents Involved in Exporting Thai Jasmine Rice	9
5. Availability of Electronic Customs	12
6. Development of Single Window Systems	13
7. Engagement in Cross-Border Paperless Trade Documents or Data Exchanges	13
8. Operational Model of PAA Secure Transaction Services	18
9. Republic of Korea-Taipei,China e-C/O Exchange Scenario	21
Tables	
1. National, Bilateral, and Subregional Paperless Trade Initiatives	7
2. Paperless Trade Provisions in FTAs	8
3. Number of Documents Required to Import, 2006 and 2014	10

Abstract

This paper discusses on how to facilitate paperless trade for international supply chain integration in the Asia and Pacific region. The paper defines paperless trade and describes how paperless trade can improve efficiency of international supply chain, including its economic benefits. Based on the review of paperless trade initiatives and assessment of paperless trade readiness of economies in the Asia and Pacific region, the paper identifies five critical challenges in facilitating cross-border paperless trade: use of common international standards, harmonization of different legal frameworks, capacity gaps among the parties, cooperation between the public and private sectors, and lack of coordination mechanisms for cross-border data exchanges. For each challenge, the paper describes its nature and possible measures for alleviating it. In its annexes, the paper also provides implementation cases of cross-border paperless trade in the Asia and Pacific region, namely Pan Asian e-Commerce Alliance (PAA) and electronic Certificate of Origin between the Republic of Korea and Taipei,China.

Keywords: Paperless trade, international supply chain integration, trade facilitation

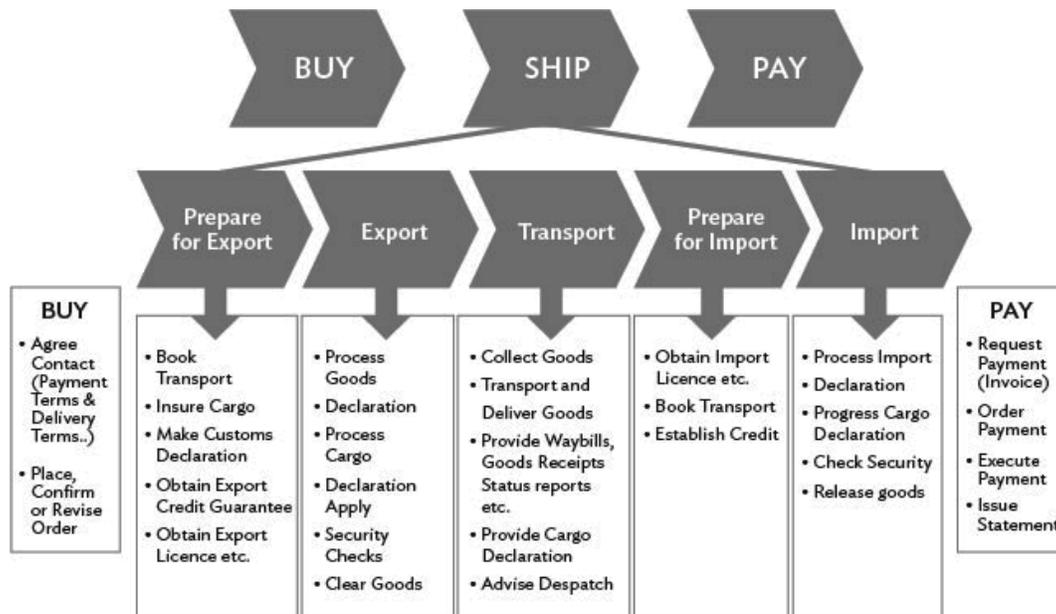
JEL Classification: F15, F19

1. Introduction

A supply chain is an interaction among relevant parties, either people or organizations, engaging in a series of activities, with the exchange of information and goods among them, to achieve an intended goal. With globalization and ever-changing business environments, supply chains have also evolved into more complicated arrangements, resulting in the involvement of more processes and engagement of more parties. To improve efficiency, businesses can transform a domestic supply chain into an international supply chain operating across borders.

In the United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) Buy-Ship-Pay Model, the operation of an international supply chain is represented by three major distinct steps of “buy,” “ship,” and “pay.” The model specifies the processes and players involved in each sub-stage of each step (Figure 1).

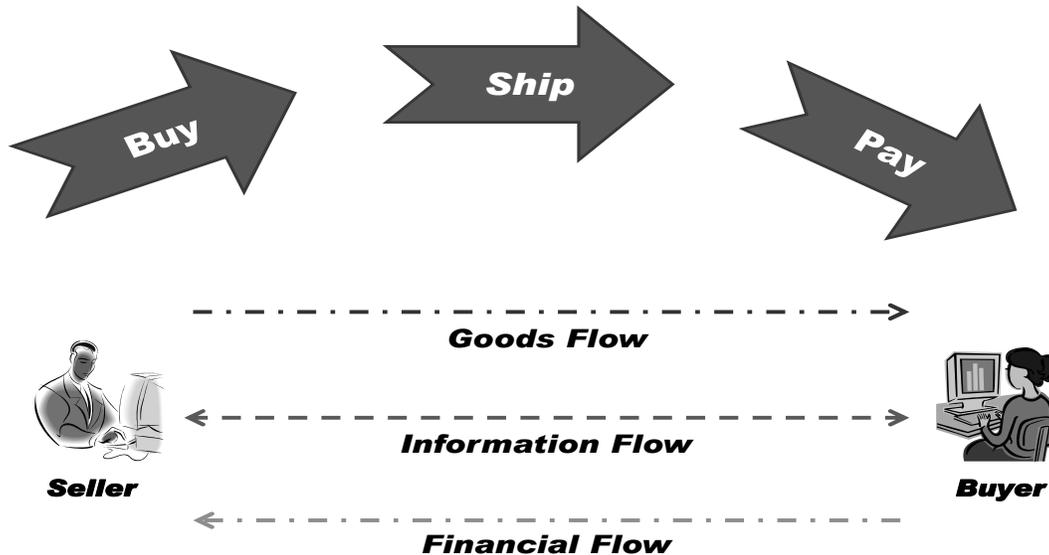
Figure 1: UN-CEFACT Buy-Ship-Pay Model



Source: <http://tfig.unece.org/contents/buy-ship-pay-model.htm>

In connection with activities conducted through the processes of an international supply chain, there are three types of flows: (i) goods, (ii) information, and (iii) finance (Figure 2). Goods are exchanged between buyers and sellers, whether they are raw materials or final products; usually, the flow of goods is unidirectional, from seller to buyer. Financial flows involve the completion of payment, which is also usually unidirectional, from buyer to seller. However, the flow of information is more reciprocal among the players in an international supply chain, involving the exchange of information not only between buyers and sellers, but also among all of the intermediaries and regulatory agencies. Among the three flows of an international supply chain, the information flow is obviously the area where paperless trade can contribute most.

Figure 2: Three Types of Flows in an International Supply Chain



Source: Authors

Paperless trade can bring huge cost savings and efficiency gains to international trade transactions. The Asia-Pacific region is home to several successful paperless trade systems that have realized impressive economic gains:

- After introducing the Single Window (SW) in Singapore, the time to process trade documents was reduced from 4 days to 15 minutes.
- Thailand has implemented a number of trade facilitation measures such as procedural reforms and customs modernization as groundwork for Single Window development. These measures have eliminated redundant processes and reduced the number of days for export from 24 days in 2006 to 14 days in 2009.
- In Hong Kong, China annual savings from an automated information transaction system are estimated at HK\$1.3 billion.
- The total savings for the business community from the use of the uTradeHub, which provides an automated information transaction system in the Republic of Korea, is estimated at around \$1.82 billion. This includes savings from reduced transmission costs by using e-documents; improved productivity by automating administrative work; and improved management, storage, and retrieval of information and documents through use of information technology.

