Information Technology and National Trade Facilitation
Making the Most of Global Trade

Robert Schware and Paul Kimberley
RECENT WORLD BANK TECHNICAL PAPERS

No. 237 Webster, The Emergence of Private Sector Manufacturing in Poland: A Survey of Firms
No. 238 Heath, Land Rights in Côte d'Ivoire: Survey and Prospects for Project Intervention
No. 239 Kirmani and Rangeley, International Inland Waters: Concepts for a More Active World Bank Role
No. 240 Ahmed, Renewable Energy Technologies: A Review of the Status and Costs of Selected Technologies
No. 241 Webster, Newly Privatized Russian Enterprises
No. 242 Barnes, Openshaw, Smith, and van der Plas, What Makes People Cook with Improved Biomass Stoves? A Comparative International Review of Stove Programs
No. 243 Menke and Fazzari, Improving Electric Power Utility Efficiency: Issues and Recommendations
No. 244 Liebenthal, Mathur, and Wade, Solar Energy: Lessons from the Pacific Island Experience
No. 245 Klein, External Debt Management: An Introduction
No. 246 Plusquellec, Burt, and Wolter, Modern Water Control in Irrigation: Concepts, Issues, and Applications
No. 247 Ameur, Agricultural Extension: A Step beyond the Next Step
No. 248 Malhotra, Koenig, and Sinsukprasert, A Survey of Asia's Energy Prices
No. 249 Le Moigne, Easter, Ochs, and Giltner, Water Policy and Water Markets: Selected Papers and Proceedings from the World Bank's Annual Irrigation and Drainage Seminar, Annapolis, Maryland, December 8-10, 1992
No. 250 Rangeley, Thiam, Andersen, and Lyle, International River Basin Organizations in Sub-Saharan Africa
No. 251 Sharma, Rietbergen, Heimo, and Patel, A Strategy for the Forest Sector in Sub-Saharan Africa
No. 253 Jensen and Malter, Protected Agriculture: A Global Review
No. 254 Frischtak, Governance Capacity and Economic Reform in Developing Countries
No. 255 Mohan, editor, Bibliography of Publications: Technical Department, Africa Region, July 1987 to April 1994
No. 256 Campbell, Design and Operation of Smallholder Irrigation in South Asia
No. 257 De Geyndt, Managing the Quality of Health Care in Developing Countries
No. 258 Chaudry, Reid, and Malik, editors, Civil Service Reform in Latin America and the Caribbean: Proceedings of a Conference
No. 259 Humphrey, Payment Systems: Principles, Practice, and Improvements
No. 260 Lynch, Provision for Children with Special Educational Needs in the Asia Region
No. 261 Lee and Bobadilla, Health Statistics for the Americas
No. 262 Le Moigne, Subramanian, Xie, and Giltner, editors, A Guide to the Formulation of Water Resources Strategy
No. 263 Miller and Jones, Organic and Compost-Based Growing Media for Tree Seedling Nurseries
No. 264 Viswanath, Building Partnerships for Poverty Reduction: The Participatory Project Planning Approach of the Women's Enterprise Management Training Outreach Program (WEMTOP)
No. 265 Hill and Bender, Developing the Regulatory Environment for Competitive Agricultural Markets
No. 266 Valdés and Schaeffer, Surveillance of Agricultural Prices and Trade: A Handbook for the Dominican Republic
No. 267 Valdés and Schaeffer, Surveillance of Agricultural Prices and Trade: A Handbook for Colombia
No. 268 Scheierling, Overcoming Agricultural Pollution of Water: The Challenge of Integrating Agricultural and Environmental Policies in the European Union
No. 269 Banerjee, Rehabilitation of Degraded Forests in Asia
No. 270 Ahmed, Technological Development and Pollution Abatement: A Study of How Enterprises Are Finding Alternatives to Chlorofluorocarbons
No. 271 Greaney and Kellaghan, Equity Issues in Public Examinations in Developing Countries
No. 272 Grimshaw and Helfer, editors, Vetiver Grass for Soil and Water Conservation, Land Rehabilitation, and Embankment Stabilization: A Collection of Papers and Newsletters Compiled by the Vetiver Network
No. 273 Govindaraj, Murray, and Chellaraj, Health Expenditures in Latin America

(List continues on the inside back cover)
Information Technology and National Trade Facilitation

Making the Most of Global Trade

Robert Schware
Paul Kimberley

The World Bank
Washington, D.C.
Technical Papers are published to communicate the results of the Bank's work to the development community with the least possible delay. The typescript of this paper therefore has not been prepared in accordance with the procedures appropriate to formal printed texts, and the World Bank accepts no responsibility for errors. Some sources cited in this paper may be informal documents that are not readily available.

The findings, interpretations, and conclusions expressed in this paper are entirely those of the author(s) and should not be attributed in any manner to the World Bank, to its affiliated organizations, or to members of its Board of Executive Directors or the countries they represent. The World Bank does not guarantee the accuracy of the data included in this publication and accepts no responsibility whatever for any consequence of their use. The boundaries, colors, denominations, and other information shown on any map in this volume do not imply on the part of the World Bank Group any judgment on the legal status of any territory or the endorsement or acceptance of such boundaries.

The material in this publication is copyrighted. Requests for permission to reproduce portions of it should be sent to the Office of the Publisher at the address shown in the copyright notice above. The World Bank encourages dissemination of its work and will normally give permission promptly and, when the reproduction is for noncommercial purposes, without asking a fee. Permission to copy portions for classroom use is granted through the Copyright Clearance Center, Inc., Suite 910, 222 Rosewood Drive, Danvers, Massachusetts 01923, U.S.A.

The complete backlist of publications from the World Bank is shown in the annual Index of Publications, which contains an alphabetical title list (with full ordering information) and indexes of subjects, authors, and countries and regions. The latest edition is available free of charge from the Distribution Unit, Office of the Publisher, The World Bank, 1818 H Street, N.W., Washington, D.C. 20433, U.S.A., or from Publications, The World Bank, 66, avenue d'Iéna, 75116 Paris, France.

Robert Schware is Senior Informatics Specialist for The World Bank, Finance and Private Sector Development Vice Presidency, Industry and Energy Department, Telecommunications and Informatics Division. Paul Kimberley is an electronic commerce consultant to the division and principal of Paul Kimberley and Associates (PKA).

Comments on this document may be directed to: Robert Schware, Senior Informatics Specialist, Telecommunications and Informatics Division, Industry and Energy Department, The World Bank, 1818 H Street NW, Washington, DC 20433, USA, Tel: (+1 202) 458-0794, Fax: (+1 202) 477-3379, Internet: rschware@worldbank.org
# Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreword</td>
<td>v</td>
</tr>
<tr>
<td>Abstract</td>
<td>vii</td>
</tr>
<tr>
<td>Acknowledgments</td>
<td>ix</td>
</tr>
<tr>
<td>Abbreviations and Acronyms</td>
<td>xi</td>
</tr>
<tr>
<td>Prologue</td>
<td>xiii</td>
</tr>
<tr>
<td>1 STUDY OBJECTIVES AND SCOPE</td>
<td>1</td>
</tr>
<tr>
<td>Economic Advantages to Improved Trade Management and Facilitation</td>
<td>1</td>
</tr>
<tr>
<td>Critical Path: Cargoes and Data Flows</td>
<td>3</td>
</tr>
<tr>
<td>Some Options</td>
<td>4</td>
</tr>
<tr>
<td>Best Practice</td>
<td>5</td>
</tr>
<tr>
<td>The Efficiency of Transport</td>
<td>5</td>
</tr>
<tr>
<td>A Value-Added Passenger Processing and Immigration Initiative</td>
<td>6</td>
</tr>
<tr>
<td>Speed or Efficiency?</td>
<td>7</td>
</tr>
<tr>
<td>Opening Up Trade Opportunities</td>
<td>7</td>
</tr>
<tr>
<td>The Internet</td>
<td>8</td>
</tr>
<tr>
<td>Private Networks</td>
<td>9</td>
</tr>
<tr>
<td>Public and Private Sectors</td>
<td>10</td>
</tr>
<tr>
<td>Implementing Trade Facilitation</td>
<td>11</td>
</tr>
<tr>
<td>Barriers to Use and Participation</td>
<td>13</td>
</tr>
<tr>
<td>Costs, Revenues, and Benefits</td>
<td>14</td>
</tr>
<tr>
<td>To Summarize</td>
<td>15</td>
</tr>
<tr>
<td>2 EDI: A GLOBAL PRESENCE</td>
<td>17</td>
</tr>
<tr>
<td>Major Participating Countries</td>
<td>17</td>
</tr>
<tr>
<td>Canada, Mexico, and the United States</td>
<td>17</td>
</tr>
<tr>
<td>The Caribbean and Latin America</td>
<td>17</td>
</tr>
<tr>
<td>Eastern Europe</td>
<td>18</td>
</tr>
<tr>
<td>Western Europe</td>
<td>18</td>
</tr>
<tr>
<td>The Middle East and North Africa</td>
<td>18</td>
</tr>
<tr>
<td>South Africa</td>
<td>18</td>
</tr>
<tr>
<td>East Asia</td>
<td>19</td>
</tr>
<tr>
<td>South Asia</td>
<td>19</td>
</tr>
<tr>
<td>Japan and the Republic of Korea</td>
<td>19</td>
</tr>
<tr>
<td>Australia and New Zealand</td>
<td>19</td>
</tr>
<tr>
<td>3 SELECTED CASE STUDIES</td>
<td>20</td>
</tr>
<tr>
<td>Brazil: Background and History</td>
<td>20</td>
</tr>
<tr>
<td>Current Status</td>
<td>21</td>
</tr>
<tr>
<td>Plans</td>
<td>21</td>
</tr>
</tbody>
</table>
Information technology is demolishing territorial boundaries today, and bringing nations together in a single global community—but a community more fiercely competitive than ever before.

Change is the order of the day. Trade, banking, and telecommunications are being deregulated. Transport is getting faster, flexible, and available. Reengineered business systems are taking advantage of quick-response and just-in-time strategies; and cargoes, containers, and goods are being tracked around the globe by a variety of automatic identification devices. Electronic data interchange and electronic commerce are replacing the slower, more tedious paper trail. Countries now compete in global markets regardless of time zones, national boundaries, and distance, as products and processes are redesigned to adjust to the new business environment.

The increasing pressures from the global market are forcing everyone to adopt these new trade practices and standards. Customs, treasuries, and lawmakers are having to reinvent themselves to adapt to the concept of electronic commerce. Nations are adjusting to new methods of finance and tax gathering, opening up their telecommunications systems to private interests, and learning to take full advantage of harmonized procedures, standards, and practices for trade documentation. None of this is easy, but for many countries of the world, it is a matter of survival.

The present report, Information Technology and National Trade Facilitation: Making the Most of Global Trade, attempts to make the process of change smoother. It examines costs, benefits, and best practices in applying information technology to trade facilitation. It provides definitions and introduces basic concepts and issues in the substitution of electronics for paper, in the effort to achieve cost-effective international trade.

The companion volume, Information Technology and National Trade Facilitation: Guide to Best Practice, is a practical aid for governments to understand the tasks, costs, and time involved in setting up and implementing national trade facilitation initiatives. Together the reports offer essential information for decision makers promoting better trade practices in concert with international standards, common practice, and most important, specific national goals.

JEAN-FRANCOIS RISCHARD
VICE PRESIDENT
FINANCE AND PRIVATE SECTOR DEVELOPMENT
THE WORLD BANK
NOVEMBER 10, 1995
ABSTRACT

The objectives of this study are described in the opening section, followed by some practical results of the concepts discussed throughout this report. The focus is on world wide experience and identification of factors which make for trade facilitation through successful application of information technology (IT). Economic advantages from best practice based on the use of electronic commerce in trade management and trade facilitation are described and several case studies referenced. The case studies cover national, industry and enterprise level experiences from several countries.

An analysis of information and cargo flows in international trade accompanies a discussion of the efficiency of transport and logistics and the concept of IT based best practice, with particular emphasis on electronic commerce and Electronic Data Interchange (EDI). The opportunities for these technologies to open up world trade are considered, as are the technologies and services themselves. Barriers to use and participation are discussed and means by which these may be overcome. The task, time scales and costs involved in setting up and implementing a national initiative are identified, as are the potential revenue streams which accompany service provision, and the national benefits of such a program.

A selection of national case studies is prefaced by a global review of participation in IT assisted trade facilitation and best practice. National case studies from Brazil, Hong Kong, Hungary, Singapore and Taiwan are followed by a status report of the World Bank's experience in this area, with particular reference to the Mauritius model.

The summary contains a discussion of the main challenges and dangers resulting from technological disenfranchisement, followed by a comprehensive list of participating agencies and organizations.
ACKNOWLEDGMENTS

Many organizations have been generous in the donation of their time and in sharing their experiences with the authors of this report. In a separate section of the report, there is a list of all cooperating agencies, organizations, and individuals who contributed information and experiences. They include many international agencies, international industry bodies, government departments, technical and trade associations, vendors and a wide variety of systems users from banks, corporations and governments. In addition we received the help of many hardware and software vendors, of network services vendors, and of telecommunications companies and authorities, and from private individuals. Valuable contributions have been made by professional staff within the Bank, particularly Hans Peters and Françoise Clottes. We would like to thank Shampa Banerjee for a fine job of editing.

