

Unclassified

TD/TC/WP(2003)21/FINAL



Organisation de Coopération et de Développement Economiques
Organisation for Economic Co-operation and Development

17-Oct-2005

English - Or. English

**TRADE DIRECTORATE
TRADE COMMITTEE**

**TD/TC/WP(2003)21/FINAL
Unclassified**

Working Party of the Trade Committee

THE ROLE OF AUTOMATION IN TRADE FACILITATION

OECD Trade Policy Working Paper No. 22

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JT00191963

Document complet disponible sur OLIS dans son format d'origine
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ABSTRACT

This paper analyses customs automation which is one of the most powerful tools to increase customs efficiency. It focuses in particular on the benefits and implementation costs of automation. It is part of a series of studies that analyse various aspects of trade facilitation and the objective is to contribute to discussions in the WTO Negotiating Group on Trade Facilitation. Based on cost estimations in customs-related lending projects, the paper finds that the costs for implementing, maintaining and operating automated customs systems are substantial. However, the very great majority of WTO members have already implemented such systems and past experiences show that the financial benefits in many cases have exceeded the costs over time. Among the various lessons learned from successful implementation of automated customs systems, two are particularly worth highlighting. First, automation should not be considered a panacea for trade facilitation; and second, commitment and financial sustainability are prerequisites for successful customs modernisation involving automation.

Keywords: customs, customs automation, customs modernisation, trade facilitation

ACKNOWLEDGEMENTS

This study was prepared by Tadashi Yasui and was updated and extended by Michael Engman of the OECD Trade Directorate. Anthony Kleitz and Evdokia Móisé of the OECD Trade Directorate provided guidance. The Working Party of the OECD Trade Committee has agreed to declassify this paper, with the aim of bringing information on this subject to the attention of the wider audience. It is available at the OECD website under the following address: www.oecd.org/trade.

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EXECUTIVE SUMMARY

Trade facilitation was included in the mandate for trade negotiations in the Doha Development Agenda in July 2004. Before this decision, some opponents of the inclusion argued that several countries lacked the necessary capacity to implement new rules on trade facilitation and that the potential costs could go beyond the means of many developing countries. This paper analyses customs automation which is one of the most powerful tools to increase customs efficiency. It focuses in particular on the benefits and implementation costs of automation.

Automation is not a requirement under existing WTO disciplines and its role in relation to any future disciplines is still the subject of negotiations in Geneva. Some countries have argued that most trade facilitation measures could be undertaken without automation while others have argued that measures related to automation would be among the most essential for ensuring a useful outcome of the negotiations. It is thus misleading to assume that all WTO members would be required to implement automation for government border procedures. This document aims to provide background information that may increase the understanding of how automation issues could be dealt with in future WTO disciplines on trade facilitation.

Automation is a powerful tool to facilitate trade but it is not an objective in itself. Automation only makes sense if it serves as a tool to support implementation of modern customs management practices. There are plenty of trade facilitation measures that do not require automation and some of these measures are already included in the current GATT framework. However, there are provisions that are poorly implemented in many countries and a stricter adherence to existing rules and guidelines would greatly facilitate trade.

Automation entails costs for both businesses and governments and this paper reviews cost estimations in customs-related lending projects. These figures are usually substantial, including continuous operating and maintenance costs. The paper shows that the very great majority of WTO members already have implemented automated customs systems and past experiences also show that the financial benefits in many cases have exceeded the costs over time. The opportunity cost due to a lack of automation may thus be significant.

In addition, this paper examines two other issues that are of importance in realising the gains from automation. The first is the role of customs-related lending projects in the successful implementation of automation. Among the various lessons learned from past projects, two are particularly worth highlighting: first, automation should not be considered a panacea for trade facilitation; and second, commitment and financial sustainability are prerequisites for successful customs modernisation involving automation.

The second issue is to identify trends in ongoing and recently-introduced trade facilitation projects. Newcomers to trade facilitation have the advantage of drawing on a wealth of experiences of best practices related to customs reform. Paperless environments, Internet-based systems, single window environments, and harmonisation/standardisation are a few of the observed trends. Multi-tier means of communication and the interoperability between different automated systems are other important developments.

List of abbreviations

ACE	Automated Commercial Environment
APEC	Asia Pacific Economic Cooperation
ASEM	Asia-Europe Meeting
ASYCUDA	Automatic System for Customs Data
BSCC	Baltic Sea Customs Conference
CAP	Collective Action Plan
CCRA	Canada Customs and Revenue Agency
CTB	Customs and Tariff Bureau
CTG	Council for Trade in Goods
DDA	Doha Development Agenda
DFAT	Department of Foreign Affairs and Trade
EC	European Commission
EDI	Electronic Data Interchange
ESCAP	Economic and Social Commission for Asia and the Pacific
EU	European Union
FTA	Free Trade Agreement
GATT	General Agreement on Tariffs and Trade
GSP	Generalised Preferential System
G7	Group of Seven
IAP	Individual Action Plan
ICC	International Chamber of Commerce
ICT	Information and Communication Technology
IMF	International Monetary Fund
JETRO	Japan External Trade Organization
JSEPA	Japan-Singapore Economic Partnership Agreement
LDC	Least Developed Countries
MOF	Ministry of Finance
NAFTA	North American Free Trade Agreement
NCTS	New Computerised Transit System
SAD	Single Administrative Declaration
SME	Small and Medium-sized Enterprise
SOFI	Solutions Françaises Informatiques
SPS	Sanitary and Phytosanitary
TEDI	Trade Electronic Data Interchange
TIMS	Trade Information Management System
TPR	Trade Policy Review
UN	United Nations
UN/CEFACT	United Nations Centre for Trade Facilitation and Electronic Business
UNCTAD	United Nations Conference on Trade and Development
UNECE	United Nations Economic Commission for Europe
UN/EDIFACT	UN Directories for Electronic Data Interchange for Administration, Commerce and Transport,
USTR	United States Trade Representative
VAN	Value-Added Network
WCO	World Customs Organisation
WTO	World Trade Organisation

INTRODUCTION

1. Issues related to customs automation and the use of information and communication technology (ICT) in trade procedures have attracted considerable attention in WTO discussions on trade facilitation. Several developing countries have raised the issue of their lack of capacity to implement potentially new WTO trade facilitation disciplines. In spite of the fact that there is still no full understanding of the type and magnitude of the costs involved in implementing trade facilitation measures, it is generally assumed that a substantial part of the costs are attributed to automation. Indeed, automation gives rise to significant implementation, operating and maintenance costs but the following analysis will show that the great majority of developing countries already have automated customs systems in their main seaports and airports. Prospective new trade facilitation disciplines are being discussed in the WTO Negotiating Group on Trade Facilitation (NGTF) and an agreement is yet to be reached. This paper does not intend to assess whether trade facilitation modalities in any way could be coupled to automation but rather studies the role of automation in facilitating trade. Significant progress can also be made in the area of trade facilitation without regard to automation (see Box 1).

2. Automation is not a requirement under the current multilateral trade facilitation disciplines of GATT Article V, VIII and X, which have been in place for more than half a century. Nevertheless, non-binding recommendations or guidelines are quite frequent at the multilateral level (UN, 2001)¹. In the trade facilitation discussions that took place at the WTO Council for Trade in Goods (CTG) leading to the WTO Cancun Ministerial, some participants argued that most trade facilitation measures could be implemented without automation. Other participants argued that automation would be among the most essential factors for ensuring the success of trade facilitation measures considering its significant efficiency-enhancing impact on government border procedures.

3. There is a general consensus that automation may efficiently serve both public and private interests. Automation has the potential to facilitate trade while also helping to meet objectives related to the maintenance of national and social security. Smooth trade flows are paramount in many countries that are dependent on just-in-time delivery and global supply chain systems. Predictable border services, customs clearance time and trade transaction costs are important factors when companies consider investing or doing business in a country (OECD, 2005a). From a public sector perspective, limited human resources and rapidly growing trade volumes have led to the recognition of automation as essential to safeguard and meet budgetary, health, environmental and other social goals. Heightened national security concerns relating to the international movement of cargo following the 9/11 terrorist attacks have also encouraged further use of automation and ICT at borders. Automation serves other purposes than facilitating movement of goods and people: added benefits may include reduced levels of smuggling, corruption, increased productivity in customs operations, and improvements in valuation methods which may have the added benefit of increasing government revenue.