The gains of paperless trade mentioned above have resulted from implementing paperless trade only in the domestic aspects of trade processes. Considering the nature of international trade in which three flows occur across borders, it is not hard to imagine how efficiencies could be gained from implementing paperless trade across borders.

This paper is structured as follows. The next section provides an overall picture of paperless trade. It also explains that paperless trade initiatives can be pursued at three levels: national, bilateral, and subregional. Section 3 provides a review of the current status of paperless trade. It reviews the documentation requirements of Asian economies and each economy's readiness for implementing paperless trade. Section 4 discusses five critical challenges in cross-border paperless trade. Section 5 provides two case studies of the implementation of paperless trade at the regional and bilateral levels: (i) the Pan Asian e-Commerce Alliance (PAA) and (ii) the Electronic Certificate of Origin between the Republic of Korea and Taipei, China. Section 6 presents questions for discussion. Section 7 presents recommendations based on the findings of the paper and the results of the discussion. Finally, Section 8 summarizes the paper and concludes.

2. Description of Paperless Trade

2.1 Paperless Trade and the Efficiency of International Supply Chains

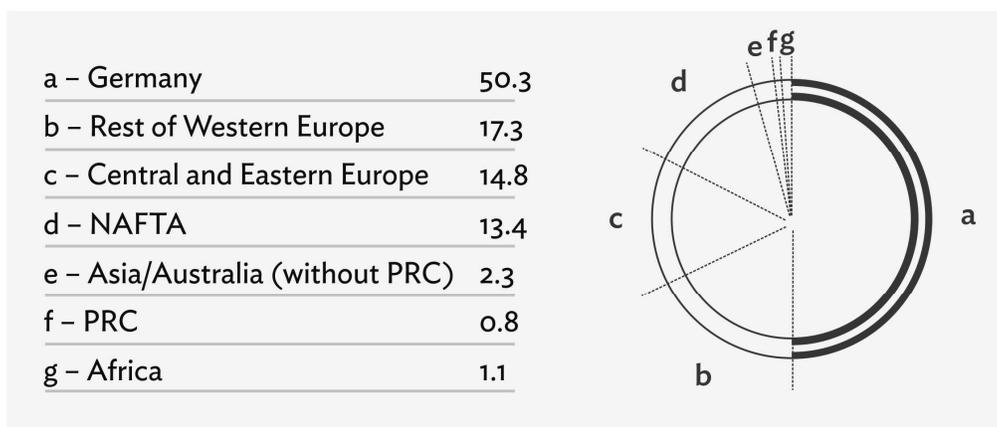
Paperless trade involves conducting trade transactions on the basis of an electronic exchange of trade-related data and documents, in contrast to the conventional way of exchanging trade information using paper documents. Electronic commerce is generally defined as “e-commerce” if the whole (or at least part of a) transaction process is conducted electronically. By the same token, paperless trade includes trade transactions of both “paper-less,” where a portion of the trade-related data and documents are exchanged electronically, and “paperless,” where all of the trade-related data and documents are exchanged electronically. With the definition and scope of paperless trade given, any information systems that are used for completing trade transactions are called paperless trade systems, whether their application is for Business-to-Business (B2B), Business-to-Government (B2G), or Government-to-Government (G2G).

B2B paperless trade has been widely adopted in the private sector, in particular by large enterprises, to improve the efficiency of their supply chain. Typically, large enterprises—such as GM, Chrysler, Mercedes Benz, and BMW in the vehicle manufacturing industry, Walmart in the distribution and retailing industry, and Intel and Samsung in the semi-conductor industry—have implemented Electronic Data Interchange for efficient international supply chain management. For example, BMW Group has been utilizing EDI with their 12,000 vendors in domestic market as well as in overseas market to develop and maintain sustainable supply chains. Figure 3 shows the composition of BMW Group's purchase volume, clearly illustrating the global operations that comprise its supply chain. And they are encouraging first-tier suppliers to press for the implementation of standards along the entire supply chain to promote sustainability requirements among respective suppliers and sub-suppliers.

Paperless trade systems can take various forms, from basic information sharing system to more sophisticated systems where multiple trade transaction processes are handled. An electronic SW system that allows “parties involved in trade and transport to lodge standardized

information and documents with a single entry point to fulfill all import, export, and transit-related regulatory requirements¹⁷ is one example of sophisticated paperless trade systems that have facilitated trade for the last decade.

Figure 3: Regional Mix of BMW Group Purchase Volume in 2012



PRC= People's Republic of China.

Source: BMW Group. <http://www.bmwgroup.com/>

As an information (processing) system, paperless trade systems are mainly concerned with streamlining the flow of trade information in an international supply chain. However, with the advancement of information and communication technology (ICT), paperless trade has expanded its application areas and can also facilitate the flow of goods with the use of Radio Frequency Identification (RFID), mobile technology, and Geographical Positioning System (GPS); such application in particular facilitates enhancement of security measures and traceability in international supply chains. The application of paperless trade also increases in the area of financial flows by facilitating the efficient exchange of financial information among relevant parties.

International trade transactions inherently require transactions to occur across more than one economy since an import transaction in one economy corresponds with an export transaction in another economy in international supply chain. However, a economy's primary concern is trade transactions occurring in its domestic area, whether import or export, since it has jurisdiction only on one part while the other part is governed by another partner economy. Therefore, trade facilitation measures are mainly implemented within an economy. Even though paperless trade is also cross-border, just like conventional international trade, paperless trade systems, in particular B2G and G2G systems, are mainly developed and used at the domestic level as trade facilitation measures.

¹ UN/CEFACT Recommendation 33.

Recent developments in international supply chains reinforce the potential importance of cross-border paperless trade in improving supply chain efficiency and facilitating supply chain integration. Such developments include:

- More and more supply chains are connected across borders for the more efficient procurement of raw materials, specialized and distributed manufacturing of goods, and streamlined distribution of final products to customers. For those products composed of diverse parts, it is rather difficult to see a case where such products are produced in a single economy. With this trend, operating a supply chain results in a series of continuous import and export activities among various players. Under such circumstances, it is obvious that paperless trade across borders can greatly enhance supply chain efficiency and integration, and improve information flows.
- Ever-shortening production life cycles are another development in supply chains that contribute to higher demand for the implementation of paperless trade systems. To maintain short production life cycles, the sharing of relevant information among the players of a supply chain needs to be more efficient. Such efficiency in information sharing can be quite critical when a supply chain is operated across borders. As mentioned earlier, paperless trade can greatly facilitate the flow of information.
- Major export markets have introduced various initiatives to enhance supply chain security, which has implications for the efficient operation of supply chains. For example, the United States (US) has introduced a series of supply chain security measures, including Container Security Initiative (CSI), Secure Freight Initiative, Importer Security Filing (ISF or 10+2), and Advanced Electronic Cargo Information. Some of these measures indeed have implications for the mandatory use of paperless trade. The use of paperless trade can help better meet the requirements of security initiatives and enhance the security of supply chains with the seamless flow of information.
- Businesses transform their business models and operation of supply chains in ever-changing business environments through innovation, convergence, and alliance. Paperless trade helps businesses to improve operation of their businesses by facilitating streamlined information flows and creating of new business models. Paperless trade also promotes the predictability of the business environment with higher levels of transparency and regularity, which is critical for businesses to invest in the innovation of their business practices.

