

Albuero, Florian A.

Working Paper

The development impact of information technology in trade facilitation

ARTNeT Working Paper Series, No. 78

Provided in Cooperation with:

Asia-Pacific Research and Training Network on Trade (ARTNeT), Bangkok

Suggested Citation: Albuero, Florian A. (2010) : The development impact of information technology in trade facilitation, ARTNeT Working Paper Series, No. 78, Asia-Pacific Research and Training Network on Trade (ARTNeT), Bangkok

This Version is available at:

<https://hdl.handle.net/10419/64294>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



Asia-Pacific Research and Training Network on Trade
Working Paper Series, No. 78, January 2010

The Development Impact of Information Technology in Trade Facilitation

By

*Florian A. Albuero**

* Centre for the Advancement of Trade Integration and Facilitation (CATIF), Manila, Philippines. This work was carried out with the aid of a grant from IDRC, Canada and is part of an ARTNeT Regional Study on the Impact of Information Technology Based Trade Facilitation Measures on SMEs (see www.artnetontrade.org for details). The technical support of the United Nations Economic and Social Commission for Asia and the Pacific is gratefully acknowledged. The opinion figures and estimates are the responsibility of the author and should not be considered as reflecting the views or carrying the approval of the United Nations, ARTNeT and the CATIF. This paper benefited from comments received during the Regional Policy Forum on Trade Facilitation and SMEs in Times of Crisis, 20-22 May 2009, Beijing, China. Any errors are the responsibility of the author, who can be contacted at falbuero@yahoo.com

The Asia-Pacific Research and Training Network on Trade (ARTNeT) is aimed at building regional trade policy and facilitation research capacity in developing countries. The ARTNeT Working Paper Series disseminates the findings of work in progress to encourage the exchange of ideas about trade issues. An objective of the series is to get the findings out quickly, even if the presentations are less than fully polished. ARTNeT working papers are available online at www.artnetontrade.org. All material in the working papers may be freely quoted or reprinted, but acknowledgment is requested, together with a copy of the publication containing the quotation or reprint. The use of the working papers for any commercial purpose, including resale, is prohibited.

Table of Contents

1. The Context of Information Technology (IT) In Trade Facilitation	1
1.1 Introduction	1
1.2 External Forces to Adopting IT in TF	1
1.3 Internal Forces to Adopting IT in TF	12
1.4 Implications	19
1.5 Conclusion	20
2. Trade Facilitation and Information Technology Framework and Experience	22
2.1 Framework and Empirical Evidence	22
2.2 Experiences in Information Technology for Trade Facilitation.....	29
2.3 SMEs in Trade and Information Technology.....	33
2.4 Summary and Implications for Inclusive Growth.....	39
3. The Development Impact of Information Technology on Trade Facilitation: Summary of Basic Studies	42
3.1 Introduction	42
3.2 Country Studies	47
Similar and Common Settings	49
Stages of Information Technology Development	50
Programs for Select Traders.....	52
Internationalization of SMEs	54
Benefits and Costs.....	55
Intermediation in Facilitation.....	57
3.3 Implications	58
References	60

1. The Context of Information Technology (IT) In Trade Facilitation

1.1 Introduction

It is almost taken as a matter of definition that IT is an integral part of trade facilitation (TF) which objective is to expedite the movement, clearance, and release of goods, including goods in transit. Yet for many developing and least developed countries, especially those from Asia, IT remains a distant but desirable goal. There are many and varied reasons behind this, and it is not the purpose of this chapter to lay them out. However there appears to be some confusion regarding IT in TF. The common perception is that adopting automation for trade transactions automatically leads to speedier movement of goods and people. This is tantamount to a mechanistic way of looking at IT. This kind of confusion is clearly misplaced. After all, the installation of computers, software, and other peripherals is only the instruments for TF and there is no immediacy to improvements in efficiency and reduction in transactions costs. Recall the “productivity paradox” associated with the use of IT in US industries.

But the counter-claim is that calls for the use of IT have not really been in isolation from the larger set of needs the trading system requires. What is evident however is that the IT message is forthright while its associated ingredients are either ambiguous or simply taken for granted. Of course these always turn out to be long lists of requirements compared to the technical specifications that go with IT implementation that are often ready, off-the-shelf, or packaged. Without understanding and appreciating the larger set of components to an effective IT in TF, its impact may be more limited and governments unable to capture its optimal benefits relative to costs.

The purpose of this chapter is to concretely define the context of IT in TF and delineate its environment. The argument is that the importance of IT’s context can not be overlooked and may even be critical to its successful application to a country’s trading system. Moreover it is not just the identification and delineation of this context but of indicating the possible sequencing of the various elements that compose that context without necessarily exhausting them. The next part discusses the various external forces to IT in TF. An external impetus to IT would come from the practices followed by the international trading system, agreements that countries enter into, and other conventions. The third part examines the internal factors that are essential to the IT environment. These are the ones that are supposed to be country-driven and have to be undertaken within the country. In the fourth part implications for an inclusive IT in TF is derived. The last part of the paper draws some conclusions about how to determine the “IT for TF” readiness of trading systems and how to fit the IT tasks in such a setting.

1.2 External Forces to Adopting IT in TF

The increasing amount of global trade has necessitated transmission of information in electronic format and the broader use of IT among traders but also its extension to trade authorities, regulators, and others involved in the entire logistic chain

of international commercial transactions. The use of IT in the information exchange of trade transactions reduces errors as the same data are transmitted, minimizes the need for re-entry of similar information for multiple parties involved in transactions, and increases the efficiency of trade. This is especially true given the finding that a typical trade transaction involves an average of 30 parties, 40 documents, 200 data elements, and re-encoding of 60-70 percent of all data elements at least once¹.

The use of electronic medium for information, documents, and submission of forms and paperwork in trade transactions is only a natural course driven by more trade (volume) and more countries. Although part of the necessary factors to TF, this is not a deliberately facilitative measure. After all, the use of electronic medium is not the same as the automation of trade transactions by which is meant real-time exchange of electronic-based information. Indeed for many trade regimes manual information is electronically encoded, stored, and transmitted but these may be used more for creating databases². Apart from this modality are specific external forces that have influenced the adoption of IT in TF.

One of the most important impetus to adopting IT in TF is the Revised Kyoto Convention (RKC)³. The original Kyoto Convention came into force in 1974. The rapid expansion of international trade since then, among others, necessitated a review of the Convention and four years after, in 1999, the RKC was unanimously adopted. The Convention however has to be ratified by at least 40 members of the World Customs Organization (WCO) in order to become effective. The Convention was open for signature for one year (June 1999 to June 2000) after which the members of the WCO (Contracting Parties) accedes to the Convention by notifying the WCO after national steps have been completed. But it was only in February 2006 that RKC was finally ratified.

Aside from the expansion of world trade, the increasing use of information technology, the need to reduce technical barriers to trade which included restrictive customs procedures, and the overall customs modernization were the reasons for the RKC. The IT part of the RKC is the focus of the following discussion. It is composed of two major parts – the General Annex and the Specific Annexes. The body of the Convention and the General Annex are binding on the part of all Contracting Parties and constitute the minimum requirements. There is no requirement for all the specific Annexes to be accepted and WCO members can choose the Annexes they accept⁴.

¹ This fact (which origin is difficult to trace) involves not just the trading part of international transactions but from the first step of international commerce (e.g. purchase order). Independent surveys give comparable results such as the export of rice from Thailand involving 24 documents and 15 parties (Keretho, 2009).

² Some of the ASEAN countries which still do not have automated customs systems require electronic keying of data which are then stored in databases (SATMP and CIE, 2006).

³ *International Convention on the Simplification and Harmonization of Customs Procedures (as amended)*
http://www.wcoomd.org/Kyoto_New/Content/content.html

⁴ Note a substantial difference between the GATT 1994 and the RKC where the former requires that all agreements are binding i.e. WTO agreements are considered a single undertaking.

Of the 600 standards and recommendations contained in the RKC, 120 of these are in the General Annex and are therefore the minimum which the WCO contracting Parties are bound. These include standards and recommendations for clearances and customs formalities, duties and taxes, security and guarantees, controls, information technology, customs relationship with third parties, information, decisions, and rulings supplied by Customs, and appeals in customs matters. According to those customs authorities that have acceded to RKC the 120 binding provisions have general applications across most customs procedures.

The provisions of RKC identify standards and transitional standards. The Convention requires the implementation of the standards within 36 months after ratification and transitional standards provide for implementation within 60 months after ratification. In addition the Convention does not limit the implementation measures only in customs but in all other national notifications, decrees, administrative orders, and other instruments.

The General Annex Chapter 7 “Application of Information Technology” appears to be innocuous to have substantial significance. Yet its importance can not be understated especially if undertaken by customs authorities as gateway of goods in and out of a given territory. Here three standards are specified. The first provides that Customs use information technology to support Customs operation when it is cost-effective for Customs and trade. Notice the condition “when it is cost-effective...” in order to use IT. In situations where IT is to be used Customs specifies the conditions for its application. This implies that in customs administrations where the volume is not enough for using IT, the RKC standard is not applicable.

The second standard has something to do with the introduction of computer applications. The RKC provides that Customs shall use relevant internationally accepted standards. The experiences in the application of IT for Customs operations has had two distinct directions – one where application designs have been tailored to specific customs territories and one where there are off-the-shelf designs to be adopted by customs authorities. The Customs IT programs for Malaysia and Singapore are examples of tailored designs while the adoption, by Nepal and Bangladesh, of the Automated Systems for Customs Data (ASYCUDA) are examples of the latter. It is probably not so much the notion of internationally accepted standards as reference but the standard procedures followed in customs administration. Standardized procedures (which occupy the major parts of the General Annex) can be the basis for the design of IT that can remain internationally accepted standards.

The final standard relates to the use of electronic commerce (e-commerce) methods to satisfy documentary requirements. The RKC provides that national legislation provide for this including the use of electronic in addition to paper-based means for authentication. Customs has a right to retain information for its own use and exchange the information, as appropriate, with other Customs administrations and other legally approved parties through e-commerce techniques.

Operationally, the use of IT is binding on RKC if it is found to be cost-effective. The authorities then have 36 months with which to implement it using e-commerce techniques and applications that have internationally accepted standards or, appropriately, following customs procedures that are standardized.

Fifty-six (56) Contracting Parties have acceded to the RKC (February 2006) with only 7 from Asia (Azerbaijan, People's Republic of China, India, South Korea, Mongolia, Pakistan, and Viet Nam). These are bound by the provisions of the General Annex and would have 36 months with which to implement all the standards set in the RKC.

Another external force that has triggered the consideration of using IT for TF is the WTO negotiations for TF itself. Recall that the Ministerial Statement of the Doha Round bound the negotiations around Articles V, VIII, and X of the GATT 1994. When one looks at the many proposals submitted for consideration in the TF negotiations, it becomes clear that they include several measures that are not procedural or directly intended to automate the array of activities that go with the movement of goods across national boundaries. What do these proposals then suggest about the direction for TF and where does IT fit in it?

First of all, the clarifications surrounding Articles V, VIII, and X implicitly admit that many of the existing environments for trade in developing and least developed countries have to be improved through reforms. Through these articles the proposed reforms aim to strengthen the underlying specific principles of the WTO and the more general principle of universal access to information and related factors that affect the movement of traded goods. In particular, these proposals are meant to transform trade environments from one of uncertainty to one of a calculable risk i.e. enhancing predictability. As a start it is not so much the procedures or the documents required but rather *knowing* what these are through their wide publication, sufficient lead time given to traders before enforcement and application of rules and requirements, and simple clarification of terms. The message of these proposals is that accessible information is conducive to a facilitated trade.

Second, the proposals also aim for greater transparency of procedures and requirements in a speedier movement of goods crossing national borders. These include clear and transparent processes for appeal in cases of disputes concerning traded goods, clear specification of fees and charges (and that they satisfy more specified provisions of Article VIII) connected with imports and exports, objective criteria for classification of goods (following universal standards), and a review process (as well as consultations with affected parties) for the rules, regulations, documentation, and procedures. The message of these proposals is that the more transparent the conditions are that goods face when crossing borders, the faster they move.

Third, the proposals are intended to reduce the magnitude of discretion on the part of border officials in decisions regarding the disposition of goods as these enter national

territories. One critical way to do this is to tighten rules, make them transparent and widely known (the points made above). Both a policy and bureaucratic level of setting rules, procedures, documentation, and review are meant to raise governance at the borders. At the policy level, there is no doubt that fewer, if not a single, tariff rates leave little room for discretion in terms of goods classification and thus payment of duties and taxes⁵. At the bureaucratic level, the prohibition of payment of unpublished fees and charges can go a long way to minimize discretion; conversely clear specification of penalties and charges reduce under-the-table negotiations. The message of these proposals is that tightening rules and lessening the room for discretion on the part of border officials potentially saves revenues for the government and unnecessary expenses on the part of traders while at the same time increasing the speed at which goods move when entering national territories.

Table 1 reproduces Annex E of the Sixth Ministerial Conference of the WTO (2005) which contain a summary of the various proposals that clarify and improve Articles V, VIII, and X as reported by the Negotiating Group on Trade Facilitation (NGTF) along with an indication of whether the proposed measures can be transformed into electronic format, can be automated, or need to be specified. A to F pertains to measures proposed under Article X (Publication and Administration of Trade Regulations), G to L under Article VIII (Fees and Formalities Connected with Imports and Exports), and M under Article V (Freedom of Transit).

A TF measure can be in electronic format which allows it wider dissemination (e.g. through the Internet web sites) and readily downloadable. Such measures need not be part of an automation process referring to procedures goods go through in moving into national territories. TF measures under “automation” mean they can be integrated into formal procedures for bringing goods into or out of territories as final points or in transit. Finally, there are TF measures which need to be further specified in order to improve them or to tighten rules to achieve greater predictability, transparency or reduce the amount of discretion on the part of border officials. The Summary Table lists more than 60 TF proposed measures that cover the 3 articles included in the mandate of the (NGTF).

⁵ This point is purely based on effects on governance and discretion on the part of government officials and not whether a single or uniform tariff rate is optimal from the point of view of production incentives or protection. See Amiti, 2004.

Table 1: Annex E of Sixth Ministerial Meeting of the WTO

	For Electronic	For Automation	For Specification
A. PUBLICATION AND AVAILABILITY OF INFORMATION			
• Publication of Trade Regulations	✓		
• Publication of Penalty Provision	✓		
• Internet Publication	✓		
(a) of elements set out in Article X of GATT 1994			
(b) of specified information setting forth procedural sequence and other requirements for importing goods			
• Notification of Trade Regulations	✓		✓
• Establishment of Enquiry Points/SNFP/Information Centres	✓		✓
• Other Measures to Enhance the Availability of Information	✓		✓
B. TIME PERIODS BETWEEN PUBLICATION AND IMPLEMENTATION			
• Interval between Publication and Entry into Force	✓		✓
C. CONSULTATION AND COMMENTS ON NEW AND AMENDED RULES			
• Prior Consultation and Commenting on New and Amended Rules	✓		✓

• Information on Policy Objectives Sought	✓		
D. ADVANCE RULINGS			
• Provision of Advance Rulings	✓		✓
E. APPEAL PROCEDURES			
• Right of Appeal	✓		
• Release of Goods in Event of Appeal	✓		
F. OTHER MEASURES TO ENHANCE IMPARTIALITY AND NON-DISCRIMINATION			
• Uniform Administration of Trade Regulations	✓		
• Maintenance and Reinforcement of Integrity and Ethical Conduct Among Officials			
(a) Establishment of a Code of Conduct	✓		✓
(b) Computerized System to Reduce/Eliminate Discretion		✓	
(c) System of Penalties	✓		
(d) Technical Assistance to Create/Build up Capacities to Prevent and Control Customs Offences			✓
(e) Appointment of Staff for Education and Training			✓
(f) Coordination and Control Mechanisms			✓
G. FEES AND CHARGES CONNECTED WITH IMPORTATION AND EXPORTATION			
• General Disciplines on Fees and Charges Imposed on or in Connection with Importation and Exportation			
(a) Specific Parameters for Fees/Charges	✓	✓	

- (b) Publication/Notification of Fees/Charges ✓ ✓
- (c) Prohibition of Collection of Unpublished Fees and Charges ✓
- (d) Periodic Review of Fees/Charges ✓
- (e) Automated Payment ✓
- Reduction/Minimization of the Number and Diversity of Fees/Charges ✓ ✓ ✓

H. FORMALITIES CONNECTED WITH IMPORTATION AND EXPORTATION

- Disciplines on Formalities/Procedures and Data/Documentation Requirements Connected with Importation and Exportation

- (a) Non-discrimination ✓
- (b) Periodic Review of Formalities and Requirements ✓ ✓
- (c) Reduction/Limitation of Formalities and Documentation Requirements ✓ ✓ ✓
- (d) Use of International Standards ✓
- (e) Uniform Customs Code ✓
- (f) Acceptance of Commercially Available Information and of Copies ✓
- (g) Automation ✓
- (h) Single Window/One-time Submission ✓ ✓ ✓
- (i) Elimination of Pre-Shipment Inspection ✓
- (j) Phasing out Mandatory Use of Customs Brokers ✓

I. CONSULARIZATION

- Prohibition of Consular Transaction Requirement ✓ ✓

J. BORDER AGENCY COOPERATION

• Coordination of Activities and Requirement of all Border Agencies		✓	✓
K. RELEASE AND CLEARANCE OF GOODS			
• Expedited/Simplified Release and Clearance of Goods	✓	✓	✓
(a) Pre-arrival Clearance			
(b) Expedited Procedures for Express Shipments			
(c) Risk Management /Analysis, Authorized Traders			
(d) Post-Clearance Audit			
(e) Separating Release from Clearance Procedures			
(f) Other Measures to Simplify Customs Release and Clearance			
• Establishment and Publication of Average Release and Clearance Times	✓		✓
L. TARIFF CLASSIFICATION			
• Objective Criteria for Tariff Classification	✓		
M. MATTERS RELATED TO GOODS TRANSIT			
• Strengthened Non-discrimination	✓		
• Disciplines on Fees and Charges			
(a) Publication of Fees and Charges and Prohibition of Unpublished ones	✓		
(b) Periodic Review of Fees and Charges	✓		
(c) More effective Disciplines on Charges for Transit	✓		
(d) Periodic Exchange Between Neighbouring Authorities			✓

- **Disciplines on Transit Formalities and Documentation Requirements**
 - (a) Periodic Review ✓ ✓
 - (b) Reduction/Simplification ✓
 - (c) Harmonization/Standardization ✓ ✓
 - (d) Promotion of Regional Transit Arrangements ✓ ✓
 - (e) Simplified and Preferential Clearance for Certain Goods ✓ ✓
 - (f) Limitation of Inspections and Controls ✓
 - (g) Sealing ✓
 - (h) Cooperation and Coordination on Document Requirements ✓ ✓
 - (i) Monitoring ✓
 - (j) Bonded Transport Regime/Guarantees ✓

- **Improved Coordination and Cooperation** ✓
 - (a) Amongst Authorities
 - (b) Between Authorities and the Private Sector

- **Operationalization and Clarification of Terms** ✓

Source: WTO (2005) and author's indication.