¹ Although the revised version of the WCO's Kyoto Convention (formally named as the International Convention on the Simplification and Harmonization of Customs Procedures) recognises the importance for trade facilitation of making the maximum use of automated systems, it creates no obligation to make available or accept computerised data entry (EC, 2003a).

4. It is misleading to assume *a priori* that all WTO members would be required to implement automation for government border procedures under prospective WTO disciplines on trade facilitation. It is not yet clear whether new obligations will emerge in this area and what form they would take. Thus, it may be early to discuss lack of capacity relating to automation. Automation is not a pre-condition for trade facilitation initiatives but considering its great potential impact, the issue of automation appears unavoidable when the cost of trade facilitation is discussed. Also, the benefits should be taken into consideration in any assessment of the role of automation in trade facilitation. The objective of this paper is to provide background information about automation issues that could be dealt with in possible WTO disciplines on trade facilitation and contribute to discussions in the WTO NGTF.

Box 1. Trade facilitation without automation

Automation is a powerful tool to facilitate trade but it is not an objective in itself. Automation only makes sense if it serves as a tool to support implementation of modern customs management practices. There are plenty of trade facilitation measures that do not require automation and some of these measures are already included in the current GATT framework. However, there are provisions that are poorly implemented in many countries and a stricter adherence to existing rules and guidelines would greatly facilitate trade.

The publication and easy access to information concerning trade regulations is one area which would greatly help traders, in particular SMEs. This could include the establishment of single window enquiry points with information on trade regulations and timely notification of new trade regulations. According to GATT Article VIII, customs fees and charges on imports should be limited in amount to the approximate cost to the services rendered. A recent OECD (2005b) paper found that many countries still charge high *ad valorem* fees without ceilings for various purposes and services. A stricter definition of how these fees should be calculated and what constitutes a valid “customs service” would further reduce trade transaction costs.

Trade formalities can be submitted to single window environments which do not necessarily need to be automated. Manual initiatives are less ambitious but they are nevertheless beneficial for both governments and traders. Costa Rica introduced a manual single window system in 1994 with the aim of simplifying and accelerating import and export administration for foreign trade procedures. Risk management principles can also be applied by all customs administrations. Risk management requires the customs administration to have a clear understanding of the nature of existing risks and the development of practical methods to mitigate these risks but automation is not a prerequisite (Widdowson, 2005).

The Dutch Ministry of Trade and Industry recently surveyed Dutch companies to investigate the type of trade facilitation measures that would make a direct impact on their daily operations. Three of the most common answers related to measures that do not require automation. First, a central enquiry point would increase transparency and anticipation. Second, a move towards mutual recognition of inspection certificates would greatly facilitate trade, especially a removal of double SPS inspection procedures. Third, traders (and customs authorities) would save on administrative work if customs authorities minimised the requirement of non-standard documents.

5. The paper is organised as follows. Part I reviews cost and benefit analyses provided in the existing literature. Part II and Part III deal respectively with two other issues that are relevant for reducing costs and adding to the benefits from automation: namely, the lessons that can be drawn from customs-related lending projects; and the emerging trends in ongoing initiatives and recently-introduced trade facilitation measures in selected economies. The final part concludes.

PART I. COST AND BENEFIT ANALYSIS

6. There is a scarcity of reliable data comparable across countries which would allow for a more detailed assessment of the costs and benefits of customs automation. This section examines national trade facilitation experiences and the analysis acknowledges the benefits resulting from overall trade facilitation efforts.

A. Costs

7. Customs automation gives rise to costs for both businesses and customs authorities. Few studies have attempted to estimate these costs due to the complexity involved (Finger, 2000) although recent OECD work has presented the cost experiences of several countries (OECD, 2004a). This section draws mainly on data from customs-related lending projects and the OECD projects on costs of trade facilitation measures. Trade facilitation is only one of the objectives of automation so the total cost of automation is greater than other initiatives to facilitate trade.

8. The more narrow focus of customs procedures will be used here because of the greater availability of data. Challenges related to cost estimations of customs automation include:

1. The costs vary significantly depending e.g. on the initial state of the border procedures and the desired nature and extent of automation. Any cost figure is dependent on each country's unique situation.
2. The implementation of automation presupposes the availability of related technologies, infrastructure, financial and human resources, and other conditions. For example, it would not work appropriately without stable electricity supply and communication means or appropriate human resources for daily operation, management and maintenance (see Box 2 for a discussion). Thus, the cost boundaries are rather unclear.
3. Without laws recognising its legal status, electronic documentation must continue to be accompanied by paper documents. In this sense, an appropriate legal framework needs to be established such as that relating to digital signatures. The cost of changing laws and regulations may be included but it is often difficult to estimate the related costs².
4. Additional costs may be associated with procedural and organisational changes within both businesses and customs authorities (Finger, 2003).

9. Automation has been considered a critical part in most customs-related lending projects and it was incorporated in over 90% of the technical assistance projects with a customs component funded by the World Bank between 1994 and 2002³. Also, ASYCUDA (Automatic SYstem for CUstoms Data),

² Even if paper copies must be submitted afterwards, automated pre-arrival clearance drastically reduces delays.

³ An automation element has been included in 24 out of 27 technical assistance projects with customs components in the World Bank during 1994-2002 (World Bank, 2005).

developed and maintained by UNCTAD, had been installed in over 80 developing countries as of 2005⁴. According to WTO Trade Policy Reviews (2000-2005), most WTO countries, including least developed countries, have established customs automation systems, despite different degrees of development and coverage of the systems (see Box 3 for a discussion regarding the choice of automated system).

Box 2. Constraints to implementing automation systems

While automation/computerisation can increase the efficiency of well-run operations, it is not a miracle solution to existing problems. Automation of customs procedures needs to be part of an overall modernisation project not to add to the cases where the inappropriate introduction of computer systems has exacerbated existing problems.

The successful outcome of the introduction of automation is conditioned on careful planning, preparation and sequencing of a number of activities, including training of operators, procurement of hardware and the development/purchase of own/package software. Computerised systems are also dependent on reliable power supply, telecommunication networks, computer hardware suppliers and the availability of local maintenance services.

Several procedural considerations are crucial in automation projects. First, automation projects are heavily dependent on long-term political commitment – at low and high levels alike – because automation projects may be resource-intensive, time-consuming and controversial. Second, prior adjustment/simplification and review of tariff schemes and customs legislation facilitate the post-reform administration and remove many potential issues. New legislation may also be needed in order to introduce electronic signatures and encryption techniques as well as to assure data security. Third, automation needs to be preceded by standardisation, consolidation, modernisation and simplification of the entire manual system and its procedures – with the simplification and streamlining of customs procedures and documentation, the development of a self-assessment system, and planning and preparation for implementation.

Fourth, automated systems need to connect to a number of external sources and issues related to trade data interchange standards, telecommunication standards, security arrangements etc. need to be negotiated and settled with trade participants, including importers, exporters, banks, seaport and airport authorities, shippers, brokers, and freight forwarders. In addition, the potential introduction of single window systems bring a host of issues related to government inter-agency communication and institutional co-operation.

Source: This text draws mainly on De Wulf and McLinden (2005) and Corfmat and Castro (2003).

10. Automation normally entails substantial costs, in some cases amounting to over two-thirds of the total cost of a customs-related lending project. For example, the 6-year budget for the Russian Customs Development Project (2003-2009) was estimated at nearly USD 190 million, of which USD 133 million is devoted to customs automation (World Bank, 2003). The cost for automation accounted for 40% of the total fund in the customs reform projects in Tanzania and 60% in Central and Eastern Europe (Finger et al., 1999). The estimated cost of customs automation can be significant for governments, in particular for those of least-developed countries. It may be drastically decreased, however, as the use of the Internet has eliminated the need for expensive hardware (World Bank, 2000).