It is impossible to research global experiences without the help of the pioneers. We gratefully acknowledge this help.
### Abbreviations and Acronyms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACS</td>
<td>Automated Commercial System</td>
</tr>
<tr>
<td>APEC</td>
<td>Asia Pacific Economic Cooperation</td>
</tr>
<tr>
<td>ASYCUDA</td>
<td>Automated System for Customs Data</td>
</tr>
<tr>
<td>BT</td>
<td>British Telecom</td>
</tr>
<tr>
<td>CAS</td>
<td>Community Access Service, Hong Kong</td>
</tr>
<tr>
<td>CIM</td>
<td>Computer-Integrated Manufacturing</td>
</tr>
<tr>
<td>CNAB</td>
<td>National Council for Banking Automation, Brazil</td>
</tr>
<tr>
<td>EAN</td>
<td>European Article Numbering</td>
</tr>
<tr>
<td>EANCOM</td>
<td>European Article Numbering Communication</td>
</tr>
<tr>
<td>ECE</td>
<td>Economic Commission for Europe</td>
</tr>
<tr>
<td>EDI</td>
<td>Electronic Data Interchange</td>
</tr>
<tr>
<td>EDIFACT</td>
<td>EDI for Administration Commerce and Transport</td>
</tr>
<tr>
<td>EFT</td>
<td>Electronic Funds Transfer</td>
</tr>
<tr>
<td>EFTA</td>
<td>European Free Trade Area</td>
</tr>
<tr>
<td>EFTPOS</td>
<td>Electronic Funds Transfer at Point of Sale</td>
</tr>
<tr>
<td>ERS</td>
<td>Evaluated Receipt Settlement</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>FACET</td>
<td>Future Automated Commercial Environment Team</td>
</tr>
<tr>
<td>FDP</td>
<td>Finance and Private Sector Development</td>
</tr>
<tr>
<td>GATT</td>
<td>General Agreement on Tariffs and Trade</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>IBM</td>
<td>International Business Machines</td>
</tr>
<tr>
<td>ICC</td>
<td>International Chamber of Commerce</td>
</tr>
<tr>
<td>ID</td>
<td>Identity</td>
</tr>
<tr>
<td>III</td>
<td>Institute of Information Industry, Taiwan (China)</td>
</tr>
<tr>
<td>ISO</td>
<td>International Standards Organization</td>
</tr>
<tr>
<td>IT</td>
<td>Information Technology</td>
</tr>
<tr>
<td>JIT</td>
<td>Just in Time (inventory control)</td>
</tr>
<tr>
<td>LOCODE</td>
<td>United Nations Location Code</td>
</tr>
<tr>
<td>MBK</td>
<td>Hungarian Bank for Foreign Trade</td>
</tr>
<tr>
<td>MOF</td>
<td>Ministry of Finance, Taiwan (China)</td>
</tr>
<tr>
<td>MSTQ</td>
<td>Metrology, Standards, Testing, and Quality</td>
</tr>
<tr>
<td>MTCW</td>
<td>Ministry of Transport, Communication, and Water Management, Hungary</td>
</tr>
<tr>
<td>NAFTA</td>
<td>North American Free Trade Agreement</td>
</tr>
<tr>
<td>NCB</td>
<td>National Computer Board, Singapore</td>
</tr>
<tr>
<td>OECD</td>
<td>Organization for Economic Cooperation and Development</td>
</tr>
<tr>
<td>OFTP</td>
<td>Open File Transfer Protocol</td>
</tr>
<tr>
<td>PAXLST</td>
<td>(UN-EDIFACT) Passenger List</td>
</tr>
<tr>
<td>PSA</td>
<td>Port of Singapore Authority</td>
</tr>
<tr>
<td>QR</td>
<td>Quick Response</td>
</tr>
<tr>
<td>RFID</td>
<td>Radio Frequency Identity</td>
</tr>
<tr>
<td>SITPRO</td>
<td>The Simpler Trade Procedures Board</td>
</tr>
</tbody>
</table>
SME  Small and Medium Enterprise  
SNS  Singapore Network Services  
SPEDI  Shared Project for EDI, Hong Kong  
TDB  Trade Development Board, Singapore  
TP  (UNCTAD) Trade Point  
UN  United Nations  
UNCTAD  United Nations Conference on International Trade and Development  
UN-EDIFACT  United Nations EDI for Administration Commerce and Transport  
U.S.  United States  
U.K.  United Kingdom  
VAB  Value Added Banking  
VAN  Value Added Network  
VANS  Value Added Network Service  
WCO  World Customs Organization  
WTC  World Trade Center  
WTO  World Trade Organization  
WWW  World Wide Web

Xii Information Technology and National Trade Facilitation: Making the Most of Global Trade
Prologue: A Lamb’s Tale

“Now it were done when ’tis done, then ’twere well it were done quickly.”

MACBETH, Act I, scene vii

No industry could be further removed from the mainstream of information technology than the primary producer industry, or so it would seem.

Farmers are concerned with the elements, with the day-to-day struggle on the land, and the constant battle to make ends meet between good and bad seasons. It would appear that all decisions faced by a farmer, information technology would hardly rate a thought. There are many such sectors of the retail industry, whose members—like the farmer—do not see themselves as being part of the retail supply chain. Do sheep farmers, who supply export-quality product actually know who their ultimate, or even penultimate, clients are? Do they see themselves as being in the retail business at all? How can they, when they have virtually no contact with a retailer, let alone a retail client. But things are changing, driven by the farmer’s customers and, ultimately, by the retail client.

What follows is the story of a current initiative in the New Zealand sheep farming industry. The story is concerned with current trends in retailing and the retail supply chain. The farmer is the first link in the food retail supply chain. A typical supply chain may involve well over 60 weeks of time, between retail forecasts being filtered backwards through the chain to the first link in the chain (for example, apparel and chilled meat forecast-to-retail sale cycles are both in the 60-to-70-week region). The more steps there are in the chain, the more “slack” there is. Slack, or excess stock, may be due to inflation or misinterpretation of demand or forecasts, excess safety stock, transcription errors, and extra stock ordered or produced to compensate for this slack, or “float” in the system.

The U.K. retailer in this project thinks of the complete supply chain from point of sale back to the farm, and all of the steps in between, as his or her supply chain. The retailer advocates electronic connections between each point in the chain so that all of the participants in the chain know the exact status of sales, inventory, and orders at all times, from end to end, and at each link in the chain.

The retailer captures 100 percent of sales information at the point of sale from bar coded product. Each night these data are sent to the retailer’s mainframe computer, which then generates orders based on actual sales. The objective is to replenish sales, not to make for stock. This technique avoids building up a float of inventory, of expense, and of information in the supply-value chain. The retailer also makes sales data available by electronic data interchange (EDI), to any supplier or to anyone in the supply chain. The concept is to identify product at source, and to carry this identity—and hence the brand—all the way through to the retailer. The retailer in turn will supply sales and quality data, business messages, and value exchange (funds), all by EDI. The consequent reduction in float, of stock, and of investment, leads to better yields, and electronic connections lead to closer relationships between suppliers and clients.

At the other end of the supply chain, the farmer identifies individual animals by subcutaneously injecting each with an RF transponder (a Radio Frequency ID or tagging device), or by attaching a machine-readable tag to the ear or tail. These identifying devices contain the supplier number (the farmer’s ID), and in some cases, a unique animal ID for particular livestock. The ID is then matched against a database that is used to generate control information all the way through the process, right up to point of sale. This creates a merchandizing brand and feedback through the supply chain on sales and quality data. In this
scenario a farmer holds a database on a computer, referring to individual animals or to a complete herd. The portable scanning process of bar coded tags (or RFID) enables the farmer to keep individual records on weight, quality, diet, progeny, and so on.

The farmer’s computer is equipped with a modem and a printer. These enable the freezing plant to send contract and payment data to the farmer from its mainframe computer by EDI. It also allows the plant’s mainframe to interrogate the farmer’s records for information on stock availability, weight, age, quality, so on and so forth, for scheduling purposes, in addition to broadcast requests for stock on given dates, thereby enabling better management of supply and product mix. The freezing plant scans the animal’s ID device on receipt, either by wireless receiver or by an ear tag or tail tag bar code reader. This information is converted into bar coded identifying tags or tickets, which follow the product through the process and are carried through to the labelled packaging for export dispatch, and on to point of sale to complete the tracking from end to end.

The final stage in this closed loop process involves communications with the retailer, whereby shipment and export data are sent by EDI to the retailer or customs broker (or agent). Similarly, the retailer sends sales and trend data by EDI to the processor. This same process is used for quality data, veterinarian and sanitation data, orders, schedules, and changes. Later stages are soon to include on-line video conferencing of the meat grading process for an even closer remote evaluation of grade and quality by the retailer.

Because retailers use bar coding systems for product ID and therefore sales data capture; because the sales value is consistent across a whole retail organization; because price changes are captured and maintained centrally and downloaded daily to the stores’ point-of-sale (POS) systems in order to update price look-up tables; there is now a mass of timely and accurate retail sales data available.

This information can be used for replenishment purposes. The retail head office, no matter what products or service it offers, can replenish stock based on actual sales data and calculated statistical trends, supplemented of course by experience, by knowledge of local conditions, and of special events.

So far, this approach has largely been used by supermarkets, chain stores, and department stores. Their central computers talk to each POS device to obtain current sales data, then consolidate those before sending them on to suppliers. Implementation of EPOS-EFTPOS (electronic point of sale—electronic funds transfer at point of sale) by the major retailers is now being followed by retailers of all types, in all sectors. The mass of data they accumulate on sales, and hence on accurate replenishment—not forecast—orders as well as on payment details, are now enabling them to conceptualize the supply-value chain, and what it means to them.

The generalized concept is that retailers communicate orders, shipping instructions, amendments, payment instructions, remittance advices, and quality messages (for example) to their suppliers in an electronic format. EDI is the widely accepted term for this process. It means that retailers can send orders from their computer to a supplier’s computer in a matter of seconds or minutes. The process eliminates time, cost, and delays involved in the mail, in data entry, in transcription errors, and in the build-up of intermediate stocks caused by waiting for information or imprecise information.

This process of sending and receiving business data by EDI facilitates quick response (QR), or the rapid delivery of precisely calculated replacement orders. Replenishment is now made at the point of sale, in the right quantity, at the right time, to the right quality, at the right price. It ensures that the retailer has exactly the right amount of product in stock to support its particular level of service goals, and that intermediate stock and distribution points and processes are minimized. At the manufacturer level these systems are known as just in time (JIT) systems.

The advantages of such an approach include a much reduced lead time through the supply chain, hence an ability to place much more frequent and smaller orders. QR strategy makes dramatic inventory reduction possible, giving the retailer better control over price, quality, response to
customer demand, and customer satisfaction. The supplier, in this case the primary producer, tends to get more of the retailer's business, better prices and consistency of orders, in addition to extra, valuable information. Branding, better utilization of resources, faster and more accurate exchange of supply and business data, and a closer relationship between supplier, processor, retailer and consumer results from this EDI-facilitated end-to-end supply chain management system.

IT and electronic commerce in the primary industry sector is bringing about revolutionary changes, which will prove important for emerging economies and developing countries just as much as for developed and advanced nations. The retail industry and its supply chains are global and homogenous. They are set to be electronically integrated.

This is the underlying message behind this primary producer project. To obtain control over the supply chain, every step in the chain must be aware of—and able to communicate—supply and demand. Since all of the technologies for data capture, electronic interchange of data, and the technical vendor infrastructure are available now at competitive pricing, EDI and electronic communications provide the vehicle for change. What follows is more to do with transforming attitudes and business practices.
Study Objectives and Scope

The objectives for this Finance and Private Sector Development (FPD) study were to summarize the experiences and to identify the factors that make for success in information technology (IT) facilitated trade processing. Since it is now apparent that IT is inseparable from best practice in many public and private sector initiatives, the project was designed to create a best practice model for trade facilitation in response to growing demand from countries ready to receive technical and institutional guidance in a range of trade facilitation activities.

In order to identify what best practice is, it has been necessary to evaluate practical experience on the broadest possible front, especially in the use of IT for the trade processing function. In this case, best practice means the use of electronic commerce techniques, most particularly electronic data interchange (EDI). The use of these techniques for trade competitiveness is not limited to either the domestic or the international scene; they occur in both. In order to achieve the objectives for the study therefore, it was necessary to undertake an extensive meeting and research program. This program was designed to understand the widest range of experiences, of both failure and success, and to verify them in the field with the people and organizations mandated with the task.

A further set of documents have been produced as a result (see the companion volume). These discuss the best practice model in detail and explore a wide range of implementation issues of interest to World Bank professional staff (task leaders and project officers) and institutional staff from Bank borrowers and recipients of technical assistance from other United Nations (UN) and bilateral agencies.

The work began in late September 1994. Bank staff and external consultants conducted an extensive research interview program for the following nine months. Countries in which field research took place include: Hong Kong, Malaysia, Singapore, Taiwan (China), Australia, New Zealand, Hungary, Argentina, Brazil, Chile, and Mexico.

ECONOMIC ADVANTAGES TO IMPROVED TRADE MANAGEMENT AND FACILITATION

At the national level the simplifying and speeding up of trade information flows offer significant national benefits. At one level such improvements ensure that efficient approvals and information flow can be processed with a smaller number of steps, fewer people, and in less time, thus offering savings to government departments and users alike. But the downstream results of these efficiencies are even more important.

The use of accelerated, simplified systems and EDI to preclear imports and exports means that goods can be loaded and unloaded in the most efficient manner, problems can be anticipated and solved before they become problems, facilities can be properly scheduled, and maximum use made of the road, rail, ports, and harbor infrastructure and installations. To take a simple example: if a ship can be processed in half a day or less rather than the entire day or more it may currently take, then the infrastructure capacity is effectively doubled: twice the cargo, twice the number of ships, twice the number of containers. A nation may expect increased harbor duties, excise taxes, and revenue from income tax and company profits without increased investment in infrastructure.

Singapore claims that properly applied trade facilitation is already saving it in excess of one percent of its gross domestic product (GDP) each year. It received a return on its investment in its national
Trade facilitation initiative, Singapore Network Services (SNS), during the second year of operation. Taiwan (China) and Korea have similar stories to tell. Hence the big picture shows more efficient trade, higher government revenue, and the ability to defer government investment in major infrastructure projects by optimizing use of existing installations.

The benefits of these efficiencies translate to wider attractions to trading partners. Efficiency improvements in vessel turnaround have attracted new entrepôt and distribution business to Singapore. Advanced electronic commerce and EDI facilities are allowing Australia to increase their lead in tourism revenue growth. The ability to communicate with its northern hemisphere trading partners has resulted in a four-week extension of its supply season each year for a New Zealand produce industry.

At the enterprise level the adoption of quick response (QR) and just in time (JIT) strategies—particularly those supported by EDI—are enabling textile and apparel manufacturers all across Asia and Latin America to dynamically satisfy variable customer demand, and thereby gain significantly larger proportions of those customers’ business. Car manufacturing operations all over the world are reporting savings of US$200 per assembled vehicle in cost savings through JIT and EDI practices. Major multinational retailers are obtaining a greater variety of fresh produce from all corners of the globe, while simultaneously achieving dramatic savings through the use of QR strategies. In some cases supermarkets have increased profits threefold over the last ten years, as their inventory stock has been reduced from three to four months of supply to less than one week.