In view of developments in supply chains, it is no surprise that there are an increasing number of initiatives from the private sector and public sector to realize cross-border paperless trade. Nonetheless, current cross-border paperless trade is limited in its number and coverage due to various challenges. This paper will review the current status of paperless trade implementation in the region, discuss major challenges in further progressing cross-border paperless trade, and analyze two initiatives for enabling cross-border paperless trade in subsequent chapters.

2.2 Three Levels of Paperless Trade Initiatives: National, Bilateral, and Subregional

Asia and the Pacific region is home to paperless trade initiatives at the subregional; bilateral; and, particularly, national level (Table 1). Many economies have implemented different forms of paperless trade systems, including Single Window, or are moving toward a Single Window environment. Most national initiatives in the region, however, took an evolutionary approach rather than the upfront implementation of advanced paperless trade systems; they usually started with trade process automation and transitioned into systems with advanced features such as Single Window.

For example, the Nippon Automated Cargo and Port Consolidated System (NACCS),² which is a Single Window in Japan, started with automation of regulatory trade processes in the late 1990s. After the completion of automation, the NACCS, based on government mandates, moved toward interfacing with systems of other government agencies in the 2000s. The NACCS enabled one-stop services for the trading community in meeting regulatory requirements. As a result, the NACCS has contributed to shortening the time for customs clearance of import by more than one-third, while the number of import declarations increased more than three times in the same period (1991–2009). The NACCS continues its enhancement of services, including enabling cross-border connectivity by becoming a member of the PAA.

However, with most paperless trade systems being implemented at the national level in the region, the paperless flow of trade information usually does not continue along an international supply chain, being disturbed at borders by requirements to follow paper-based trade transaction practices. When cross-border paperless trade is enabled, trade information can flow across borders through the whole operation of an international supply chain.

As is clearly shown in Table 1, bilateral initiatives are much more limited compared to the abundance of national initiatives. It is understandable since harmonizing paperless trade systems between two economies or economies is much more difficult with many technical and legal challenges. Major challenges of cross-border paperless trade are elaborated in detail in Section 4. One case of bilateral cross-border paperless trade that has received much recognition is the exchange of electronic Certificates of Origin between the Republic of Korea and Taipei, China, which is explained in detail in Section 5.

² See UNNExT Brief #6 for details on NACCS. Available at <http://unnex.unescap.org/pub/brief6.pdf>

Table 1: National, Bilateral, and Subregional Paperless Trade Initiatives

Type of Initiative	Economies and Examples	
National	Single Window (in operation)	Azerbaijan, Indonesia, Japan, the Republic of Korea, Malaysia, the Philippines, Singapore, and Thailand
	Single Window (under development)	All other Association of Southeast Asian Nations (ASEAN) members, Kazakhstan, the Kyrgyz Republic, Mongolia, Turkey, Tajikistan, Uzbekistan, the Russian Federation, India
	Other Paperless Trade Systems	<ul style="list-style-type: none"> - India's Customs EDI System (ICES) - The People's Republic of China's e-Ports - Digital Trade and Transport Network (DTTN) of Hong Kong, China - Pakistan's Web-Based One Customs (WeBOC)
Bilateral	<ul style="list-style-type: none"> - Electronic Certificates of Origin between the Republic of Korea and Taipei, China - Electronic Exchange of Preferential Certificates of Origin among ASEAN members - Electronic Sanitary and Phytosanitary (e-SPS) exchanges between Australia and New Zealand 	
Subregional	<ul style="list-style-type: none"> - ASEAN Single Window - Pan Asian e-Commerce Alliance (PAA) 	

Source: APTFF Survey 2012.

Despite the limited number of cases of actual implementation, acknowledgement should be given to the willingness of authorities in the region to pursue cross-border paperless trade. As shown in Table 2, many economies in Asia and the Pacific region show a high level of willingness to implement paperless trade at the bilateral level based on the number of paperless trade provisions in their Free Trade Agreements (FTAs).

However, most economies are not sure yet on how to implement paperless trade at the bilateral level, resulting in FTAs that express a commitment to paperless trade while leaving the implementation details blank. For example, though the New Zealand–Singapore Closer Economic Partnership Agreement (CEPA) has binding language within its provisions,³ such commitment is limited in scope to customs administration. The agreement also limits its application scope at the domestic level by specifying “an electronic environment that supports electronic business applications between each customs administration and its trading community,” not yet addressing the electronic environment for bilateral data exchanges, whether customs to customs, or customs to the trading community of another party.

³ With a view to implementing the APEC Blueprint for Action on Electronic Commerce, in particular the Paperless Trading Initiative, the Customs administrations of both Parties shall have in place by the date of entry into force of this Agreement an electronic environment that supports electronic business applications between each Customs administration and its trading community.

Table 2: Paperless Trade Provisions in FTAs

FTA	Nature of Commitment
ASEAN–Australia–New Zealand FTA	Best Endeavor
Australia–Chile FTA	Best Endeavor
Australia–Thailand FTA	Best Endeavor + Some Binding
Australia–United States FTA	Best Endeavor
PRC–Peru FTA	Best Endeavor
India–Singapore CECA	Some Binding
Japan–Philippines Economic Partnership Agreement (EPA)	Best Endeavor
Japan–Singapore New Age Economic Partnership	Some Binding
Japan–Switzerland FTA	Best Endeavor
Japan–Thailand EPA	Some Binding + Best Endeavor
Republic of Korea–Peru FTA	Best Endeavor
Republic of Korea–Singapore FTA	Best Endeavor
New Zealand–PRC FTA	Best Endeavor
New Zealand–Hong Kong, China Closer EPA	Best Endeavor
New Zealand–Singapore Closer EPA	Binding
New Zealand–Thailand Closer EPA	Best Endeavor + Binding
Trans-Pacific SEP (Brunei Darussalam, New Zealand, Chile, Singapore)	Best Endeavor

PRC = People's Republic of China.

Source: S. Lim (2013).

Asia and the Pacific region has two major subregional initiatives: one is intergovernmental, and the other is private sector-led. The intergovernmental initiative, the ASEAN Single Window, is an effort to “expedite cargo clearance within the context of increased economic integration in ASEAN” by connecting and integrating National Single Windows (NSWs) among ASEAN Member States.⁴ Some members are in the process of implementing their NSWs while others are in full operation. Currently, some members are conducting interconnectivity pilot tests among NSWs. The other initiative is the PAA—an alliance of paperless trade service providers to enable cross-border trade data exchange. A detailed description on the PAA is provided in Section 5.

⁴ ASEAN Single Window Web Portal: <http://asw.asean.org/>

3. Review of Current Status

3.1 Status of “Paper-less” Trade

As discussed in previous chapters, international trade involves the flow of information, requiring players to convey relevant trade data using documents, either paper or electronic. Figure 4, derived from the Business Process Analysis (BPA) case of exporting Jasmine Rice from Thailand to the US, illustrates the extensive documentary requirements in conducting international trade. Documentation is an inherent part of international trade, which would still remain even in the move toward paper-less and paperless environments.