11. According to UNCTAD (2002a), the cost is normally estimated at less than USD 2 million for the ASYCUDA system and it can be as high as USD 20 million if a country develops an original system. In practice, the introduction of the ASYCUDA system required external funding of around USD 9 million in Bolivia (Gutierrez, 2001) and USD 5.5 million in Jamaica (Grant, 2001). In Turkey, the total introduction cost of the SOFI system amounted to USD 32 million (World Bank, 2005). One survey

⁴ See details at www.asycuda.org

commissioned by the Japan Customs (Japanese CTB, 2001a) estimated the cost of setting up Korea's original automated customs system at around USD 24 million between 1992 and 1997. One fourth of this cost was related to programme development and management, and the rest was spent on hardware. The Royal Thai Customs invested Baht 1.0 billion in 1997-2000 to introduce and install an IT system in its central offices and an additional Baht 400 million is budgeted for 2004-2006 to migrate it to an open Internet-based system accessible from all customs offices (based on information provided by the Thai authorities).

12. Senegal developed a system for customs operation management (Trade X) between 1986 and 1990. The cost of upgrading this system in 2000-2002 to a web-based version was € 3 000 000. Half of this cost was related to investments in IT-equipment. Ten professionals are currently employed to maintain, update and operate the system and the yearly cost for this team is € 600 000. A more recent three-year project to develop a single window system (Orbus) cost € 610 000 and the system draws on the IT-infrastructure provided by Trade X and installed at the Customs headquarter. 18 professionals are operating the single window system at an estimated cost of € 600 000 per year. This cost can be compared to the € 800 000 that are collected in yearly service charges. Senegal's customs web site was developed over a six-month period at a cost of € 15 000 (based on information provided by the Senegalese authorities).

13. Automated systems incur substantial operating, maintenance and updating costs. It is reported that updating ASYCUDA software requires at least an estimated USD 2 million (Nathan Associates Inc., 2002). The operating and updating costs may be balanced by user fees or financed by governments. Haiti's upgrade of ASYCUDA to ASYCUDA ++ at principal customs offices cost USD 1.43 million. In Singapore, operating costs are covered by user fees, while updating costs are financed by the government. Chinese Taipei updated its air cargo clearance system in 2000 at a cost of USD 5 million, and it will update its ocean-going cargo system in 2004 with a total budget of about USD 6.5 million (WTO CTG, 2002). In the Philippines, updating the automated system from a DOS-based system to a Windows platform increased the costs of its modernisation project by 40% to USD 27 million in total. Most of the funding was used for purchasing hardware and software (Bhatnagar, 2001).

Box 3. Off-the-shelf systems vs. in-house development of automated systems

IMF (2003) argues that acquiring an existing software package such as ASYCUDA ++, MicroClear, SOFI, TATIS or TIMS is less costly than developing original software. Apart from the cost, there are advantages and disadvantages related to this option. The World Bank (2005) argues that off-the-shelf systems incorporate the most advanced technologies and give the assurance that the functions of the different system modules are stable and robust. In-house developed systems tend to be more expensive and often not as well designed as those on the market. Widespread use, the availability of external expertise and the use of international standards are other advantages of off-the-shelf systems.

14. However, these available systems also bring some disadvantages of which inflexibility and difficulty in changing or upgrading the system can be major concerns. Off-the-shelf systems may be available to competitive prices, or even come free, but there are inevitable long-run costs that can significantly reduce their benefits. The reliance on external expertise makes implementing countries dependent on the future procurement of services. External service providers may have limited capacity to provide timely services or simply go out of business. Customs administrations may hence chose to develop local IT expertise to gradually reduce the level of dependency on the service providers.

B. Benefits

15. Several country experiences indicate that customs automation benefits both traders and governments. How much of the benefits are related to the introduction of automation is less clear. Effective implementation of modern customs procedures (e.g. risk management, pre-arrival processing, and post clearance audit), uniform application of national laws and regulations as well as the generation and analysis of customs data enhance the efficiency of customs procedures, for example through the reductions in direct costs and delays. It also provides an effective anti-corruption mechanism thanks to the reduced face-to-face interaction between customs officials and traders. Several countries also have reported that customs automation has helped to both increase customs productivity and to tackle fraud, smuggling and valuation issues (see OECD (2005) for further discussion).

16. Some country experiences provide quantitative assessments of overall benefits, especially in terms of customs clearance time. According to WTO TPRs (2000-01 – 2005-06), customs clearance can be quickly executed under electronic environments provided that all the requirements and paper formalities are in order. Table 1 reveals that the great majority of WTO members have implemented some kind of automated system. All OECD members and non-OECD EC members have automated customs systems while 83% of non-OECD members were reported to have automation systems implemented at the time of publication of the WTO TPRs⁵. UNCTAD's ASYCUDA and ASYCUDA ++ systems are installed in more than half, or 62 out of 110, of the reported developing and least developed countries. In some of these countries, automation is only installed in major seaports and airports but the table indicates that most cross-border movement of goods – typically between 75% and 100% in terms of import value – were covered. Several developing and least developed countries have more than a decade of experience with the ASYCUDA system.

17. The data on customs clearance time reported in the WTO TPRs are based on government information rather than independent measurements by the WTO. This may be one explanation why the clearance times reported in Table 1 in many cases are lower than the time reported in many independent surveys of traders.⁶ For example, the authorities of Benin state that customs formalities take less than 24 hours but this view is not shared by private operators according to the WTO TPR. Table 1 indicates that there is a great difference in clearance time between different countries with automated systems and even between countries with similar systems. For example Guyana which has installed an ASYCUDA system reports clearance time below 168 hours while other countries with a similar system report average clearance time in low single digit hours. This illustrates how important other factors than automation are in trade facilitation. Most developing countries with automated customs systems report that average customs clearance take between 24 and 72 hours.

⁵ The WTO Trade Policy Review of the EC states that: “*The uniform implementation of common customs procedures by EC member states has been a challenge due to variation in the availability of electronic access to customs..., limited interfaces for interoperability between systems, and different interpretation of EC customs legislation by national customs administrations...*”. It also states that “*The challenge is being addressed within the context of the EC’s “Customs 2007” programme... [which] aims to ensure that member states’ customs administrations interact and perform their duties as efficiently as a single administration; improve trade facilitation...*”.

⁶ It is unclear from the WTO TPRs how the clearance time is measured and if the authorities always use the same definition. Many of the figures refer to average customs clearance of cases where all requirements and paper work are in order. Other cases are less clear and simply refer to “average” customs clearance. This discrepancy and loose definition imply that any comparisons should be done with caution. The data presents customs information provided over a five and a half year period and the clearance times may since have changed for some countries as they have reformed their border procedures.

18. In Canada, the standard clearance time was 45 minutes in 2000, but most goods were cleared within seconds (WTO CTG, 2000). In Australia, over 98% of electronically lodged import entries were processed within 15 minutes in year 2000 (Australian Customs Service, 2002). Customs clearance time was reportedly an average of 4 hours in Spain (OECD, 2000), 30 minutes in Greece (OECD, 2001), 14 minutes in France (OECD, 2003a), and less than 24 hours in major cases in Mozambique (OECD, 2003b). Thanks to the paperless trading system, the average customs clearance time has fallen from 5.3 to 1.5 hours in Chinese Taipei, and from 12.2 to 1.1 hours in Mexico (Australian DFAT, 2001). Morocco's automated system contributed to a reduction of the average clearance time from 132 hours in 1997 to less than an hour in 2002. Major effects of the Peruvian customs reform programme included release time reduced from 360-720 hours in 1990 to 2-48 hours in 1996 (Wilson et al., 2002). Automated systems in Costa Rica helped the average customs clearance time to be reduced from 144 hours before 1994 to 12 minutes for the cases without inspection and 115 minutes for those requiring physical inspection in 2000. Argentina reports that a reorganisation and the introduction of its Maria Informatics System helped reduce clearance time from four days to 24 hours (based on information provided by the Argentinean authorities). See Box 4 for some further experiences from time release studies.

19. The effectiveness of automation is more tangible when one compares customs clearance time between automated and paper-based systems (see Table 2). The New Zealand customs service envisages the processing of EDI import entries within 0.5 hour and paper-based entries within 24 hours (WTO TPR, 2003). In Chile, the average customs clearance time was 2.2 hours (the maximum was 3 hours) with EDI processing, and 10.8 hours with the paper-based system (WTO CTG, 1998). The Philippines' project for computerising tax and customs administrations during the period 1994-1999 also resulted in considerably reduced customs clearance time for EDI users compared to non-EDI users in the first quarter of 2002 (Arevalo, 2002). In Thailand, it takes less than an hour on average for EDI systems, while 3-4 hours are needed for non-EDI processing (WTO TPR report, 2003).