The general term for these changes in international trade administration is “trade facilitation.” Trade facilitation implies an optimum use of standards throughout the whole process, standards for information formats and layout, for codes, for procedures, and for rules. Many of the new techniques are designed to overcome incompatibilities so that, where possible, existing systems may be integrated into other systems unaltered. In the case of information exchange between computers the technique is known as electronic data interchange (EDI). Electronic network services such as the Internet and other, private, services contribute to the reengineering of trade processing practices; so do international and development organizations helping the smaller trader participate in trade facilitation services, as well as a range of “no tech-low tech” EDI services.

The umbrella term for all of these electronic techniques and services is electronic commerce. EDI is the key electronic commerce technique for the reengineered...
trade facilitation process.

Best practice trade facilitation and EDI-based industry initiatives have not only produced economic advantages, they have become a marketing tool for their advanced users. New business is being attracted to EDI-compliant enterprises at the expense of those who are not. The ultimate question might be not “What does EDI do for me,” but “What will the lack of EDI do to me?”

**CRITICAL PATH: CARGOES AND DATA FLOWS**

The factors which determine today’s trading methods are principally logistics, transport, banking systems, and information. The first recorded international trade transactions took place over 5,000 years ago. International commerce began with the trading of natural surpluses in exchange for needed supplies from the surpluses of other trading areas or nations. The principal limiting factor was then—and has been almost ever since—the speed with which goods could be moved between buyer and seller. Information about the transaction traditionally accompanied the goods themselves, as a sort of trade passport. As industry and commerce became more sophisticated, the paperwork covering international trade transactions tended to follow a different path from the goods themselves: most often going via the postal service.

So long as trade, transport, and distribution of goods were dependent upon sailing ships and horse-drawn transport, or even steam ships and locomotives, the paperwork generally arrived with or before the goods, thereby allowing ample time for processing the information. Paper trade processing systems were considered perfectly adequate for the task. Indeed, even after the introduction of computers for generating and storing information, paper administration and the mail remained the norm. However, recent transport and trading revolutions have irrevocably changed that situation.

Jet transport, fast container ships, container handling techniques, and efficient road and distribution systems have helped create an explosion in international trade and in globalization of the supply chain during the last part of the twentieth century. Paper and the mail are no longer adequate to process the volume of information at the speed and accuracy demanded by modern trading conditions. IT, or informatics, is now vital for the rapid and accurate exchange of the information that controls and drives world trade.

A modern wide-bodied jet can traverse the globe in twenty-four hours, carrying fresh produce from a supplier in one hemisphere to a buyer in the opposite hemisphere on the same or the next day. Yet it can take ten days to process orders, to obtain customs and departmental approvals, to book and schedule transport and distribution, to obtain payment and insurance approvals and to complete the transaction, often before the delivery can take place. In the case of fresh produce this removes 10 days from the selling season, days that can never be replaced and whose lost revenue must be added onto base costs. This in turn puts the grower at a disadvantage in relation to his overseas competitors, who may organize matters more efficiently. And the same is true for any other product or service. Information flows, and the speed and efficiency with which they are processed, are now as important as home markets and natural resources.

Trade is no longer a case of producers or traders in one country selling to their counterparts in another. The world no longer operates on such simple principles. Goods are now assembled in different locations: many firms buy materials from several different countries, process in a second group of countries and assemble in a third, then reimport them to some of the original countries and ultimately reexport them all over the globe. The United Nations Conference on Trade and Development (UNCTAD) believes that one-third of all trade is now intra-firm trade, adding a further complicating factor to the challenge facing traders. The patterns of world trade are constantly shifting, driven by economies of scale, currency fluctuations, managed trade considerations, labor and market proximity, and the emerging force of trading blocs and trading associations, such as the European Union (EU), the
North American Free Trade Agreement (NAFTA), and Asia Pacific Economic Cooperation (APEC). The Organization for Economic Cooperation and Development (OECD) and the World Customs Organization (WCO) further complicate the issues for traders, no matter what their aims and ultimate benefits may prove to be.

If we add to those challenges the growing proportion of services as a component of world trade, the feasibility, cost and time of building new ports, harbors, handling and distribution facilities, it is clear that the most efficient users of the global infrastructure are the most competitive. International trade success is conditional upon the optimum use of these resources through the efficient processing and use of information. UNCTAD estimates that at least US$100 billion could be saved each year by the adoption of efficient trade practices. This figure has nothing to do with tariff reductions resulting from the completion of the Uruguay Round, which has made traded goods 2.5 percent cheaper in their import markets; it refers solely to the savings produced by the adoption of best practice in international trade, specifically IT-supported trade facilitation. Many international agencies attribute an overhead of as much as 7 percent of the value of world trade to the current costs of administration and the downstream effects of those systems. These systems are still based overwhelmingly on paper forms and traditional procedures. The challenge of best practice is to reengineer these practices and to properly deploy IT in pursuit of the greatest efficiency.

SOME OPTIONS

A typical international trade transaction can take as many as 150 different documents to complete, according to the Trade Finance Department of The Hong Kong Shanghai Bank. Some of these documents, such as the bill of lading, are surrounded by 500-year-old practices and rules about their use. The types of documents in use can be illustrated by following a typical supply chain, involving a simple seller-to-buyer transaction in two different countries. They include:

- raw material and component suppliers;
- the manufacturer or assembler;
- customs agents and brokers;
- customs authorities;
- government authorities concerned with import-export promotion, as well as approvals, and statistics;
- local transport and warehousing companies;
- container handlers;
- ports and harbor authorities;
- shippers, for example, sea, air, road, rail, river, canal, etc.;
- banks and insurance companies.

Each of these links in the chain have to refer to, and possibly interact with and depend upon, other organizations. Each have their own set of paper forms—even if they are generated by, and ultimately stored in, computers—and their own counterparts in the importing country. Moreover, this simple list of participants in a linear trading cycle presupposes a totally domestic manufacturing supply chain and goods that are supplied direct to the consuming market. As we have already seen, this is likely to be the exception rather than the rule as trade gets more sophisticated and accelerates faster.

Even the most uncomplicated trading transaction probably requires the cooperation of at least 20 organizations and as many as 100 different forms. Most of the information is distributed across the forms and throughout the process, probably in different formats and positions. Generated by computer, the information is reentered into the computer of the next party in the process. (It has long been accepted that as much as 70 percent of all information entered into one computer has already been generated by an earlier computer system. Trade information processing systems are a classic case of multiple entry of the same data.)

In order to react more flexibly and promptly to market demand, new logistics technologies are being adopted, such as JIT inventory control and QR retail supply systems. Unfortunately, QR and JIT practices impose enormously heavy burdens on administration and procurement systems. The thousands of small deliveries to the factory assembly line or retail point of sale
that replace the traditional weekly or monthly batch delivery to the warehouse, require very high volume and precision of information to maintain continuous supply of the product. The only way to manage a QR or JIT system is to eliminate paper from the procurement process and arrange for trading partners' computers to talk directly to each other.

Today we see the emergence of systems designed to eliminate paper from the trading process and to simplify—or to reengineer—processes based on standardized methods of information exchange. Harmonized customs processes among nations, or standardized transportation timetables and freight modules or containers, for example, along with accelerated information processing and information exchange, can lead to preclearance and prereconciliation of transactions at all stages in the trading process, independent of time, distance, and technology incompatibilities, and at a fraction of the cost of paper systems.

BEST PRACTICE

The purpose of best practice within the context of trade facilitation is to replace paper documents with electronic equivalents, but not in an exact substitution. Much of the information transmitted on paper, such as names, addresses, product and service descriptions, or terms of trade may be represented by simple codes, recognizable by computer software. For example, the United Nations Location Code (LOCODE) is a mnemonic which describes all ports, harbors and airports in the world that are active in the import and export processes. Similar codes are applicable to other industries, other countries, and other professions. Therefore the only information that must be represented in electronic format in detail is transaction variable information, such as numbers of units, discounts, dates, special delivery instructions, clearance and approval numbers, and so on, and so forth.

In a reengineered environment it may be possible to eliminate certain messages altogether. For example, the retail industry is working hard to replace its most costly document, the invoice, with a process called evaluated receipts settlement (ERS), in which goods are delivered against a purchase order. The packaging bar codes are then scanned on receipt of the shipment, and receipt details are compared against the purchase order in the computer. If matched, the record is passed straight through to accounts payable systems, which in turn generate an electronic funds transfer direct to the supplier's bank. This has resulted in the elimination of supplier invoice checking, accounts payable reconciliation processes, and the vendor payment enquiry function, at an average saving of US$25 per (replaced) invoice.

Similar reengineering principles are possible in trade facilitation. The concept of replacing paper documents with EDI, representing much of the detail with codes and harmonized processes (trade facilitation), and the simplification of procedures (reengineering) represents the complete IT-facilitated trade process.

The subject of this report is the rationale, the technologies, the practices and the implementation of IT-based best practice for trade facilitation with particular emphasis on electronic commerce and EDI. It is supported by case studies, by cost-benefit examples, and by supporting information and references and guidelines on what to do next.

THE EFFICIENCY OF TRANSPORT

For most of recorded history, human beings were born, lived, and died within a 15-mile (25-kilometer) radius: the maximum distance of a day's return journey from their home base. There were a few exceptions to the norm, of course: soldiers and sailors, merchants, adventurers, and noblemen, for example, but the vast majority had to stay close to their immediate village area because of the limitations of available modes of transport. The steam age and the attendant advances in transportation methods changed all that, as did the massive displacement of people after the agrarian revolution and the still continuing urbanization resulting from the industrial revolution. Now there are signs that the developing information revolution may finally halt, and perhaps even reverse, the migration of people from rural to urban areas.
The technology of the industrial revolution initially depended upon steam for powering its transport and machinery. Coal gradually gave way to other fossil fuels such as oil, gas, and petroleum-gasoline products. Today's wide-bodied jet aircraft represent the culmination of 100 years of development of the internal combustion engine. In about 150 years the speed of travel has risen from a walking speed of 3 mph (5 kph) to over 600 mph (1000 kph). Increase in the speed of transportation has been matched by increase in efficiency. It is this increase in efficiency that forms the basis for modern logistics and trade facilitation initiatives. Such a proposition may easily be tested by looking at the example of a person making a journey between two countries using the fastest available mode of transport.

For a simple one-to two-hour flight within, say, Europe, the passenger has to go through at least 10 different stages; travel time possibly totals five hours or more, and differences in time zones may also influence effective use of time. The documents involved in this simplest and most common form of travel include:

- passport;
- airline tickets;
- boarding card;
- visas;
- health certificates;
- baggage tags and receipts;
- departure forms;
- arrival forms;
- customs declarations;
- possibly insurance certificates, including health insurance;
- currency;
- travellers checks;
- credit cards.

Passenger airline travel is the most highly organized form of international travel, but in order for it to work smoothly, passengers must present themselves to the system to be processed in a highly regulated and user-unfriendly fashion. Even so, taking all these personal inconveniences into consideration, jet transport only accounts for something like 30 to 40 percent of elapsed journey time, the remainder being consumed in local “feeder” travel, information processing, and waiting (storage).

Many different forms are involved in the administration process, in addition to airline reservation and information systems, baggage tracking systems, customs and immigration systems (and associated government information systems). Any goods or samples that accompany the traveller, trigger a whole array of supporting freight and customs processes. Language, currency, and time differences, incompatible customs systems, businesses processes, and culture, all add complexity.

The travel example is an analogy for freight processing, the lifeblood of international trade. If passenger transport is so complex, then how much more complex and inefficient is trade transportation. Clearly, the efficiency and speed of transport are crucial considerations in world trade, but the harmonization and simplification of processing information are at least as important as increase in speed. The European Free Trade Area (EFTA) claims as much as 5 to 10 percent of the value of goods may be taken up with the preparation and processing of information alone, in addition to the costs that inefficiencies impose.

So here is the challenge and the opportunity for trade facilitation: to remove those inefficiencies, to make optimum use of today’s speed of transport and the existing port and transport infrastructures, and not the least, to streamline government procedures.

**A Value-Added Passenger Processing and Immigration Initiative**

Several years ago, New Zealand had a monopoly domestic air carrier and three ports of entry, all nationally owned and operated: Auckland, Wellington, and Christchurch. Customs and immigration operated on a conventional full-disclosure passenger processing basis. At least one of the airports, Auckland, had a baggage handling service so inefficient, it was legendary. Delays of up to one hour in the arrival of baggage were not unknown. Then, an enlightened customs service adopted EDI for import clearances; later on the airlines were deregulated and became
competitive, and airports passed into the hands of the local authorities. Customs and immigration decided to extend the principles of EDI, or computer-to-computer exchange of standardized information across electronic networks, to the passenger clearance process in New Zealand.

They participated in the development of a standard message for the purpose, known as PAXLST, or Passenger List. For this process, the passenger manifest is consolidated after a flight has closed, just before departure. This manifest is then transmitted in an electronic format to the electronic mailbox of the New Zealand Customs and Immigration Service. In a matter of minutes the information is received and reformatted, so that it can be entered into and read by their own computer systems. The New Zealand authorities are thus able to process passenger names and passport numbers and to identify individuals judged worthy of further investigation before the passengers actually arrive on New Zealand soil.

As a consequence, most passengers receive only cursory attention and are processed very quickly, subject, of course, to the discretion of the individual officer on duty at the time.

The results have been dramatic. For example, at Wellington Airport, where, as in the other New Zealand ports of entry, they have also upgraded terminals, passenger handling, and baggage handling facilities, the time from disembarkation to departure from the terminal is now generally less than 20 minutes, down from an average of over 45 minutes in 1990. Target time for clearing customs and Immigration is 14 minutes from aircraft arrival time.

The objective of this reengineered system was to remove customs and immigration processing from the critical path of total journey time, in order to better service New Zealand’s tourist and business guests. It also achieved better use of customs and immigration resources, more predictable and improved work load balancing, enhancement of arrivals supervision, and a dramatically improved level of customer service. Every customs and immigration officer in the country is trained in EDI and in what it can do for them.

The air passenger example illustrates two fundamental points in transport and logistics efficiencies. First, for the movement of freight, speed, of itself, is not necessarily the most important factor in journey times. Second, removing information processing from the critical path makes the greatest contribution to efficiency improvements, better use of existing resources and infrastructure, and hence growth in trade information and freight processing capacity.

Speed or Efficiency?

Although speed is an important factor, and increased speed a welcome innovation, administration, information processing, and the reduction of the overall journey time are the keys to enhanced efficiency. Indeed, speed changes affect a sophisticated and complex set of international schedules. Some speed enhancements could actually increase journey time because schedules may become unsynchronized.