Figure 4: List of Documents Involved in Exporting Thai Jasmine Rice

1. Proforma Invoice	19. Cover Note
2. Purchase Order	20. Bill of Lading
3. Application for Permission to Export Rice (KP, 2)	21. Insurance Policy
4. Sales Report (KP, 3)	22. Export Declaration
5. Application for Certification of the Permit for the Export of Rice (A, 3)	23. Good Transition Contral List
6. Permit for the Export of Rice (A, 4)	24. TKT 308.2
7. Application for Certification of Standards of Products (MS, 13)	25. Equipment Interchange Report (EIR)
8. Rice Quality Certificate	26. Container Loading List
9. Certificate of Standards of Products (MS, 24)	27. Container List Message
10. Application for Phytosanitary Certificate (PQ, 9)	28. Outward Container List
11. Booking Request Form–Border Crossing	29. Manifest
12. Booking Confirmation–Border Crossing	30. Phytosanitary Certificate
13. Booking Request Form–Inland Transport	31. Certificate of Origin
14. Booking Confirmation–Inland Transport	32. Application for Certificate of Origin
15. Cargo Insurance Application Form	33. Application for Letter of Credit
16. Commercial Invoice	34. Credit Advice
17. Letter of Credit	35. Debt Advice
18. Packing List	36. Remittance Advice

Source: ESCAP/UNECE (2012a).

Reforms can make significant improvements in reducing the number of documents required in international trade. As shown in Table 3, an analysis of the World Bank Doing Business data reveals that the average number of documents required to import in Asia-Pacific economies has been reduced to more or less eight today from nine in 2006. It is important to note that these good performers in 2014 were usually successful in implementing reforms. With the exception of Singapore, which achieved less-paper trade in 2004, all other good performers in 2014 successfully reduced the number of required documents only recently. Both Hong Kong, China and the Republic of Korea, which both require the same number of documents as Singapore in 2014, required 8 documents in 2006. Georgia and Thailand, which required only 4 and 5 documents, respectively, in 2014, required 15 and 12 documents in 2006.

Table 3: Number of Documents Required to Import, 2006 and 2014

Economy	2006	2014	% Change
Singapore	3	3	0
Hong Kong, China	8	3	-5
Republic of Korea	8	3	-5
Malaysia	4	4	0
Georgia	15	4	-11
Brunei Darussalam		5	NA
Thailand	12	5	-7
People's Rep. of China	6	5	-1
Marshall Islands	5	5	0
Solomon Islands	5	5	0
Taipei, China	6	6	0
Kiribati	6	6	0
Federated States of Micronesia	6	6	0
Samoa	6	6	0
Tonga	6	6	0
Philippines	8	7	-1
Sri Lanka	10	7	-3
Timor-Leste	7	7	0
Vanuatu	7	7	0
Indonesia	8	8	0
Viet Nam	8	8	0
Armenia	6	8	2
Pakistan	8	8	0
Bangladesh	8	8	0
Cambodia	11	9	-2
Myanmar		9	NA
Maldives	9	9	0
Palau	9	9	0

Table 3: Continued

Economy	2006	2014	% Change
Papua New Guinea	9	9	0
the Lao People's Democratic Republic (Lao PDR)	15	10	-5
Afghanistan	10	10	0
Fiji	10	10	0
Azerbaijan	11	11	0
Kyrgyz Republic	17	11	-6
India	11	11	0
Nepal	11	11	0
Kazakhstan	13	12	-1
Tajikistan	13	12	-1
Bhutan	12	12	0
Mongolia	13	13	0
Uzbekistan	15	14	-1
Average	9.1	7.8	-1.3

Source: World Bank. 2006 and 2014. *Doing Business*. Washington, DC.

The two main reform approaches to reduce documentary requirements are (i) directly reducing required documents by identifying unessential documents or harmonizing relevant documents into one; or (ii) implementing electronic data interchange (EDI) along with improved paperless trade mechanisms especially in the area of customs. Examples of economies pursuing the first type of reforms include Cambodia, Georgia, and the Kyrgyz Republic. In the case of Georgia, in addition to simplifying documents, it created customs clearance zones, which contribute to reducing document requirement. Examples of economies pursuing the second type of reforms include the Republic of Korea, the Lao PDR, the Philippines, Sri Lanka, and Thailand. The Republic of Korea upgraded its EDI system. Thailand augmented its e-customs system along with an EDI upgrade. The Philippines upgraded risk management and EDI systems along with improved electronic customs systems, facilitating electronic payments and online submissions of declarations. Sri Lanka augmented its EDI system with ASYCUDA and an electronic payment system for port services. The Lao PDR improved regulations on agencies involved in goods inspection and, later, implemented the ASYCUDA EDI at the Thanaleng Friendship Bridge border crossing.

However, some economies face difficulty in reducing documentary requirement. For example, Azerbaijan, Bangladesh, India, Fiji, Mongolia, and Pakistan have introduced reforms but have not achieved a reduction in documents. Armenia, on the other hand, added two documentary requirements despite the introduction of EDI and other measures. Despite the introduction of reforms, including the implementation of EDI, some economies have failed to reduce the number of required documents, probably because the reform was simply shifting a paper-based process into an EDI-based one.

In this context, emphasis should be given to the importance of simplification and harmonization of processes and documents in conducting reforms. It is noteworthy that top

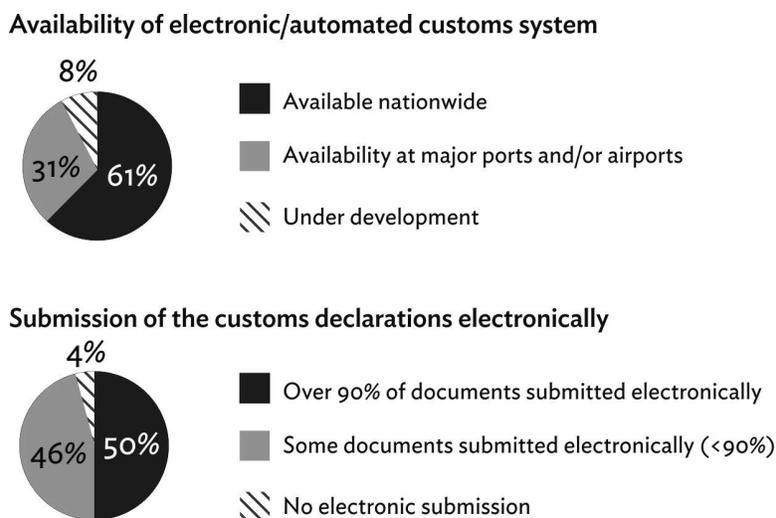
performers such as Hong Kong, China; the Republic of Korea; and Singapore have fully implemented risk-based customs declaration management systems or pre-arrival import declaration. Having a risk-based clearance system, shipping documents—such as a commercial invoice, packing list, or bill of lading—are not required for clearance purposes, but rather mostly for post-audit purposes. It means that in the actual import clearance process, the only required document is an import declaration in electronic form, while shipping documents shall be kept at the importer's office for future audit. In the case of pre-arrival import declaration, importers can submit required shipping documents and certificates to customs in advance, thus saving time for the clearance of cargo as well. This implies that, together with an effort to reduce required documents, business process re-engineering is also important in moving toward a paper-less trade environment.

3.2 Assessment of Paperless Trade Implementation in Asia and the Pacific

A recent survey made by the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), as part of the Asia Pacific Trade Facilitation Forum (APTFF) 2012, revealed the region's readiness to transition to a paperless trade environment, which is a good signal for creating an environment to reduce documentary requirements or at least to make it easier to meet such documentary requirements.