20. Chile's implementation of an Electronic Data Interchange system brought significant benefits to the trading community (WTO, 2000). For example the number of data inputting errors fell from 14% to 2%. Traders were also allowed to resubmit import declarations with errors on the same day instead of the following day. The opening hours for submitting declarations were greatly extended, customs clearance time was drastically reduced and a number of officials were reassigned from repetitive administrative work to more value-adding duties such as customs inspection.

Table 1. Customs automation and clearance time for imports in WTO members

OECD Members	Year*	Automation	System**	Automation coverage	Clearance time (h)***	PSI
Australia	2002	<input checked="" type="checkbox"/>		98%	...	<input type="checkbox"/>
Canada	2003	<input checked="" type="checkbox"/>		<input type="checkbox"/>
EC	2004	<input checked="" type="checkbox"/>		<input type="checkbox"/>
Iceland	2000	<input checked="" type="checkbox"/>		95%	"a few minutes"	<input type="checkbox"/>
Japan	2005	<input checked="" type="checkbox"/>		...	0.6-4.3	<input type="checkbox"/>
Korea	2004	<input checked="" type="checkbox"/>		75%	1.3	<input type="checkbox"/>
Mexico	2002	<input checked="" type="checkbox"/>		...	< 3	<input type="checkbox"/>
New Zealand	2003	<input checked="" type="checkbox"/>		100%	0.2	<input type="checkbox"/>
Norway	2004	<input checked="" type="checkbox"/>		...	0.05-0.08	<input type="checkbox"/>
Switzerland	2004	<input checked="" type="checkbox"/>		90%	...	<input type="checkbox"/>
Turkey	2003	<input checked="" type="checkbox"/>		100%	< 24	<input type="checkbox"/>
United States	2004	<input checked="" type="checkbox"/>		96%	...	<input type="checkbox"/>
Non-OECD Members						
Albania	...	<input checked="" type="checkbox"/>	ASYCUDA ++			
Angola	...					
Antigua & Barbuda	2001	<input checked="" type="checkbox"/>	ASYCUDA	...	24-72	<input type="checkbox"/>
Argentina	...	<input checked="" type="checkbox"/>				
Armenia	...	<input checked="" type="checkbox"/>	ASYDUDA ++			
Bahrain	2000	<input type="checkbox"/>
Bangladesh	2000	<input checked="" type="checkbox"/>	ASYCUDA ++	...	48-72	<input checked="" type="checkbox"/>
Barbados	2002	<input checked="" type="checkbox"/>	ASYCUDA ++	...	...	...
Belize	2004	<input checked="" type="checkbox"/>	ASYCUDA	...	< 72	<input type="checkbox"/>
Benin	2004	<input checked="" type="checkbox"/>	ASYCUDA ++	...	< 24	<input checked="" type="checkbox"/>
Bolivia	...	<input checked="" type="checkbox"/>	ASYCUDA ++			
Botswana	2003	<input checked="" type="checkbox"/>	ASYCUDA	...	0.17-0.75	...
Brazil	2004	<input checked="" type="checkbox"/>		...	30-40	<input type="checkbox"/>
Brunei	2001	<input type="checkbox"/>
Bulgaria	2003	<input checked="" type="checkbox"/>		<input type="checkbox"/>
Burkina Faso	2004	<input checked="" type="checkbox"/>	ASYCUDA ++	98%	48	<input checked="" type="checkbox"/>
Burundi	2003	<input checked="" type="checkbox"/>	ASYCUDA	...	48-72	<input checked="" type="checkbox"/>
Cambodia	...	<input checked="" type="checkbox"/>				
Cameroon	2001		<input checked="" type="checkbox"/>
Central African Rep.	...	<input checked="" type="checkbox"/>	ASYCUDA			
Chad	...	<input checked="" type="checkbox"/>	ASYCUDA ++			
Chile	2003	<input checked="" type="checkbox"/>		100%	< 24	<input type="checkbox"/>
China	...	<input checked="" type="checkbox"/>				
Colombia	...	<input checked="" type="checkbox"/>	ASYCUDA			
Congo	...	<input checked="" type="checkbox"/>	ASYCUDA ++			
Costa Rica	2001	<input checked="" type="checkbox"/>		...	1	...
Cote d'Ivoire	...	<input checked="" type="checkbox"/>	ASYCUDA			
Croatia	...					
Cuba	...	<input checked="" type="checkbox"/>	ASYCUDA			
Dem Rep. Congo	...	<input checked="" type="checkbox"/>	ASYCUDA			
Djibouti	...					
Dominica	...	<input checked="" type="checkbox"/>	ASYCUDA			
Dominican Rep.	2002	<input checked="" type="checkbox"/>		...	48	<input type="checkbox"/>
Ecuador	...					
Egypt	...					

*) The year of publication of WTO TPR.

**) The UNCTAD ASYCUDA or ASYCUDA ++ system is implemented or is being implemented.

***) The data reported typically refer to "average clearance time" or "clearance time in normal cases".

"..." no relevant information available in the sources mentioned below.

The ticked boxes indicates "yes"; and unticked boxes "no".

Source: WTO Trade Policy Reviews (2000 January - 2005 June); OECD (2003b, 2004a); UNCTAD (2005).

Table 1. Customs automation and clearance time for imports in WTO members, *continued*

Non-OECD Members	Year	Automation	System*	Automation coverage	Clearance time (h)**	PSI
El Salvador	2003	<input checked="" type="checkbox"/>	ASYCUDA ++	...	< 24	...
Fiji	...	<input checked="" type="checkbox"/>	ASYCUDA ++	...	...	...
FYR Macedonia	...	<input checked="" type="checkbox"/>	ASYCUDA ++	...	...	...
Gabon	2001	<input checked="" type="checkbox"/>	ASYCUDA ++	...	...	...
The Gambia	2004	<input checked="" type="checkbox"/>	ASYCUDA	...	3-4	<input type="checkbox"/>
Georgia	...	<input checked="" type="checkbox"/>	ASYCUDA ++	...	...	...
Ghana	2001	<input checked="" type="checkbox"/>	ASYCUDA	...	24-48	<input type="checkbox"/>
Grenada	2001	<input checked="" type="checkbox"/>	ASYCUDA	...	< 48	<input type="checkbox"/>
Guatemala	2002	<input checked="" type="checkbox"/>	ASYCUDA	...	4-24	<input type="checkbox"/>
Guinea	...	<input checked="" type="checkbox"/>	ASYCUDA	...	...	...
Guinea Bissau	...	<input checked="" type="checkbox"/>	ASYCUDA	...	...	...
Guyana	2003	<input checked="" type="checkbox"/>	ASYCUDA	...	< 168	<input type="checkbox"/>
Haiti	2003	<input checked="" type="checkbox"/>	ASYCUDA ++	...	24-48	<input checked="" type="checkbox"/>
Honduras	2003	<input checked="" type="checkbox"/>	ASYCUDA ++	98%	24-72	<input type="checkbox"/>
Hong Kong, China	2002	<input checked="" type="checkbox"/>		100%	...	<input type="checkbox"/>
India	2002	<input checked="" type="checkbox"/>		75%	...	<input type="checkbox"/>
Indonesia	2003	<input checked="" type="checkbox"/>		<input type="checkbox"/>
Israel	...					
Jamaica	2005	<input checked="" type="checkbox"/>		...	< 24	<input type="checkbox"/>
Jordan	...	<input checked="" type="checkbox"/>	ASYCUDA ++			
Kenya	2000	<input checked="" type="checkbox"/>		...	< 48	<input checked="" type="checkbox"/>
Kuwait	...					
Kyrgyz Rep.	...					
Lesotho	2003	...		...	48-72	...
Macao, China	2001	<input checked="" type="checkbox"/>		...	0.33	...
Madagascar	2001	<input checked="" type="checkbox"/>	ASYCUDA	<input type="checkbox"/>
Malawi	2002	<input checked="" type="checkbox"/>	ASYCUDA ++	...	48-72	<input checked="" type="checkbox"/>
Malaysia	2001	<input checked="" type="checkbox"/>		...	3-48	<input type="checkbox"/>
Maldives	2003	<input checked="" type="checkbox"/>	ASYCUDA ++	...	< 2	<input type="checkbox"/>
Mali	2004	<input checked="" type="checkbox"/>	ASYCUDA	95%	2-6	<input checked="" type="checkbox"/>
Mauretania	2002	<input checked="" type="checkbox"/>	ASYCUDA ++	...	48	<input checked="" type="checkbox"/>
Mauritius	2001	<input checked="" type="checkbox"/>		...	0.08-1	<input type="checkbox"/>
Moldova	...	<input checked="" type="checkbox"/>	ASYCUDA	...	...	...
Mongolia	2005	<input checked="" type="checkbox"/>	ASYCUDA	65%	...	<input type="checkbox"/>
Morocco	2003	<input checked="" type="checkbox"/>		100%	0.87	<input type="checkbox"/>
Mozambique	2001	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Myanmar	...					
Namibia	2003	<input checked="" type="checkbox"/>	ASYCUDA ++	90%	2-4	<input type="checkbox"/>
Nepal	...	<input checked="" type="checkbox"/>	ASYCUDA ++			
Nicaragua	...	<input checked="" type="checkbox"/>	ASYCUDA ++			
Niger	2003	<input checked="" type="checkbox"/>	ASYCUDA	...	...	...
Nigeria	2005	<input checked="" type="checkbox"/>	ASYCUDA	...	48	<input checked="" type="checkbox"/>
Oman	...					
Pakistan	2002	<input checked="" type="checkbox"/>		...	24	<input checked="" type="checkbox"/>
Panama	...	<input checked="" type="checkbox"/>	ASYCUDA			
Papua New Guinea	...	<input checked="" type="checkbox"/>	ASYCUDA			
Paraguay	2005	<input type="checkbox"/>
Peru	2000	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Philippines	...	<input checked="" type="checkbox"/>	ASYCUDA ++			
Qatar	2005	<input checked="" type="checkbox"/>		...	1-3	<input type="checkbox"/>