Trading partners, although mindful of speed, also require predictable and reliable deliveries, which are largely dependent upon international published schedules. A coordinated approach to efficiency improvement is the only practical way to proceed. This will involve electronic commerce and EDI, trade facilitation, systems reengineering, changed legislation, and a closer integration of business systems and business practices.

UNCTAD offers an appropriate formulation in the context of its Special Programme on Trade Efficiency:

\[
\text{trade efficiency} = \text{trade facilitation} + \text{trade information} + \text{best practices.}
\]

OPENING UP TRADE OPPORTUNITIES

As business and trade become truly globalized, the requirements for national competitiveness are changing. Once it was sufficient to provide scarce commodities, out-of-season produce, or cheap manufactured goods for the markets of more advanced European or American economies. Today progress in transport and information technology make virtually all products and services from all countries available to any purchaser on the globe. Trading blocs, preferential arrangements, and quotas still have a major effect on market access, but
assuming these arrangements will play a diminishing role in the overall proportion of global trade, what will be the new limiting factors to market access and economic growth?

Essential as EDI and the reengineered process might be, they are geared to trade transactions, to the supply-value chain, to buying and selling. Once the contract has been signed or the order placed, these systems come into their own. EDI is also widely used in price and catalog inquiry in the marketing and presales phases of commerce. But there is more to trade and trade information than the administration of the supply chain and the movement of goods between buyer and seller.

How can technologies that make EDI such an important part of trade and supply administration help create or find new markets, compete for new business in established markets, and ensure a level playing field with traders with better market access and more sales and marketing resources?

There can be no substitute for superior marketing and professional selling, but technology is beginning to help balance the scales between those with many resources and those with few. Technology is beginning to redefine the rules for successful international marketing.

THE INTERNET

The Internet (or the “net”) is a global family of telecommunications networks that connects computers from all over the world. It has doubled in size each year since 1988. Although it is virtually impossible to accurately count the number of net users at any given time, the number of “hosts” (computer processors) connected to the net can give an approximate guide. Based on an average five users per host at the beginning of 1995, the population of users is estimated to be 24 million today.

The net was originally designed to enable academics and researchers, and defense establishments to get access to information data bases on each other’s computers. In this way, researchers on one continent could have instant access to data on another continent, direct from one computer to another. Electronic mail was added, thereby allowing users to correspond with each other using the same technology and speed of access. The net provided this access or transfer of information for a minimal cost, virtually instantaneously, independent of time, distance, and technology incompatibilities. Any computer can now talk to any other computer, anywhere in the world through the Internet.

Over the last two years, as Internet capacity has increased, a new “multimedia” facility has been added, providing access to and transferring pictures, moving images, sound and voice signals in addition to the traditional Internet information services and electronic mail. This facility is known as the World Wide Web (WWW, or the “web”). The web has extended its usage to purely commercial organizations who now

<table>
<thead>
<tr>
<th>Hosts (%)</th>
<th>Users (M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>69.50</td>
</tr>
<tr>
<td>Europe</td>
<td>22.47</td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>5.43</td>
</tr>
<tr>
<td>Other</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>0.24</td>
</tr>
</tbody>
</table>

8 Information Technology and National Trade Facilitation: Making the Most of Global Trade
regularly use its global facilities to market and promote products, services, and support. By January 1995, 27 percent of all hosts connected to the net were commercial computers.

This means that firms now accept and promote products and services across the Internet; they receive trade inquiries, provide marketing, product, service, and support information, accept orders, send invoices, and accept electronic payments. Electronic brochures, prospectuses, catalogues, price lists, specifications, designs, illustrations, advertising materials, and a wide range of complementary marketing activities are now carried out over the net. It can provide the same level of service for a one-person company as for a large multinational; it is as immediate for a company in distant countries, no matter how small, as for large companies on the U.S. or European mainland.

The net and a wide variety of complementary networks and services now offer equal access for all players, to all markets of the world. While many areas are still denied access at the moment, the fastest growth of access is now in Eastern Europe, the Middle East, and Africa, and programs are being developed to accelerate the growth.

Private Networks

A number of private networks have developed at the same time as EDI, Value Added Network (VAN) services and the Internet. Private networks may be defined as being restricted to subscribers, hence access to more than one would require multiple subscriptions, or the payment of fees for interconnection. Private networks include such companies as Microsoft network, Prodigy, America Online, CompuServe, eWorld and others, most of whom have a gateway to the net and can exchange electronic mail with each other. Some of them have started offering full Internet access. In this way, information services, trade and tariff databases, transport and scheduling information, and the widest possible variety of professional and recreational information services are directly available to the user, as are a new family of trade matching services and trade opportunity databases for buyers and sellers.

**UNCTAD’s Trade Point Initiative**

The concept of a service center, or bureau, for EDI input/output purposes designed for non-automated traders is not new. No tech-low tech initiatives are well under way in several Asian countries, in North America, and in Europe. No tech-low tech techniques include service centers and a range of alternative technologies which provide EDI access for nonautomated organizations. (See companion volume, Technology and Cost Options.)

However, service center transaction charges can be considerable; a charge of US$10 is not unusual to send and receive a single message or small file.

Even so, the usage costs of a bureau can be relatively painless compared to the start-up and capital costs necessary for self-sufficiency.

Trade point (TP) complements the concept of low-tech EDI. It says that the addition of access to trade databases and information services for the purposes of countertrade, opportunity matching, and trade facilitation information, is a perfect fit for Small, Medium Enterprises (SME) and developing countries. It also offers facilities for EDI transaction processing. TP prices are intended to be affordable to local communities, but the concept is still at an early stage.

**Trade Point Goals**

Each TP coordinates and shares information with all other TPs. But the design of each TP is undertaken locally, following UNCTAD guidelines. The staffing and financing are primarily local; therefore, each TP takes into account the unique circumstances of its location.

Trade points aim to place all the necessary ingredients for international trade under one roof. These ingredients will include information, trade facilitation, communication, enhanced transaction, and educational and consulting services. A subscriber to the service will have access to every step of a transaction, from finding a trading partner to negotiating a sale, to making payment, or getting paid.

A very important part of TP’s mission is to build overall awareness of the benefits of international trade through electronic commerce. Ongoing efforts are being made to educate companies through a business community outreach program and the formation of partnerships with universities and other educational institutions. TP initiatives now exist or are planned in 48 countries.
around the world. These include UNCTAD's trade point service, IBEX from AT&T, International Chambers of Commerce (ICC) services and the World Trade Center's (WTC) information services.

Prerequisites for access to these aids to trade efficiency and trade expansion are the tools of information technology: computers, telecommunications networks, modems and communication systems, software, and the skills base. Services that complement trade facilitation, reengineer processes, and feed modern transport and trade infrastructures are EDI, electronic messaging and network services, the net, and the web, together with the emerging family of trade and opportunity matching services. All are available and in use today. This array of electronic services and tools for competitiveness is generically known as electronic commerce.

PUBLIC AND PRIVATE SECTORS

This section discusses the concept of a nursery for new private and public sector business practices and a greenhouse for a new kind of national enterprise.

Although there are case studies for universal adoption at the national level of IT-facilitated best practices, there are no perfect precedents. However, there is enough experience to identify some key factors that make for success or failure. Decisions on the best model may take the following into account:

National Strategy. If there is a national strategy for IT already in existence, much of what follows will be irrelevant. However, if such a strategy exists but does not take into account electronic commerce and the synergistic relationships between national competitiveness and IT, then the following comments may be particularly relevant.

A national strategy will have to take into account the political beliefs of the government that may be affected by electronic commerce and the resulting integration of public and private sectors in the facilitation of trade. Much of the implementation work will involve restructuring present work and business practices, and simplifying government approvals. It will also be necessary to achieve closer interaction between trading partners and international agencies in other parts of the world where governments pursue different ideologies. Hence the relationship between the sectors must be fluid enough to allow a profound change in the way trade is carried out in the future.

Business Culture. The ideal is a relationship of mutual trust between trading companies and government departments. In reality, a history of mistrust and failed initiatives may have a strong inhibiting effect. Any new initiative, therefore, needs to distance itself from potentially damaging recent history, in experiences or relationships.

Strength of Need. If there is a strongly felt need for change in the business community, then the ground has already been partially prepared. The next step is to temper strict commercial interests with wider national considerations. Vendors, consultancies, third parties, and industry and international agencies will often offer conflicting advice, much of which may need to be carefully examined before adoption.

There is, as well, the influence of the most important group—a nation's trading partners. Wherever such groups are beginning to express a preference for electronic commerce, the choices are already made on behalf of both the public and the private sectors. In such a case, information becomes a vital factor in making the most efficient technological decisions within a short time.

Financial Strength and Independence.

There may be a history of independent action by certain strong industries which compels them to adopt an early industry- or company-focused initiative. These initiatives may need to be modified in order to integrate with the wider cross-industry community, and then with the national and the international community. The process is not an easy one, and it is important to achieve the widest cooperation for the best cross-industry and national interests, in which everybody is a winner.

At the same time, there is need for funding in the early stages. Initially corporations may be the only willing parties. But in the case of national best practice for IT-facilitated trade, where the benefits, if properly applied, are spread across the nation as a whole, governments can ill afford long-term loss of national competitive advantage by refusing to involve
themselves in the effort. The most productive scenario will see industry and government together formulating and adequately funding a strategy for trade facilitation.

Infrastructure. If an initiative is to succeed, it requires people with the ability to grasp the concepts, to apply them to local conditions, and to help obtain commitments of the right level of funding. It is unimportant where such people originate from, be they private industry, consulting firms or international agencies, provided technology and knowledge transfer are contracted. Further, success will be directly dependent upon technology infrastructure, on the computers installed, the quality and flexibility of telecommunications, and the base of skilled and experienced people available to the project and to its early users.

Secondary and tertiary education will be a key component, so that the flow of appropriately trained and educated people continues. Adequate funding must also be available to ensure that the private sector can comply with personnel and technology needs within the implementation time frame. This means that programs for helping smaller enterprises must be included in any national strategy and vision statement.

Timing. Many countries have been using the technologies for five to seven, or even 10 years. Their period of learning and experimentation is over. They are already at work building even more technologically competitive trading systems. Each day’s delay widens the gap between them and the nations which are yet to adopt EDI for trade facilitation. Decisions on timing, participation, means, structure, and methods may be painful and resource-hungry, but they have to be made, and the sooner the better.

To summarize: the major areas in which the public sector can—indeed must—contribute, include: initial funding for a national vision statement, a national awareness campaign, and a commitment of government organizations to work side by side with the private sector on implementation issues. It also needs to commission reengineering work on government systems, evaluate existing legislation, and gradually enact changed or new legislation in consonance with the electronic commerce world.

Indeed, because of the size of the market, or because of vendor or technology infrastructure, it may be necessary for the public sector to fund the organization that provides the technology to the marketplace, as well as the technology itself, because there may not be another valid alternative. Alternatively, it may be possible to operate a joint venture with an existing vendor or a start-up company. Or in some circumstances, in well developed, technologically literate markets, it may be possible to totally subcontract the task to the private sector. Whichever choice is made, there must be strong and continuing coordination between the public sector, the private sector, industry bodies, EDI associations, trade facilitation bodies, international agencies, and the vendor.

Finally, if the vendor is partly or wholly funded by the public sector, there is a strong argument for privatizing the government’s share once the vendor becomes well established with a positive cash flow and good financial prospects.

IMPLEMENTING TRADE FACILITATION

This section is solely concerned with technologies and practices that are of direct relevance to the application of IT and electronic commerce to a national initiative in trade facilitation.

The Goal. The ultimate goal for a technology-based scheme for the facilitation of trade processes would be a system by which a trader’s computer—or any other party in the supply-transport-facilitation chain—may be considered part of a network that seamlessly connects all of the concerned parties’ computers. This ideal system enables any party to enter information into their systems once only, in order for the appropriate information to be passed to all other parties. The information is transferred in such a format that all other computers can read the information without any additional processing or external intervention.

The design aim is to reduce the trade information processing cycle to an irreducible minimum critical path, achieving...
maximum economies and optimum trade competitive advantage. This is a heady goal, one that no country has yet reached, but some are well along the way, notably Australia, Finland, Singapore, and Taiwan (China). Many European, Asian, and American countries are now in the early stages of implementation of their own, or their trading bloc’s, plans.

Best Practice. The term “best practice” is subject to wide interpretation and to much abuse, but in the context of EDI-based trade facilitation it may be considered to be the implementation of the goals of trade facilitation as previously defined. Such implementation involves simplifying processes, removing excessive and obsolete controls, shortening and easing lines of communication, and using barcoding and EDI for rapid, accurate transfer of data between computers. This implies alignment with trading partners’ systems and adoption of world standards for best practice.

Any plan to implement best practice conditions presupposes a knowledge of EDI, trade facilitation goals, the appropriate technological infrastructures, willing participants, and a nationally agreed program. Key steps in the implementation of the process follow:

1. Feasibility study. Documentation of information flows and identification of key players for the early stages of implementation.
2. Project plan. This includes broad awareness, concept marketing, and education program.
3. Documentation of existing systems. Documenting the systems as they are currently being used, not as they were originally designed. The two conditions are often significantly different.
4. Review knowledge of what is possible. This involves an awareness of, and education in, all of the technologies previously discussed. It also involves knowledge of case studies, understanding of trading partners’ business processes, and awareness of what is required for an international alignment of systems, both in technology and business practice.
5. Reengineering. Having documented existing systems, and evaluated how they work, it is now possible to redesign and reengineer current systems, based on a knowledge of what is possible.
6. Standard messages. Having reengineered the information flow, it is now necessary to examine the newly-defined data to be transferred between computers. This data then needs to be compared with existing approved standard messages.
7. Message design. Message design and approval can be a time consuming process, and should be avoided if possible. If new messages are deemed necessary and the design process therefore unavoidable, they must be based on guidelines discussed in detail in the EDIFACT message syntax and design guidelines. (See companion volume, Annex 5: UN-EDIFACT.)
8. Pilot operations. An initial EDI group of trading partners is then set up and extended to a small number of competent
trading partners. This involves installing translation software, integrating that software with existing application software, connecting to a VAN’s EDI service, and then exchanging test messages. As the pilot develops, it is possible for partners to begin to trade electronically and to gradually replace the paper systems it was designed to replace.