Customs is the area of trade facilitation where most attention has been given and also where a number of trade facilitation measures have been initiated. It is no surprise that the APTFF 2012 Survey revealed a high degree of availability of electronic customs. Figure 5 shows that 92% of responding economies have automated customs system available either nationwide or in major ports and/or airports. For the submission of an electronic customs declaration, 96% responded that most (over 90%) or some documents can be submitted electronically.

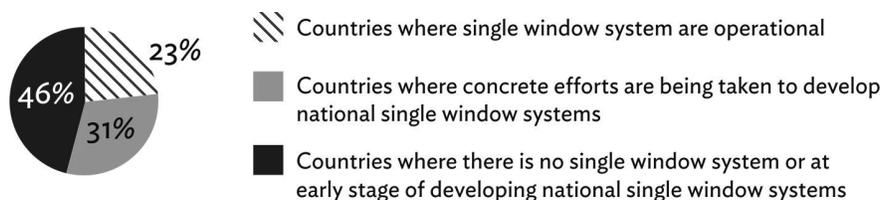
Figure 5: Availability of Electronic Customs



Source: APTFF 2012 Survey.

Single Window, as described earlier, is an advanced form of a paperless trade system that has drawn much attention in the field of trade facilitation over the last decade. The region is home to many cases of Single Window. Figure 6 shows that 23% of survey respondents in Asia and the Pacific have already implemented Single Window systems, while 31% are in the process of moving toward development of a Single Window system.

Figure 6: Development of Single Window Systems



Source: APTFF 2012 Survey.

Another interesting result from the APTFF 2012 Survey is that 38% of participants engage in cross-border paperless trade or data exchanges as shown in Figure 7. Considering the difficulty of executing cross-border trade data exchanges, this ratio is quite high. Though it is likely that many respondents are in the stage of basic data exchanges with limited scope or in a pilot testing mode, it is still an impressive ratio since it demonstrates the level of commitment to cross-border paperless trade in the region.

Figure 7: Engagement in Cross-Border Paperless Trade Documents or Data Exchanges



Source: APTFF 2012 Survey.

4. Five Critical Challenges in Cross-Border Paperless Trade

Notwithstanding the huge benefits that cross-border paperless trade can bring to the participants in an international supply chain, it is not easy to implement paperless trade across borders due to various existing issues, mainly concerns over coordination and harmonization of different legal, policy, and technology frameworks. Based on a review of current paperless trade initiatives in the region, both domestic and cross-border, this paper has identified five main challenges to overcome.

4.1 Challenge 1: Use of Common International Standards

Paperless trade inherently applies ICTs to make trade transactions more efficient. In other words, paperless trade systems are developed by applying a specific ICT, such as data format, messaging and communication protocols, and security measures. When particular economies or agencies implement paperless trade systems, they develop such systems using available ICTs in a way to meet their business requirements. An issue of interoperability, which is the ability of two or more systems or components to exchange information and to use the information that has been exchanged, arises when interconnecting such systems one another to enable paperless trade.⁵

The issue of interoperability can arise in conducting both domestic and cross-border paperless trade. However, it is more difficult to address when it comes to cross-border paperless trade. When domestic paperless trade systems are developed, in particular by public sectors, they are usually developed in accordance with a national policy or technical interoperability guideline such as an e-Government Interoperability Framework (e-GIF), where basic guidance is given on the use of certain technologies and standards to promote interoperability. In the case of cross-border paperless trade, such a technological framework is absent unless it is made in an environment where economic integration is in place.

Under the current circumstances in which different economies develop their paperless trade systems, where a universal guiding framework is both absent and infeasible to put in place, the best way to promote interoperability is to use common international standards. When paperless trade systems are developed based on common international standards, they can be more easily connected to one another, though it still cannot guarantee 100% interoperability. Though some economies develop their paperless trade systems on the basis of international standards, the application of international standards is usually limited only to certain functionalities. A more dominant current practice is the development of paperless trade systems on the basis of national standards or technical requirements.

4.2 Challenge 2: Harmonization of Different Legal Frameworks

Just like trade transactions, paperless trade transactions are conducted under a certain legal and regulatory regime, primarily at the domestic level. At the national level, governments establish their domestic legal framework to enable paperless trade systems to operate properly. To serve this, new legal frameworks are established by enacting new laws, or existing ones are revised accordingly; in many cases, both are needed.

With such national legal frameworks in place, paperless trade transactions occurring within the boundary of a border may not face any problems, but issues can arise when such paperless trade systems are utilized across borders. When the legal frameworks of the importing economy and the exporting economy are not harmonized, paperless trade systems cannot interoperate. Similarly, traders in one economy cannot directly use the paperless trade systems

⁵ Institute of Electrical and Electronics Engineers (IEEE). 1990. *Standard Computer Dictionary: A Compilation of IEEE Standard Computer Glossaries*. New York, NY.

of another economy. Considering the nature of international trade, trade transactions can be most efficient if they flow continuously across borders, which is not possible when different legal frameworks are not harmonized.

4.3 Challenge 3: Capacity Gaps among the Parties

To conduct paperless trade across borders, the participating parties need to have paperless trade systems. Asia and the Pacific region has many economies in a leadership position with respect to paperless trade. At the same time, the region is a home to many least developed economies (LDCs) and land-locked developing economies (LLDCs). For LDCs and LLDCs, implementing paperless trade systems and engaging in cross-border paperless trade can significantly contribute to improving their trade competitiveness and efficiency, and effectively support their trade-led economic development policy. In particular, cross-border paperless trade between LLDCs and their neighboring transit economies can alleviate their geographical disadvantage and better link them to export markets.

However, LDCs and LLDCs usually lack human, technical, and financial capacity to implement paperless trade systems. Implementing paperless trade systems requires certain experiences and knowledge on relevant technologies and skills, such as business process analysis and re-engineering, harmonization of data, application of ICTs, and automation techniques. Though many LDCs and LLDCs are committed to paperless trade and are already moving toward implementing systems such as electronic customs, the capacity gap with economies that have advanced paperless trade systems hinders their engagement in cross-border paperless trade.

4.4 Challenge 4: Cooperation between the Public and Private Sectors

Paperless trade systems need to be implemented on the basis of the requirements of all stakeholders, including both the public and private sectors, to properly serve the wider trade community. Many paperless trade systems, such as Single Window, are implemented and operated by the public sector due to their nature as public goods. However, users of such paperless trade systems are importers, exporters, and intermediaries. If such systems are developed without proper consultation with the private sector, they may not serve the needs of traders properly and also may face difficulty in gaining wide adoption and use. Case studies of successful paperless trade systems stress the importance of stakeholder coordination, in particular with the private sector.

For example, when the different paperless trade systems of different regulatory agencies, such as customs and inspection agencies, are being developed without proper consultation with the private sector about their concerns, these systems may not reduce the administrative burden of the private sector by failing to eliminate redundant regulatory requirements, defeating their intention to be trade facilitation measures. By the same token, cross-border paperless trade systems result in reduced benefits to the trade community when the trade data and regulatory requirements of different economies are not harmonized. Cross-border paperless trade systems should be implemented through close cooperation between the public and private sectors.

4.5 Challenge 5: Lack of Coordination Mechanisms for Cross-Border Data Exchange

Firms always try to find ways to innovate their business practices. It is no different in the operation of international supply chains. As described in section 5, firms try to arrange cross-border paperless trade data exchanges in every possible way. However, there are certain limitations on the private sector related to regulatory controls imposed by government agencies. Harmonizing and coordinating different regulatory controls across borders can be done, whether bilaterally or multilaterally, only at the intergovernmental level.