*) The year of publication of WTO TPR.

**) The UNCTAD ASYCUDA or ASYCUDA ++ system is implemented or is being implemented.

***) The data reported typically refer to "average clearance time" or "clearance time in normal cases".

"..." no relevant information available in the sources mentioned below.

The ticked boxes indicates "yes"; and unticked boxes "no".

Source: WTO Trade Policy Reviews (2000 January - 2005 June); OECD (2003b, 2004a); UNCTAD (2005).

Table 1. Customs automation and clearance time for imports in WTO members, *continued*

Non-OECD Members	Year	Automation	System*	Automation coverage	Clearance time (h)**	PSI
Romania	...	<input checked="" type="checkbox"/>	ASYCUDA ++			
Rwanda	2004	<input checked="" type="checkbox"/>	ASYCUDA	...	48	<input checked="" type="checkbox"/>
St Kitts & Nevis	2001	<input checked="" type="checkbox"/>	ASYCUDA	...	...	...
St Lucia	2001	<input checked="" type="checkbox"/>	ASYCUDA	<input type="checkbox"/>
St Vincent & Gren.	2001	<input checked="" type="checkbox"/>	ASYCUDA	...	...	...
Senegal	2003	<input checked="" type="checkbox"/>		90-95%	...	<input checked="" type="checkbox"/>
Sierra Leone	2005	<input checked="" type="checkbox"/>		...	24	<input checked="" type="checkbox"/>
Singapore	2004	<input checked="" type="checkbox"/>		...		<input type="checkbox"/>
Solomon Islands	...					
South Africa	2003	<input checked="" type="checkbox"/>		...	< 72	...
Sri Lanka	2004	<input checked="" type="checkbox"/>	ASYCUDA ++	<input type="checkbox"/>
Suriname	2004	<input checked="" type="checkbox"/>	ASYCUDA	...	< 72	<input checked="" type="checkbox"/>
Swaziland	2003	...		...	24	<input type="checkbox"/>
Chinese Taipei	...					
Tanzania	2000	<input checked="" type="checkbox"/>	ASYCUDA	...	24	<input checked="" type="checkbox"/>
Thailand	2003	<input checked="" type="checkbox"/>		85%	< 4	<input type="checkbox"/>
Togo	...	<input checked="" type="checkbox"/>	ASYCUDA			
Trinidad and Tobago	...	<input checked="" type="checkbox"/>	ASYCUDA			
Tunisia	...					
Uganda	2001	<input checked="" type="checkbox"/>	ASYCUDA ++	...	72	<input type="checkbox"/>
United Arab Emirates	...					
Uruguay	...					
Venezuela	2002	<input checked="" type="checkbox"/>	ASYCUDA ++	...	48	...
Zambia	2002	<input checked="" type="checkbox"/>	ASYCUDA ++	...	2-3	<input type="checkbox"/>
Zimbabwe	...					

*) The year of publication of WTO TPR.

***) The UNCTAD ASYCUDA or ASYCUDA ++ system is implemented or is being implemented.

***) The data reported typically refer to "average clearance time" or "clearance time in normal cases".

"..." no relevant information available in the sources mentioned below.

The ticked boxes indicates "yes"; and unticked boxes "no".

Source: WTO Trade Policy Reviews (2000 January - 2005 June); OECD (2003b, 2004a); UNCTAD (2005).

Table 2: Customs clearance time in automated and non-automated environments

Country	Customs Clearance Time (hours)		Conditions	Sources
	Automation	Non-automation		
Chile	2.2	10.8	On average	WTO CTG (1998)
New Zealand	0.5	24	At maximum	WTO TPR (2003)
Philippines	0.1-0.5	1.0-2.5	No inspection	Arevalo (2002)
	1.1-24.5	2.1-24.2	Documentary inspection	
	4.1-48.5	6.1-72.5	Physical inspection	
Thailand	1	3-4	On average	WTO TPR (2003)

21. The border waiting time may be reduced by the introduction of automation to other border procedures, in particular by establishing a single window system (see section 3.3). For example, it has been estimated that extended use of automated systems has made it possible to shorten the delay from port entry to release for food or like products imported to Japan by 47% (JETRO, 2002). In Korea, a single window system linking automated systems among customs and 56 other government agencies has reduced the

waiting time by half in government border procedures for the goods subject to clearance confirmation for public health, social security, and environmental protection (WTO TPR, 2000).

22. Reducing delays at the border can provide substantial benefits to traders. Hummels (2001) estimates that one day saved at the border would equal a 0.5% reduction in tariffs. Another quantitative study on benefits of trade facilitation also suggested that the welfare gains would be higher for trade facilitation measures reducing delays at the border than those for reducing compliance cost related to border procedures (OECD, 2003c).

Box 4: Time release studies in selected countries

Indonesia: A study of cargo clearance times at Tanjung Perak port in Indonesia by the World Customs Organisation (WCO) found that the customs clearance process for certain shipments took an average of 6.4 minutes, compared to 159 hours and 23 minutes for other activities involved in cargo clearance. The main sources of delay included incomplete documents; red tape involved in releasing goods from godowns; documentation errors; payment hold-ups; and deliberate delays in delivery, even after the release of goods by customs officials.

Source: Wilson et al. (2000)

Japan: The latest Japanese time release study showed that sea-cargo imported to Japan took 68.4 hours on average from port entry to customs entry declaration in 2001, while 4.9 hours on average from customs declaration to permission. The study also showed that air-cargo imported to Japan took 25.1 hours on average from port entry to customs entry declaration, while 0.4 hours on average for clearance time.

Source: Japanese CTB (2001)

The Baltic countries: At the 4th Baltic Sea Customs Conference (BSCC) in Vilnius in June 2001 it was agreed that a pilot study to measure the time for border crossing would be carried out in Estonia, Germany, Latvia, Lithuania, Norway, Sweden and Poland. The crossings of more than 33000 vehicles were measured. The result shows that average border crossing time takes between eleven minutes to over twelve hours. The goal to reach two-hour border crossing was only fulfilled in 50% of the measured border crossings.

Source: BSCC (2002)

C. Do investments in customs automation pay off?

23. There is a significant opportunity cost of foregoing the efficiency gains that are provided through automation and its trade facilitation effects (WTO CTG, 2000). Experiences have shown that development and implementation costs can be covered by the financial benefits incurred in the long run, as seen in World Bank project appraisal reports (World Bank, 2000).