Of the more than 60 proposed measures only around 20 percent allude to the need for the application of IT. Most actually require information dissemination and the most appropriate mechanism for wider information accessibility is in an electronic environment i.e. publication of these measures on the Internet through a web site – easily downloadable, can be printed in multiple copies, and clearly transparent. Moreover electronic formats allow some documents and forms to be integrated into other necessary requirements. The other classification “For Specification” is a fuzzy interpretation of some measures which appear to need details before either wider electronic publication or automation. For most if not for all these measures, their tighter and more concrete determination are obviously going to contribute to the faster movement of goods

Between these two external forces driving IT in TF, the proposals in the WTO seem to be more detailed and specified than the generic type of standards that are found in the RKC. Both however point to the need for using IT in the process of pursuing trade facilitation. Although one may always find differences between the two forces, what is important is the directions for the trade regimes. First, the RKC force is specific to Customs administrations and it moves national legislation to align domestic laws and regulations with the standards provided in the Convention.

Second, to the extent that the proposed TF rules in the WTO negotiations on trade facilitation lead to their adoption and translation into legally binding commitments, the WTO Members would not only be required to comply with them but they can be brought before dispute settlement bodies. This partly explains apprehensions among developing countries about the proposed IT-related measures and what undue obligations they may impose.

Third, the IT directions, at least in the WTO negotiations, concretely point to two directions – the use of electronic medium for data storage, information dissemination, public notification of rules and regulations, and information sharing among border agencies, and the eventual automation of customs and trade procedures for speedier clearance and release of goods.

Fourth, the RKC provides for sufficient time period for WCO Contracting Parties to implement the standards and transitional standards required in the General Annex. Similarly, it is anticipated that there will provisions for special and differential treatment (S&D), capacity building, and technical assistance in the rules that may evolve out of the trade facilitation negotiations in the WTO. Both forces therefore recognize the need for ample preparation on the part of developing countries in the area of IT for TF.

Finally, while the RKC measures appear to be aimed at specific elements of processing goods at the borders and the international standards needed, the results of the WTO negotiations, even if confined to the 3 relevant GATT articles, may have to be sifted and organized to achieve optimal synergy among TF procedures.

1.3 Internal Forces to Adopting IT in TF

At the same time that there are external forces moving countries to the use of IT in TF (and assuring international standards), there are also internal forces that equally trigger IT use. It is not easy (and may not make sense) to exhaustively define what these are. For example, it can be argued that a fundamental foundation for a successful and efficient computerized procedure for the movement of goods is the extent of automation taking place in the rest of the economy and not just among the agencies that is part of the windows traders deal with. For those agencies directly involved in the goods movement itself, if only their trade function is automated and the rest of agency operations are not, any efficiency gains are only going to be short-lived. More pointedly, without concomitant changes in the whole “automation culture” speedy movement of goods is hard to come by. A study of IT in Singapore Customs showed that it was part of a larger effort to automate the entire government machinery and not just the customs (United Nations, 2002). Indeed this would later lead to the networking of other agencies dealing with trade into a single window that is now being replicated in the rest of ASEAN.

Within the national economy it would be useful to consider the forces that are within customs administration and related border agencies, and those other forces that equally influence the emergence of an “automation culture”. The broad frame for the adoption of IT in TF at Customs would be under the rubric of customs modernization which underlies many components all related to the adoption of IT. Other national forces can be found in the promulgation and practice of electronic commerce (ecommerce), the evolution of institutions in both public and private spheres that provide the associated forces.

Customs Modernization

A modernized customs regime is characterized as using IT for the administration of its procedures, interactive with other border agencies, and transparent in its operations. But behind these is a more modern customs law that sheds archaic requirements of the past such as hundred-percent inspection, voluminous documentation, and extended storage⁶. In its place would be fast release of goods (targeting only a small fraction of goods for inspection), minimum documentation, and efficient movement of goods. These are the hallmarks of RKC.

Several countries in Asia have seen their customs laws revised, amended, or completely changed to recognize the needs of modernization. How far these changes are can be appreciated by the fact that customs laws are often one of the oldest laws in most countries as they regulate the movement of goods traded which had been going on for centuries. The mission and function of Customs have changed from originally being gatekeeper and collector of trade taxes to newer functions of facilitating movement of goods. This means eschewing strict controls to facilitation or more accurately using

⁶ See Mikuriya, 2005 for a discussion of the importance of customs legislation as part of customs modernization.

modern techniques of controls combined with facilitation. Many variations of these changes are evident in Asia. For example among the ASEAN countries, only Indonesia, Malaysia, and Viet Nam continue to have their customs authorities patrol borders as part of their mandates (CIE and SATMP, 2006). The other ASEAN countries have relinquished border security functions. The particular creation of a new agency in Singapore, the Immigration and Checkpoint Authority (ICA) partly came out of a major shift in Singapore Customs giving up border security and concentrating on “behind-the-border” enforcement. On the other hand, some customs authorities have included the collection of excise taxes to trade taxes as part of their functions. Only Laos, Myanmar, and the Philippines do not collect excise taxes. Trade statistics collection has been added to customs functions in Cambodia, Thailand, and Viet Nam.

Most countries in the Asia region have revised or are in the process of revising their customs laws to take in new developments in procedures and documentation of trade transactions, among others. The content of these laws varies across countries in terms of details and scope. What can be observed is that while modern procedures are finding their way into revisions of customs laws others are not integrated into their specific provisions. Nor are there common standards in publication and effectivity of these laws. A prominent evidence of modernization is the availability of customs web sites in the Internet. Yet information available in these sites is not the same across countries. For example, some of these sites do not contain flowcharts of procedures (for import and export) and the associated tariffs for goods. Others, on the other hand, even have downloadable forms for filing of declarations and other forms necessary to conduct business with customs.

Two of several stamps of customs modernization are institutional changes that facilitate trade and at the same time strengthen controls. Reducing the number of cargo inspections does not mean abandoning safeguards to ensure appropriate collection of revenues and protecting national security. It means shifting the effort on the part of customs from on-site evaluations to other means. A modernized customs apply risk management principles to administer procedures and obviously these are not expected to be laid out in customs laws. But the procedures that reflect them are the legal instruments that customs have. The establishment of post-clearance audit (PCA) as integral to customs functions is an important component of customs modernization. PCA has to be legally embedded in customs laws defining what it means, how it is to be carried out, the measures associated with it, sanctions for violations, provisions for appeals and dispute resolutions, customs behavior in practicing PCA, etc. And in an electronic environment, how documentation is to be handled forms part of the PCA. The other is the process of customs valuation. Changes in customs law invariably incorporate how goods are to be valued and how customs take them into account. The GATT Agreement on Customs Valuation clearly defines the various ways of valuing trade products as they enter customs territories, what steps customs authorities take when declarations of valuations are made, alternative courses of action in cases of inconsistent information and many other specific processes.

The Singapore Customs Act (1960 with 17 amendments until 2003) illustrates the incorporation of PCA in an electronic age where the law allows any document, list, receipt, or statement to be served or submitted by electronic means (section 86[1]). At the same time the law also indicates what rules are to be followed when conducting audit of declared cargoes including the rights of declarants. Customs valuation is incorporated in most customs laws but with different degrees of detail. Compare for example the Thai Customs Law (Thai Ministerial Regulation 132 B.E. 2534 under Customs Act B.E. 2534) with the Cambodia Draft Law on Customs (Ch III Art. 21).

There are other modern customs procedures, compliant with RKC, that need to find their way into revised customs laws. After all, changes in the way customs conduct cargo processing partly reflect functional shift from controls to trade facilitation. For example provisions which allow for pre-arrival lodgement (General Annex [GA] 3.25), advanced ruling, methods of duty payments (GA 4.6), etc. adhere to the RKC standards. The RKC standards for customs behavior should ideally be in the customs laws e.g. goods declaration checked soon after registration (GA 3.30), coordinated inspection with other agencies (GA 3.35), incomplete good declaration allowed (GA 3.13) and many others.

Selective physical cargo inspections are implemented across most territories in Asia but not all employ systematic risk assessment methods. Instead certain targets are defined (e.g. 20 percent of all entries are to be examined) based on other criteria such as when products are part of the ASEAN CEPT. Or customs authorities accredit and provide special processing schemes for certain traders (e.g. Malaysia's *Golden Client*, Thailand's *Gold Card*, Philippines' *Super Green Lane*, Indonesia's *Cargo Fast*, ASEAN's *CEPT Lane*, etc.).

In the light of these characteristics of customs modernization is continued adherence and acceleration of customs integrity, indicating a frontal address to containing if not reducing corruption in border transactions. There is no shortage of declarations at the international and national levels. The World Customs Organization *Arusha Revised Declaration on Integrity in Customs* provides the international framework and guidelines for countries (along 10 principles). Some countries have drawn up codes of conduct for customs including regular training on anti-corruption (e.g. Brunei's *Quality Control*, Indonesia and Thailand Code of Conduct). Other customs have rewards, special awards and salary schemes, bonuses, and legalized incentives funds in actual legislation or intention to promote integrity (e.g. Laos, Myanmar, Philippines, Viet Nam). These integrity considerations are either integral to the country's customs laws or are separate pieces of legislation. With a customs that focus more on facilitation, faster movement of goods, and reliance on modern means, there is no doubt that integrity questions will become more outstanding and therefore need to be carefully balanced.

Tables 2 and 3 below summarize what customs modernization means across some selected countries in Asia⁷. Table 2 is a quick summary of customs laws in these

⁷ Tables 2 and 3 are modified versions of Tables II.9 and II.10 in CIE and SATMP, 2006.

countries and their progress in revision or amendments. Nearly all have changed their laws to conform to modern practices. Table 3 indicates an illustrative comparison of customs web sites and their content relating to these practices. Although none of these is exhaustive the flavor seems to be that customs authorities are realizing the importance of adjusting to the global environment of greater trade volumes, faster and synchronized movements, and better and timely information.

Table 2: Customs Laws in Some Asian Countries

	Title of the Law	Year passed / latest amendment	Revising?
Bangladesh	Customs Act	1969	
Brunei	Customs Act	1984	Yes
Cambodia	Law on Import and Export Goods Taxation	1989	Yes
India	Customs Act	1962	Yes
Indonesia	Customs Law Number 10/1995	1995	Yes
Lao PDR	Customs Law	1994	Yes
Malaysia	Customs Act / Custom Duty Act	1967/1978	Yes
Myanmar	Sea Customs Act / Land Customs Act	1878/1924; last amended in the 1990s	Yes
Philippines	Tariff and Customs Code of the Philippines	1999	Yes
Singapore	Customs Act	1960/2003	No
Sri Lanka	Customs Act Number 10	1983	
Thailand	Customs Law	1926/2000	Yes
Vietnam	Customs Law	2001	Yes

Table 3: Information in Some Asian Customs Web Sites

	Website	Tariff s	Processes	Customs law & regulations	Data	Dec Forms	English version
Bangladesh	www.nbr-bd.org				√		
Brunei	www.customs.gov.bn						√
Cambodia	www.customs.gov.kh	√	√	√	√		√
India	www.cbec.gov.in	√	√	√	√	√	√
Indonesia	www.beacukai.go.id	√	√		√		√
Lao PDR	http://laocustoms.laopdr.net			√			√
Malaysia	www.customs.gov.my	√					√
Myanmar	www.myanmar.com/Ministry/Fianance/customs_page.htm						√
Philippines	www.customs.gov.ph		√	√			√
Singapore	www.customs.gov.sg	√	√	√	√		√
Sri Lanka	www.customs.gov.lk	√	√	√	√	√	√
Thailand	www.customs.go.th		√	√	√		√
Vietnam	www.customs.gov.vn	√		√			√

Electronic Commerce

When commercial transactions (including international trade) are carried out electronically, it is important that they are legally recognized as similar to manual transactions. Thus there must be legislation which has the effect of legal recognition of electronic record (data messages and electronic communications), the same legal effect as writing, or as original record, and the legal effects of electronic signature.

The application of IT to trade transactions – for commercial purchase and sale of goods and services, and for transactions with government agencies in the course of goods declaration, the acquisition of licenses and permits, the payment of duties and taxes, the clearance of cargoes and their release from records of storage – all partake of actual effects that mimic writing, creating records and files, and signatures affixed to the transactions.

This is the purview of electronic commerce (ecommerce) which may include buying, selling, marketing, distributing and servicing of products and services through electronic means such as the Internet and other computer networks. It is the electronic application to commercial transactions. A national law would be needed to provide a legal basis for these transactions.

There are many concerns to the promulgation of ecommerce law. One of the most important of these is the use of electronic signature to signify agreement to terms and conditions of transactions, submission of forms and applications, concurrence with liabilities and debt instruments, etc. But more than this the electronic transaction must be able to authenticate electronic signatures as attributable to the owner and ensuring integrity of contracts⁸.

How important is ecommerce law to the use of IT in TF? It is obvious that electronic submissions of customs declaration involve transactions between traders (or their agents) and government authorities. The various messages exchanged between customs and its clients (e.g. the acknowledgment of submission and tagging of transaction number) need to be recognized as legitimate transactions with legal basis. Modern customs law which allows electronic submissions and wider IT will require a legal basis which will have to come from a broader legislation. Thus an ecommerce law legitimizes all electronic transactions including those with government agencies.

The use of electronic or digital signatures to recognize submissions, the protection of the privacy of data and personal (or trader) information, and other security concerns all are integral part of ecommerce. The authentication of signatures may require the use of Public Key Infrastructure (PKI) and other means to legitimize the transactions. As more fraudulent and deceptive electronic practices take place ecommerce laws may have to be more comprehensive which will also affect (protect and promote) the integrity of IT in

⁸ Ecommerce laws simply recognize digital signatures but the integrity of the recognition requires a more elaborate security set-up in order for the law to be credible.

TF. On the other hand, a customs law that uses electronic means for transactions without concomitant legal basis may not be effective and makes traders hesitant.

Many countries in Asia have started to enact ecommerce laws providing legal basis for electronic transactions including those in customs. But there is substantial unevenness as to what is covered and how encompassing they are to transactions with government entities. In Asia, the ASEAN countries apparently are the most advanced in the legislation of ecommerce laws. Table 4 below compares the status of ecommerce laws in ASEAN between 2004 and 2007 showing that for many there were already ecommerce laws as early as 2004.

Table 4: E-Commerce Legislation in ASEAN

Country	2004	2007
Brunei	Enacted	Enacted
Cambodia	None	Draft
Indonesia	None	Draft
Lao PDR	None	Draft
Malaysia	None	Enacted
Myanmar	Draft	Enacted
Philippines	Enacted	Enacted
Singapore	Enacted	Enacted
Thailand	Enacted	Enacted
Viet Nam	None	Enacted

Source: UNCTAD (2007)

Notice from the table that half of the ASEAN countries had no ecommerce laws in 2004 but by 2007 all have laws either enacted or their drafts completed. The pace with which these laws were considered and legislated in part can be explained by the efforts at the regional level to provide the platform in getting the ecommerce legislation into accelerated process. ASEAN is the first regional organization in the developing world that had a harmonized ecommerce legal framework across jurisdictions. After an ecommerce initiative in 1999 the member countries entered into an e-ASEAN Framework Agreement to establish an ASEAN Information Infrastructure. Two national milestones were part of the agreement – enact domestic legislation to provide legal recognition of electronic transactions (cyberlaws) by the end of 2008, and facilitate cross-border electronic transactions and the use of digital signatures.

There are other efforts in Asia towards harmonized ecommerce laws. The South Asian Association for Regional Cooperation (SAARC) is carrying out its Harmonization of E-Commerce Laws and Regulatory Systems in South Asia, and the Pacific Islands Forum has its Cyberlaws Strategy as part of its Pacific Plan for regional cooperation and integration. Yet individual countries have also paid attention to legislating ecommerce laws such as Nepal’s Electronics Transaction Act of 2006 and India’s Information Technology (Amendment) Bill.