9. Ramp up. This is the term given to extending the new electronic methods to the widest range of participants. The techniques used to enlarge the user community and to encourage participation may vary from mandating compliance at one extreme to a range of financial and business inducements at the other. Only full participation will yield the desired results.

10. Progress. The management and the project review of each pilot and major initiative will involve public and private sector organizations, as well as many of the major trading partners. The purpose of reviews, apart from commercial and operational necessity, is to confirm that the original design parameters are being met, and to improve them where possible.

11. Legislation. To the extent that legislation needs to be changed, attention should be paid to the Customs Act, the Evidence Act, and any other legislation that concerns the validity of electronic commerce, taxation, and banking regulations.

When presented in this fashion the task may seem overwhelming, but a properly constructed plan will create a staged approach, phased and balanced for local conditions, with as much expert help as necessary. The plan should take into consideration the non-automated small- and medium-sized enterprises through a local variation of no tech-low tech EDI initiatives. Enterprises and industries from nations of every size and from every continent have already embarked on such a plan. The fundamental prerequisite is determination.

BARRIERS TO USE AND PARTICIPATION

On one hand, EDI is seen as a tool for the larger enterprise, the wealthy industry, or for government departments. The well-funded, well-resourced, technologically literate organizations are always among the pioneers, and tend to dominate the standards-setting process. These are the people who can afford the right software and the right VAN service.

On the other hand, the unautomated and hence technologically disenfranchized small companies fall even further behind the wealthy organizations as the adoption of technology widens the gap between the smallest and the larger organizations.

Funding, however, is not the only barrier to the use of EDI. Even in wealthy countries there can be equally effective barriers, such as competing infrastructures, lack of leadership, and inappropriate message standards.

This section briefly looks at the most common limiting factors in order to sound a note of caution on the methods that may be adopted and implemented at the national level.

Funding. Clearly the most common reason why EDI is imperfectly implemented or adopted at all is lack of adequate funding. This manifests itself at the national and the enterprise level alike. At the national level an inadequate telecommunications infrastructure, lack of a sufficient base of IT equipment, or the absence of a body of skilled and experienced people, would clearly make it difficult to achieve a critical mass of users.

There are some appropriate aids, such as the no tech-low tech initiatives, but an effective telecommunications infrastructure and an EDI VAN are the minimum prerequisites for EDI, for which government funding should be available.

At the enterprise level there are a range of aids and inducements. “EDI In” and “EDI Out” service bureaus, fax input-output services, voice input-output services, and inducements from government and industry bodies can help. Loans for equipment and training to be repaid from savings, the rental of hardware and software by VANS, fixed monthly billing and a range of shared operation options, all work under the right circumstances.

Finally, banks and financial institutions may choose not to cooperate in clearing house functions for electronic funds transfer, trade payments, and electronic trade documentation. Whether this is the result of
cynicism, of perceived technological superiority, or the desire for market advantage over domestic competition, it happens all too frequently, to the detriment of national interests. The banks and financial institutions must become part of the best practice movement; they must be persuaded to adopt EDI and financial EDI from the outset.

Vision and Leadership. An EDI initiative is rarely successful when driven from the bottom up. Success requires a strategic plan and a shared vision of the outcome and benefits. Without this form of leadership from the highest levels or from a strong, unified commercial interest, the result is a fragmented effort with consequent wasteful use of scarce resources. This breeds only partial commitment and gradual disinterest. It may be necessary to mandate certain national processes in order to achieve the necessary critical mass vital to the overall success of the initiative.

Knowledge. Until a sufficient number of people concerned with trade facilitation issues know what is possible, it is very difficult to make progress. Unless a campaign of awareness and education is undertaken at the right level and for the right duration, the pioneering implementers and users will have an uphill task. An awareness and education program is possibly the most important key to success, and conversely, the lack of such a program is the most likely to cause failure, delay, or compromises.

Too Much Competition. Unfocused initiatives or lack of leadership can breed unnecessary competition among vendors, each seeking competitive advantage over the other. An absence of leadership can also encourage an environment of noncooperation among vendors, nonstandard approaches and, consequently, higher costs and noncompliant systems. The choice and adoption of industry, national, and international standards, and their application in a uniform fashion, so as to be aligned with overseas trading partners, are particularly important. An uncoordinated vendor infrastructure leads to confusion and lack of cohesion.

COSTS, REVENUES, AND BENEFITS

There is no magic formula that guarantees a safe return on investment in EDI and best practice. The most successful case histories are from those countries who were able to conceptualize solutions to their fundamental trade processing problems, and then committed themselves to the approach, with the conviction that substantial benefits would follow. Much of the investment made for implementing best practice and EDI is indirect in nature, but must nevertheless be taken into account: for example, the commitment of the time of key people to the project. They represent real costs, but they may possibly be absorbed within normal budgets.

Investments also depend upon the scope and the size of any project. Three different models illustrated in the companion volume show a range of costs from between US$4 million to US$40 million, depending on take-up rates and end user revenues. Totally reengineering a nation's trade process from a base of clerical and bureaucratic systems involves commitments of a significantly higher order than those required when an individual enterprise adopts best practice where EDI and a good technology infrastructure already exist.

Two extremes illustrate the differences in more detail: the macro view (a national perspective) and the micro view (an enterprise-level perspective). Take the example of a nation or territory where there is no existing national program and few, if any, EDI users. Assume also that the country has the traditional paper and lengthy approval customs export-import system. Further, there is no natural candidate for a national organization which can provide technology, commercial leadership, and project management. There are several categories of costs needed to build the infrastructure and awareness from the ground up, assuming that there is an adequate basic IT infrastructure (telecommunications, computer usage and skills pool).

The first is discovery, which includes executive time and travel, and external advice, such as some external agency involvement in the debate on objectives and options, potential scale, and sources of funding.
Next is awareness, or the creation of a national promotional campaign, education courses, conferences, and the use of the media, spread over a lengthy period.

The evolution from the launch of the program to its adoption by the education system may take about five years. The public sector will almost certainly have to bear the brunt of these establishment costs if the job is to be done properly, especially in the market start-up and consolidation phases. A nascent technology vendor-VAN industry would be unable to fund such an extensive program in advance of revenue, although it should be able to make an increasing contribution as the market expands. This phase of the project is vital for a successful national implementation; therefore, sources of funding must be established at the outset.

The third cost category is the technology provider. It may be necessary, at one extreme, to establish a new organization and to install new equipment and software in order to provide the necessary technological facilities and level of service required for a national approach. To prepare for this possibility, and in order to make realistic commercial decisions, this exercise will involve feasibility studies, cost benefit assessments, and business planning activities. Thereafter, the organization will require investment and support until the enterprise breaks even, or achieves a level of business performance at which it may attract private sector funding or may even be completely privatized.

Plans need to take into account all direct costs of technology, staff, and other resources, pricing models, and "rate of take up" models. Case studies have shown that the direct costs of technology are typically considerably less than 10 percent of the total project costs, and in some cases as little as 3 percent. The balance of costs is concerned with people from the technology provider and end user organizations, in both public and private sectors. It is essential for a national organization to take the lead and transfer the technology; traditional vendors either cannot justify the local investment, or do not have local expertise.

This last point is a crucial one, and explains why commercial vendors are not breaking down doors to fund the start-up operations of electronic commerce initiatives in developing countries. The funding of the infrastructure and market development costs are outside the normal span of commercial viability for existing technology suppliers. Their business is to provide access to the specific technologies necessary for electronic commerce, but as case studies illustrate, the technology alone is a relatively small cost component when compared to overall costs. However, to take a wider perspective, although the payback may be longer than for many other commercial enterprises, the revenue stream is also correspondingly longer, and ultimately more profitable.

Finally, there are the costs of implementation. Increasingly, as the project matures and the local VAN or EDI vendor grows in experience, the technical people and the technology are provided by the local authorized organization—once again the local VAN. VAN revenue comes from software sales, education and training, consultancy, and network traffic, perhaps from supporting electronic commerce services as well as EDI.

The first three categories are once-only activities; network traffic increases with volumes of transactions and the variety of applications. Virtually every case study illustrates a cash flow break-even of between four to six years on this type of operation. So the challenge is to bring forward that break-even point, or to support activities until returns can be made.

The national benefits must be assessed in the same way as costs. They will involve direct benefits of efficiencies, of cost reductions, in better use of resources, and in deferral of capital expenditure. Growth in trade needs to be considered, as does the value of the new skills and industries fostered by the new technologies and techniques introduced to support the trade facilitation initiative. One percent of GDP, or even a fraction of that one percent, should be sufficient incentive to justify the investment.

To summarize

At the level of the individual enterprise, the costs and potential benefits are much more tangible and more immediate. The costs of
installing EDI obviously vary with company size and project complexity. Although some organizations might have a main-frame computer handling high volumes of complex transactions, well over 90 percent of all EDI users around the world use a personal computer for the purpose. At the level of the smaller enterprise, staff involvement may be measured in hours.

The benefits may take some time to accrue, in line with the number of trading partners who are or already have adopted EDI practices. But in some cases—for example in the case of a customs broker making export declarations—the benefits begin to flow from the first day. General benefits include direct cost savings, increased productivity, improved trading partner relationships, greater marketing opportunities, and reduced inventory levels. Faster response times often lead to increased sales volume but in a greater number of smaller batches. EDI is the only reliable way to cope with this trend. New business opportunities, particularly from overseas trading partners, can occur simply because of EDI compliance.

There are about 100,000 users of EDI operating to national and international standards in 1995. The number increases at a rate of around 25 percent each year; the volume of transactions and new applications goes up at a significantly higher rate. Not all of these users have experienced the suggested benefits, but many have, and more expect to do so.

The same is true for national initiatives. In one form or another, over 50 countries are now actively using EDI. Traders in virtually all these countries are using EDI for trade clearances and trade facilitation purposes. There are many more times the number of users using EDI for industry and efficiency purposes. The cost-benefit case depends very largely upon local conditions and the local starting point. But the apparent business case may no longer be the most important consideration.

The fact is that the more advanced trading partners, at both national and enterprise levels, are beginning to demand EDI compliance as a condition for doing business in the future. Already some organizations will only accept new suppliers if they can demonstrate EDI capability. There are cases of companies, particularly traditionally small, older firms, that have gone out of business because of inability—or unwillingness—to comply, or disbelief in the need to comply. This has been particularly true of some “middlemen,” or intermediary occupations.

Ultimately, there is an even harder fact to consider. There is no longer any choice about compliance; the market has made the decision for everyone. The remaining choices involve timing, and the level of participation. It may be possible to adopt a cosmetic approach, or minimum-level compliance. But that represents considerable pain for a limited, and transient, gain. Market conditions will, in time, demand maximum participation and the adoption of best practice for survival. At the moment, there are still opportunities for competitive advantage.
Reengineered trade processes based upon trade facilitation principles and EDI are now a global phenomenon. But there is no single thread spinning through all of the initiatives on earth. Quite the contrary: local conditions have created a wide diversity of approaches:

- an approach driven, funded, and managed by the government;
- a strong cooperative arrangement, driven either by a government department or by a joint venture with the private sector;
- a private sector-driven initiative based on existing competitive infrastructure, possibly in cooperation with a nationally approved or mandated facilitating organization;
- a range of random leaderless examples;
- very little or no activity.

The major determinants for ultimate success, and for a high overall number of EDI users are clearly the active and willing involvement of the public sector, well organized and funded, and the enthusiastic participation of the private sector. A sophisticated, well-resourced technology infrastructure with access to the right skills and experience also has a direct effect on early success.

There are probably 50 cases of countries in transition from paper-based trade information processing systems to EDI trade facilitation systems. Each continent has its examples, as described in the following pages. It should be remembered that the user mentioned in this report is the end user, not an organization which may have many end users. Also, to qualify as an EDI user for this report the user must be using an approved message standard, either a national standard, or the international standard, UN-EDIFACT.

**MAJOR PARTICIPATING COUNTRIES**

**CANADA, MEXICO, AND THE UNITED STATES**

A private sector-dominated market has produced a large number of active and successful EDI users. There is government involvement in a range of applications, particularly in healthcare, social services, and procurement activities, but not too much in the way of trade facilitation, especially UN-EDIFACT. North America has the largest number of VANS, software houses, and practitioners, perhaps 50,000 total users in 1995 for the whole NAFTA region. Financial EDI is extremely strong in North America, possibly in response to diffuse and fragmented national banking systems. With the exception of Canada, the national EDI and trade facilitation organizations operate in a very low-key way, where they operate at all.

**THE CARIBBEAN AND LATIN AMERICA**

While Chile is organizing itself along with its Asian and Pacific competitors for EDI, most of Latin America has not initiated much in trade facilitation and domestic EDI applications. Trade facilitation, in particular, needs strong government participation, funding, and leadership. None of these factors are yet evident in the region.

With the exception of Brazil's electronic banking and financial EDI user base, the total number of users of EDI in the region is probably no more than 1,000; trade facilitation users are probably no more than 10 percent of that number. Leadership is coming from national European Article Numbering (EAN) and ICC organizations, especially in Colombia, Chile, and Brazil.

Until the governments of Latin America and the Caribbean begin to play a serious role in EDI and trade facilitation, the techniques and usage will continue to languish. Meanwhile they still have to solve
the problem of private sector cynicism.

**Eastern Europe**

A number of initiatives are emerging from the former Soviet bloc. Each major country in the region, with the assistance of aid organizations and international agencies, is working hard to catch up with the West. Once again, trade facilitation has a heavy emphasis, although the Hungarian case study later in this report illustrates some of the problems many of these countries face for the next few years. EAN organizations, local EDI Associations, international agencies, consulting firms, and trade facilitation organizations are the high-profile groups leading the move towards EDI in the region. The EU and Economic Commission for Europe (ECE) are also very important organizations in this regard.

There may be around 1,000 active EDI users in the region in 1995.

**Western Europe**

The United Kingdom initiated EDI for trade facilitation early in the 1980s. The British Simpler Trade Procedures Board’s (SITPRO) pioneering efforts did much to pave the way. Also, the U.K. Article Numbering Association and the implementation of a national standard gave it the lead well before EDIFACT was conceived. All these, in addition to the efforts of the retail, manufacturing, distribution, and export industries, have not only ensured that the United Kingdom adopted that lead position in Europe, but also that it developed a significant electronic commerce export industry.

As early as 1986, the U.K. government, through the Department of Trade and Industry, HM Customs and Excise, and several British port operations, cooperated with the VAN industry to promote an extensive and effective national awareness campaign.