24. The cost-benefit assessment for United States' Automated Commercial Environment (ACE) – a new automated customs system – estimated that the government's USD 1 billion investment would save USD 22.2 billion on businesses and USD 4.4 billion on the US Customs Service over 20 years (USTR, 2002 and APEC, 2003). In Chile, the total investment costs of implementing customs automation was USD 5 million, two thirds of which was paid by the private sector, and those business costs were quickly recouped through business savings estimated at over USD 1 million per month (WTO CTG, 2000). The direct cost of developing Singapore's TradeNet, often cited as one of the successful examples to meet the peculiar needs of its free port environment, exceeded SGD 20 million (equivalent to about USD 11 million) in 1987, and saved Singapore traders around USD 1 billion per year in internal productivity savings (See Box 5 and Australian DFAT, 2001).

PART II. LESSONS LEARNED

25. Many studies and reports draw lessons from customs reform and modernisation projects to date (Cox et al., 1998; Wilson, 2001; WCO, 2002; World Bank, 2005). The outcome of their implementation is usually dependent on high-level commitment, a top-down and holistic approach, consultations with businesses, the establishment of a consultation committee and clear responsibility.

A. Automation is not a panacea

26. Despite its great potential to increase customs efficiency, automation alone should not be viewed as a *panacea* to achieve the benefits of trade facilitation, (WTO CTG, 1999). Too often, a misperception is conveyed that automation enables a solution to all problems faced by Customs – such as fraud, poor revenue collection and corruption – and that it therefore should be established in the first place.

27. Experiences have proved that this is not the case. Rather, to achieve its full potential, customs automation should be accompanied in parallel by streamlined and simplified border practices and management. The introduction of new or updated automation systems for border procedures is an important opportunity for revisiting and re-engineering the overall border procedures.

B. Long-term commitment is crucial

28. Automation generates operating and updating costs in addition to initial development and implementation costs. For example, the Philippines' customs automated system hardly worked following withdrawal of external funding which was needed for continuous system updates. The sustainability of funding and management is paramount to keep automated systems operational and functional. Also, as the frequent updates of protocols and/or procedures of the system may cause considerable burden to both businesses and governments, the timing should be carefully considered to strike a balance between the costs and benefits.

Box 5: Singapore's TradeNet - Costs and benefits

Costs incurred by the government: The direct capital cost of TradeNet's development, i.e. the contract cost to IBM and other sub-contractors was in excess of SGD 20 million in 1987. This does not include the costs incurred by various agencies in conceiving the project, developing requirements and specifications and establishing Singapore Network Service Ltd. (SNS), the quasi-governmental company that manages TradeNet.

Costs incurred by businesses: In order to join TradeNet, a company has to pay a one-time connection fee of SGD 750, a monthly charge of SGD 30 for a dial-up port and transaction costs of SGD 0.50 per kB of transmitted information (the average declaration requires 0.7 kB). A company also needs the appropriate hardware for local processing of applications and transmission of the coded EDIFACT data. At the time of introducing TradeNet the minimum PC configuration costs amounted to SGD 4000 and software between SGD 1000 and 4000. The indirect cost of making the necessary changes to procedures and protocols in order to adopt TradeNet was less clear. For some companies, the conversion was minimal because they already had the relevant systems in place, but for those with no prior experience in e-business, the change was more difficult. Today, the user pays a one-time fixed fee of about SGD 1500 and a yearly maintenance fee of about SGD 1200. In addition, the user pays SGD 6.50 per transaction or declaration made through the system.

Government benefits: Benefits also accrued to government agencies using the system. Customs moved from a system of post-approval of applications to pre-approval. Customs duties are now pre-paid through electronic means. TradeNet also enables faster and complete compilation of trade statistics since data from the documents no longer need to be re-keyed by government agencies to compile trade statistics. Singapore claims that properly applied trade facilitation is already saving it in excess of 1% of its gross domestic product each year.

Business benefits: TradeNet has resulted in considerable productivity improvements which made the entire trading community more competitive internationally. Turnaround time for processing typical trade documents was reduced from 2-4 days to as little as 15 minutes. Studies suggest that TradeNet reduced trade documentation processing costs by 20% or more thanks to the replacement of over 20 paper forms required previously by a single online form. The use of clerks or couriers to transport trade documents to various agencies and the long delays of staff waiting for documents to be cleared was eliminated, leading to time-savings and better deployment of staff and vehicles. Faster turnaround made it possible to better organise shipments and overall production activities. Several freight forwarders reported savings of 25-35% in handling trade documentation as TradeNet operates 24 hours a day.

Source: ESCAP (2003)

PART III. EMERGING TRENDS

29. This part aims to identify some emerging trends from ongoing and recently-implemented automation programmes. It may be useful from a capacity-building perspective since newcomers to automation have the advantage of being able to adopt approaches based on best practices and modern technology. Findings in this part should be considered as a menu of options or actions, depending on the degree of development in each country, with respect to the introduction, updating or changing of automated systems.

30. Before examining specific trends in automation, it is worthwhile noting the lead-time that is necessary for implementing new or changed systems, and the related cost implications. In fact, it normally takes several years to develop and implement a new system. For example, about 3 years are normally required for the phase-by-phase implementation of the ASYCUDA system (Gurunlian, 2001). In Japan, the automated customs systems for air cargo and sea cargo were updated in 2001 and 1999 respectively, after the end of their 8-year life-cycle.

31. The necessary timeframe for implementation appears associated with relevant international initiatives as well as national e-government strategies. Despite its non-binding nature, APEC envisages to achieve the paperless trading initiative by 2005 for developed and 2010 for developing APEC economies. APEC has also set a goal stated in the Shanghai Accord to reduce trade transactions costs by 5% across the APEC region by 2006. Moreover, harmonised electronic messages for certain border procedures are expected to be implemented in the Group of Seven (G7) countries by 2005. National e-government strategies in many OECD countries also envisage the handling of all types of government procedures online (Accenture, 2002).

32. The following paragraphs present some emerging trends with respect to customs automation.

A. Paperless environment

33. Recent legal and technical developments relating to ICT make it technically possible to eliminate paper requirements in government border procedures but some paper documents are still required in most countries. This is often due to the legal requirement to submit original documents and/or the need of a signature of the person in charge. It may also be due to procedural requirements for verification purposes. Several countries allow electronic clearance without paper documents but require that paper copies are submitted at a later stage. Cost savings will be below potential for both businesses and governments unless paper document requirements are completely eliminated (Australian DFAT, 2001). However, even in this case, the reduction of delays through paperless clearance can nevertheless secure substantial benefits (see above Para 22). The typical trade documents involved in importation include e.g. import entry declaration, official certificates, and commercial documents according to WTO TPRs.

Import entry declarations

34. Not only customs services but also many other government agencies are responsible for the movement of goods at the border, such as port authorities, statistics bureaus, and various controlling agencies including health and safety agencies. Among various government border procedures, however,

automated systems for customs import entry declaration appears the most widely used in both OECD and non-OECD countries. First introduced in the 1970s in Europe, they are now commonly used in most countries. Increasingly, automated systems have been extended to other customs procedures as well as other border procedures such as quarantine-related or port procedures (APEC, 2002a). Since most have been developed independently to meet their particular requirements, interoperability among the systems appears unsatisfactory in most cases (see section 3.3-3.4 for more detail).

35. Many countries tend to keep a hybrid system of allowing government agencies to accept trade-related declarations in both electronic and paper forms. In several countries, traders are encouraged to use electronic lodgement by various incentives, such as lower fees and cheap or even free software. The e-customs project of the EU envisages electronic customs declarations as the norm and verbal or paper-based declarations as the exception (EC, 2002a). On the other hand, electronic lodgement is legally obligatory in some countries. In Korea, New Zealand, Morocco, Singapore and Peru, for example, import entry declaration must be electronically filed to customs authorities. In Mexico and Chile, fully electronic import declaration systems have been realised in the context of which declarations must be processed by certified customs brokers. In the United States and Australia, an import customs cargo report must be electronically lodged, while the hybrid system for import entry declaration remains operational for the time being. This enables data to be systematically and efficiently processed in order to assess risk of border-crossing cargo. In any case, it is desirable to electronically store and process the declared information in order to enhance efficiency and allow secondary-usage within or between governments.