While Table 4 appears to indicate that ASEAN is close to having unified ecommerce laws, the content and coverage differ across the member countries. For some parts of ecommerce, some laws have not covered them. Table 5 shows the extent of these differences across the ASEAN countries

Table 5: Coverage of Cyberlaws in ASEAN

	Consumer protection	Privacy	Cybercrime	Spam	Online content regulation	Digital copyright	Domain name regulation	Electronic contracting	Online dispute resolution
Brunei	None	None	Enacted	None	Enacted	Enacted	Enacted	Enacted	None
Cambodia	None	None	None	None	None	Enacted	Enacted	Draft	None
Indonesia	Draft	Draft	Draft	None	None	Enacted	Draft	Draft	None
Lao People's Democratic Republic	None	None	None	None	None	Planned	None	Draft	None
Malaysia	Enacted (voluntary)	Draft	Enacted	Enacted	Enacted	Enacted	Enacted	Enacted	None
Myanmar	None	None	Enacted	None	Enacted	Planned	None	Enacted	None
Philippines	Enacted	None	Enacted/draft	Draft	None	Enacted/draft	None	Enacted	Enacted
Singapore	None	Enacted (voluntary)	Enacted	Enacted	Enacted	Enacted	None	Enacted	None
Thailand	None	Draft	Enacted	Planned	None	Planned	None	Enacted	Planned
Viet Nam	None	None	Enacted	None	None	None	Enacted	Enacted	None

Source: ASEAN E-commerce Project, Survey of Cyberlaws in ASEAN (internal project materials), ASEAN secretariat and Galexia, October 2005 (updated August 2007).

Notice from the table that there is no uniformity in the coverage of the ecommerce laws in ASEAN. This is not likely going to take place immediately as the member countries have different perspectives on these specific components. At least, in the most important component, electronic contracting, more than half have enacted the necessary provision in the ecommerce legislation with the remaining members committed to eventually enact it. This is the part of ecommerce law which is crucial for concluding contracts as it incorporates the recognition of electronic and digital signatures.

There are other associated concerns regarding ecommerce laws but not particularly pertinent to customs modernization. These include jurisdiction of electronic transactions (which court oversees appeals and disputes over customs decisions), taxation, international transfer of personal data, and others which deal with global electronic transactions. Only the minimum parts of the ecommerce laws are actually important to customs modernization using IT. What is necessary is to ensure that the use of IT would not be any different, in legal terms, from manual transactions and paper work in transacting with customs authorities.

1.4 Implications

The previous sections described a number of forces, external and internal, that have prodded developing and least developed countries to adopt IT in their international trade transactions. The developing countries of Asia have also adopted the use of IT in varying degrees but all in the name of facilitating trade. Crucial among these is the measures on the table of the WTO NGTF. Once these are accepted as binding obligations on the part of WTO members, countries may have limited choices in terms of carrying them out. But it is also true that there are inherently important merits to the use of IT especially on the part of border authorities (customs in particular). As countries modernize their customs organizations they can not avoid the need for computerization and automation of transactions with the international commercial stakeholders. On the other hand, as pointed out in the previous section, there must be associated legislation so that electronic transactions in general, and with government authorities in particular, provide their necessary legal recognition.

The question that follows from adopting IT in transacting with customs authorities is whether this will have an even impact on the traders and other stakeholders, or whether this will have distorting effects on the development and evolution of small traders i.e. small exporter and importers relative to their larger counterparts. More pointedly, it is important to understand the larger development impact of IT in TF i.e. on the part of small and medium traders. After all, many of common objectives of widening and deepening international commerce in development is the prospects of drawing in more small traders into mainstream global commerce.

Implicit in some of the measures being proposed at the WTO level is the removal of institutional wedges between world markets and domestic entrepreneurs. For example, among the measures related to formalities connected with importation and exportation is the elimination of pre-shipment inspection and the phase-out of the mandatory use of customs brokers. The former goes against the very idea behind the Agreement in Customs Valuation that not only sets the sequential procedures for valuing traded products but would effectively lead to their lower landed prices. The standards suggested in the WCO Framework of Standards to Secure and Facilitate Global Trade (SAFE) would allow other ways to secure similar information than the traditional pre-shipment inspection facilities.

On the other hand, the proposed phase out of the use of customs brokers needs to be seen in the light of the wider availability of the Internet in conducting trade transactions with government border authorities. As the Internet is seen as a veritable democratizing instrument that allows wide access to electronic commerce, it is only fitting that traders can directly deal with customs and other agencies in an electronic environment. And as specific components in the use of the Internet increases security, enhances interoperability with other peripherals, and protocol languages become more standardized, the Internet becomes the reference for trade transactions. There is no doubt that if the more dedicated electronic vehicles remained, it would be difficult for small establishments to access the electronic environment. Again, the idea behind the WTO

measure is that it would facilitate trade and reduce further transactions costs on the part of traders. Indeed as speeds of Internet facilities further increase and their costs continue to decline, transactions costs using electronic means would decrease and benefit every one in both the trading and non-trading communities.

The answer to whether the removal of these wedges, coupled with the other positive elements supportive of electronic transactions, actually lead to significant benefits, can only be seen by understanding changes empirically. In the development language, what need to be explored is the inclusive effects of IT in TF.

Several things have to be considered in any evaluation of these issues. For example, there may be other benefits that traders derive from the use of customs brokers or even pre-shipment inspection facilities that they would forgo when dealing directly with customs and other agencies through the Internet. For some, their transactions costs may even increase though not for others. Small importers and exporters may not be computerized given their volumes and prefer to outsource transactions with government.

On the part of the small traders, they may require capacities that are not in the stream of what they normally undertake, e.g. production of commodities that are not technology intensive. Their sizes may not be sufficient to undertake direct electronic transactions even through the Internet. This does not mean they are not computerized in terms of billing, accounting and other office operations.

There may also be other factors that will give preferential treatment to large traders as they use electronic means for their transactions. Many of customs modernization programs include the designation of preferred customers and clients to be given faster services based for example on volume of transactions. While this will encourage traders to expand their trade, consolidate with other traders, or undertake systematic joint ventures, it may also be discouraging.

If the use of IT by small and medium sized traders actually lead to speedier movement of their exports and imports, reduce their transactions costs in terms of cutting down the time involved in dealing with government agencies, and eliminate their need for other unnecessary operations including bad governance, it would mark a progress in a more inclusive trading regime. And it would make sense to target IT for TF towards their wider involvement. The forces that have been identified in this chapter have only altered an environment used to manually operated systems.

1.5 Conclusion

The context for IT in trade facilitation can be traced to several forces both within developing countries and outside through various international conventions and institutions. Global trade may have necessitated electronic means for conducting international commerce. But this does not immediately mean that transactions between government authorities and the trading establishment are automated.

The drive for modernizing customs however, the changing standards for customs to conform to an increasingly automated global trade, and the agenda of the WTO to attend to trade facilitation through binding measures and obligations essentially have set the stage for considering IT for TF. Setting standards and “best practices” consistent with an electronic environment ensures that transactions costs are minimized while maximizing the flow of trade.

Recognizing the trend towards IT for not only global but domestic commercial transactions has also egged governments to improve its environment through the provision of legal mantle to electronic commerce. Efforts to legislate ecommerce laws have helped traders to seriously increase its use of IT. In tandem with revisions of customs laws to allow electronic transactions to substitute for manual and paper-driven operations, these have also helped set the stage for IT in TF.

How much these have changed the climate for supporting if not reducing the disadvantages small traders face in the international trading arena needs to be systematically studied and empirically documented. Because of the increasing use and declining costs of Internet facilities as medium for electronic transactions, there are also questions, which likewise need empirical answers, if existing institutions that have traditionally facilitated trade can be abolished and allow traders to directly deal with government institutions to clear goods, secure necessary formalities, and reduce their transactions costs. It may be important to define the mechanisms by which IT for TF impact on traders, especially small and medium sized traders and how the context for IT, described in this chapter, influences their behavior.

2. Trade Facilitation and Information Technology Framework and Experience

2.1 Framework and Empirical Evidence

It is important to lay out a framework for understanding how trade facilitation affects the movement of goods, and where information technology (IT) fits. This relationship in turn sets the stage for locating small and medium enterprises (SME) in international transactions. There is increasing substantial literature on trade facilitation (TF) and an equally wide knowledge of IT. There is no intent here to survey these materials; however to the extent that they are relevant to the discussion, they will be referred to appropriately. This section elaborates on TF and the wide range of instruments that have been used and analyzed while the next section details some of actual experiences in the use of IT for TF. The third section examines small and medium enterprises and IT for TF. The final section gives a summary of the chapter and derives implications for inclusive growth.

What we are looking for in a framework is the identification of the channels and mechanisms by which trade barriers other than transparent tariffs, when removed or reduced, affect commercial transactions and overall economic conditions – levels, composition, and speed. The removal or reduction of these barriers is the scope of TF which in itself may be wide and therefore the associated measures that both the public and private sectors apply. Such a framework therefore may or may not delineate the instruments which include the use of IT. How IT comes into TF, to the extent that it is not integral, also becomes part of this framework.

In the Asia-Pacific Economic Cooperation (APEC) study (2002), TF is *not* directly associated with the use of IT. Rather TF is considered as activities in the movement of goods across borders that lower the “...costs of administration, standardization, technology, information, transaction, labor, communication, insurance, and financing as well as reduce time costs related to these procedures. The technology costs are involved during standards procedures, and information costs arise while importing or exporting goods and services. These costs result in loss of economic efficiency and reduce gains from trade...” (APEC 2002: 10). What matters here are those actions by economic agents that lower these costs. Instead of considering various options for carrying out TF, the study measures the effects of these TF activities on macroeconomic and trade variables.

On the other hand, the OECD study on the role of automation in TF (2005) analyzes the effects of automating TF measures many of which are customs-related. Indeed the major focus is in examining the impacts of automating the entire customs procedures related to import and export. The study surveys the range of benefits and costs associated with this automation. Although automation is not seen as a “panacea” for TF, it improves the movement of goods across borders. A paperless environment, the

increased use of the Internet, and a legal framework that allows digital transactions all suggest that an automated TF increases the efficiency of commercial transactions.

There are at least two streams of thinking on TF and how IT fits into the scheme of things. One is simply to analyze how non-tariff barriers to trade affect international transactions on the trading countries. Such a framework identifies those barriers and then traces the effects of removing them either in total or in specific components depending on the array of these. The task of their reduction or removal is the purview of trade facilitation given that these are often non-tariff in nature. This stream refrains from laying out how the TF measures are to be undertaken and implemented. Thus IT does not enter into the framework in concrete ways and is often left as part of TF agenda. IT may only be one means for addressing the reduction of these barriers.

Another is simply to analyze what happens to trade and the economy under a scenario where barriers which are pervasive are dominated by bureaucratic formalities, documentary requirements, and involve multiple public and private agencies, and the ensuing scenario where these barriers are removed through an automation of processes and procedures. The presumption is that these processes and procedures act as bottlenecks to the movement of goods across borders. The automation is the trade facilitation measure applied and its impact is in the speedier flow of goods.

It would seem that if there are differences in the underlying framework between these two streams they may be subtle not striking. Yet when we go into some of their details in terms of the scope of TF, methodology for measuring TF, and implications for addressing and using IT, differences may turn out to be more prominent.

Trade Barriers and Measures and Empirical Analyses

In the first place, the barriers that are identified and for which TF measures are applied vary considerably. These could be “non-price” wedges between domestic and world prices including non-tariff measures (conventionally viewed as policy driven such as licenses and quotas), transportation bottlenecks, logistics constraints, infrastructure deficiencies, and administrative weaknesses.

Innovative ways in which these have been further indicated or quantified have grown in recent years. In the APEC study (2002), trade costs incorporate transactions costs (transport and insurance), policy costs (tariff and non-tariff barriers), and facilitation costs (absence of trade facilitation). A reduction in any of the components can be considered as equivalent to a reduction in trade costs. While it is theoretically possible to measure the incremental welfare effects of TF (depending on the parameters of import demand and change in trade costs), the usual empirical basis for measuring barriers has used results from surveys of firms about their magnitude. In Arvis and others (2007), for example, TF practitioners rated a range of measures of logistics performance on a given scale. These various ways of quantifying the costs of TF have revealed such measures as trade costs of non-tariff barriers as share of total trade values, technology standards imposing 10 percent of production costs, the equivalence of health restrictions to tariffs,

costs of transport restrictions to border crossings as share of total transport time, monopoly in port services in terms of export taxes, etc.

Results from surveys of business firms would indicate the relative importance of different trade impediments which can then be measured against trade costs. In the APEC study the results reveal that high tariffs, complex customs and administration, trade restrictions and quotas, business mobility, standards and licenses rank in decreasing importance (as barriers) to international commerce. Further breakdown in these categories give finer specifications of the impediments. But a consolidated measure of costs are in terms of effects on transactions costs, price of imported products, and increase in consumer demand by trade facilitation. These variables are then used to estimate their influence on the broader macroeconomic indicators such as aggregate output, employment, wages, inflation, trade volumes, and other trade related meters. Their numerical impacts indicate how much they impinge on the economy in general and on the trade sector in particular. And since the variables are only outcomes of more specific actions they do not point to direct TF measures.

Consider now what happens if the finding (from surveys) that complex customs procedures and trade administration are the main impediments to faster trade flows is translated into specific variables. A common direction followed is a “time and motion” study of the customs procedures and trade administration. By dissecting the entire procedure into component parts which are attributable to various administrative responsibilities it is possible to measure the impacts of addressing individual components on the speed of trade movements. The increments can then be estimated in terms of trade values, volumes, and eventual effects on the economy.

In the second place, the way these barriers are modeled in determining how TF measures would affect the trading economies equally varies. Some studies note that empirical analyses of TF employ an array of methods such as surveys (e.g. how important are barriers to traders), gravity models (examining the importance of geography in explaining the existence of barriers), partial equilibrium analyses and general equilibrium modeling.

Much of these models have been used to analyze the economic benefits of TF. In a review of these models by the APEC study (2002), partial equilibrium analyses focused on estimates of the equivalence of trade restrictions to tariffs on consumer welfare gains and in terms of GDP effects, and the effects of standards and conformance in terms of trade costs (value of trade). Surveys obviously focused on the nuts-and-bolts of TF – time costs for freight loading, transactions costs, compliance costs of standards. Regression estimates revealed how much trade creation takes place, and the volume and value increases resulting for example from standardization. The larger computable general equilibrium models (CGE) yielded estimates of increases in real incomes from tariff reductions and TF measures. The inclusion of wider barriers to trade through infrastructure bottlenecks, logistics (domestic and international) networks, clearance processes by customs and other agencies, facilities to track and trace shipments, etc. has used ratings by TF professionals regarding performance in individual countries (Arvis

and others 2007). These ratings can then be used to trace their effects on larger macroeconomic variables (e.g. impacts on trade, poverty).

What can be observed from the frameworks of trade facilitation is, on the one hand, the use of aggregate macroeconomic indicators, trade impediments often indexed by surrogate variables, and models and methodologies that do not fully take into account automation and other IT instruments. On the other hand is the use of comparative indicators (usually time-release studies) of trade transactions before and after the institution of automation and other IT applications. Changes in the comparative indicators are attributed to the IT use as the principal TF measure although other related measures may also be included in the analyses. The mechanisms by which TF affects trade, aggregate output, and income are similar although how they are arrived at may differ. For example, changes in freight loading/unloading times can be translated into increases in the volume of trade and other aggregate economic indicators while impacts on trade volumes can be translated into increased movement of goods across borders (loading/unloading times). Indeed they are mirrors of each other.

GATT Framework and Empirical Analyses

The TF framework that has been laid out here appears as academic mainstream even if the studies are clearly applied theoretical and empirical research.⁹ Its underlying context is the broad economic changes that take place when non-tariff (and even more broadly, “behind-the-border” and “inside-the-border”) impediments to trade are removed or reduced. It takes into account many inter-acting variables economy-wide.

But there is a narrower context of the framework defined by parameters in which new trade rules governing TF will eventually emerge. These relate to Articles V (Freedom of Transit), VIII (Fees and Formalities Connected with Imports and Exports), and X (Publication and Administration of Trade Regulations) of GATT 1994. Do these fit in this framework? One can always argue the answer either way since this larger macroeconomic framework can actually encompass these more specific provisions. Indeed many of the clarifications related to these articles point to the implications of not addressing them. They lead to increases in trade costs.

In the analytical exercises related to the framework, the success of TF measures is usually indicated by a fall in the price of imports which would be tantamount to improvements in activities related to the 3 articles. In a partial equilibrium setting it is then possible to estimate the effects of price reduction (in equivalent terms to some TF initiatives) on trade and the larger macroeconomy. And in the CGE modeling one can trace the effects of the TF surrogates on specific sectors of the economy, various components of demand, and other aggregates.

⁹ The wide latitude in the interpretation of some variables in the aggregate analysis often makes them less appealing to policy makers.