The Netherlands and the Scandinavian countries followed close behind. Now all of the Western European countries have active trade facilitation and EDI campaigns and programs. France, Ireland, Italy, Germany, Spain, Switzerland, and the Benelux countries are all enthusiastic participants.

Individual country initiatives exist, but the larger, pan-European initiatives are now being funded by a range of EU and ECE programs.

At the same time, much of the UN-EDIFACT activity is Europe-oriented, including language, location of secretariat, message content and compliance requirements. Since manufacturing and retail operations have advanced user groups, the commitment to cross-border trade facilitation EDI is very strong.

The number of Western European EDI users in 1995 is probably in the order of 30,000, of which 10 to 15 percent are trade facilitation users, using EDI for import-export purposes. Trade Points are being set up in close cooperation with Working Party 4 of the UNECE.

**The Middle East and North Africa**

There is some activity in Morocco, a great deal of activity in Israel, and an excellent example of a port using EDI for trade facilitation in the port of Dubai. With the exception of Israel, which has strong local infrastructure, local conditions do not make EDI easy to contemplate in this region. At the moment, many of the countries in the region are at very early stages of implementation.

Including the unusual example of Israel there may be 500 EDI users in the region, although accurate figures are hard to come by. There are certainly a number of local branches of multinationals who use EDI by long line from other countries.

**South Africa**

Over the last three or four years South Africa has been preparing for a large-scale EDI movement. It has had an EDI association for about five years, in which several VANS are represented, directly and through resellers. Although it started comparatively late for a Western-style economy, there is serious interest from customs and ports and harbors.

It is possible that there are as many as 1,000 EDI users in South Africa in 1995.
EAST ASIA

China, Hong Kong, Malaysia, Singapore, and Taiwan (China), are all active territories for EDI, and particularly for trade facilitation. There are several national initiatives, constructed along classic lines. All have government sponsorship; most had government funding. In addition, there are active EDI associations, EAN organizations, trade facilitation organizations, chambers of commerce, and all take the EDIFACT process very seriously. Indonesia and Thailand are lagging slightly behind, but both have had (rather unsuccessful) private sector initiatives for a year or two. Vietnam is currently installing an SNS system but does not expect too much usage for a couple of years. Brunei, Myanmar, Laos, and Cambodia have very little EDI activity but interest is building.

The total regional number of EDI users—most of them in Singapore—is probably around 7,000, of which at least 50 percent are trade facilitation users.

SOUTH ASIA

At the end of 1993, India committed itself to domestic EDI usage through its overseas telecommunications company. However, local business practices are making it difficult to make rapid headway, most especially in trade facilitation. There are very few active EDI users in India at the moment; the same is true of Pakistan, Bangladesh, Sri Lanka, and other South Asian countries. The region also plans to have financial EDI available in the near future.

In spite of recent infrastructure building there are probably no more than 200 users in the region, and virtually none in trade facilitation.

JAPAN AND THE REPUBLIC OF KOREA

These countries represent a paradox. Between them they probably have over 30,000 EDI users, but virtually all of them use private-format EDI. There are about 1,000 VANS in Japan alone, but very little interconnection, almost no EDIFACT, and very little trade facilitation. Japan has erected electronic barriers to electronic international trade, but it is hoped they will soon announce a solution. Korea has a national initiative that is government funded and dedicated to EDIFACT. But the majority of domestic users are on private or industry VANS. There is virtually no interconnect arrangement.

AUSTRALIA AND NEW ZEALAND

Australia and New Zealand have followed similar paths, New Zealand lagging slightly behind. Both countries are active EDIFACT users, and European Article Numbering Communication (EANCOM) is also finding a following, along European lines. Both countries’ governments have stayed out of trade facilitation, New Zealand’s more so than Australia’s. Nevertheless, the private sector has stepped in to fill the void.

There are probably around 10,000 users of EDI in Australia, and about 1,000 in New Zealand. Around 15 percent in both countries are trade facilitation users.

The following chapter presents five of the more than 20 case studies investigated during this project. They have been selected to illustrate the variety of conditions that trade facilitation initiatives must meet, and the correlation between results and the approach taken. A companion volume contains details on the costs and benefits and respective roles of the public and private sectors in these initiatives, as well as in Malaysia, Australia, New Zealand, Argentina, Chile, and Mexico.
A volatile and confused economic history is paralleled in the use of electronic commerce in Brazil. Led by the banking sector for many years, most of the necessary technologies have become commonplace. A deregulated VAN market has also helped create the basic infrastructure; but lack of central direction and cooperation between the public and the private sector has created a multiplicity of initiatives, many of which are in technological conflict.

The astonishing difference between Brazil and virtually every other country is that EDI started in the banking sector. Many years of inflation and uncertainty about future costs forced the banks to cooperate very early on such things as formats for data transfer between themselves, usually by file transfer. Beginning in the 1970s, the National Council for Banking Automation (CNAB) specified standard message and file layouts in order to reconcile intra- and interbank holdings at a new reconciled daily value every day. Because of the rapidly diminishing face value of bank notes, automation was employed as early as possible for collections and settlements. Similarly, automation has been consistently used in order to operate on predictable costs and minimum staffing levels, and to mitigate the impact of rampant inflation, as far as possible.

Some banks operate their own networks and offer complete electronic services for accounts payable and receivable, and cash management, usually through a dedicated terminal and using proprietary standards; but there is no interconnection between the central bank, the interbank network, and other individual bank networks.

Although a large number of banks offer electronic banking, these are neither EDI nor financial EDI systems. They are private-format, dedicated-terminal, direct-entry networks. Nevertheless, they operate as paperless systems and provide a vital service for corporations that must exist in times of volatile currency and interest rate fluctuations.

An interbank network was developed in the 1980s through a cooperative arrangement of around 70 banks (from a total of 240 banks in Brazil). A new interbank switch, known as Interchange, owned by Unibanco, Citibank, and Banco Real is currently handling 10 million banking transactions each month, something like 40 percent of the national total. Interchange is now converting to UN-EDIFACT message sets for users, although it will continue to switch between banks in private formats. There is still no interconnection for the central bank and transactions from a bank's own network.

Currently at least 650 industrial groups, representing possibly as many as 15,000 end users, are using existing proprietary banking formats. Fifteen percent of these have indicated a willingness to migrate to financial EDI and then into business systems EDI using EDIFACT. The Banking Association is still supporting both private standards and EDIFACT for corporate and banking clearance purposes. The central bank does not yet appear to have a position on EDIFACT.

The auto manufacturing industry has been operating a private-format version of file transfer data exchange for some years. The customs appears to have no position on
EDI, nor on EDIFACT, at least in public.

CURRENT STATUS

Telecommunications is only deregulated for VAN services, while voice is still regulated. The national carrier, Embratel, launched an EDI service in 1995. It also offers electronic mail and will soon provide the nation's first commercial Internet access. Also in 1995, the Brazilian Federal Government began work on EDI for customs usage. Initial discussions are still in progress.

The same year, Unibanco, a major Brazilian bank, in concert with its partners in Interchange, began to offer value-added banking (VAB) services based on EDIFACT standard messages. Interchange will retrieve and deliver messages to all VANS, other banking or private networks, or even direct to the clients' own networks.

In 1994, SINDIPESA, the Brazilian manufacturers' association, recommended a national standard for the auto manufacturing industry. It contains 17 message types and is based on ODETTE, the European proprietary EDI system for auto manufacturing. ODETTE is, in fact, a message set and an open file transfer protocol (OFTP). The Brazilian banks have rejected this proposition; discussions are still on.

EAN Brazil has been developing commercial EANCOM message sets since 1993. It has helped some 60 commercial companies into EDI, using 8 to 10 EAN messages. There are now several EAN initiatives including hardware, wholesale, the supermarket industry (which is now nearly 100 percent product bar coded), pharmaceuticals, and transport. EAN Brazil's targets are 100 users by the end of 1995 and 350 users by the end of 1996. A user is defined as a large company, or hub. They also hope to attract 20 percent medium-sized companies into these projects, in addition to large companies. EAN Brazil is now attempting to develop national EDIFACT message guidelines, integrating Brazilian codes into EANCOM and EDIFACT messages. The first two messages to be completed are PAYMLT (multiple payments) and its response message.

Siscomex, a service bureau specializing in trade documentation, is talking to the customs about the possibility of including EDI modules in its service for traders. Mercosur, the Latin American trade grouping, should require EDI between its members quite soon.

At this point there are no tertiary education courses on EDI or electronic commerce. EAN runs regular courses for its own members specifically on EDI implementation and technology. There is also no law covering EDI or electronic commerce so far.

PLANS

EAN Brazil has the clearest plans and expects to have 350 major users within 18 months. The auto industry plans may need revision in the light of best practice in other auto industries and standards trends. The banking industry is well on the way to migrating at least part of its user base to full EDIFACT-based EDI in the near future. The Brazilian trade simplification authority, SIMPRO, and customs, electronic commerce law, education, and training are all at fairly early stages. VAN EDI experience is limited but there is no serious obstacle to a rapid growth in EDI at the technological level.

DISCUSSION

Leadership is fragmented, but peak industry bodies and nongovernment agencies appear to be playing a useful role. The absence of any government initiative to legalize electronic commerce is a concern, as are the different views prevailing on standards; but informed debate should resolve these issues.

A national shared vision articulated by the government is considered only partially useful. A joint initiative with agencies such as SIMPRO and EAN Brazil (which also act as the de facto EDI Association) carries more support in the business community. Government-only guidance would be unwelcome, although the issue of mandating EDI for customs clearance has some support.

In summary, inflation led to an information explosion which led banks in Brazil to an electronic regime much earlier than in many other countries. The arrival of VANS over the last three years has given rise to concerns about bypassing intermediaries in banking, which in turn has created greater concern for banking or financial EDI.
Private sector agencies and peak industry bodies are now taking up the challenge for business systems EDI. Although there are only 100 to 200 true EDI users in Brazil at the moment, there are few technological inhibitors to growth. The missing elements include: electronic commerce law, education, a national public sector partnership and a shared national vision, the participation of customs, and a central bank EDI interconnection initiative.

In Hungary, there is widespread ignorance of EDI as a potential business facilitator within the trade and industry communities. Interindustry relations and trading arrangements still reflect past practices of hoarding inventories and production. As a result, inventory turnover rates and order processing cycles remain excessive by international comparison. Interestingly, computer-aided design and manufacturing have a tradition in several branches of the Hungarian industry, but these were confined to individual plants in the local economy and did not serve as a medium for interindustry communication, let alone as an instrument for interacting with consumer markets at home or abroad. Still, the existence of computer-integrated manufacturing (CIM) points to the fact that there have been substantial research and development capabilities in Hungary. All CIM hardware and software were locally designed and manufactured.

The challenges for the Hungarian government and the local business community have been to encourage the reluctant industrial, agricultural, and service sectors to adopt informatics concepts, and to integrate EDI-based management arrangements into their production, marketing, and sales processes. The urgency of these actions is heightened by the fact that foreign competitors have started to aggressively penetrate Hungary's domestic market. The lifting of import quotas and growing liberalization of regulations that govern the provision of services in Hungary have created a situation in which foreign parties can expand their networks into the local economy. These foreign traders and service providers have a built-in advantage: they employ advanced informatics systems that the Hungarian business community cannot match. Hence, many local producers and traders have found themselves increasingly marginalized.

With the help of foreign aid institutions, the government has started several initiatives for effective EDI-based management information systems in trade, industry, and the agricultural sector. Notable among the aid providers are the Economic Commission of the European Union (EU) and the World Bank. Both organizations engaged in market analyses and the derived design for informatics systems. The EU focused on the agricultural sector. The World Bank concentrated on measures for developing competitive markets for consumer goods while maintaining emphasis on agro-industrial products. Meanwhile, the Ministry of Transport, Communications, and Water Management (MTCW) in Hungary collaborated on EU-sponsored research in the application of EDI concepts in the service sector, especially transport.

Trade Facilitation

In the 1970s, the Hungarian government established a specialized body—HUNGPRO—that was mandated with trade facilitation measures. The organization and goals were modelled after the British Simplification of International Trade Procedures Board (SITPRO). SITPRO's terms of reference are to "guide, stimulate, and assist the rationalization of international trade procedures and the documentation and information flows associated with them and, where appropriate and in consultation with the Department, to undertake consultancy work in the trade facilitation field in the United Kingdom and overseas."
But HUNGPRO did not evolve into anything even remotely resembling SITPRO. Its successor organization, HUNPRO, which the government set up during the 1980s, failed to create consensus among government institutions, and the national trade and industry community, about required actions.

HUNPRO established links with the ECE, and became a member of the Eastern European EDIFACT Board. But because of rivalries among government ministries, HUNPRO was ineffective in propagating the principles and measures to be applied within the Hungarian business community. All efforts to introduce EDI systems in Hungary were bogged down in an administrative quagmire by officials who were still philosophically attached to former central planning practices.

**CURRENT STATUS**

A new HUNPRO was established in 1993. Leadership in the Ministry of Industry and Trade was streamlined and objectives more clearly defined, as were the institutional responsibilities. This time, HUNPRO includes three levels of EDI activity. At the first level, an Interministerial committee decides upon the work plan, coordinates its execution, ensures appropriate financing, and represents Hungary in international forums. A second executive level includes the secretariat and other auxiliary groups responsible for the execution of the work plan and providing assistance to other groups within HUNPRO. The third level comprises so-called EDI forums or EDI working parties from different sectors of the economy.

The transport EDI forum has become the most active; MTCW undertook to orchestrate its work program. As one of its first initiatives, MTCW arranged for seminars in which participants could learn the basics of EDI, meet Hungarian software developers, and discuss how to take part in transport pilot projects. Several pilot projects have been started in the areas of freight forwarding, trucking, inland waterways transport, and railway management. A financial EDI experiment was launched with two users by the Hungarian Bank for Foreign Trade (MBK). This solution enables those having in-house EDI systems (through a banking EDI interface) to connect to MBK.

The national headquarters of the customs is planning the introduction of an EDI module in its new computer system. In early 1995 a project was launched to create the proper customs environment, primarily with *bona fide* partners who are entitled to delayed customs payment. A TP project has recently been initiated in Budapest.

**SUMMARY**

The new HUNPRO shows much promise, and although hurdles remain to be overcome, infrastructural issues appear to have eased. HUNPRO reports: “Data exchange can now be realized in many areas of the country through telephone lines, and through dial-up modems at a quality approaching European standards.” International connections are possible to 27 countries. According to evaluations carried out by HUNPRO’s transport forum, the “data transmission infrastructure does practically not impede future development of EDI applications.” Despite the truth of these observations, there is a continuing need to entice potential domestic trade and industry users to participate. HUNPRO is aware of this need and has special plans for information dissemination and training.