There is no region-wide intergovernmental platform in place to facilitate coordination of cross-border paperless trade, though ASEAN can cover its 10 member economies. For example, if one economy would like to initiate cross-border paperless trade with another economy, it has to rely primarily on bilateral mechanisms, such as an FTA. Since every economy needs to engage in trade transactions with other economies, a bilateral approach may end up with a stock of arrangements that are hard to manage. In addition, there is no guarantee that each bilateral arrangement will be compatible with other such arrangements, since different economies may demand different specificities in the provisions.

5. Cross-Border Paperless Trade Implementation

This section provides two case studies of paperless trade. One is at a regional level and the other at the bilateral level. For each case, background, operations, and limitations of the project will be discussed in turn.

5.1 Pan Asian e-Commerce Alliance

A. Background

In the late 1980s and early 1990s, several governments of economies and economies in Asia initiated Electronic Data Interchange (EDI)-based paperless trade projects and established paperless trade service providers—adopting a planned implementation strategy rather than a market-driven approach for the promotion of paperless trade—to support their export-led economic development policies. Governments of those economies played a critical role during the implementation and promotion of paperless trade services by providing policy measures for the implementation of various facilitation measures, including a “Call for Collaboration” to invite the participation of the trade community in the use of EDI, the establishment of a standards body for e-commerce, the adoption of the legal framework on the use of e-documents and data messages, an education and awareness campaign on EDI for various stakeholders, and the provision of funding for the implementation of projects in strategic areas.

Based on the mandate given by the relevant national strategy, paperless trade service providers developed their own platforms and services in close cooperation with governments. Most of those paperless trade service providers started with the implementation of customs clearance

service, while others began their projects with port automation and then extended them to customs clearance later. Following initiatives in Europe and the Americas, the private stakeholders adopted EDI for supply chains, particularly in the retail and banking sector.

After successful implementation of electronic transactions such as automated customs clearance and manifest submission, paperless trade service providers began to look at the possibility of extending their service coverage to overseas markets. Some service providers explored collaboration with newly established global paperless trade platforms and services such as Bolero and TradeCard. At the same time, they also initiated a regional cooperation framework among the paperless trade service providers in Asia, thus launching the Pan Asian e-commerce Alliance (PAA) mentioned above. The background for the establishment of the PAA involved the (i) introduction and spreading of the Internet-based technology; (ii) completion of the automation of national trade procedures, including the formulation of the early models for a Single Window platform; and 3) the growing volume of the intra-regional trade in Asia.

B. Issues and Challenges

The PAA is a private sector alliance of government-backed paperless trade service providers. Compared to the implementation of domestic paperless trade infrastructure and services, the facilitation of cross-border transaction service is much harder to achieve and involves many more constraints. At the same time, there are limits and obstacles that the PAA, as a private sector entity, faces in pursuing cross-border transaction services. In the early stages of the PAA, during its development of a Cross-Border Transaction Framework, it faced the following challenges and issues:

- **Lack of related international standards.** During the establishment of the PAA framework, unlike today, there were few standards for cross-border exchanges of electronic documents. The PAA had to make huge investments to establish its mutual PKI digital signature recognition framework, new XML message standards, and service level agreements. However, the PAA tried to adopt as many up-to-date available international standards as possible such as ebXML message handling as its interconnectivity protocol.
- **Harmonization of different legal frameworks.** As many PAA members' national laws did not coincide with the services of the PAA, it created the PAA Club Agreement, a robust, contract-based, three-tiered legal framework for cross-border transactions: (i) mutual recognition of CAs, (ii) PAA Service Level Agreement with technical specifications, and (iii) a Subscriber Agreement that enrolls a subscriber as a member of the PAA Club.
- **Lack of coordination mechanisms for cross-border data exchanges.** The PAA framework is not recognized by most governments, as it is not an international standard. The PAA has played the role of a regional cross-border trade data hub but administration procedures remain out of its reach. Thus, the main services of the PAA have been commercially focused.
- **Technical gaps.** The level of readiness for cross-border transaction services differed

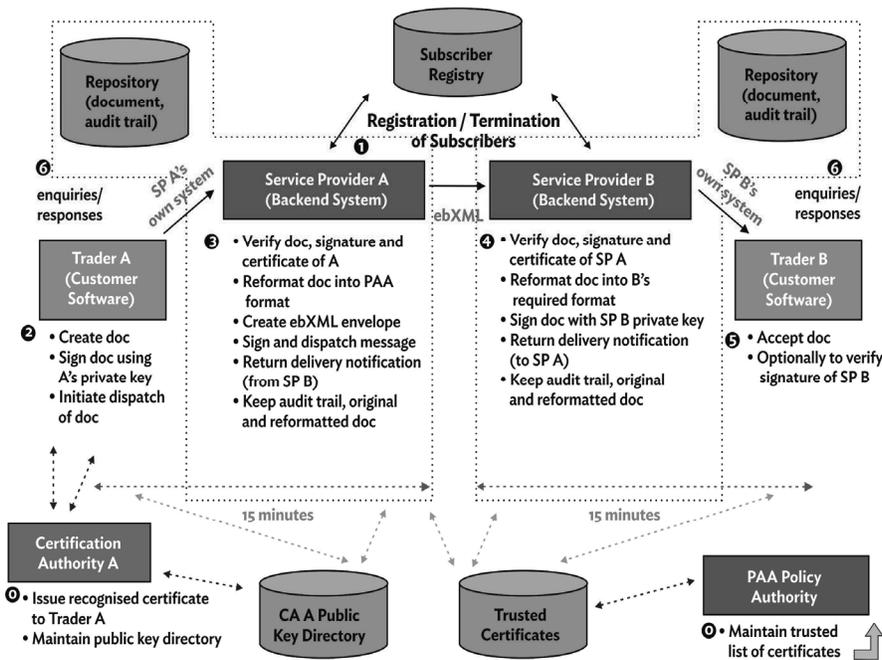
among the various economies that comprised the PAA’s membership. Thus, the implementation of services did not always cover all PAA members.

C. Operational Model and Transaction Arrangement

The PAA has implemented the following secure cross-border transaction services based on its legal framework and technical specifications (Figure 8):

- B2B Services with PAA Extensible Markup Language (XML) Document Standard
- Republic of Korea–Taipei,China electronic Certificate of Origin (e-C/O) Service
- Cargo Visibility Service

Figure 8: Operational Model of PAA Secure Transaction Services
PAA Transaction Services Operation



Source: UNNExT Brief #9.

With the help of PAA B2B services, traders and forwarders can exchange trade documents electronically with their overseas partners regardless of their system and solutions. The trade documents that PAA offers are as follows:

- Purchase Order
- Advance Shipment Notice
- Packing List
- Commercial Invoice
- Air Way Bill

- Bill of Lading
- Delivery Order
- Trade Declaration
- Electronic Certificate of Origin (e-CO)
- Shipping Order
- Processing Trade (PRC)

TAL Apparel of Hong Kong, China was the first user of the PAA B2B Service. Tradelink of Hong Kong, China provided TAL with intermediary services, including message translation between TAL's message standard and the PAA XML standard. In their commercial transactions, TAL exchanges Purchase Orders, Invoices, and Advance Shipping Notices with their overseas suppliers.