The 2004 work of Wilson, Mann and Otsuki attempts to combine the ratings of various impediments found in many surveys with more objective data on trade flows, tariff structure, and traditional explanatory variables of trade on cross-country experiences covering 75 countries. Four indicators of TF are used – standardized ratings on port efficiency (port facilities, inland waterways and airports), customs environment (hidden import barriers and irregular payments), regulatory environment (satisfaction of transparency of government policy and control of corruption) and service infrastructure (speed and cost of internet access and speed of internet on business). They argue that these indicators are constructed to reflect the TF agenda of Articles V (port efficiency), VIII (customs environment), and X (regulatory environment) in addition to also indicating “border” measures (port efficiency and customs environment) and “inside-the-border” measures (service infrastructure and regulatory environment). Their results showing the importance of TF measures in expanding trade are robust and appear to be consistent with limited country-level data. Indeed, what their results suggest is that unilateral TF reforms and implementation would lead to gains especially in terms of exports. What kinds of reforms are needed by each of the categories of TF can not be answered by the study but by a complementary framework that deals with the actual “nuts and bolts” in the movement of goods across borders.

The Wilson, Mann and Otsuki (2004) study illustrates a combination of the two streams out of the TF framework. The further specification of the border trade impediments into their components highlights varying results. And as they had indicated the literature that uses aggregative data tend to show large TF impacts simply because they tend to incorporate many of the particular activities involved in reducing trade barriers both at the border and inside the border. Their reviews revealed high TF elasticities of trade.¹⁰ This is also validated in some of the CGE models used in evaluating the impacts of TF on the aggregate economy.

The APEC (2002) study estimates the increase in GDP arising from TF (which is presumed to be reflected by a 5 percent reduction in trade costs over 5 years across all the economies) would be unevenly distributed with Singapore getting the largest gain and the US the smallest gain.¹¹ In the recent CGE simulation (Trade Sustainability Impact Assessment) of the proposed ASEAN-EU Free Trade Area the results are similar – large output gains for some countries, small for others. In terms of export (value) increases, the underlying TF elasticities are quite high across different TF configurations (proxied by a 1 percent reduction in border costs for limited FTA; a 2 percent cost reduction plus 1 percent cost reduction in some sectors for ambitious-plus FTA) analogous to the impacts on aggregate outputs (Ecorys 2008).

It is also possible to find out the effects of a singular trade facilitating measure on the economies of trading partners. Examples of such singular facility include port

¹⁰ The highest elasticity comes from improved port efficiency compared with the elasticity of improved customs environment or services sector infrastructure. Note that port efficiency uses port facilities, inland waterways and airports.

¹¹ The 5 percent reduction in trade costs is the target of the APEC economies in trade facilitation.

development, transport infrastructure, logistics support, and IT installation.¹² In actual experiences, a singular facility may happen even if it is part of a larger package especially if time horizons differ. The study by Warr, Menon, and Yusuf (draft manuscript 2009) of cross-border infrastructure applies general equilibrium modeling to find out the aggregate effects of a transport infrastructure on trade along with other effects. The Second Mekong Bridge between Lao PDR and Thailand provides a new trade link that is directly connected with the road infrastructure of the East-West Economic Corridor (EWEC) of the Greater Mekong Sub-Region (GMS). The model used simulates the effects of different magnitudes of reduction in transport costs between the two border provinces arising from the use of the bridge. Initial results for the long-run indicate large gains in trade not only between the two countries but even larger gains in terms of each country's trade (exports) to the rest of the world. The responses vary by commodities but in general it appears that there is greater gain on the part of Lao PDR from the transport infrastructure facility than on the part of Thailand. These results however can not be truly attributable to the infrastructure alone since the presumption is that cross-border facilities have equally been provided. This was apparently followed since when the bridge became operational the associated TF measures such as customs improvements (e.g. single stop inspection and electronic submission of declarations on the part of Thailand) were implemented.

This review of various ways of looking at trade facilitation suggests some common framework at which changes take place. There are obviously behavioral changes directly on the part of economic agents along the chain from the moment goods arrive at the ports until they are delivered to final destinations and, indirectly on the broader surrounding economy. A range of methodologies are applied in measuring the effects of TF and, depending on the variable specification, these changes result from particular measures. TF can also be seen as specific intervention modalities which can be considered as projects for which *ex ante* benefits can be identified and quantified. When combined with quantification of costs it is possible to arrive at traditional benefit-cost ratios to determine viability of the interventions. Another way of analyzing TF would be a systematic tracking of goods as they go through different public and private windows until they are cleared. Indeed among these different windows are the various government agencies with border functions, private-sector run interfaces (e.g. warehouses) and other organizations facilitating the movement of goods.

Tracing behavioral changes on those directly and indirectly affected by TF requires measuring its effects on trade and related sectors, and on the rest of the economy through other channels (e.g. trade expansion leading to increases in per capita GDP, real wages, real consumption). The APEC study (2002), ASEAN-EU FTA TSIA (2008), and Warr, Menon and Yusuf (draft manuscript 2009) are examples of efforts not only to develop a larger framework but of postulating how TF influences the economy. Data and information from multiple sources and the use of ratings from trade specialists on

¹² Wilson, Mann and Otsuki (2004) reviews some of these singular measures including standards harmonization, tariff-reduction equivalence of saved shipping time, increased web hosts and trade flows, and reduction in bilateral phone call prices and bilateral trade flows.

effectiveness of TF would also be a way to trace the influence of TF on specified dependent variables. Much of the work by Wilson and others and the specific reference to Wilson, Mann, and Otsuki (2004) try to quantify the impacts of TF measures on trade behavior. But because the combined data include objective and subjective variables these results often have to be complemented by other objective data.¹³ Nevertheless the underlying framework stays with behavioral changes. What is behind assessments of benefits and costs of various TF measures (e.g. the institution of advanced rulings, creation of post-clearance audit facilities, electronic submission of entry documents) is the measurable stream of benefits and costs that in turn imply behavioral changes (on the part of the beneficiaries). In the particular exercise of looking at TF interventions as economic project analysis one has to sift through the quantitative results about whether they are all caused by the intervention or not since comparisons of benefits before the intervention (through a TF project) and after the intervention may not be totally due to it. This kind of qualification of course also holds true for all the other behavioral analysis of TF.

Assessments that follow the movement of goods as these enter the border, go through various documentary, physical, technical, and other requirements until final clearance and delivery are not within the immediate ambit of the above framework. It is the behavior of the goods that is being observed. However attributing their movement to specific interventions (say, at various windows) requires an analogous framework for removing other explanations for the observations. There may be a multitude of reasons why goods movements behave the way these do during import and export formalities (e.g. the kind of goods, cargo content, country of origin and intermediate ports, broker for the consignee, etc.). It is important to remove alternative credible explanations before asserting that a TF measure explains the movements. Needless to say the resulting changes in the movement of goods can be transformed into equivalent volume and value of trade changes and other indirect effects the way the other modes of examining TF are specified and analyzed.

Automation has not really been integral to the framework that has been used in understanding how TF affects trade. In many instances the use of IT is subsumed in the measures being studied. For example, the Global Competitiveness Report rates the level of efficiency in customs procedures and not really whether the customs environment is automated or not. In some instances the use of IT in trade procedures falls far short of being automated.¹⁴ In a number of countries in Asia IT is only up to the submission of goods declaration in electronic format. Developing a procedure to evaluate the effects of this partial IT would be difficult.

¹³ There is a breakdown of the impacts from these TF measures by regions and in the specific countries of Guatemala, Nigeria, and Indonesia illustrating not only variations across the regions (and in the limited set of countries) but the general robustness of the econometric results.

¹⁴ Even if only certain steps in particular agency procedures are automated (more specifically in electronic format) there would always be benefits however partial and it is a matter of measuring these against the alternatives. Customs procedures in some Asian countries are only partially automated.

2.2 Experiences in Information Technology for Trade Facilitation

There are not too many reviews of the use of IT as a TF measure. The recent review by Grainger (2007, 2008) in fact notes "...it is surprising that so little literature on the subject has been produced..." (Grainger 2007:p. 42). The OECD study (2005) which principally is on customs automation also notes the paucity of reliable data across countries which would allow detailed assessment of the benefits and costs of customs automation. A way to look at IT for TF is to consider the existing literature which seems to be along two distinct categories. One set provides the necessary knowledge to develop IT systems that facilitate trade This means identifying technical conditions, associated hardware and software essential in running automation that help move goods across different formalities. Within this set of materials are various off-the-shelf programs that can run and operate the IT systems or several independent IT systems that can be replicated in other environments and settings.

But the "IT for TF" in this sense appears too broad. First the multitude of government and private agencies with border functions are part and parcel of what TF should pay attention to whether these be quarantine agencies, port authorities, warehousing establishments, logistics firms, brokerage or customs house agents, and many others. The importance of these different organizations depend on the kinds of products moving, the location of borders and other physical and geographical conditions in the trade transactions.

Second, the development of IT platforms often takes place modularly i.e. within a single agency dictated by its individual conditions, capacities and readiness, and facilities, among others. If the development is outsourced, as it may usually be, it means it would be tailored to fit the organization. Rolling out this single platform to the trade formalities can be the TF. Multiplying this development across many agencies, public and private, does not guarantee that trade facilitation may take place. For one, there is a problem of interoperability across varying platforms and thus instead of facilitating formal processes the varying IT systems may even lengthen them. For another, an IT system for each agency may require different electronic forms and thus while electronically filed may end up being cumbersome to traders. And then the different systems would have multiple records for the same transaction.

Finally, the IT being broad may not really be material to the TF if there is active coordination and collaboration in the development of platforms. Indeed this may require the designation of an agency to be the hub, gateway, or portal in which different systems become interoperable. Once the hub is agreed upon the scale of TF would then depend on the speed in which the other agencies and organizations are effectively linked together.

Another set in the literature of IT for TF focuses on analyzing and measuring the benefits from automation. Indeed the presumption of this set is that IT is clearly beneficial based on classic transformation in some countries. It is almost taken for granted that when IT is carried out the benefits that come to trade outweigh the costs that are incurred in installation and continuing maintenance and regular upgrading.

Both these kinds of literature usually refer to IT in customs and customs-related procedures thus their institutional reference is a country's customs administration. The benefits from IT depart from improvements in the area of customs formalities while the development of IT platforms concentrates on how automation can be applied on its steps and processes.

It is therefore not surprising that the experiences in IT for TF that are documented are mostly in customs administration. The OECD study (2005) surveys different country experiences in automation among both OECD and non-OECD countries. The automation TF is viewed as a project with associated costs and benefits. Although it is admitted that cost determination is unique to country characteristics and there is no common template, it notes that there are important parts of automation for which cost parameters are more identifiable. For example, the adoption of off-the-shelf system i.e. ASYCUDA has predictable costs in installation and maintenance; costs of computers and other hardware are readily available; some infrastructure costs are also common. In short, there are costs that allow comparability. Automation costs are only part of the larger customs development program with the experiences of Russia, Tanzania, and Central and Eastern Europe. Between 40 and 60 percent of total costs are for automation although there is no indication what are the remaining costs for in these countries (OECD 2005). It is also important to note from these various country experiences that while there is an expectation that migration to the Internet reduces costs in the long run, this upgrading will initially entail cost (e.g. Senegal's customs operation management system upgrading to a web-based version). Cost comparisons are also available between the off-the-shelf systems (e.g. ASYCUDA) and those independently developed to particular country settings with the latter costing 10 times more. In addition to these general investment costs, there would be costs in running the automation services when users access the facilities, submit forms, and exchange messages with the system. In most instances, operating costs are shouldered by individual users who are supposed to be levied fees that approximate the costs of delivering the services (Article VIII of GATT 1994).

The benefits from automation go to private traders and government in terms of greater efficiency in cargo movements, improved governance due to reduction in smuggling and in face-to-face transactions with officials, predictable revenues, and decline in delays in transactions and their costs. The measurement of benefits from automation is mostly in terms of the reduction in clearance time of goods with customs. Country experiences with this type of benefits show wide variation from 168 hours in Guyana to single-digit hours in other countries. This tangible benefit in the form of reduced clearance time is driven home further by comparisons between automated and non-automated environments in customs procedures. Again the differences between the two have wide variations (e.g. in Thailand the difference is between 1/3-1/4 of the time in manual processes; in New Zealand clearance by automation is 1/48 the manual time at maximum; in Chile it is 1/5 the manual time).¹⁵

¹⁵ In OECD (2005), the list of countries with customs automation includes information on the year installed, coverage of the automation, system that is installed, and clearance time (OECD 2005: Table 1).

Stacking up this array of quantitative benefits against the costs answers the question whether investment in automation pays off. The experiences of automation in the US, Chile and Singapore are described as illustrative of the high pay-off from the application of IT to customs procedures. Indeed the benefit stream seems so large that it becomes hardly an issue whether automation should take place. Business savings, productivity improvements, and efficiencies in customs administration all point to the high benefit-cost ratio of IT. In the more detailed analysis of the evolution of Singapore's automation (UNESCAP 2002) more items are indicated composing benefits and costs. For example, the direct costs (S\$ 20 M in 1987) constitute the development of the system while some traders incur indirect costs through subscription, access, equipment, and set-up (some of these are one-time costs and others recurring transactions costs) and others may incur more costs especially for those which are not exposed to IT at all and thus their direct training costs. On the other hand, the benefits accruing to other government agencies using the system are not included in the estimated stream of benefits as well as other organizations that indirectly benefit such as the transport sectors, logistics providers etc.(UNESCAP 2002: 53). Although it is quite clear if not obvious that the potential benefits from automation of customs procedures as TF are large, it also evident from the limited experiences that are often illustrated that the details of these benefits and the details of these costs in a project analysis context are not adequately laid out.

One can always find a comprehensive rationale for the application of IT in TF (e.g. UNCTAD 2006) in terms of increasing volume of trade, globalization of production platforms and their needed speed and synchronization, increasing accessibility of telecommunications infrastructure and liberalized environments, greater interaction with transport and logistics sectors and expanded participation of the private sector in the management of trade processes (through e.g. privatization of ports). Indeed electronic TF is ultimately viewed as a global portal development derived from initial stages of single-window national portals to multi-nation and regionally integrated single-window portals ((McMaster and Nowak n.d.)

Being technical in nature, the literature on developing the automation system for TF is broadly confined to the kinds of software and hardware that are essential to automate trade procedures. There is a set of "best practices" for IT in national trade facilitation (Schware and Kimberley 1995). And the use of current version of ASYCUDA is the de facto system many developing countries adopt (UNCTAD 2006). Even if the "best practices" for IT may have been overtaken by events with the wider use of the Internet and web platform, the focus by Schware and Kimberley on Electronic Data Interchange (EDI) does not diminish their discussion of the many, even more important, enabling conditions for automation. Indeed there are several critical ingredients essential for a successful automation for TF – building awareness, working with potential users to prepare them for ecommerce, developing and designing messages and guidelines, and re-engineering systems. The technology costs – including technology services to be provided by Value-Added-Network (VAN) provider – are but a small part (typically 3-10 percent of all costs among case studies reviewed) of overall costs and can be outsourced.

Notice that in this EDI-based automation the break-even period for typical investment is between 48 and 72 months.

The utilization of ASYCUDA as the automation instrument for many developing countries involves its application to customs administration. Its installation clearly drives home the point above that technology is exogenous and that there are more important considerations to take in the use of IT for TF. Some of the problems that come up with the use of off-the-shelf system, as the case of ASYCUDA, appear when it is installed as external application on interrelated institutions and information flows (Albuero 2007). Thus even if the costs of this technology may be lower than other alternative systems, one has to take into account the associated adjustments and their costs in the long-run. The OECD study (2005) reports that the installation cost of ASYCUDA may be as low as USD 1.5 – 2.0 million in 2002.

Many countries have likewise been successful in developing independent automation systems tailored specifically to their peculiar environments. Although development costs may be high, and their development may also be outsourced, they take into account more closely the institutional set-up. Some of these countries include Singapore, Malaysia, and Thailand in ASEAN, Russia, South Korea, Japan, the US, and Central and Eastern Europe. There is an analogy here with respect to the use of EDI as automation foundation in its early evolution. But the increasing availability of the Internet (coupled with its increasing security properties) provides the difference as even these independent systems can be made compatible with the widely used web-base to gain broad access.

It is not surprising that the development of these independent systems has triggered their participation in providing alternatives to the ASYCUDA in developing automation platforms. Indeed Singapore's Crimson Logic (TradeNet), Malaysia's DagangNet, and other commercial IT providers (e.g. Microsoft) are bidding to develop independent automation in other developing countries including participation in the design of single-windows. Given that these independent systems have been tested and used, they can give more options than the ASYCUDA.

There are several observations that can be gleaned from this review of the relationship between IT and TF. While TF has wider impacts than can be captured by a narrow component in the form of IT, the notion of facilitation would also include IT content. However to the extent that we can identify the unique IT part, it is then possible to review what may be the underlying interaction between the two.

First, as noted by those who had earlier reviewed the role of IT in TF, there is limited literature that systematically relates the two. And the usual area of analysis is customs-related automation. This does not mean that automation is only effective or has optimum impact on customs processes. Yet there is dearth of understanding and analysis of IT in other areas of TF. For example, there is limited, and not reviewed here, measure of how automation in quarantine procedures can facilitate trade. Many institutions and

organizations have border functions and their relative importance is a function of the kinds of goods traded.

Second, the limited documentation of experiences in IT for TF often assumes substantial benefits from automation. There is of course no doubt about their direction and even magnitude. But it is hardly helpful for countries considering automation to take its benefits on faith especially if there are alternative areas for IT investments.

Third, in the customs procedures there is no indication which parts of the whole processes are automated. One can always assume that it is an end-to-end automation. Yet even in this scenario benefits are non-uniform and there is still a need to measure the varying benefit streams rather than gloss over them or worse exaggerate these either in magnitudes or time flows.