Official certificates

36. The importation of goods may require official certificates issued by different authorities. Such certificates may include sanitary and phytosanitary (SPS) certificates and certificates of origin. For example, certificates of origin may be needed in order to enjoy preferential tariff treatment under Generalised Systems of Preferences (GSPs) or Free Trade Agreements (FTAs)⁷. They are normally issued by governments (e.g. the customs authority) or other authorised bodies (e.g. chamber of commerce) in the exporting country, and most importing customs authorities still require them in paper form, while increasingly accepting electronic equivalents to most other documents. In cases where origin certificates are needed, the possibility of electronic submission of certificates of origin in standardised format is increasingly important considering the recent proliferation of FTAs. Electronic submission discharges customs officials to a certain degree from having to process paper certificates based on differing sets of rules of origin.

37. Among trade-related documents, certificates issued by foreign authorities appear the most difficult to incorporate in an electronic environment because it may require interoperability between the systems of the issuing and accepting authorities. A limited number of interoperable systems can be found in bilateral arrangements or regional initiatives. The Australian Quarantine and Inspection Service has forwarded the Japanese Ministries of Health and Welfare and Agriculture, Forestry and Fisheries annually 38000 electronic health certificates for meat exports to Japan (Australian DFAT, 2001). APEC endorsed the Pathfinders Initiatives in the area of Electronic SPS Certificates and Electronic Certificates of Origin⁸, with the aim for each APEC economy to implement them when ready. As of early 2004, Australia, New Zealand and Chinese Taipei participated in the former initiative, while Singapore and Chinese Taipei

⁷ Procedures to issue certificates of origin can vary across FTAs. Instead of official certificates, self-certification by traders is adopted in several FTAs, including NAFTA.

⁸ It was estimated that the application and transmission of electronic certificates of origin to buyers, banks and the relevant regulatory agencies would reduce the entire process from 4-7 days to just a few minutes via Internet, and ensure direct savings about SGD 2.9 million per year for Singapore traders (APEC 2002b).

participated in the latter one (APEC, 2004). The APEC Secretariat will review progress of the initiatives in due course in order to encourage broader participation of APEC economies.

Commercial documents

38. Border agencies often require various kinds of commercial documents to support import entry declarations. This is mainly for verifying the information declared by traders and it often involves duplication. If they do not remove such regulatory requirements altogether, governments should consider accepting their electronic equivalents in order to fully realise the benefits of paperless environments.

39. According to the WTO TPRs (2000-2005), standard commercial documents required for border procedures include commercial invoice, manifest, bill of lading, and packing list. In commercial transactions, electronic equivalents to such commercially available documents are getting more and more common, and in particular, they are widely accepted throughout the banking and logistics sectors. Private value-added networks (VANs) such as Bolero and TEDI (Trade EDI) provide frameworks for electronic documentation and formats to various kinds of trade documents. Border authorities are increasingly required to consider acceptance or interoperability of such electronic equivalents.

40. In Korea, all documents required for customs import entry declaration must be submitted in electronic form except for origin certificates. Commercial invoices are no longer required, but the related information is incorporated in the customs import entry declaration (Japanese CTB, 2001a). The NAFTA Implementation Act allows the US Customs to release entries without a customs officer's reviewing invoices. Instead, it is only required to transmit commercial invoice information when requested specifically by US Customs. This "*Invoice by Request*" feature is available within electronic invoice program prototype, and the electronic invoice is reportedly requested only for a very small number of shipments. The Japan Customs began accepting electronic invoices via Internet as from March 2003, and they are currently reviewing the interoperability between its customs system and private VANs (Japanese MOF, 2002). The Japan-Singapore Economic Partnership Agreement (JSEPA)⁹ also includes a provision for jointly reviewing the progress to accept, as supporting documents, electronic trade-related information and electronic versions of relevant documents exchanged between the public and private sectors. This is meant to help promoting paperless trading.

B. Internet utilisation

41. Internet is increasingly used as a tool for communicating between traders and government authorities. The most widespread use of Internet is probably for making trade-related information available to the public¹⁰. This may provide an easily accessible centre for all kinds of trade-related information. Besides, governments increasingly provide for the possibility to submit electronically via Internet import entry declarations and other relevant documents required in border procedures. Businesses generally welcome the use of Internet for modernising customs procedures and emphasize its advantages such as the ability of accessing shipment information quickly, securely and from any location (ICC, 2002).

42. Some OECD and non-OECD countries have either partly or fully implemented such a system for customs declarations, while several others are in the process of doing so. Hong Kong, Japan, Korea, New Zealand, the Philippines, Singapore, Sweden and Thailand are some examples. In several European countries like the UK and Germany, private VANs hold the intermediary function of clearing houses of

⁹ For further information on JSEPA: www.mofa.go.jp/region/asia-paci/singapore/jsepa.html

¹⁰ As of 6 July 2005, 134 out of 166 members of the World Customs Organisation (WCO) provide hyperlinks to their homepages on the "customs web sites" at www.wcoomd.org/ie/en/CustomsWebSites/customswebsites.html

receiving the trade data via Internet from traders to forward them to the relevant government systems through closed networks. Also, UNCTAD has launched a web-based version of ASYCUDA, called AsycudaWorld, which is compatible with the latest EDI-based version ASYCUDA++ (UNCTAD, 2002a).

43. An interesting possibility is to make use of mobile phones for Internet connection. In the Philippines, Internet access through mobile phones allows traders to pay duties as well as accessing trade-related information (ASEM, 2002). In Sweden too, trade-related information can be accessed via mobile phones (Swedish Customs, 2002). In a pilot project in Japan, truck drivers can check the status of customs clearance and whether and when to take and/or bring their containers to and from the container yard in the port with mobile phones¹¹.

44. Benefits of Internet utilisation have also been well documented especially in the context of e-commerce and e-government. For instance, the installation of web-based systems does normally cost much less than in the case of conventional EDI systems, since it is not subject to a specific type of hardware and software, and the same infrastructure can be shared for business and official purposes. Web-based systems are of particular interest to small and medium-size enterprises (SMEs) in developing countries who suffer from a number of drawbacks such as their distance to important markets and the lack of information about market opportunities and available supplies. However, developing countries are not in a position to avail Internet services as much as developed countries due to their physical and financial constraints. In this regard, they may need to first invest in basic infrastructure which can provide telecommunication and power supply services. Such investments are usually substantial but the services they generate can be shared and benefit the society as a whole.

45. Experiences to date show that Internet communication is unlikely to be implemented for all government border procedures. Rather, it is likely for the time being that conventional electronic means of communication would be retained, including closed EDI systems based on in-house direct connection or via relevant agencies, through input at a designated centre, or submitted on floppy disks. Traders are able to select the most suitable mean of communicating with government authorities. Since Internet-based solutions are currently considered more vulnerable to heavy traffic depending on the facility, direct permanent EDI-based connections to the relevant authorities may be suitable for regular and high-volume traders. Low-volume traders may prefer to use the Internet. For example, New Zealand Customs Service (2004) suggests that Internet declaration is generally more suitable for low-volume traders, because they do not invest in any special software but rather pay for message costs. On condition that compatibility among communicating means is assured, such multi-tiered systems are likely to be expanded to other economies, although in it general is more expensive for governments to retain multiple than single systems.

C. Single window environment

46. A “single window” can be described as a system that allows traders to lodge information with a single body to fulfil all trade-related regulatory requirements (UNECE, 2002). It can provide one entrance for the submission and handling of all data and documents related to the release and clearance of an international transaction. The concept of single window environments, whether physical or electronic, has been developed for a few decades, and recommended for a long time¹². However, implementation has been slow in many countries. This is partly due to competition between government agencies and the legacy of systems that make it difficult to assure interoperability. Each agency is inclined to stick to its current automated system and be reluctant to change it for the sake of other agencies. An increasing number of electronic cases have recently been observed, including in Australia, the Czech Republic, Finland, Japan, Mauritius, the Netherlands, Norway, Sweden, Singapore, Thailand, UK, and the United States.

¹¹ www.hits-h.com/

¹² ICAO, CICA, Annex 9 (4.24) Recommended Practice (UN, 2001).

47. Electronic single window systems can be established in different ways (UNECE, 2002). One is to allow one agency, such as Customs services to perform a number of tasks on behalf of other government agencies. Such a system is used in the Netherlands and Sweden. In Sweden, “*virtual customs*” are in charge of selected trade-related procedures via Internet (Swedish Customs, 2002). Another is a system with an entry, through which traders are able to communicate with different systems of different government agencies, as observed in Singapore and Mauritius. A third way is a single integrated system, allowing traders to submit the standardised data only once so that the system distributes them to the related agencies. Current automated systems in Japan and the US belong to this category. Since installed in July 2003 in Japan, it is reported that this system covered over 22% of customs clearances at the beginning of 2004 (OECD, 2004b). In addition, private VANs may virtually provide a single window function as intermediary and value-added services, which may receive all the necessary information for border procedures from traders, and then distribute it to relevant government authorities in appropriate forms, as observed in several European countries.