D. Limitations

One major shortfall the PAA has faced in its effort to facilitate cross-border trade data exchanges is that trade documents under the PAA framework could not be processed at every stage of the trade business cycle. In general, trade documents have the following uses and purposes:

- proof of contract and business
- business operation management
- supplementary paper for customs clearance and regulatory requirements
- payment, collection, and presentation of trade pricing or trade financing from bankers
- delivery and pick-up of goods

Some uses above can be covered by the PAA's legal framework and services, such as proof of contract and business, business operation management, and delivery and pick-up of goods. However, others are heavily dependent on the laws, regulations, and policies of local governments for their acceptance in cross-border electronic transactions. Despite work efficiency and the convenience of paperless trade in supply chain management systems, should any process among the whole trade business cycle require paper documents in line with regulatory requirements, then traders will have to exchange paper documents with overseas partners. To avoid such situations, it is necessary for governments to promote a legally enabling domestic environment for the exchange of trade-related electronic documents as well as to facilitate the interoperability of cross-border paperless trade, including the following measures:

- legislate the validity of electronic documents received from overseas;
- establish a neutral and technical platform to prevent forfeiting of electronic documents, as well as to protect data privacy;
- introduce international standards and technical specifications for e-commerce; and
- encourage partnership between the public and private sectors on modalities of cross-border paperless trade as both stand to benefit, and to bring about a balance between the needs of trade facilitation and regulatory compliance.

For PAA members, it is necessary to participate in bilateral, regional, or international arrangements to establish cross-border recognition of electronic document frameworks to cover trade areas beyond the reach of PAA services. The following is a discussion of how the PAA could succeed in developing cross-border e-C/O service in close cooperation with the public sectors of the Republic of Korea and Taipei,China.

5.2 Electronic Certificate of Origin between the Republic of Korea and Taipei,China

A. Background

Together with other cross-border trade documents such as Bill of Lading and Sanitary-Phytosanitary (SPS) Certificate, Certificate of Origin (C/O) has been identified as a key document to be harmonized and circulated through online systems for seamless paperless trade transactions. At the international level, various regional and international cooperation frameworks have been prepared by bodies such as Asia-Pacific Economic Cooperation (APEC), the United Nations (UN), and the World Customs Organization (WCO). For instance, the World Chambers Federation set up a task force to develop International Certificate of Origin Guidelines, which include the adoption of electronic Certificate of Origin.⁶

APEC Paperless Trading Subgroup (PTS), under the E-Commerce Steering Group, has initiated a number of Pathfinder projects as part of APEC's Strategies and Actions toward a Cross-Border Paperless Trading Environment. The Pathfinder projects of APEC PTS include:

- E-Cert SPS (Australia/New Zealand)
- E- C/O (Republic of Korea-Taipei,China)
- e-Negotiation (Republic of Korea)

Unlike e-SPS, whose issuance and final recipient are the same kind of inspection agencies, e-C/O has a difficult challenge; it has different stakeholders at its issuing and receiving sides, which makes it difficult to implement across borders.

In the Republic of Korea, KTNET has been providing an EDI-based C/O service with the Korea Chamber of Commerce and Industry since 2000. But, as the C/O needs to be submitted to customs agencies in trading partner economies and economies, the C/O has had to be delivered in paper form for many years. To make matters worse, some overseas customs agencies require an authenticated C/O that is registered and stamped at the embassy in the exporting economy. This has been a setback in establishing cross-border e-C/O exchanges. In 2004, KTNET proposed an e-C/O project to Trade-Van of Taipei,China with their web-based e-C/O system. However, it was impossible to conduct the project without the participation of both governments. By utilizing the APEC PTS meeting, they could initiate a private-public partnership (PPP) meeting. The governments of both economies came to an agreement to

⁶ <http://www.iccwbo.org/chamber-services/trade-facilitation/certificates-of-origin/co-guidelines/>

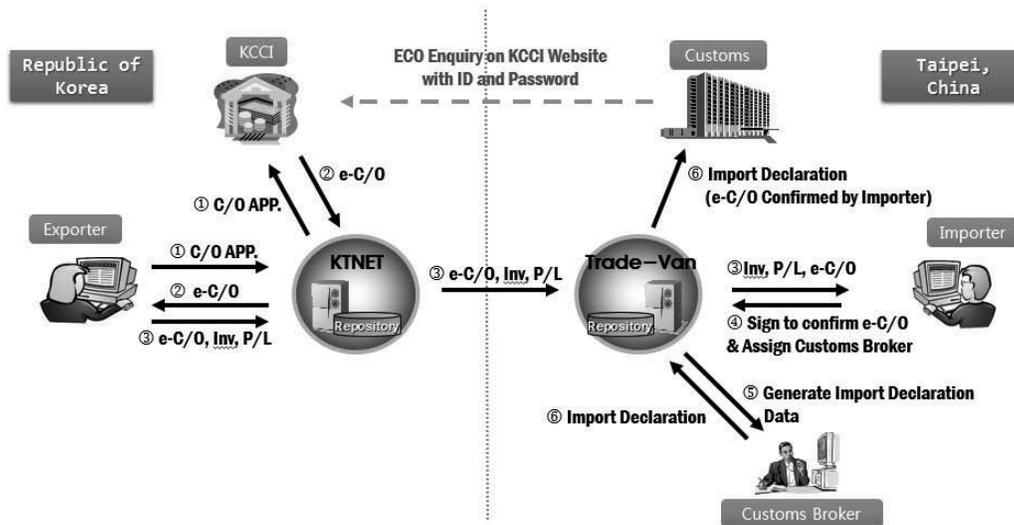
have annual bilateral meetings, including the participation of private sector representatives, to discuss paperless trade.

In 2005, the Republic of Korea had its first PPP meeting with Taipei,China and proposed an e-C/O project. A series of Republic of Korea and Taipei,China PPP meetings for paperless trade was held thereafter. Regular participants include the Ministry of Knowledge Economy (now called the Ministry of Trade, Industry and Energy), Korea Chamber of Commerce and Industry (KCCI), and KTNET from the Republic of Korea, and the Bureau of Foreign Trade and Customs and Trade-Van from Taipei,China.

B. Operational Model and Transaction Arrangement

Both governments agreed on the PAA framework for the secure exchange of e-C/O. A Memorandum of Understanding (MOU) on the exchange of e-C/O was signed by the Mission Office of each economy in 2009. In 2010, the first e-C/O transaction was made between the Republic of Korea and Taipei,China. Korean exporters no longer have to visit the Taipei,China Mission Office in Seoul or Busan for the certification of a paper C/O. The Republic of Korea–Taipei,China e-C/O exchange scenario is illustrated in Figure 9.

Figure 9: Republic of Korea–Taipei,China e-C/O Exchange Scenario



Source: Authors

The Republic of Korea–Taipei,China e-C/O exchange scenario involves the following:

- Korean exporters use the KTNET uTradeHub (uTH), the Korean Single Window for paperless trade, to complete the C/O application form over the Internet and send it to KCCI. This online e-C/O application system is operated by KTNET.
- KCCI, as the C/O issuing authority, reviews and approves the e-C/O application using its own legacy system and sends a confirmation to the exporter through KTNET.

Exporters can have an access to the e-C/O database for inquiries, according to the e-C/O code issued, or download the e-C/O message to its legacy system.

- The exporter sends the approved e-C/O to the importer with the uTH of KTNET, which is interconnected with Trade-Van's online e-C/O service. Before the e-C/O is delivered to Trade-Van, KTNET signs the approved e-C/O on behalf of KCCI and the exporter by the PKI mutual recognition framework of the PAA. It is no longer necessary for exporters to take the paper C/O to the Taipei,China Mission Office in Seoul for authentication, as the digital signature technology provides more than sufficient assurance to the Taipei,China customs agency on the origin, authenticity, and integrity of the e-C/O. In the meantime, the goods are shipped to Taipei,China from the Republic of Korea, which takes about 3 days.
- The e-C/O system of Taipei,China will remind the importer with an e-mail notification that the e-C/O has been received from the exporter.
- The importer or customs broker will submit a customs import declaration electronically, quoting the relevant electronic e-CO reference.