Fourth, what seems to follow from the reviews is a more careful specification and analysis of the benefits and costs of IT investments. For one, finer details of benefits and costs allow greater deliberation of choices that governments may make in applying IT in TF. For example, the wide variation in clearance time for cargoes based on many surveys indicate a need to understand why and explore possible sources of explanation, and greater consciousness of what analytical tools to use to draw conclusion about impacts of IT.¹⁶ This would especially be important to least developed countries with limited resources but willing to invest in IT efforts with largest impacts. For another, there needs to be further specification of the incidence of an automated system i.e. which stage of the procedural flow (if it is in the customs) is the IT effective. Indeed there may be cases where the stage of a country's trade does not in fact warrant automation especially the kind requiring custom-built design. The Revised Kyoto Convention specifically defines the use of IT only when it is cost-effective. And if service providers of customs IT are to come from the private sector careful feasibility analysis may not warrant full automation. Finally, one way of validating the magnitudes of benefits and costs is to undertake a post-project evaluation comparing the actual benefits and costs with the *ex ante* magnitudes that led to the implementation of the automation. While it is useful to validate automation by estimating all savings with the use of the facilities, it is another thing to decide on alternative IT choices.

2.3 SMEs in Trade and Information Technology

The initial technology used in customs automation was EDI and its costs were considered to be high figures for small-to-mid-size businesses. As Schware and Kimberley (1995) has shown with their estimates of internal and external costs, these are high enough to become barriers to entry for SMEs. On the other hand, with many alternatives to connect to EDI (e.g. "low tech-no tech" non-computer technology and

¹⁶ For example, one reason why variations in clearance time among cargoes are so wide is because there is also wide variation in the application of TF measures by customs in this case. It is not clear if collecting more samples of cargoes can reduce the variations.

other basic devices such as phone, fax, telex) SMEs can still become part of an automated regime in EDI.

Did the EDI-based IT facilities actually expand the participation of SMEs in international trade? Would this kind of platform diffuse to the wider trading system across the global community? While access by SMEs to EDI may have increased via other alternatives this was self-limiting. And the self-limitation was not due to lack of participation by the SMEs but because of EDI itself. Aside from the costs involved in EDI system and the dedicated nature of its use, Schware and Kimberley argue that what has made it problematic was the hybrid nature of the system where EDI hubs use paper for majority of their trading partners but pure EDI for a small though growing minority of partners. This hybrid actually leads to higher not lower costs and to convert all partners into EDI would take a long time. As they note the EDI brick wall, which makes its wider diffusion self-limiting, is the work involved in installing and integrating EDI into the business systems of traders.

The subsequent developments after EDI (e.g. the use of extendable markup language XML and transition stages through more access points) were significant in the further automation of trade procedures and processes. And the integration of the Internet into both off-the-shelf and dedicated platforms drastically eased the previous constraints paving the way for wider adoption of IT in TF. But even with expanded IT in TF arising from reduced costs the participation of SMEs still seemed to have lagged behind although this is not just from the IT application but more generally in the internationalization of the SMEs.

IT in TF for SMEs is set in a larger context in the Asia-Pacific Economic Cooperation (APEC). Here ecommerce is seen as giving unique opportunities for SMEs in the APEC economies to have more access to international trade (APEC 2003). Ecommerce technologies help SMEs realize reductions in direct costs and increase efficiency savings which arise because of border delays and documentation which tend to add to the landed price of various products. On the other hand, the streamlining of customs, "...quarantine, health, and port services provided by government agencies to the trading community..." can provide efficiency savings to resource and time deficient small businesses (APEC 2003: 8). For small businesses to benefit from IT, it should be seen as part of a comprehensive package involving all the facets of ecommerce thus including telecommunications infrastructure, legality of digital information and signatures, security concerns, common if not harmonized standards and cultural and language differences. These are concerns that go beyond the need for automating trade formalities and how this would affect SMEs.

What constitutes barriers to international markets often discriminate against SMEs since large companies usually have resources to minimize risks in international commerce, including strong lobbies for favorable laws and regulations (Fliess and Busquets 2006). In the context of increasing globalization most SMEs that are accessing international markets have to face up to the need for networking with global firms, and become part of supply chains. They become more vulnerable to access constraints. More

apparent among these is the non-tariff barriers that SMEs face in their trade through high costs of customs administration and restrictive health, safety and technical standards, among others, in which various procedures are involved. Automating these processes and procedures in some sense make their barriers to SMEs more predictable and costs can be adjusted if not minimized.

Even before actually engaging in international trade SMEs are hampered by difficulties in obtaining information about laws, regulations, advisory services, and even market opportunities. Without a way of obtaining regular information SMEs tend to incur more costs and time in getting such types of information which large companies can usually get with their more extensive resources. What this means is that part of a TF for SMEs would include easy access to information that gets them into global commerce. The application of IT involves two parts – access to electronic sites (e.g. chambers of commerce, industry associations) that provide a range of information services that SMEs can use from market information to advisory services, and access to electronic information of government procedures, requirements of agencies which process trade transactions, and product specific information or links (GFP 2005).

Once these kinds of facilities are provided there is still no assurance that SMEs actually end up engaging in international trade. Many reasons have been advanced based on surveys and researches on SMEs' inability to exploit opportunities in export businesses and to source inputs through importation. Despite the potentials arising from globalization much of international commerce are done through network firms and multinationals. It has been large firms that have actually been dominating in this set-up. For SMEs to participate in this globalization process they have to overcome existing barriers posed by large multinationals. Even for SMEs in developed countries these barriers are quite imposing – big firms are able to leverage their large volumes to extract price, services and other add-ons not available to SMEs. (Shatz 2004; Goldsborough 2005). Without internal adjustments on the part of SMEs they remain outside of the global commercial transactions. A number of these adjustments in fact would be IT-related such as processes re-engineering, integration of business functions to improve coordination, links among suppliers, vendors, partners and customers, and adoption of specific application programs related to international trade (Goldsborough 2005). In other words, SMEs have to gear up their firms to be capable of electronic link-up with the external trading community through internal capacity improvements not only of human resources (e.g. IT expertise) but the acquisition of necessary equipment and facilities and their appropriate upgrading. Where an option may be in the form of outsourcing some of the preparatory system, what is important is that the SMEs see their own adjustment as essential before capturing the optimal benefits from exogenous IT-related TF measures.

Poor participation by SMEs in international trade can thus be partly traced to the firms themselves and not only to the trading environment which also implicitly favors large enterprises. Of course problems with the trading environment may be onerous but more so for SMEs which often suffer from size limitations and lack of modern technologies. Thus the environment places a relatively larger burden on them than on large firms (EC 1999). What is emphasized is that SMEs become aware of best

international practices in global commerce and the role that TF measures can play in ensuring their participation.

In the end, the importance of IT to SMEs must be answered by the firms themselves. Assuming the boundaries of the IT for TF for SMEs include the various procedures and processes involved in trade formalities, the question is whether these are important to the SMEs. If these are considered barriers by the SMEs these are more external than internal to the firms i.e. they are part of their business environment or accessibility to international markets. International SMEs however are not synonymous with exports only but also importation for eventual exports. They form part of the production platform where firms are linked together because of horizontal integration and component manufacturing.

One partial answer to the question of importance can be gleaned from a study of SMEs across the APEC economies and OECD members (OECD-APEC 2006). 978 SMEs constituted the sample of a survey along with a matching survey of OECD-APEC governments on the same question of ranking barriers to SME internationalization. The results indicate that what the policy makers and SMEs commonly perceived as the 10 most important barriers to internationalization cluster around capabilities (e.g., lack of trained personnel for internationalization, developing new products), finance (e.g., shortage of working capital), and access (e.g., limited market information, identifying business opportunities, unfamiliar export procedures/paperwork). Business environment (e.g., unfamiliar business practices), while among the 10, fall in the lower half of the perceived barriers. The IT-related barrier, “high costs of customs administration”, ranked 29th importance to SMEs (and 38th importance to governments).

The combination of survey of policy makers and SMEs allows the possibility of determining what are commonly viewed as barriers to becoming international firms and their relative importance (summarized above). From both the side of government and the SMEs, barriers for which TF measures are supposed to address are not viewed as highly important. For sure they do not rank among the difficult barriers to overcome. On the other hand, these results do not seem to contradict the characterization of SMEs from other studies. Indeed they reinforce each other.

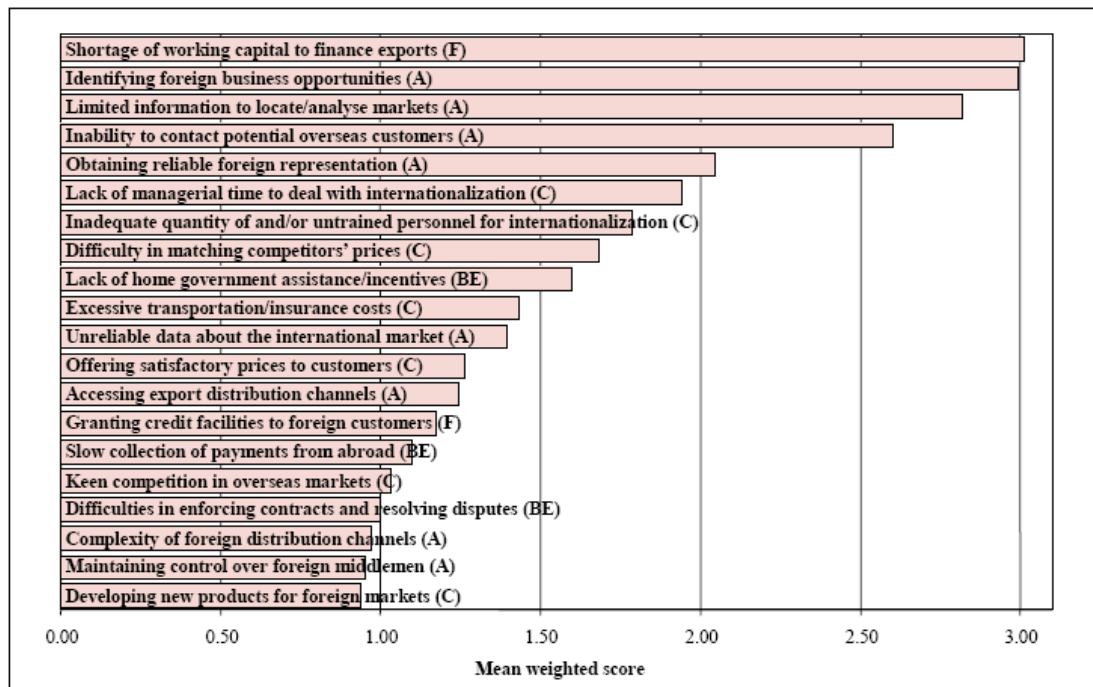
Tables 1 and 2 reproduce the ranking of barriers to SME internationalization from the combined policy maker and SME perception and the ranking by the SMEs alone, respectively. The top ten ranking method gives the consistency between what is seen by the firms and what is seen by the policy makers as inhibiting the entry of SMEs in international trade.

Table 1: Top 10 Barriers to SME Access to International Markets Reported by Member Economies

Rank – Weighted Factor	OECD 1997 Classification	Description of barrier
1	Capabilities	Inadequate quantity of and/or untrained personnel for internationalisation
2	Finance	Shortage of working capital to finance exports
3	Access	Limited information to locate/analyse markets
4	Access	Identifying foreign business opportunities
5	Capabilities	Lack of managerial time to deal with internationalisation
6	Capabilities	Inability to contact potential overseas customers
7	Capabilities	Developing new products for foreign markets
8	Business Environment	Unfamiliar foreign business practices
9	Capabilities	Meeting export product quality/standards/specifications
10	Access	Unfamiliar exporting procedures/paperwork

Source: OECD Member Economy Policymaker Survey and SME Survey, 2006.

Table 2: Top 10 Barriers to Internationalization, Ranked by SMEs



Source: OECD Member Economy Policymaker Survey and SME Survey, 2006.

Source: OECD-APEC 2006

The study does not give explanations for these results, some of which appear to be surprising given the kinds of benefits TF measures endow SMEs. Moreover the results

are consistent with what member economy policy makers perceive as important barriers faced by SMEs in internationalization. On the other hand, these results also support earlier arguments that much of the internal efforts by SMEs are more important in being able to access international markets than what facilities there are in facilitating trade including IT.

These may not really be representing the sentiments of most SMEs especially those from the developing countries or those which are contemplating on entering the international markets. And this study admits that "...a high degree of concentration [of samples from] within just 7 member economies: Canada (217), Greece (128), Switzerland (118), Turkey (77), Japan (74), Spain (60), and New Zealand (52)..." (OECD-APEC 2006: 37). Indeed the developing country members of APEC (as well as other economies that are added to the sample like Nepal) are under-represented except for Mexico and Chile (25 and 21 SMEs, respectively). Unfortunately, there is no report of the important barriers faced by the sub-samples of the developing countries that would have allowed tests of significance from the aggregate results.

Similarly, the study also stratified the SMEs into those not active in exporting, aspiring to be exporters, and actively exporting and captures those which are also importing (along the same classification) with enough numbers among the categories (e.g. 4.3 percent not active in exporting, 27.6 percent aspiring, and 68.1 percent actively exporting). Unfortunately again, there is no report of how the perceptions differ according to their actual participation in international trade (e.g. those actively trading can be argued to find IT more important than those not active or even those aspiring who have yet to experience internationalization).

Because of the skewed distribution of the SMEs to the more developed economies and conversely the small size of the SMEs from developing economies, finer-level analysis of barriers they face may not be possible. But there can still be insights if the SMEs are further analyzed according to their actual state of internationalization where TF may become more important. The clustering of different barriers can also provide useful insights into their varying importance to the SMEs.

The fit of SMEs in trade facilitation is not as simple as it is often made out to be. As our review of existing knowledge shows, there are many ways of looking at how SMEs enter global markets and where IT appears to be important. It seems clear that reduction of time for processing documents, simpler procedures for moving goods in and out of ports, and improved coordination among agencies SMEs deal with in connection with trade all contribute to their efficiency and therefore profitability. But there are other equally important pre-requisites that SMEs undergo through before they can effectively venture into the global market – internal adjustments that include more use of IT in firm operations as well as other office routine that need retooling in order to face up to the way international transactions are conducted.

2.4 Summary and Implications for Inclusive Growth

The literature on TF is vast and extensive and we have not even exhaustively reviewed them here. They do take on two distinct categories. One set analyzes the broad macroeconomic effects of TF which means looking into their impacts on aggregate outputs, employment, and prices among others. The other set analyzes TF effects on narrower sectors of the economy usually the trade areas. The former therefore uses macroeconomic methodologies while the latter relies on microeconomic and behavioral models. Both however use similar ways of indicating the TF measures which are analyzed. IT is only a part, sometimes a small part, of all kinds of TF activities.

While the results of most studies, whether aggregate or on narrower areas, indicate the large quantitative benefits from TF, in terms of the specific question of the use of IT in general and automation of trade formalities in particular, there are several observations that can be derived from the limited reviews here. First, it seems that the description of benefits appear either too sweeping or too broad. Indeed in some of the assessments of IT in TF the benefits are taken more as matter of faith than of detailed specification and may turn out to be overstated. Second, the costs of these IT systems for TF are often not given finer specification. Whether costs are all to be borne by government investments or some to be shouldered by private traders is neither clear nor unambiguous. For sure the operation of IT systems for example in customs declaration involves not just customs administrations but network providers for which traders either subscribe or reconfigure their internal systems. Third, it is also not clear which part of the process of goods movement is the target of IT; and neither is there a clear picture as to how different agencies with border functions relate to the IT development (which is usually undertaken in one agency e.g. customs). Fourth, there is no documented experience about the effects of partial automation i.e. where IT is applied only to particular parts of processes (e.g. entry lodgment or submission of license applications) in measurable ways. Finally, in the specific cases of IT applications to TF, the experience seems to indicate these have either been “plug-ins” i.e. exogenous to the institutions or agencies or customized but still technically outsourced in development and in eventual installation and operation.

These considerations especially those that relate to the stream of quantitative benefits and costs are important for countries that are contemplating on using IT as a TF instrument. They need systematic insights on what implications there are for partial versus full automation and which part of the processes; which border agencies have the largest impacts from IT applications; the costs that would be borne by private traders and associated transactions arising from IT. More importantly any public investment on IT for TF has to be solidly based as project analysis and economic internal rates of return evaluation. Put differently, without sufficient knowledge about the relative benefits of IT among different configurations, investments of scarce resources by poor countries are not likely to be optimal.

The internationalization of SMEs is the underlying reason for looking at the role of IT in TF on SMEs. There is a dearth of literature on automation and IT in TF and more

so on SMEs. Again, the limited knowledge seems to indicate that TF and IT have a wide range of importance and function for SMEs. Indeed SMEs are not integral to the analysis of TF. It appears that there are important pre-conditions on the part of the SMEs *before* they can effectively participate in international commerce. Size, technology, lack of networks, and information are among the many barriers that SMEs need to overcome in order to internationalize. IT in TF therefore may not be effective without these prior gearing up especially for those which are aiming to become direct international traders (as opposed to being indirect traders).

SMEs are significant to economic development. In most developing countries they account for a large share of employment, contribute to aggregate value added, and are more widespread in location. A considerable number of them are exporters and thus earn foreign exchange. The global community sees it as imperative that no potential international trader is excluded from international commerce (EC 1999). Facilities ought to be provided to those with trade potentials in the form of TF measures or outright support. To the extent that SMEs are potential traders but face barriers to entry, they should be provided with all measures of TF support including access to IT applications in trade.