The following observations were formulated during a workshop organized by a World Bank mission in February 1995. The participants represented a wide spectrum of the Hungarian trade, industry, and service communities. The issues they raised were based on what they considered necessary conditions for a well-functioning EDI system:

- reliable competitive and cost-effective telecommunications networks in which all users are free to choose from a range of telecommunications solutions;
- a secure electronic environment in which business users can communicate free of risk to the confidentiality and integrity of proprietary business information;
- an environment in which it is possible to protect personal data to address legitimate concerns, while ensuring that EDI achieves the benefits arising from free flow of information;
• an environment in which a manufacturer of any product or a provider of any service distributed over the information infrastructure is afforded strong and binding intellectual property rights;
• an environment in which telecommunications and information technology standards are simple, unambiguous, timely, and set at a truly global level;
• an environment based on a free flow of products and services, and in which barriers to trade are the exception rather than the rule;
• a stable legislative environment that attracts international investment capital to the telecommunications and information technology sectors;
• an environment in which business takes the clear lead, and governmental and intergovernmental activity on the legislative, regulatory, or institutional front is discussed with the input of users, manufacturers, and service providers.

TRADELINK

In 1985, the Hong Kong government helped sponsor a special council to improve trade through trade facilitation. The council proposed an EDI system—a database of consignments—called Hotline; it suggested that the government build the system. The government’s reply was that such a system would be of benefit mainly to business, and therefore declined to fund it. Its reticence in taking the lead on Hotline resulted in an hiatus in EDI for trade in Hong Kong. Still, the belief that EDI was needed for trade persisted, and several companies that had participated in the council started their own forum, Tradelink, to support a consultancy study investigating the commercial viability of a trade-related EDI system.

The resulting report indicated that such a system would probably not be profitable from a strictly business point of view, and further obscured what roles should be played by the government and the private sector in its creation.

In March 1990, the government announced it was setting up a shared initiative with Tradelink to take the project closer to a working system. The shared initiative was called SPEDI (Shared Project for EDI). Of special interest to SPEDI and the Tradelink partners were: a gateway to Hong Kong government systems such as customs and quota systems, VANS and IVANS interconnection and common access, EDIFACT message development, Chinese language standards development, economic methods of EDI usage, access for the 80 percent of Hong Kong firms with less than 10 employees (Community Access Service, or CAS), and a service bureau or paper-based trade facilitation service for these small companies. Tradelink finally became the national EDI service for trade facilitation (one of at least three of that name in the world), owned by a local consortium of public organizations and private companies.

Around July 1993 Tradelink announced that it had concluded negotiations with IBM to provide the Tradelink EDI service, due to go live late 1994 or early 1995. This left very little time before 1997, when Hong Kong is due to rejoin China.

Unfortunately, in 1994, IBM and Tradelink abandoned their negotiations,

HONGKONG BACKGROUND AND HISTORY

Hong Kong’s experience illustrates what can happen in a totally private initiative funded by trading companies with vested interests, and with no national vision, no customs or government commitment. Add to this the uncertainty about future political and economic direction, and Hong Kong’s Tradelink is the result. With its small land mass and population of around six million, Hong Kong, like Singapore, has major land and sea ports and depends on trade, particularly reexports. Both countries started to implement EDI in the 1980s. What has happened since then is symptomatic of the difference between the two nations.
each side blaming the other for either rewriting the specifications or not adhering to original agreements. Tradelink itself, which at one stage had 23 employees engaged in system design and message development, is now having to rethink its implementation, marketing, and support roles, all of which were originally to be contracted out to IBM. CAS for non-automated users appears to have been placed on hold. There has so far been no public announcement on the government's participation in the project.

The launch date for Tradelink's initial service is now March 1996. In the meantime, the transport and distribution industry has set up an alternative, Cargonaut. The retail industry also launched its own service in May 1995. Both these important user bases are now lost to Tradelink, which will pose technical and marketing problems to them downstream.

As mentioned before, what happened with Tradelink emphasizes the differences between Hong Kong and Singapore, the most obvious of which lies in government philosophy. Singapore is interventionist and paternalistic, and hence offers strong leadership and direction. This has led to the great success of Singapore's TradeNet EDI services. Hong Kong has a *laissez faire* approach: anything that is good for trade and industry should be paid for and operated by private commercial interests. Since the most relevant interests are represented by a small number of large trading and commercial companies, some of whom are in fierce competition with one another (and competition in Hong Kong is much fiercer than the European or North American variety), any collection of strictly commercial interests actually tends to delay action. The situation has clearly not been helped by the "1997 syndrome."

An additional brake on progress is the practical concern that any trade facilitation EDI should have the active support of customs. However, Hong Kong, which is a virtually free port, collects very little in the way of duties. The main role of the customs is to police borders, oversee trade quotas, and try to contain the drug trade. Consequently, Hong Kong government and customs trade processing IT systems, with the exception of quota management, are very limited in scope. Commercial procrastination and lack of central leadership in Hong Kong have combined to allow Singapore to take the lead in EDI and gain significant commercial advantage in the region.

Which is not to say that Hong Kong is backward in establishing the infrastructure. It has deregulated the VANS market and has an excellent telecommunications system, with 17 suppliers of paging services, 3 mobile radio operators, 3 telepoint personal communication systems, 2 operators of trunked radio systems for voice and data, and over 30 licensees of value-added services for electronic mail, voice mail, and store and forward fax services.

EDI users in Hong Kong belong to the retail industry, shipping lines, freight forwarding companies, some airlines, and a few U.S.-based multinationals. Textiles and apparel manufacturers and importers-exporters are also developing electronic connections to major U.S. and European clients. Even so, with all of this activity, in the absence of commercial unanimity and government leadership there are probably no more than 500 EDI users in Hong Kong.

Other factors are having an influence, compounded by the 1997 deadline; among them the most lethal to the economy is the brain drain. From 1989 to 1993, an estimated 40 percent of the top IT professionals in Hong Kong have either left, or have obtained a British passport, thereby enabling them to leave in the near future.

**OVERVIEW**

Tradelink is a private company formed by an equity partnership of 11 major Hong Kong enterprises. It has government backing to run a community EDI service, with equity of between 30 percent and 48 percent being taken up by the government. The arrangement is that Tradelink will get an exclusive EDI gateway to the government for a period of seven years. The gateway will provide two-way EDI access to trade, customs, and statistics departments. In return Tradelink must provide electronic input and output facilities for up to 120,000 Hong Kong trading companies.

This last item presents the real challenge. Most experts agree that after about
10 years of true EDI experience, the total number of EDI users worldwide is currently around 100,000. Thus, to fulfill its mandate, Tradelink must revolutionize the way EDI is implemented, and pay special attention to the needs of small traders, and to Chinese language issues. Many in Hong Kong are uncertain about the government’s intention to make EDI mandatory. But without some compulsion it is doubtful if Tradelink will come anywhere near that total of 100,000 plus users in within the stipulated seven years.

The crucial importance of Tradelink’s success to Hong Kong’s commercial well being—in particular to the export-oriented industries of textiles, electronics, and banking—cannot be overestimated. Delays have enabled other private sector competitors to erode Tradelink’s potential customer base, its authority, and ultimately its participation in the full trade facilitation process in Hong Kong. But Tradelink will be breaking new ground. Nowhere in the world has anyone developed such a large EDI community from scratch.

With 1997 looming in the horizon, procrastination, lack of commitment, lack of leadership, and crucially, lack of a shared vision embracing both the public and the private sector, have all contributed to the growing confusion. What could have been an opportunity for a quantum leap in trade competitiveness and regional advantage, has been turned into an exercise that will need considerable good fortune for Hong Kong to catch up with its neighbors.

With 1997 looming in the horizon, procrastination, lack of commitment, lack of leadership, and crucially, lack of a shared vision embracing both the public and the private sector, have all contributed to the growing confusion. What could have been an opportunity for a quantum leap in trade competitiveness and regional advantage, has been turned into an exercise that will need considerable good fortune for Hong Kong to catch up with its neighbors.

From the perspective of Singapore, storage of goods awaiting clearance is no longer necessary. Goods go straight to the consignee from the cargo plane or vessel. This is particularly important for Singapore, where space is at an absolute premium. The flow of goods has been expedited even further by the Port of Singapore Authority’s (PSA) own port, container, and real time vessel management system. It is claimed that ships can now be turned around in less than 10 hours, offering considerable improvement in the utilization of port and harbor facilities. EDI preclearance has added to these extra
efficiencies to help make the PSA possibly the most efficient port in the world. These "trade center management" efficiencies have been valued by the Singapore government as being worth annually in excess of S$1 billion, or around US$700 million. In 1994 this was worth more than 1 percent of Singapore's GDP and around 0.4 percent of total external trade.

For users with no computers of their own, SNS set up a number of service centers, or EDI service bureaus. At one stage there were 10 of these bureaus, but their numbers are decreasing as more traders install their own computers. SNS now has 12,000 users, but probably only 50 percent are EDI users (of whom less than 3,000 are traders). The remainder are mostly users of electronic mail, information services, and bulletin boards, as well as a range of new services designed for health care, legal systems, electronics, manufacturing, retail, and distribution.

**Current Status**

SNS claims to have broken even in year three of operation. It employs 200 people; the average burdened salary for a Singaporean IT professional is in the order of S$250,000 a year. For its 12,000 users, 70 percent of revenue is derived from the higher value added services of EDI. SNS is now installing several exported versions of its service in such countries as China, India, Mauritius, Canada, Silicon Valley-USA, Vietnam, Malaysia, and the Philippines. Many of these installations are actually joint ventures with government departments, such as Mauritius Network Services or with commercial enterprises, such as Ayala in the Philippines. By now, SNS may be handling as many as 10,000 declarations a day, each of around 700 characters, charged at S$0.50 per thousand characters, plus S$6.00 per declaration.

**Plans**

SNS has embarked on a very aggressive international marketing campaign, with particular emphasis on joint ventures. Its home market is already reaching maturity, especially for higher-revenue earning services, so it needs new services, and must add value to existing ones. In addition to multimedia services for the home and education, real time EDI is likely to be high on the agenda. For all its success, the Tradenet service is still a batch-oriented store-and-forward service.

If SNS decides to introduce a real time EDI service, and it has already demonstrated a prototype, it will once again be pushing the standards and performance frontier. Real time EDI will need real time standards, which is a significantly greater challenge to end user and server systems than batch operations.

SNS is now promoting access to the Tradenet service through communication nodes in Malaysia and connections facilitated by exported systems to countries such as Mauritius. Experience suggests that such international traffic peaks at 10 percent of transactions and 15 to 17.5 percent of revenue, a useful addition to domestic revenue, if support costs can be contained.

**Discussion**

SNS has demonstrated great success in the application of EDI to trade facilitation. In particular, it is illustrating where national benefits lie for newer entrants. But how much of what has been learned through the experience of Tradenet has genuinely universal application? How much of its claimed success is in fact due to the efforts of the PSA and the NCB? What are the levels of costs and benefits that might be expected from SNS if it were planning it today, in isolation from the special Singapore factors?

**The SNS Business Case**

In 1988, when SNS was just being planned, a government spokesman was reported as saying that a financial payback for the Tradenet service would "take many years." By 1991, the CEO of Tradenet was saying that technology investment in Tradenet was only around S$3 million and that it broke even in its third year of operation.

In 1993, Tradenet management was quoted as saying "we have been profitable since our second year of operation. Revenues grew from (about) S$4 million in 1989 to more than S$20 million with profits of
$3.2 million in 1992. We have no debt; our paid-up capital was financed from funds provided by our boards." Another article at the same time says that the investment in technology, including hardware, software, and IBM consultancy assistance and development was US $20 million.

Even if technology was assessed at 30 percent of the total investment, this would raise the project cost to around US$65 million or S$100 million—much more in line with all other cases studied as part of this project. Perhaps the efforts of the other participating bodies such as NCB, PSA, and government departments had not been counted. Undoubtedly, technology investment can be a much smaller component today. Companies like SNS, GEIS and Tandem now have products that eliminate much of the need for pioneering effort. But each country has its unique characteristics. It is hardly likely that any product can be installed as a plug-in-and-go system. The capital cost must be assessed realistically, and efforts to customize systems for local adoption properly counted. At the end of December 1994, with 200 people employed at an average of S$250,000 per year, SNS’s total annual cost was around S$50 million.

LEGISLATION

It was widely rumored at the time that the Singapore government intended to legislate that EDI would be mandatory for trade declarations by 1989. Legislation did not prove necessary; a combination of enlightened self-interest, and statements from TDB that paper declarations would not be accepted after this date, ensured over 95 percent compliance. Paper is still handled by the service centers on behalf of smaller, nonautomated traders. Paper is also used for declaring personal effects, for vessel provisioning, and numerous other specialized imports and exports.

BUSINESS AND CULTURAL FACTORS

There is no doubt that Singaporean businesses are much more complaisant than their counterparts elsewhere: the economic health of the republic, and by inference its traders, is of paramount concern. As a consequence, if a government announcement promotes a new efficiency initiative, then it will be taken up without much opposition, and quickly. Singaporeans traditionally expect that their government has thought through any commercial implications and that the new initiative will be of benefit to all. Although this is fine for Singapore, which long ago shared its national vision with every citizen, it is less likely to work elsewhere. Most countries have not articulated a set of national goals and persuaded their businesses and citizens to sign off on them. The type of uncritical acceptance of government initiatives that is the norm in Singapore is most unusual elsewhere.

The technology and business skills infrastructure, and the general levels of education in Singapore are all much more conducive to the success of a technology initiative. At the same time, the regulated nature of state enterprises does not encourage funding for competition, or for competition with government enterprises as part of the business mindset.

On balance, the SNS experience is invaluable; but because of a series of local special factors, it is unlikely to be repeatable elsewhere. This is of concern, because there are evidently many government agencies around the world who believe they can repeat the Singapore experience by buying their hardware and software. This may make start-up cheaper, but only for that proportion of the task that is technology dependent. And even the cheaper technology will only work properly if all of the preparation work has been completed.
Information Industry (III). Start-up capital was provided by the Ministry of Finance (MOF) and set at NT $2.1 billion (US$85 million). The objective for the initiative was to speed up international trade and improve the use of airport and harbor facilities. More formally stated, TradeVan's mission is to improve the international competitiveness of Taiwan (China).