If necessary, Taipei,China's customs agency can visit the e-C/O database website of KCCI for inquiries. After inquiry and taxation, the customs agency will grant release of the goods. A customs broker or an importer will then arrange to pick up the goods from the terminal or holding area and deliver them to the importer's warehouse or required location. The service is currently provided free of charge by both service providers.

C. Achievements and Limitations

This service has been renowned as a best practice in paperless trade throughout APEC. An APEC e-CO case study shows that significant tangible benefits in terms of costs reductions have been generated for both importers and exporters from the implementation of e-C/O between Taipei,China and the Republic of Korea.

The savings for an exporter include:

- administrative time savings of 4 hours and 20 minutes (equivalent to \$74 at \$ 17 per hour),
- direct expenses saving of \$143.50, and
- reduction in processing time by two days on the export side of the process.

The savings for an importer include:

- administrative time savings of 7 hours and 15 minutes (equivalent to \$58 at \$8 per hour),
- direct expenses saving of \$ 147, and
- reduction in processing time by 3 days on the import side and time saved from avoiding the need to send the paper C/O to Taipei,China.

However, despite the success of the cross-border e-C/O project, there are limitations and important lessons to be observed:

- There is no international framework for e-C/O as the project utilized the PAA framework, which is a private standard, hence prohibiting the expansion of the service outside of PAA's area of coverage.
- Bilateral PPP dialogues helped stakeholders share their views and concerns, and understand each other.
- As both economies have well established environments for cross-border transactions, not much capacity building was necessary. However, when it comes to expansion of the e-C/O service, the capacity gaps among economies should be addressed.
- What took the most time was the e-C/O exchange entering into a bilateral agreement, not the technical specifications. From the beginning of the dialogue between the two economies, it took almost 5 years to agree upon an MOU. An international arrangement such as a regional agreement could have quickened the process.
- Lastly, traders need to exchange not only C/O but also other trading documents in electronic form to enjoy the true benefits of e-C/O as exporters are still sending the other trading documents in paper form. Even if the C/O is a key document, without converting all documents into electronic format and without covering the whole international supply chain with these electronic forms, the benefits will be limited.

It seems that currently, it is inevitable that economies should pursue bilateral approaches to realize a mutual recognition of cross-border electronic documents and data with the absence of an international framework and given the technical gap among economies in Asia and the Pacific region. As it has been proven in many cases that the cross-border exchange of paperless trade-related documents and data can bring huge benefits to global supply chains, it is necessary to have a regional or international legal framework for the recognition of trade-related documents and data.

6. Policy Discussions

In facilitating cross-border paperless trade, there can be different approaches. The following five questions correspond to the five challenges presented above and were intended to stimulate in-depth discussions during the Asia and the Pacific Trade Facilitation Forum (APTFF) in 2013:

6.1 There are different common international standards available. Is there any particular standard that fits better than others? If so, how can one identify such a common international standard? What would be the features of such a common international standard?

6.2 The paper mentions harmonization of national legal frameworks with international legal instruments. Are there enough legal instruments available for harmonizing every aspect of a national legal framework? If not, what aspects are in need of further development by the international community?

6.3 As witnessed in the process of WTO Trade Facilitation Negotiations, capacity gaps among developing economies can be a critical issue in implementing trade facilitation measures, especially for the implementation of paperless trade. What would be effective capacity building mechanisms that developing economies can utilize to move toward paperless trade practices? Perspectives from current developing economies as well as those economies that used to be developing economies would be valuable inputs in the discussion.

6.4 The public sector and private sector have fundamentally different objectives in dealing with trade transactions. The former has a mandate to ensure regulatory compliance, while the latter wants more facilitation of trade to maximize profits. There are an increasing number of public sector trade facilitation measures to help the private sector. One example is the introduction of an Authorized Economic Operator (AEO) program. Are such programs really valuable from the private sector's perspective? If not, what would be other possible measures that can be introduced through PPPs in international trade, particularly in relation to cross-border paperless trade?

6.5 Intergovernmental facilitation of cross-border paperless trade can take place at the bilateral, subregional, and regional levels. Is facilitation at a certain level more effective than others? What are the pros and cons of intergovernmental facilitation at each level? What would be best (most feasible or practical) format or mechanism for each level of intergovernmental facilitation?

7. Possible Solutions

The paper identified five major issues and challenges in further facilitating cross-border paperless trade in Asia and the Pacific region. There are no easy solutions for any of the five challenges. Despite this, the paper attempts to propose some recommendations as alleviating measures so that the region may make steady improvement toward a cross-border paperless trade environment.

First, for the use of common international standards, each economy needs to make an effort to integrate common international standards whenever it develops new paperless trade systems or upgrades existing systems. At the regional level, having some guidance on the use of common international standards would also help economies to coordinate the use of standards at the national level.

Second, for the issue of harmonizing different legal frameworks, each economy needs to base or align its legal framework with international instruments (e.g., model laws, conventions, good practices) as much as possible. Good examples are UNCITRAL model laws on e-commerce and e-signatures, as well as the UN Convention on Use of Electronic Communications in International Contracts.

Third, to narrow capacity gaps among the parties, more rigorous capacity building programs are needed at the regional level. Such programs need to accommodate reciprocal capacity building

activities and support, rather than focusing on unidirectional support from more advanced economies to the economies in need.

Fourth, for closer cooperation between the public and private sectors, a dynamic platform should be in place in which both sectors can openly share their views and concerns and communicate readily to enhance trust and reduce misunderstanding. With a better communications environment, the public and private sectors would be able to better collaborate on cross-border paperless trade with both trade facilitation and regulatory compliance in mind.

Finally, for regional coordination mechanisms in cross-border paperless trade, regional intergovernmental bodies with wide membership and a proper mandate need to show leadership by initiating arrangements such as regional agreements. Such regional arrangement would provide good guidance in arranging bilateral mechanisms and reduce the divergence of approaches in place among bilateral mechanisms.

8. Conclusion

As discussed in previous chapters, implementing paperless trade, particularly across borders, can significantly improve trade efficiency and contribute to the integration of international supply chains. However, realizing cross-border paperless trade imposes more difficult challenges to overcome than implementing domestic paperless trade systems.

The main source of challenges in cross-border paperless trade resides in harmonizing the legal, technical, and policy frameworks that differ from economy to economy. Overcoming such challenges requires facilitating different paperless trade systems to operate with one another. Intergovernmental efforts to facilitate cross-border paperless trade—whether at the bilateral, subregional, or regional level—is desirable and needs to be further explored. Among the three types of intergovernmental facilitation efforts, a regional approach is especially valuable in seeking greater harmonization and a higher level of interoperability among paperless trade systems.

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The Progress of Paperless Trade in Asia and the Pacific

Enabling International Supply Chain Integration

This working paper discusses on how to facilitate integration of international supply chain using paperless trade in the Asia and Pacific region. The paper defines paperless trade and describes how paperless trade can improve efficiency of international supply chain. Based on the review of paperless trade initiatives and assessment of paperless trade readiness of economies in the Asia and the Pacific Region, the paper identifies critical challenges in facilitating cross-border paperless trade and elaborates on how those challenges can be lessened.

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