48. Cooperation and coordination among relevant government agencies are essential for successful single window environments. With a single window system, different procedures can be processed in parallel which helps to reduce delays. Also, traders would be discharged from keeping different systems or producing different data in different formats for different border procedures. Another possible benefit to governments is the possibility of carrying out risk analysis by sharing the related information among relevant government agencies, so as to enhance the overall efficiency of governments. In this case, it may be needed to overcome problems relating to confidentiality as authorities may be prohibited from forwarding information declared by traders to other agencies. A UN/CEFACT recommendation on establishing a single window system and an associating guideline, which are currently under discussion, may provide a good reference in planning and establishing the single window environments (UN/CEFACT, 2004).

D. Harmonisation/standardisation

49. Another development is the progress made in the harmonisation or standardisation of electronic message structures and data elements. UN/EDIFACT (United Nations Directories for Electronic Data Interchange for Administration, Commerce and Transport)¹³ provides a set of international standards in this area. These standards are used as a base for the G7 countries which have harmonised and standardised their customs message structures and data requirements. In January 2002, this initiative was taken over by the WCO for implementation and follow-up work and renamed “*WCO Customs Data Model*”¹⁴. UNECE elaborated an integrated set of electronic standards-based trade documents which will be first implemented on a pilot basis in selected countries (UNECE, 2004).

50. A number of international initiatives have also been taken among members of regional trade agreements to align their border procedures, including customs procedures, with internationally standardised or harmonised systems. In APEC, for example, collective action plans (CAPs) under the area of customs procedures provide for the adoption and support of the UN/EDIFACT standard as well as the harmonisation of common data elements based on the WCO work for customs cargo clearance (APEC, 2002c). Similar endeavours are set in the ASEM Trade Facilitation Action Plan for 2002/2004 (ASEM, 2002b). The EU-Mercosur Action Plan on Business Facilitation agreed in May 2002 includes “*an undertaking to use and further develop information technology, using international standards*” (EC, 2002b), and the Positive Economic Agenda agreed in the EU-US Summit in 2002 includes an electronic customs initiative for defining and developing prototypes between the EU and the US (EC, 2002c).

¹³ For further information on UN/EDIFACT at www.unece.org/trade/untdid/welcome.htm

¹⁴ Further information are available on the website of the WCO Customs Data Model www.wcoomd.org/ie/En/Topics_Issues/FacilitationCustomsProcedures/facil_wco_data_model.htm

51. The EU has also undertaken community-wide efforts to harmonise the Members' automated systems in its "*Customs 2007*" programme (EC, 2003b)¹⁵, including the New Computerised Transit System (NCTS). The main elements of the NCTS are to confirm the legal status of electronic exchanges between economic operators and customs as well as between the various customs administrations; to provide rules on the structure and content of the messages to be exchanged as well as the codes to be used; and to establish a procedure for providing systematic advance notification to concerned customs through electronic exchange of data between member customs administrations. This covers transit procedures undertaken on the basis of Single Administrative Document (SAD) declarations and it therefore mainly deals with road transport for the time being (although applicable to other modes of transport). The programme also includes an objective to support the creation of e-customs via the development of communication systems coupled with the necessary legislative and administrative changes (EC, 2002d).

52. Harmonisation or standardisation of data requirements is essential for taking full advantage of electronic documentation. This could occur between the relevant automated systems between the public and private sectors, among government agencies, and between agencies in importing and exporting countries. It would enhance transparency of border procedures by eliminating ambiguities of data elements so that traders easily find information on the type and format of data that are required. Harmonisation or standardisation would also allow traders to use the same information for commercial documents, export and import documents, and for statistical and trade regulation purposes. They would not have to re-enter or modify data for each instance, so opportunities for errors in electronic documentation would be greatly reduced. This would pave the way for a "seamless data flow" throughout trade-related activities¹⁶. As a result, traders would avoid the burden of compliance with differing requirements from different authorities. International shipping lines calling at multiple ports are often faced with this problem (APEC, 2002a).

53. Another expected benefit is that harmonisation or standardisation would make possible arrangements for exchanging and sharing information among relevant automated systems. Again, such arrangements may need to address legitimate concerns relating to confidential clauses (as described in section 3.3), the costs born by the authority concerned, or the accuracy of the information provided. Nevertheless, the Customs-to-Customs information exchange between exporting and importing countries may appear ambitious but it is not a new concept. One example is Customs mutual assistance agreements which normally give the legal grounds and certain conditions for exchanging customs-related intelligence. Another is the statistics agreement between Canada and the United States, in which each country's data on imports from the other country are used by the partner country to compile its export statistics (CCRA, 2002). Moreover, a pilot project of weekly exchanges of export consignment declarations has been established between Korea and Malaysia¹⁷.

E. Additional observations

54. The emerging trends summarised above lend themselves to several cross-cutting observations. One is that traders are provided with multiple choices in communicating with relevant government authorities, including by paper-based systems, inputs at a designated centre, physical submissions on

¹⁵ For further information on the Customs 2007 programme at http://europa.eu.int/comm/taxation_customs/customs/c2007/customs_2007_0_en.htm

¹⁶ In the WCO Customs Data Model export and import data requirements are aligned and the respective electronic declarations share the same structure, which allow traders to exchange information more economically and enable the importer to utilise the export information as the basis for the import formalities.

¹⁷ This project is subject to several limitations such as exchange of only three subsets of the selected harmonised tariff codes (6-digit) for each direction, the selected subsets of declaration data, and the coverage only of direct shipments, as well as the introduction of a confidentiality clause (APEC, 2001).

floppy disks, closed EDI systems, trade-related private agencies such as customs brokers, open network Internet systems, private or quasi-governmental VANs, direct permanent connection to the related authorities, or varying combinations of the above enumerated means. Among such a variety of means, traders are able to choose the most suitable one in communicating with government authorities depending on their situation. On the other hand, it is worthwhile noting that electronic lodgement has been already mandatory in several cases, and more countries are expected to follow suit, in particular in the light of increasing national security concerns on the movement of cargo.

55. Another observation is the importance of interoperability among the information exchange systems for ensuring efficiency of border procedures. Cooperation and coordination are essential between the public and private sectors, among border agencies, and between authorities in importing and exporting countries. For example, the implementation of electronic single window systems requires interoperability between government systems as well as coordination between the private and public sectors. Risk management is also facilitated if the authorities in importing and exporting countries have interoperable information systems.

PART IV. CONCLUSIONS

56. The negotiation of WTO disciplines on trade facilitation is of concern to some developing countries and the concerns relate to the prospective costs of compliance and capacity constraints of implementing additional disciplines.

57. Among trade facilitation measures, customs automation has attracted considerable attention due to its potential to reduce trade transaction costs. In particular, it is considered as one of the most promising means to facilitate trade while safeguarding national and social security. Yet the cost of automation may be significantly greater than other trade facilitation measures even though the cost varies depending e.g. on the initial state of customs infrastructure and customs procedures, and the ambition with the reform. In some cases, automation takes up two-thirds of the budget for customs-related lending projects.

58. Customs modernisation programmes may require commitments to large initial investments and long-term operating and maintenance costs. Yet experiences have shown that the costs may be quickly covered by the gains from facilitated trade and increased productivity in customs administrations. The non-application of automation could also entail a high opportunity cost.

59. Automation should not be considered as a *panacea* for achieving the benefits of trade facilitation. Rather, the real benefits may be realised only if automation is accompanied by measures to streamline and simplify the border procedures. In addition, long-term financial and political commitment must be provided to sustain automated systems, in particular in low-income and medium-income countries.

60. Trends for recently-introduced automation include paperless environments, Internet utilisation, single window systems, and harmonisation/standardisation. Multi-tier means of communication and the interoperability between different automated systems are also of great importance.

61. This document complements other OECD work on the introduction and implementation costs of means to facilitate trade. Automation is only covered to the extent it serves as a support for specific trade facilitation measures.

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