From among the many TF measures some may be more neutral in terms of who benefits (e.g. basic infrastructure like roads), some may benefit more the larger traders than smaller traders (e.g. container yards). There may be others which benefit more the smaller traders than larger traders (e.g. basic information on procedures). And in the case of IT what is important is to understand the means by which the facility may be delivered. In particular it may be important for SMEs which trade-related agency is automated in its functions, which parts of the functions has IT been applied (if it is not end-to-end), the manner and requirements for access to the facility, and the costs involved in participation. For these reasons some relevant experiences would be essential to understand what the implications would be for SMEs. As the review here has shown, there is not much that is systematically known.

In the development of IT for TF, whether using off-the-shelf technology or custom-built it is also essential to know if SMEs have been considered in its development, apart from the benefit-cost stream that had been noted above. From the viewpoint of governments or donor agencies evaluating alternative ways to apply IT to trade, more specific project analysis is needed than what has been documented in the relevant literature. Indeed what becomes critical in any evaluation process is the long-term implications of different systems not only on the specific agency for which IT is to be applied but of other agencies which it has functional relations. From the viewpoint of traders, what is required of them in the automation process is needed so that appropriate adjustments take place. It is more so for smaller traders if they are to be part of the IT for TF. Indeed differing technical conditions imposed by different systems would have impacts on trader behavior.

An IT system for trade would be part of the array of trade facilitation measures that countries institute to speed up the movement of goods across borders. How much the

facility would be utilized become a function of both the system and the users of such system. The degree to which SMEs utilize an IT for TF facility appears to depend on several pre-conditions that are short of actual engagement in internationalization and cross-border transactions. There is not enough documented experiences to give concrete clues about how or what makes SMEs use an IT facility for trade transactions. For example, SMEs could use third (and outside) parties to handle such IT-related transactions such as the employment of brokerage and related services. Or the entire IT-related functions for SMEs are outsourced. All we know from limited surveys is that there are other things that are more important barriers to SMEs in internationalizing, and the procedures and processes involved in buying or selling goods in global markets for which IT helps overcome rank low in their perceptions. Thus unless these are addressed first IT facilities for trade facilitation may be under-utilized. Or we know that SMEs use third parties or completely outsource IT functions.

What is useful in this light is the argument of the Swedish National Board that "...it is thus not essential for [developing] country to have a fully-developed IT infrastructure, even if IT-solutions in a longer perspective is (sic) very preferable..." (SWERPO 2003: 12). Sometimes the use of electronic and IT solutions may lie far into the future since "...any technological solution will be close to ineffective without a rationalized and standardized administrative foundation to build upon..." (Ibid. p. 15). What is needed is to examine the underlying rationale for an eventual use of IT for transactions purposes. This is consistent with the argument that for SMEs to use IT for TF facilities, there must be prior conditions that effectively set them up to the more elaborate electronic requirements of international commerce. On the other hand, as has been pointed out some of their information needs are provided by web-based sites for which some basic infrastructure is critical. The configuration of this also needs to be spelled out.

In summary, several foundational pieces are important in order to appropriately locate the setting for SMEs in trade facilitation. And in the specific case of the use of IT for TF, these pieces need to be identified. It is only through the more systematic understanding of their conditions and actual environments would it be possible to determine the effectiveness of TF for SMEs.

3. The Development Impact of Information Technology on Trade Facilitation: Summary of Basic Studies

3.1 Introduction

The main purpose of this chapter is to provide an overview and context of the country studies on Information Technology (IT) for Trade Facilitation (TF) in Small and Medium Enterprises (SMEs). This introductory section aims to clarify the differing views about the importance of IT for TF and where the SMEs interests are and how these are promoted. The next section summarizes the different country studies along several themes of IT for TF. The third section derives some implications from the country studies. Finally, the contents of the succeeding chapters are introduced.

In the institution of an IT system for trade facilitation, the rate at which it is adopted and used by traders depends on many factors such as preparedness, access requirements, navigation ease, content menu and delivery, security of communications, and cost. It will have a differential impact on the trading community. International traders and firms behave in varying ways in the context of their trade needs.

One argument often made in IT for TF is that from among the firms that will potentially utilize the IT system, SMEs are bound to be adversely affected by the trade facility for many reasons. For one, there may be technical requisites that SMEs do not have or can not readily acquire. These could take many forms – the need for dedicated terminals and exclusive link-up, proprietary software, restrictive technical services, and other technical requirements. Although these pertained to first generation IT system (e.g. Electronic Data Interchange [EDI]), some technical constraint remained even with web-based and Internet accessibility.

For another, SMEs often have limited access to essential information about markets let alone deriving market studies that examine sales options and thus strategies to penetrate them. There may be simplified templates that can be adapted to different environments but these are short of appreciating unique prospective markets. Moreover SMEs also have limited access to knowing rules, procedures, and requirements for transactions across borders. The manner of cross-border transactions widely differ from regular domestic market transactions. And SMEs' familiarity with these is likely to be weak.¹⁷

Finally, as firms SMEs have different configurations and structural conditions than large domestic firms and multinationals. It is obvious SMEs are “small” compared to “large” firms even within the domestic economy and more so in comparison with transnational firms. Size however has disadvantages especially in the context of

¹⁷ SME weakness in getting information, understanding and accessing markets, and other capacities to go into business including international trade is not really relevant to information technology. But this may constrain them from using IT facilities effectively.

international trade. Many practices of large firms can not be easily followed or replicated by SMEs. There is the use of frontier-technology that can only be acquired by large firms with the resource capacity, skill complement, and size to use it efficiently. Technology diffusion usually starts with large firms and there is some gap before SMEs adopt after some standardization. There is the product leverage that large firms can easily apply to their suppliers and other sources of inputs in terms of cost reduction, technical support, and other complements that SMEs have difficulty securing. There is the financial leverage large firms have with their creditors, suppliers, and equities that provide extensive financial advantages such as longer floats, larger credit lines, better financial costs, additional emergency lines, and other financial premium only select financial customers have the privilege of.

SMEs however play a significant if not a critical role in developing countries. They generate employment, absorb marginal and unskilled workers, contribute to production and aggregate output, and earn foreign exchange. As a rule they should be integral parts of the economy and in the mainstream of development processes. Where they are left behind, development policy should encompass them and aim for a more inclusive growth.

Many of the trade facilitation measures are aimed at increasing the speed of goods movement. To the extent that all traders (actual and potential) are able to access and utilize these facilities the goals of TF are achieved. However to the extent that these measures are systematically unutilized by certain groups, it may be necessary to understand what is behind the incidence. This is the rationale for inquiring into the development impacts of TF. The SMEs which are international traders are those for which development impact is determined.

In the specific case of IT for TF, what we want to know is the extent to which SMEs utilize them in their commercial transactions. But there may be other reasons why they do not use such facilities. For example, SMEs may be using outside resources to substitute for the IT for TF; outsourcing their international trade business would be another; there may be other alternatives they use in dealing with international transactions. These may either be rational responses to the inherent constraints SMEs face or they are just coping mechanisms. Indeed some SMEs behavior with respect to the use of IT in general, and IT for TF in particular, may be optimal by concentrating on what they do best (including trading with the rest of the world) instead of spreading their limited capacities in the procedures and processes required for their international trading activities¹⁸.

A prevailing school of thought about SMEs and TF (including IT for TF) is that SMEs have not actively been in international markets because of lack of support towards accessing global commerce. The underlying assertion is that the benefits from TF are fairly large. Whatever is the kind of TF measure being considered, quantitative estimation

¹⁸ The existence of customs brokers, forwarders, and related services provides the links between traders and border agencies. This is discussed below.

shows significant positive effects. The studies on APEC (2002, 2005) document in general equilibrium setting or in terms of experiences in the member countries substantial trade gains from trade facilitation in general (e.g. trade volumes, speed of goods movement), and in terms of the SMEs (greater economies of scale, increased efficiency). Conversely, without TF measures SMEs appear to be more vulnerable to trade barriers than their larger counterparts. Some of these barriers include lost opportunities by forgoing markets, additional costs that reduce their competitiveness, and inability to influence trade policies (Fleiss and Busquets 2006). Addressing the 3 GATT articles (Articles V, VIII, and X) as basis for TF also yields numerically positive benefits to international trade (Wilson, Mann and Otsuki 2004). In fact the highest impact from TF measures comes from improvements in port efficiency compared to improvements in customs administration and services (“behind-the-border”) infrastructure¹⁹. On the part of IT for TF the prevailing view, based on the literature, is that the benefits to trade from automation processes are overwhelmingly positive. The OECD (2005) survey of customs automation shows substantial cost savings on the part of traders; increase in the efficiency of physical facilities (e.g. ports, warehouses) of government, improved governance, and predictable revenues on the part of governments. And while the benefits seem to be readily estimated along a uniform stream, the costs differ substantially according to whether the IT system is customized in the agency undertaking the automation or whether it is taken off-the-shelf and additional costs are based on scale of operations. In any case this thinking about TF (and in the specific case of IT) seems to be straightforward. A sensible policy decision ought to be in the direction of carrying out TF measures a significant part of which impacts on the development of SMEs.

There is also a school of thought pointing out that if an objective of TF is the internationalization of SMEs there may be prior conditions to satisfy before such a measure achieves its purpose. This would be especially true for automation of trade processes and IT applications to trade transactions of SMEs. One can indeed argue that this may also be true of other efforts to help SMEs internationalize. For example, UNCTAD (2005) notes that for an effective SME internationalization (by which is meant its export competitiveness), firms must be closer to the top of the value chain and production networks i.e. the finalization of a product. This would require SMEs not only to be provided with TF support but they have to connect with network firms along the value chain. While it would be possible for some SMEs to become indirect exporters or importers i.e. without being internationalized, they would still have to be integral to the network. In the event, the number of SMEs along the “curve” would not be widespread and thus their development would be limited as well.

IT experts from the earlier generation of automation system for trade argue that there are many critical enabling conditions for SMEs to effectively utilize IT for TF and these have little to do with trade (Schware and Kimberley 1995). One can expect this from a legacy system that was not only expensive to set-up and maintain but also highly inaccessible except for those traders mostly large who could put up dedicated equipment

¹⁹ The Internet (access, number of service providers, penetration rate, etc.) is viewed as a “beyond the border” measure.

and personnel to work on the system. Even then the critical enabling conditions were the same. These are more related to retooling on the part of the firms, revamping their business models, preparatory work on ecommerce, and working with partners on key messages. Notwithstanding the later shift to the more accessible web-based automation these enabling conditions remain. Indeed this kind of characteristic of SMEs is not unique to the developing world. This is also true of SMEs in the developed countries (Shatz 2004; Goldsborough 2005). They also face comparable barriers to becoming internationalized, have analogous problems as the SMEs from developing countries, and are provided support in the form of TF measures including automation. In fact some of the analysis of SME and IT application in developed countries reveal that increasing complexity of trade, the maze of network firms, and security concerns of governments pose challenge to SMEs (Goldsborough 2005). The Swedish National Board of Trade and Swedish trade Procedures Council (SWEPRO), noting the importance of computerization of procedures as part of trade facilitation, nevertheless argues that if implemented untimely and wrongly may turn out to be ineffective as well as costly (SWERPO 2003). There is a need for *basic* computerization as a building block to a full automation of trade procedures. Among the basic measures is possible electronic data submission, adoption of international standards in electronic communications, and operation of Internet-based central site for relevant information and access to forms and documents necessary for international trade. This combination of electronic filing and electronic retrieval of documents and forms also endow benefits to traders. There is no indication however from this thinking of any gestation period before the pre-conditions lead to the SMEs participation in the global economy through direct exports and imports. Nor is there an indication on how important are the partial types of computerization including their length of time before a full-blown automation is fully utilized and thus have their maximum impact the way it has been analyzed and measured by the prevailing view of TF measures.

There appears to be no wide inconsistency between the prevailing thought about the importance of TF measures on SMEs and the thought that before an effective utilization of these TF measures are necessary pre-conditions. The former just presumes these pre-conditions are there while the latter requires that these be satisfied before TF becomes effective. Limited and insufficient results from surveys of SMEs across trading nations do show that what are considered barriers to internationalization are ranked lower in importance than those considered to be basic (OECD-APEC 2006). For example, most important barriers have more to do with internal firm capabilities (managerial, personnel quality), finance (working capital), access (information and business opportunities) compared with the need for knowing exporting procedures and paperwork. For the smaller firms within the SMEs this could indicate difficult start-up if not resistance to electronic procedures and record-keeping, less paper documents and references, and even real-time transactions through the Internet.

In the specific case of IT for TF, it seems that while the latter view recognizes the importance of computerization and automation in trade, it implicitly suggests a staging process – more basic computerization at the SME level and limited computerization (and automation) as trade facilitation builds a stronger foundation for eventually being able to

fully utilize IT for TF. Moreover, this is not an argument against automation of trade processes or that the benefits from IT are not large. On the contrary, by passing through the basic stage SMEs are able to maximize their potentials in internationalization. This view therefore has implications that differ from what is prevalent. For one, the need for more accuracy in determining the benefits and costs of IT becomes compelling. This does not mean that the extensive literature quantifying the effects of IT as TF is inadequate. What this means is a need for a specification that recognizes partial IT (and thus narrower stream of benefits), limited scope in an agency where the IT is located, and finer delineation of costs (both public and private). In short, a truncated yet more elaborate benefit-cost analysis than what seems to be in the related literature. A more complete benefit-cost analysis of IT as a project becomes a firmer basis for governments with limited resources to decide on undertaking an IT for TF.²⁰

For another, in a partial computerization of automation setting, its location becomes doubly important for the simple reason that the IT application is probably modular, not linked to other agencies with border functions, and limited in information that is captured. In addition, the benefits probably differ according to location. An obvious location is customs where a partial automation may only involve electronic submission of declaration forms. Depending on the trade structure of the economy (e.g. distribution of trade products) there would be alternative locations for IT. For a dominantly agricultural products trade, the trade-off for customs (partial) automation may be computerizing regulatory and quarantine agencies.²¹ Thus measuring and understanding the effects of IT in its location provides varying bases for undertaking a limited IT for TF that forms part of a building block. In a full automation (end-to-end) a transaction process is carried from start to finish and likely be linked to other agencies with particular requirements or submissions. Interoperability may be ideal but short of that are the steps that can electronically refer procedures and documents from one agency to another in real time. Partial computerization necessarily requires partial assessment of benefits and costs and alternative implementation schemes i.e. location. In fact, in a partial computerized set-up where it is located in the procedural steps can spell some difference in the benefits to traders. Location both in terms of border agency, and within the border agency which part of its operation, is important.

For another, knowledge about actual SME behavior relative to IT for TF is limited. While there are surveys of traders (both large and SMEs) inquiring about the importance of trade it is another thing to understand the way they respond to TF measures including IT. By really following SMEs as they begin internationalizing we would be able to gauge and validate the alternative view about the importance of TF to small traders and entrepreneurs. The evidence from the OECD-APEC survey of SMEs which tend to indicate that what are important concerns they have with respect to

²⁰ As the previous chapter has shown, the literature does not provide adequate information about the actual costs and benefits of IT in TF.

²¹ In the particular case of agricultural products (especially food), automating the issuance of licenses, permits, and phyto-sanitary certificates may be more trade facilitating than a concomitant effort at customs since the time required for quarantine regulations may be longer than customs formalities.

internationalizing do not easily jibe with what TF is expected to contribute. There is a need for similar such analysis and to further expand the analysis from the survey of SMEs across different regions.

Finally, where the real environment is one where pre-conditions are constraining SMEs from entering the global marketplace the immediate policy implications are not in the direction of targeted TF for them. They are rather in the direction of addressing the pre-conditions and insuring that these are overcome so that the internationalization of SMEs can follow smoothly. Instruments to apply would actually be neutral irrespective of whether the SMEs are local or international traders. Indeed it seems to be an argument of this view that once these pre-condition constraints are addressed, important factors related to the international trade environment then determines which of the SMEs eventually become internationalized.

This kind of thinking about IT in TF also brings up the question of why focus on SMEs if they do not actually utilize such a measure? Besides the fact that this IT use has to be empirically documented, the objective of an inclusive development is overriding. This is especially true given that SMEs are seen as vehicles for poverty alleviation. It is also true that SMEs inherently are disadvantaged in terms of firm characteristics as pointed out earlier. On the other hand, there are facilitation measures meant to benefit large traders which need to be balanced. For example there are special lanes in customs procedures intended to facilitate cargoes of traders who are accredited on the basis of volume or products.

Additional information and analysis of SMEs in the context of trade facilitation experiences would be helpful in a greater understanding of IT in TF and its relative importance to the SMEs. Additional analysis of development of IT for TF would also be helpful in sifting through various views of how SMEs access the global markets and the kinds of measures useful for them. These kinds of additional analysis would actually enrich the knowledge base that has been built about the impact of trade facilitation in expanding trade and how SMEs are drawn into global commerce.

3.2 Country Studies

This part aims to summarize 5 country studies examining the development impact of information technology (IT) in trade facilitation on small and medium enterprises (SMEs) – See Box 1. This is pursued through a review of the evolution of the IT system in place in these countries and a small survey of SMEs and customs brokers or customs house agents. The countries are Bangladesh (Hossain, Deb and Al Amin 2009), India (Chatuverdi 2009), South Korea (Yang 2009), Philippines (de Dios 2009) and Sri Lanka (Wijayasiri and Jayaratne 2009). Three of the five are from South Asia, the Philippines from Southeast Asia, and South Korea from North Asia. The inclusion of the South Korea case is intended to illustrate a completed IT system and the role of SMEs.

Box 1. - Overview of Asian Country Case Studies on Information Technology (IT) in Trade Facilitation (TF)²²

In the study of IT in TF in Korea the entire development of customs automation is described from the institution of the permit system to self-declaration, from dedicated systems to more Internet-based lodgments. Despite the self-declaration environment in Korea, the study based on the results of both survey and a number of case studies suggest that brokers remain important in Korea. The study in fact argues that with IT the need for SMEs (which constitute majority of traders in the country) to do their own customs clearance work (self-declaration) is even less.

In Bangladesh a timeline shows the deployment of the ASYCUDA system was initially at the Dhaka Customs House but it took a couple of years before the system was installed at the Chittagong Customs House. There was also a stretch of time towards direct-trader-input process and finally the introduction of partial automation. The introduction of the use of IT in trade was widely associated with the efforts to reduce corruption. While the partial automation remains far short of complete end-to-end electronic procedures the results of the surveys among traders and customs house agents suggested palpable benefits in terms of lodgment time, cost, and even clearance time.

Several streams of IT are employed in India relating to different aspects of the entire movement of cargoes and these are under the management of different agencies of government involved in international trade viz. Ministries of Finance, Commerce, Industry, and Shipping among others. There is also the involvement of various ports and airports with their own systems and levels of automation. The study attempts to describe the processes by which the different streams are integrated. SMEs lack specialized knowledge to file their own documents, and more so in the electronic processing of import and export activities.

In Sri Lanka some 30 government and non-government agencies are linked to the export and import process. The degree of IT use in the country is limited to the electronic submission of customs declarations (CUSDEC) and those that are actually connected even with this limited facility include tea and garments. Sri Lanka's survey of traders (garments) and CHA with both small and large firm representation indicate that the limited extent of IT in TF is less than satisfactory especially given the charges imposed on such CUSDEC submission. The SMEs perceive however that the system does not discriminate against them.

The study of the Philippines traces the history of automation attempts, the current state of IT use especially at the Bureau of Customs, and what are some of the evaluation results of the system. The survey of customs brokers scaled the importance of electronic lodgment along with the other steps and the results show the extent to which the IT has helped facilitate trade. The mandated use of customs brokers however has revealed adjustments which differ substantially from how brokers play their role in the other country studies.

Several themes are pursued below which seem to run through the country studies. The intention of using these themes is to discern differences and similarities and to avoid the specifics of these countries' experiences. These themes provide the platform in which comparative analyses are carried out.

²² All five case studies are available in full as ARTNeT Working Papers. See www.artnetontrade.org

Similar and Common Settings

The five countries in the studies share similar and common settings. These also characterize many of the other countries in the Asia and Pacific region. They have had a legacy of difficult trading with the rest of the world. Their trading environment consisted of cumbersome procedures; many documents and signatures were required; border agencies were prone to corruption; the flow of goods was slow apart from an initial environment of high tariff rates. In recent years they have also commonly pursued liberalization policies including specific measures related to trade. They all now aim to be international-trade friendly i.e. they have made efforts to reduce barriers for their countries' traders to export and to import. For some of the measures changes have been rapid although other steps remained sluggish. Table 1 below shows what it would take to export and import in the five countries plus Singapore. We have included Singapore to provide an illustrative reference in terms of the requirements for exporting and importing being in the same region and being at the forefront of IT for TF initiatives.

Table 1: What It Takes to Export and to Import

	Singapore		Bangladesh		India		Korea		Philippines		Sri Lanka	
	2006	2008	2006	2008	2006	2008	2006	2008	2006	2008	2006	2008
Documents To Export (Number)	5	4	7	6	10	8	5	4	6	8	8	8
Time to Export (days)	6	5	35	28	27	17	12	8	18	16	25	21
Documents To Import (Number)	6	4	16	8	15	9	8	6	7	8	13	6
Time to Import (days)	3	3	57	32	41	20	12	8	20	16	27	20

Source: World Bank *Doing Business* (2007, 2009)

What Table 1 reveals is the number of documents needed to export and to import, and the number of days to export and to import. The period covered in the table seems too short and a longer time frame could in fact show the magnitude and significant changes in each of the countries. But a shorter period could even highlight more any dramatic changes that have been taking place in terms of export and import; thus the table compares 2006 and 2008. Two indicators are used – the number of documents needed to export and to import, and time to export and to import (in days).

There are quite noticeable improvements especially in imports among the South Asian countries of Bangladesh, India, and Sri Lanka. The number of documents needed to import between 2006 and 2008 fell between 25 and 50 percent for four of the five countries with the exception in the Philippines where documents required for imports

actually increased. A similar fall in the days to imports is also noticeable for all five countries. Even the reference country Singapore experienced an incremental decline in the number of documents for import. Although a comparison between South Korea and the three South Asia countries reveals a sharp distinction (in terms of the number of documents which is almost twice) in 2006, that has virtually vanished in two years' time. What they mean in terms of similar and common settings is an overall commitment to facilitate trade especially in imports.

In exports, on the other hand, improvements have not been as noticeable and there are only marginal changes with Sri Lanka's number remaining the same and an increase in the number of documents for the Philippines. No sharp distinction can also be made between South Korea and South Asia. While there are also reductions in the number of days to export across all five, these are not as significant and noticeable as those on the import side.

There are a number of observations that can be gleaned from the overall settings which are similar and common among the five countries and providing a kind of framework for the studies. First, the sharp improvements especially among the South Asian countries are in imports i.e. documents needed and number of days to import. Second, despite the improvements (and noticeable within 2 years) they are still not at par with the situation in Singapore as reference where the numbers (documents and time) are half the magnitudes from South Asia. Third, the noticeable improvements in imports may be a reflection of measures that have been taken by these countries to facilitate trade. This is more true for imports where certain steps and procedures do not always take place in exports (e.g. payment of import tariffs). The individual studies aim to summarize what have been done especially with regard to trade facilitation in general and IT in particular. Finally, what the improving settings in these countries show is a trade-friendlier atmosphere and forms part of the bigger function of doing business in them. It is an indirect manifestation that these five countries have embarked on deliberate programs aimed at freeing imports and encouraging exports. What is needed is to trace their development impacts especially among the SMEs. Although this may mean an emphasis on exports it is more often the case that exports in a globalized world also require imports for production.

Stages of Information Technology Development

In the specific development of information technology (IT) for trade, we focus on the evolution of the electronic systems, the manner of access by traders of the system, the eventual use of the Internet, the degree of automation of the processes, and the length of time for the evolution. In the development of the electronic system a distinction is made between the acquisition of off-the-shelf system and the independent development of a custom-built system suited for the country environment. It is also important to trace the transition from dedicated electronic access to the wider Internet and the transition to partial or full automation of trade procedures. Table 2 below summarizes the evolution of IT among the five countries plus Singapore. This phasing of the evolution of IT, especially in Customs, however arbitrary, captures what seems to be the actual

development of IT for TF as described in the individual country studies. There are in fact unique differences among the countries in the studies.

Table 2: Development of the IT System

	Singapore	Bangladesh	India	Korea	Philippines	Sri Lanka
Adoption/Design/Development Of Electronic System	1979	1992	1992	1989	1992	1992
	Own	ASYCUDA	Own	Own	ASYCUDA	ASYCUDA
DTI/EDI Lodgement	1986	2003	1992	1994	2000	2004
Semi-Automated Process	1989	2008	1995	1996	2005	
• Internet Access	1989	---	1997	2000	2005	
Fully Automated Process						
• Single Window	1991	---	---	2006	---	---
• Single Hub		---	---	2008	---	---
Total Length (years)	12	16	5	19	13	12
Trader/CHA/Broker Coverage						
• DTI/EDI				12%		
• +Internet				+40%		

Source: ARTNeT Reports (2009)

There appears to be more contrasts among the five countries in their IT development than comparability. The whole IT system from end-to-end was completed in a dozen years in reference country Singapore whereas in three countries which are far from complete (Bangladesh, Philippines, and Sri Lanka), they have either have reached the same length as Singapore or far exceeded it. But even in comparable Korea its length of time for completion was 50 percent longer. One wonders if the design and development of the KNet actually tried to capitalize on Singapore's experiences or was the development truly independent.

When the details of IT development among the five country studies (along with reference country Singapore) are examined contrasts become sharper. From design, development, installation and electronic lodgment the experience in India shows an almost immediate step while it took a long period for Singapore (7 years) than for Korea (5 years). The other countries of Bangladesh, Philippines and Sri Lanka took even longer simply to allow Electronic Data Interchange (EDI)/Direct Trader Input (DTI) to take place after the installation of the ASYCUDA system. On the other hand even sharper is the difference in the gestation between semi-automation (and Internet access) and full automation (Single-Window/Single-Hub) – ten years for Korea and two years for Singapore.

The development of the IT system, as shown in Table 2 for the five countries, reveals few interesting analyses. It seems that there may have only been minimal mutual learning in the IT development between Singapore's experience and the other countries. While this may not have been important in terms of the independent system for Korea and India nor of the ASYCUDA system for Bangladesh, Philippines and Sri Lanka which is different, the experience of traders' information and data entry priorities and preparedness would have been instructive to those embarking on the development of an

IT system. Indeed mutual learning would have shortened the time period for the overall development of the IT system in Korea even if the technical specifications of programs were independently designed and developed. It took longer for Korea to have a complete system than it took Singapore a decade earlier. It is of course even longer for the other countries which systems are far from fully automated.

Technical hurdles of countries adopting off-the-shelf systems are expectedly less difficult given wide experience of other countries. Yet the length of time for electronic submission of declaration appears to have been longer than independently developed system for Korea and reference country Singapore. The length of time for moving into partial automation marginally improved. The hurdle may therefore not have been technical and the individual country reports trace the non-technical difficulties in developing the IT system.

There may have been differences in the utilization rates by traders of the IT system in partial compared with full automation. This means some palpable benefits were derived from using the partial automation system. A reason why Korea took its time in moving to full automation (10 years) may have been continuing use of the system by traders. As shown in Table 2 there had been a wide difference in the user rate between EDI and the Internet by traders and brokers. This gives some support to the SWERPO (2003) point that some basic if not critical computerization scale is essential prior to trade automation. Recall that in the Singapore system development a completely wired bureaucracy had taken place earlier which reduced the learning time for full automation among users. On the other hand if there are benefits from simple electronic lodgment part of the IT system, it would not be surprising if three countries (Bangladesh, Philippines, and Sri Lanka) have remained in that stage in the IT evolution even if the total length is comparably longer.

In summary, there may be reasonable explanations for the contrasts in the IT evolution than similarities among the countries which are largely country-specific. There is no indication about differential benefits between developing incrementally and completing an end-to-end system. Neither is there any indication about the development impacts of the varying extent of the IT evolution especially for SMEs in particular and their trade behavior.

Programs for Select Traders

A common practice among border agencies in many countries is a program for select traders that would facilitate their outbound or inbound cargoes. In a situation where trade formalities are conducted manually border agencies often put up programs for these select traders that skip certain procedures, accelerate some steps, and cut down on needed signatures. And in an automated environment these programs generally remain and the system is configured so that when tagged, the associated electronic files may be redirected as separate records where they are facilitated.

Country authorities generally allow border agencies to set up special windows or lanes, provide direct assistance or designate point persons, waive certain fees or charges, and tag documents for these select traders. The bases for selection include volume, value, and frequency of trade transactions, product or industry involved, track record of past goods movements, and trader representative. Sometimes these are only available in certain designated ports. An accreditation system is usually created in order to develop a database for the select traders. The submission of various documents, certificates, records, and other evidences constitutes some of the requirements to be considered in the program to select traders.

By definition then most of SMEs would be excluded from being in the list of select traders. While some of them could qualify in terms of products being traded, other more important criteria of volume, value and frequency may not be met. Thus programs for select traders not only facilitate cargo movements but give advantages to these traders which turn out to be the “large” traders. Conversely, SMEs face undue disadvantages from the extra facilitation which, as reviewed previously, could have been hurdled by the “large” traders even without the select program. If the objective of trade facilitation is to include SMEs in international trade it may be useful to provide a balancing program for them.

Trade formalities that are electronic, partial or fully automated may also direct messages satisfying similar criteria in manual procedures²³. But more than this, when procedures and processes related to trade movements are electronic a gateway becomes necessary to link the trader and the border agency’s system. Agencies authorize service providers to deliver services accepting electronic documents from traders and transmitting them to the system. And depending on the language of the system there may be other requirements (e.g. a middleware). The extent of use of the IT in trade formalities depends partly on access through service providers.

For some traders, notably “large” ones, access through service providers may not matter significantly given their volumes. Their arrangements with such providers may even carry substantial discounts, additional benefits, and technical services. To SMEs however the wide availability and prices of service providers are important to their ability to participate in international trade assuming an initial readiness in IT for TF. This means the competitiveness of service providers. Where IT service provision is not contestable or there is only one designated, there is no choice for SMEs where even limited concessions for access to the IT systems of border agencies are quite significant beyond the pricing of services (e.g. waived charges for erroneous electronic declarations, technical support to SMEs computers). Indeed for some service providers their prices may not truly reflect the actual cost of provision as provided for in Article VIII of GATT 1994 which is integral to trade facilitation measures.

Table 3 is a list of special programs for select traders in the five country studies. The table indicates the name of the program, the number of service providers for the IT

²³ In manual systems (especially in borders where the volume of trade is not sufficient for on-line real time automation to be installed the use of a single document approximates a single window.

system in place, and the approaches to the program i.e. where the program is applicable in terms of ports or products.

Table 3: Programs for Select Traders

	Special Program	Service Provider	Approaches
Bangladesh	None	1 (DataSoft)	By Port
India	ACP	Government	By Port
Korea	“Trusted Firms”	1 (KTNET)	All Ports
Philippines	Super Green Lane	3	All Ports
Sri Lanka	Gold Card	1 (eServices)	By Product Group

Source: ARTNeT Reports (2009)

Most of the five countries have programs for select traders. In their IT system, only the Philippines has more than one service provider. Except for Korea and the Philippines, the programs are also applicable only in certain ports or for specific products (Sri Lanka).

Internationalization of SMEs

The increasing participation by SMEs in international commerce is an important development goal aspired not only by individual countries but also development institutions which promote inclusive growth. A review of what determines the internationalization of SMEs suggests that it may not be as easy as it may seem. The process seems to be more involved and there may be pre-conditions necessary before they are potentially integrated into the world economy.

SMEs play important roles in the national economy. They contribute to employment generation especially in comparison with large enterprises. Because they require lower capitalization and scale, they are capable of absorbing more labor. SMEs account for a large portion of total enterprises in a country. If we equate entrepreneurship with enterprises then the number of SMEs represents a large entrepreneurial force. In terms of more balanced development SMEs are more physically widespread than large enterprises contributing to more even development. Thus whatever is the share of SMEs to country exports can be viewed as understating their overall importance especially in terms of employment.

SMEs in the five country studies are expectedly important and comparable in magnitudes. Despite differences in the legal definition of SME which often encompass micro enterprises its importance can be seen in terms of the number of enterprises, impacts on employment, value added and exports. These range from more than 99 percent of all firms in Korea to over 90 percent of all industrial units in Bangladesh, the Philippines and Sri Lanka. SMEs also generally account for substantial share of industrial employment ranging from 87.5 percent in Korea to 36 percent for the Philippines and Sri Lanka. Output-wise (e.g. share of manufacturing value added) they contribute smaller

shares between 20 percent (Sri Lanka) and 39 percent (India). Table 4 reports the shares of SMEs to exports in the five country studies.

**Table 4: Share of SME to Merchandise Exports
(Percent of Total)**

Bangladesh	11.3^b
India	33^b
Korea	32^b
Philippines	24^a
Sri Lanka	58.9^a
APEC Average	30

^aUS ITC

^bARTNeT Reports (2009)

While Table 4 shows the extent of SME participation in merchandise exports what the table does not show is that all the other contributions impliedly are much larger in terms of the other factors e.g. employment, number of industrial units (firms), and output. In short, the likelihood of multiplier impacts from the internationalization of SMEs is not captured by these shares.

Benefits and Costs

Each of the country studies lists what are perceived by traders and their agents to be the benefits from trade facilitation in general and the IT systems in particular. Given that there are varying degrees to which systems are automated among the countries, comparability would be difficult. Nevertheless the substance of these benefits and costs are similar. These are also consistent with the overall review of the quantitative assessments of TF effects.

Whatever is the degree of automation of the IT systems in place in the five country studies, traders declare that there are benefits and costs. From what the responses reveal it seems that net benefits of the systems are positive. Several items in benefits and costs are common. One is the expected reduction in corruption at customs which often accompany manual procedures and face-to-face transactions. The initial introduction of direct-trader-input in Bangladesh has even been viewed as an opportunity to end corruption at customs. Another way of describing this kind of benefit is the reduction in side-payments made by traders in order to facilitate the clearance and release of cargoes.

Another is benefit in terms of time usually spent between electronic and manual procedures and transactions. For those countries that have only adopted electronic lodgments (e.g. Bangladesh, Sri Lanka) there are palpable impacts in terms of submissions on a 24/7 basis, removal of queues to customs offices, lesser errors in computations of taxes due, and even shorter clearance times. For those countries that have extended automation up to the major steps (e.g. Philippines, India) or complete procedural processes i.e. South Korea, the time benefits are correspondingly larger.

Indeed the South Korea study gives estimated savings because of time that would otherwise have been spent in a manual environment.

Then there are the productivity improvements across several actors in the formal trade processes. Obvious productivity increases result from reduction in costs to traders because of the TF measures – for example printing costs that are saved where certain steps in the procedures are simply electronically captured and only the final document is needed. There are reductions in delivery costs that are avoided when necessary information is electronically retrieved.

On the other hand, there are also costs to the IT system and overall TF measures on the part of the public and those shouldered directly by private traders. The public investment costs however are not reported in the country studies since they are not integral to the study. Neither are these public investment costs widely known or finely indicated to give a more meaningful interpretation. The direct IT facility cost pertains to payment to the service provider for the submission of electronic forms to the border agencies. Ideally, the price of the direct facility should be the cost of providing the service. Actual prices however seemed to have been mandated rather than by iteration in a market. And the reason can be found in Table 3 above. Four of the five countries in the study has only one service provider. The alternative way of determining the adequacy of price of the IT facility is whether traders find it excessive or just adequate.

Based on interviews, the results are mixed. Where the IT system in place covers a wide ground of the procedures and processes, traders have been satisfied with the prices charged for the facility. This is true in South Korea and in the Philippines. Traders in Sri Lanka, however, which system covers only a limited portion of the processes, expressed ambivalence about the price where some considered the price (but actually the system in place) not worth the facility. Insufficient information on Bangladesh and India prevents an initial assessment of the adequacy of pricing the IT facility.

The point about pricing of the value added service provider is whether the service is contestable. One can always argue that a single provider guarantees that only one set of standards is followed especially if there are many agencies that are inter-linked, regulations are easy to impose, and there is oversight from regulators about pricing. And in the countries studied the apparent price of services related to electronic submissions is based on the electronic transmissions (number of bytes). However it does not follow that the price imposed on traders and their agents is the actual cost of provision. What is important is to ensure that the value-added service is potentially more open given that it is a necessary component of the automation.

Table 5 below gives a sample list of productivity and savings benefits from IT in trade facilitation as reported in the country studies. Their magnitudes and importance vary by product and industry, location, volume and scale, and other factors that affect production of goods and their movements into and out of the country. It seems that these are also going to be experienced by SMEs that are internationalizing.

Table 5: Sample of Productivity and Savings Benefits

Productivity	Savings
Manpower costs	Freight Transport Costs
Paperwork printing costs	Inventory-related costs
Paperwork Delivery costs	Export-related Paperwork costs
	Import-related Paperwork costs
	Ordering Time
	Traveling Time
	Delays and Queues

Source: ARTNeT Reports (2009)

Intermediation in Facilitation

One aspect of the studies is the use of brokerage or customs house agents (CHA) by traders in loading or unloading their cargoes. A common practice in most trading countries is the use of brokers and CHAs to work for the entry of imports from or the loading of exports to the borders or ports. The increasing use of IT in trade facilitation has partly reduced the need for specialized customs brokers to undertake the required procedures, documentation, and processes for the release or loading of goods. One of the emerging proposals in TF is the phase-out of the mandatory use of brokers' services (and in the same breath the elimination of pre-shipment inspection).

Except for the Philippines, the five countries in the study do not have legislation requiring the use of customs brokerage in the clearance of cargoes. It is a common practice however in all of the countries to use these services. A past history of complicated tariffs, permits, restrictions, multiple agencies' requirements, and other paper work necessitated the intermediation which effectively relieved traders from often burdensome tasks.

Specialized skills and knowledge related to trade formalities (e.g. the submission of customs declaration, classification of goods, calculation of tariffs and other taxes, application of permits and licenses, etc.) also necessitated a system of accreditation and license to brokers to ensure that both the interests of the traders in facilitating trade and correct revenues for the government are satisfied. Hence in most cases brokers were required to pass licensure examinations and their work regulated. And in the Philippines, recent legislation professionalized brokerage services, defined specific educational requirements, specified their role in the formal movement of goods, and determined other criteria related to the practice of profession.

Brokers and CHAs are more often used by SMEs than large firms and traders from among the five countries besides the fact that even many of them are SMEs as well. Given that they are unable to assemble all the requirements for cargo releases, the associated paper work, requirements from other public and private agencies relevant to the cargoes, and associated services, it is not surprising that SMEs have relied on them. Conversely, large establishments with their trade volume are able to have organizational units that specialize in trade formalities (e.g. Sri Lanka).

The availability of IT in the trade procedures reduces the amount of work that is otherwise manually undertaken. Even partial electronic submissions cut short the amount of paperwork normally required. It follows that the SMEs can actually directly file the necessary forms electronically. Country experiences seem to indicate that they continue to rely on the services of brokers and CHAs for a number of reasons. First, with the IT systems brokers and CHAs are able to realize savings in their usual services and pass them on to their clients. Thus traders benefit without actually changing their behavior. Second, there are other services that remain a specialized work by brokers and CHAs – e.g. presence in most ports (sparing SMEs from designating staff to many ports), special skills in nuances of tariff codes. Finally, brokers and CHAs can transform their usual services into TF-related functions such as archiving documents for post-clearance audits, representing clients in customs valuation disputes, etc.

The mandatory use of brokers in the Philippines and the character of the profession generated other factors that yield issues not evident in the other countries. The legislation on brokers required certain academic qualifications which in turn generated supply responses from the education industry. The transfer of licensure from customs authorities to the larger national professional regulatory agency and the definition of the brokerage practice changed the way documents are to be formally admitted into the system. In short, both the mandatory use of brokers and the subsequent legislation institutionalizing the practice created vested interests beyond the accepted practice of using the services because of convenience and efficiency.

The use of brokers and CHAs has apparently always been a practice among traders in most trading nations. While it is possible to argue that these have been acting as middlemen in what might otherwise be direct transactions between a border agency like customs and exporters/importers, they have not been without concrete functions. Indeed trade formalities come with a plethora of rules, complicated procedures, and extensive documentation. Moreover they evolved in an environment where these are accomplished in paper forms and hard copies of documents giving them an effective intermediary function. In recent times of broad liberalization, simplification of tariffs and other procedural steps in trade formalities, and reduction in paperwork requirements, there is the question of whether the intermediation by brokers and CHAs has lost its essential role in trade. And if we add the increasing automation of the procedures this intermediation diminishes in importance. What seems to be happening in the countries included in the study is either some transformation of functions among the intermediaries or, in incomplete automation systems, the continuation of the intermediary functions of the past with significant efficiency gains.

3.3 Implications

The results of the country studies on the impact of IT in TF on SMEs, and the related knowledge base about the behavior of internationalizing SMEs suggest several implications and raise probing questions about how, if needed, can TF be designed to be more inclusive. First of all, there is no doubt that TF in general and IT in TF in particular has been beneficial to traders including the SMEs among them. The overall environment

especially for imports has improved in a short span of 2 years. But more concretely, the five countries are at varying stages in the development of IT systems for TF – some are at initial stage of electronic submission of customs declaration while Korea is moving beyond the national single window for the country. What is not too transparent however is a more accurate quantitative specification of a benefit-cost ratio at varying levels of computerization and automation of procedures. Countries which may stage the process of automation (which is what the countries that have completed automation also followed) can therefore be guided more closely not only in terms of agencies to locate a system but of the length of time certain stages (e.g. electronic submission) may have to be in, public and private costs, and other simplifications, among others.

Second, there is the question of whether an IT for TF deliberately favors large firms and traders or conversely is unduly biased against SME traders. Many countries have programs for select traders and the countries in the study are no exception. This was understandable in an environment of much paperwork, manual declarations, and with many agencies requiring similar documentations. There was a need to facilitate the movement of goods especially among those with large volume (and comparable paper requirements as SMEs) of trade. In an automated setting however there is no clear indication that a separate program for facilitation gives an added edge to large firms. Indeed large firms and traders have built-in advantages over SMEs. In situations however of partial automation and computerization such programs clearly excludes SMEs from facilitation. Thus more IT in TF should go with a non-discriminatory tag on SMEs. This does not mean that there are no inherent barriers small and medium traders have to bear in the process of internationalizing. But this would be more an internal adjustment on their part than a TF bias. As shown in I above a number of studies argue that certain pre-conditions have to be met by SMEs before they can successfully move to become internationalized.

Thirdly, given the results of the country studies, would it make sense to design an IT for TF that favors SMEs? An initial reaction would be to slant TF in general to encompass more SMEs. A careful and systematic assessment of experiences however suggests avoiding a direction towards facilitation favoring SMEs for several reasons. The move in the IT platform from exclusive proprietary EDI and related systems to Internet and web-base has expanded the accessibility by SMEs. From the results of the studies, SMEs do use the IT system. Finally, while their use of IT was a function of their preparedness within firm, the IT availability also induced them to adjust their system, equipment, and organization so they can use IT effectively. Indeed the adjustments by the traders included those in the form of organizational changes, training, procedures, connectivity, and overall business models. Brokers and CHAs (especially the SMEs) similarly followed with comparable adjustments. The original bias against SMEs in terms of price (of system to use) and accessibility has been balanced by the adoption of web-based technologies. And the IT in place is not significantly sensitive to the volume of trade i.e. the speed in electronic procedures is not strongly biased against SMEs.

Fourthly, the behavior of the SMEs in the country studies, the various ways they have adjusted to the IT system, and their actual use of TF in their trade indicate they

would use the electronic procedures even without any separate routines for them. The more important question is not any slant in their favor but whether they are prepared to use the system. This brings back the notion argued in the related studies that SMEs need to hurdle pre-conditions that would allow them to participate in global markets as exporters or importers. Without these pre-conditions any IT system, even if configured for SMEs, would not likely be used effectively and efficiently.

Finally, the argument that IT in TF adversely affects SMEs is not really due to the IT system in place but their inability to meet automation pre-conditions. In fact the country studies do point to the indirect use of the IT by SMEs through the out-sourcing of trade formalities to brokers and CHAs. And there may be other reasons why some SMEs which are internationalized prefer not to directly undertake electronic transactions related to their trade behavior. These are not arguments against an IT for TF. These are rather arguments for addressing the computerization needs of SMEs, their preparedness for automated transactions, and their capacity to directly participate in global trade. These are also arguments for an IT for TF that is non-discriminatory which means for example a phase-out of programs for special traders. As SMEs surmount inherent barriers, transition towards internationalization, and directly undertake international transactions, trade becomes more inclusive. But the instrument for that would have been some kind of affirmative action for all SMEs whether internationally trading or not.

References

- Albuero, Florian (2007). "Defining IT Transition in Trade Facilitation" (unpublished manuscript).
- Amiti, Mary (2004). "Are Uniform Tariffs Optimal?" *IMF Working Paper 04/72*. Washington D.C.: International Monetary Fund.
- Asia-Pacific Economic Cooperation (APEC) (2003). *Small Business and Trade in APEC: A Report Highlighting the Contribution of Medium, Small and Micro Enterprises to the Asia Pacific Region* (Singapore: APEC)
- Asia-Pacific Economic Cooperation (APEC) (2002). *The Benefits of Trade and Investment Liberalization in APEC* (Singapore: APEC 2002).
- Asia-Pacific Economic Cooperation (APEC) (2002). *The Benefits of Trade and Investment Liberalization in APEC* (Singapore: APEC).
- Arvis, Jean-Francois, Monica Mustra, John Panzer, Lauri Ojala, and Tapio Naula (2007). *Connecting to Compete : Trade Logistics in the Global Economy*. Washington, D.C.: World Bank.
- Center for International Economics and Society for the Advancement of Technology Management in the Philippines (CIE and SATMP, 2006). *Harmonization and*

- Integration of Cargo Processing Policies and Practices in the ASEAN Region.* REPSF 04/002. Jakarta, Indonesia: ASEAN Secretariat.
- Chaturvedi, Sachin (2009). *Impact of Information Technology Related Trade Facilitation Measures on Small and Medium Enterprises (SME): An Overview of India's Experience* (Bangkok, Thailand: ARTNeT UNESCAP).
- De Dios, Lorelei (2009). *The Impact of Information Technology in Trade Facilitation on SME in the Philippines* (Bangkok, Thailand: ARTNeT UNESCAP).
- De Wulf, Luc and Jose Sokol (2005). *Customs Modernization Handbook*. Washington D.C.: International Monetary Fund.
- ECORYS Fleiss, B. and C. Busquets (2006). *The Role of Trade Barriers in SME Internationalization* (Paris: Organization for Economic Cooperation and Development [OECD]).
- Fleiss, B. and C. Busquets (2006). *The Role of Trade Barriers in SME Internationalization* (Paris: Organization for Economic Cooperation and Development [OECD]).
- Keretho, Sumnuk (2009). "IT-Based Trade Facilitation Initiative in Thailand" presentation at the *Regional Policy Forum in Trade Facilitation and SMEs in Times of Crisis*. Beijing, China: UNESCAP and World Bank, 20-22 May.
- Global Facilitation Partnership for Transportation and Trade (GFP, 2005) "Enabling SMEs to Enter the International Supply Chain" (www.gfptt.org).
- Goldsborough, Bill (2005). "State Policy, California Exports and SMEs: Supply Chain Logistics as Tool to Increase Global Market Share" (LAS and Associates).
- Grainger, Andrew (2008). "Customs and Trade Facilitation: From Concepts to Implementation" *World Customs Journal* (April), pp. 17-30.
- _____ (2007). *Trade Facilitation: A Review* (United Kingdom: TF Consulting Ltd)
- Hossain, Syed Saifuddin, Uttam Deb, and Muhammad Al Amin (2009). *The Impact of Information Technology in Trade Facilitation on SMEs in Bangladesh*. (Bangkok, Thailand: ARTNeT UNESCAP).
- McMaster and Nowak (n.d.). "The Evolution of Electronic Trade Facilitation: Towards A Single Window Trade Portal" Suva, Fiji Islands: University of South Pacific.
- Mikuriya, Kunio (2005). "Legal Framework for Customs Operations and Enforcement Issues" in De Wulf and Sokol (2005).

- OECD (2005). *The Role of Automation in Trade Facilitation*. OECD Trade Policy Working Paper No. 22.
- OECD-APEC (2006). *Removing Barriers to SME Access to International Markets*. (Singapore: APEC)
- OECD (2005). *The Role of Automation in Trade Facilitation*. OECD Trade Policy Working Paper No. 22.
- OECD-APEC (2006). *Removing Barriers to SME Access to International Markets*. (Singapore: APEC)
- Schwartz, Robert and Paul Kimberley (1995). *Information Technology and National Trade Facilitation: Guide to Best Practices* (Washington D.C.: World Bank).
- Shatz (2004). "State International Business Programs: Organization, Evaluation and Oversight" Testimony at Hearing on International Trade: Reassessing Structure and Process, California State Assembly Select Committee on California's Foreign Trade Offices *Public Policy Institute of California Occasional Papers* (Sacramento, California, USA).
- Swedish Trade Procedures Council (SWERPO) (2003). *Trade Facilitation from a Developing Country Perspective* (Stockholm, Sweden: National Board of Trade).
- United Nations Conference on Trade and Development (UNCTAD, 2007). "Harmonizing Cyber Legislation at the Regional Level: The Case of ASEAN" Chapter 8 in *Information Economy Report 2007-2008* pp. 321-349. Geneva and New York: UNCTAD.
- United Nations Conference on Trade and Development (UNCTAD 2006). *ICT Solutions to Facilitate Trade at Border Crossings and in Ports* (New York and Geneva: UNCTAD/TD/B/COM.3/EM27/2)
- UNCTAD (2005). *Improving the Competitiveness of SMEs Through Enhancing Productive Capacity* (New York and Geneva: UNCTAD/ITE/TEB/2005/1).
- United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) (2002). *Trade Facilitation Handbook for the Greater Mekong Sub-Region* (New York: United Nations).
- Warr, Peter, Jayant Menon and Arief Anshory Yusuf (2009). "Regional Economic Impacts of Cross-Border Infrastructure: A General Equilibrium Application to Thailand and Lao PDR" (draft manuscript).

- World Customs Organization (WCO, 2006) *International Convention on the Simplification and Harmonization of Customs Procedures (as amended)* http://www.wcoomd.org/Kyoto_New/Content/content.html
- Wijayasiri, Janaka and Suwendrani Jayaratne (2009). *The Impact of Information Technology in Trade Facilitation on SME in Sri Lanka* (Bangkok, Thailand: ARTNeT UNESCAP).
- Wilson, John S., Catherine L. Mann, and Tsunehiro Otsuki (2004). *Assessing the Potential Benefit of Trade Facilitation: A Global Perspective* World Bank Policy Research Working Paper 3224 (Washington D.C.: World Bank).
- World Bank (2009). *Doing Business 2009*. (Washington D.C: World Bank)
- World Bank (2007). *Doing Business 2007*. (Washington D.C.: World Bank)
- World Trade Organization (WTO, 2005). WTO/MIN (05)/DEC, *Ministerial Declaration*, WTO Ministerial Conference Sixth Session, Hong Kong, 13-18 December 2005.
- World Trade Organization (WTO) (2001). WT/MIN (01) DEC/W/1 *Ministerial Declaration* WTO Ministerial Conference Fourth Session , Doha, 9-14 November 2001.
- Yang Junsok (2009). *SME Adjustments to Information Technology in Trade Facilitation: The South Korean Experience* (Bangkok, Thailand: ARTNeT UNESCAP).