During the period of the initial III study, it was recorded that there were five million paper sea and air declarations recorded in 1988. The clearance system involved 222 data entry operators and four divisional staff officers. The system demanded 32 different clearance documents. Four thousand customs brokers dealt directly with the customs on a regular basis. Typically, it took two days to clear a declaration because of the bureaucratic process, multiple queues, dense city traffic, and the use and management of key staff, messengers, and couriers.

Naturally, this process had developed its own inevitable cycle and resultant methods of working with—and around—the system for importers and exporters. The consequences were extra labor costs and idle time, unnecessary cargo delays, and hence the need for extra and expensive storage space, making physical customs inspections more complex and time consuming. In its turn, this led to the need for extra customs staff, adding to the costs, delays, and inefficiencies.

TradeVan installed a trade facilitation EDI system, the software for which was developed by British Telecom (BT). Much of the translation and enabling software was developed from scratch with significant local language capabilities. Legislation affecting customs clearance was amended by the administration.

TradeVan capabilities include a national packet-switched telecom network, central or application level translation, mailbox services, various databases, audit trails, and a bulletin board. It also features message design and EDI strategy and planning, software design, training, and software certification. The process of implementation included a review of customs processes, significant redesign, substitution of vital data with UN-EDIFACT messages and a redesigned approval process.

**Current Status**

TradeVan now has about 800 users including 300 customs brokers. By December 1994, 98 percent of export declarations and 80 percent of import declarations, by volume, were made by EDI. The number of customs documents has been reduced from thirty-two to two: a customs declaration now takes about 15 minutes for approval to be granted for shipment release. The number of brokers has been reduced from 4,000 to 1,300. Customs staff have been reduced by 119 data entry staff and 41 customs officers. However, paper is still required for audit purposes, but audits now occur after the event, once the goods have been released and after the duty has been paid.

Ten local software houses are the certified software vendors to the TradeVan user community. A typical software package from TradeVan or one of the certified vendors can cost between US$400 and US$2,000, depending on the amount of integration and implementation effort involved—less than half the price of corresponding products and services in Europe and North America.

TradeVan has over 100 staff, and gets significant help from III and various ministries. Of the NT$2.1 billion capital allocated by the MOF, approximately NT$1.5 billion had been spent by December 1994 (US$60 million). TradeVan estimates that only 10 to 20 percent of this amount was spent on technology; the majority was spent in the reengineering, awareness, promotion, and education phases. These figures do not include the investment from other sources such as III, other ministries, and the private sector. Allowing for the investment from these other sources in attending training and promotion sessions and the wide range of meetings concerned with implementation, liaison, and consultation, the total figure of NT$1.5 billion to date could be dramatically understated.

**The Next Step**

The government and the banking industry have now sponsored a financial EDI initiative for the payment of customs duties, and at a later stage for full electronic funds.
transfer (EFT) and remittance advice processing. A sea cargo clearance initiative went live in November 1994. Other initiatives in the retail industry are being planned. In line with the promised deregulation and ultimate privatization of the telecommunications sector, it is proposed to privatize TradeVan in 1995.

DISCUSSION

In November 1994, it was reported that the TradeVan project had already saved Taiwan (China) over NT$4.3 billion (US$125 million). It is understood that this figure was adduced from faster turnaround of vessels, improved use of storage facilities and space, and reduced delays, leading to better use of staff, reduction in time lost, and reduced impact on traffic density. The report also drew attention to the “green” aspects of the TradeVan initiative: less paper used and reduced fuel emissions.

Although by any standard Taiwan has achieved much, there are two further points to be made. First, it seems that the reengineering effort was not subscribed to by all government departments. Paper is still required for audit purposes. The development of 24 new UN-EDIFACT documents suggests that some existing internal processes were simply automated, not reengineered.

Second, because the whole process was underwritten by the MOF, it is possible that much of the planning and implementation was not subject to normal commercial management control. Although it is difficult to contest the savings quoted without detailed investigation, it is possible that other interpretations could be made of the data.

The key asset of TradeVan is the ownership of exclusive access to customs systems and data. Might this not be achieved more equitably by the creation of a customs gateway, for example? Once again, the issue of the “shared vision,” especially with the private sector, together with a more active involvement of the private sector in the planning and implementation, needs to be addressed.

At the technical level TradeVan does not yet have an international telecommunications license, nor does it have any interconnect agreement with other VANS. Apart from its certified partners it appears to operate as a monopoly service, which is an incongruity by EDI terms.

SUMMARIZING NATIONAL MODELS

There are, in sum, varying national approaches to implementation. At one extreme there are national monopoly organizations (even though they may not be thought of as such by their operators), such as TradeVan in Taiwan (China) and Tradenet in Singapore. These organizations have obtained government funding and agreement for exclusive access to government data. Further, they have obtained government assistance in mandating certain procedures, such as import-export declarations.

It takes a particular form of business culture to ensure enthusiastic end user participation under these circumstances. Trade facilitation EDI will operate satisfactorily where government employs the power to mandate usage and impose penalties for default, but the overwhelming evidence is that, except under these particular conditions, compulsion does not work and soon becomes counterproductive. This is why shared vision and enthusiasm is so important. It is certainly questionable whether this positive climate will generate the same levels of participation where public sector approvals are not so crucial to the process, such as in the national manufacturing and retail industries, for example.

Another facet of the compulsion scenario is the emerging clash between nationally approved message sets and those agreed for common international use, such as those emerging for international transport, container shipping, handling, and stowage.

At the other extreme are the hands-off approaches seen in Australia, New Zealand, and especially Hong Kong. Lack of shared vision, minimal public sector participation in the organization, and the constant need to compete and justify the existence of a national initiative operated by a private organization, have deflected the mission from national competitive advantage to survival and revenue generation. Some Latin American countries exhibit an even more extreme version of the hands-off
approach, generated by a lack of practice and understanding of potential, as well as because of traditional conflicts between the public and the private sectors.

Hungary has finally been able to achieve a coordinated approach from its public service departments. But now it must overcome entrenched private sector attitudes toward the public sector before any truly national initiative may move forward.

The middle path is quite clear: a cooperative arrangement between government and the private sector, initially set up and funded by government, but ownership and operations migrating to the private sector as the user and revenue base expands, and as the techniques become commonplace. Mandated processes are probably inescapable in order to ensure that this shared responsibility model is successful, but a reasonable lead time—say three to five years—should be allowed. Facilities for nonautomated traders should also be made available in order to avoid technological disenfranchisement.
The World Bank Experience

Experiences everywhere indicate that international, regional, and domestic trade translate into better market integration, more efficient allocation of national resources, better focus on national comparative advantage, and increased productivity. All these ultimately lead to improved product or services competitiveness.

More than 80 percent of exports from developing countries are headed for markets in the principal Organization for Economic Cooperation and Development (OECD) economies; therefore, enhancing developing countries' industrial and trading practices to become more responsive to volatile market demand is a means to fostering export-led growth and thus to reducing poverty levels.

The reduction of poverty is the World Bank's most important mission. In this connection, the chief aim of Bank assistance has been to improve competitiveness by introducing more market-responsive and service sector services, thereby improving prospects for industrial growth and trade expansion.

DIVERSITY OF ENTRY POINTS

The portfolio of Bank projects and surveys is diverse in nature, and includes:

- sectoral projects, focusing, for instance, on transport logistics, or on specific network bottlenecks;
- macroeconomic approaches in structural adjustment loans that can raise issues of export-import finance, market and price liberalization, specific tax and tariff reforms, and the overall regulatory framework that governs the conduct of transport, telecommunications, and other services;
- studies dealing with issues such as trade facilitation and transport logistics; and
- competitiveness projects that explicitly target trade facilitation, export development, or product and services market development.

TRENDS IN WHAT THE BANK HAS DONE SO FAR

The first transport sector work on facilitation was carried out in Latin America in 1976. Since then, there has been a lot of similar work, particularly in the African region, where a number of studies on corridor economics, land-locked country logistics, and facilitation have been conducted, and facilitation components included in projects.

A first effort to assess the effects of service industry and related infrastructure management practices in a developing country was carried out in India in 1989. The insights gained from these studies and operations have revealed that industries and traders can be severely undermined by supply-oriented objectives and policies.

The Bank's approach to trade facilitation has been shaped by having to adjust to how the international service industries react to changing global practices in manufacturing and trading. Its approach has also had to internalize the consequences of technological progress and respond to increasingly volatile market behavior. Typically, countries must initiate reforms that are cross-sectoral in nature, involving multiple government agencies. These reforms also require high-level decision making in government, as well as a great deal of institutional capacity building, reengineering of procedures, and systems and communications reforms.

There were three phases of World Bank involvement. First, during the 1980s, most Bank activities concerning trade facilitation had transport facilitation as their goal. Second, over the past decade isolated trade facilitation components, particularly
focusing on governance reform, have been included more and more in structural adjustment loans. Third, since 1990, Bank initiatives have explored ways of addressing the wide range of policy and administrative issues involved in trade enhancement, leading to new types of projects and technical assistance.

These projects display four new qualities. First, they have more technical assistance than lending activity. Second, they are dependent upon clear government commitment, since government willingness to promote international competitiveness is a prerequisite. Third, they reflect broad-based participation, including that of the local business community. Fourth, they are innovative in their efforts to combine different components and to focus increasingly on the services sector. The 1992 Product Market Development Project in Hungary (discussed in Volume II), and two more recent projects—one in Jordan and another in Mauritius—illustrate this new comprehensive approach.

The introduction of electronic trading is already bringing business benefits to many sectors (industry, commerce, banking, and so on), although the potential is still largely untapped in developing countries. The next stage in the evolution of the Bank’s approach could be to make information and communications systems more efficient for trading, and add this dimension to the Bank’s and borrower’s strategy in advancing the trade facilitation agenda. For instance, an ongoing transport logistics study in China, conducted in close collaboration with Chinese counterparts, is examining the status of logistic systems in the country, diagnosing the need for administrative, commercial, and customs clearance procedure reforms, and making recommendations about a framework to develop EDI to expedite trade.

THE NEXT FRONTIER: INTEGRATING AND STANDARDIZING THE APPROACH?

Table 1 lists a number of project components for trade facilitation in developing countries, and shows how some of them are actually implemented in a selection of ongoing Bank projects. This sample is by no means exhaustive, but it illustrates some of the points made above, in particular the limited incidence, up to now, of communications or electronic trading components in these projects, especially advanced applications such as EDI.

THE 1987 REVIEW: LESSONS FROM THE BANK’S EXPERIENCE IN TRANSPORT FACILITATION

Bank projects and surveys that arise from a sectoral approach, and concern transport facilitation and logistics, have been implemented in close connection with investment loans in the transport sector. These are the oldest line of significant Bank action and the only one in which there is sufficient experience to make evaluations worthwhile. Yet in 1987, transport facilitation alone had not attracted many World Bank resources, amounting only to 2 percent of the lending for noninfrastructure transport operations.

In 1987, the Bank’s Transportation Department prepared a general review of all such operations and presented a mixed opinion. On one hand, the importance of the topic is clearly emphasized; on the other, the actual impact of past facilitation programs are not perceived as encouraging, leading to the following lessons:

- The Bank has a specific role to play in facilitating transportation at various levels, by: (a) promoting intermodal coordination; (b) promoting the role of the private sector and encouraging some amount of deregulation in highly regulated areas; (c) creating the enabling environment for the growth of intermediaries such as freight forwarders; (d) increasing operational efficiency; (e) acting as a catalyst for country participation in international agreements; and (f) promoting more fluent trade between neighboring countries.
- Facilitation involves many of the countries’ government institutions in decision making (typically the Ministry of Finance, Customs and Excise, the Central Bank, the Ministry of Transport, and so on). Thus any Bank initiative in this area can be complex both in administration
<table>
<thead>
<tr>
<th>Côte d'Ivoire</th>
<th>Kingdom of Morocco</th>
<th>Hungary</th>
<th>Republic of Cape Verde</th>
<th>India</th>
<th>Jordan</th>
<th>Mauritius</th>
</tr>
</thead>
</table>

**The transport dimension:**
- Post modernization
- Highway sector improvements
- Railways modernization
- Intermodal coordination
- Reform of shipping industry
- Facilitation for container companies
- Development of freight forwarding

**The governance dimension:**
- Metrology
- Standards
- Calibration
- Quality
- Deregulation of prices
- Liberalization of trade
- Rationalization of taxes and tariffs
- Rationalization of public expenditure
- Improving commercial legal framework
- Reforming customs procedures

**The financial dimension:**
- Sublending to private entities involved in marketing, trade and distribution
- Improving export incentives
- Reforming access to foreign currency

**The management dimension:**
- Technical assistance in inventory management
- Technical assistance in cost accounting
- Technical assistance in business logistics practices
- Container company creation

**The communications dimension:**
- Implementation of new customs systems
- Framework for development of teleports
- EDI applications

---

34 Information Technology and National Trade Facilitation: Making the Most of Global Trade
The Bank should make greater efforts to provide long-term support and clear emphasis on implementation and supervision to transport facilitation initiatives through successive projects. The Bank must also set realistic objectives, taking into account the implementation difficulties. This is certainly true for the regional programs that appear to be most needed.

- A high level of government commitment and participation is a prerequisite to adequate communication and decision making across the agencies involved.
- Whenever transport facilitation initiatives are part of a structural adjustment loan, these additional factors arise: (a) programs are not always realistic in their objectives; (b) they have had to be flexible to adapt to changes in country circumstances; and (c) the willingness and capacity of the borrower to implement the program may be insufficient.
- The main problem areas found by the review raised certain concerns about the role of the Bank, such as: (a) the Bank’s role has been insufficiently defined, in spite of a clear understanding of the economic stakes (particularly in terms of trade balance) involved in transport facilitation procedures; and (b) the Bank has been more responsive to the need for tangible investment in the transport sector than it has been to resolving the intricate efficiency bottlenecks of the transport system.

In conclusion, the 1987 review restates the importance of the transport facilitation agenda, both for the Bank and for other multilateral agencies, and also recognizes the complexity of the issue and the great challenge of implementation that is usually involved. Recommendations for designing a facilitation program emphasize the need for realistic objectives, risk assessment in project development and fall-back strategies, as well as the need to recognize the scarcity of technical expertise in this field.

THE 1992 REVIEW AND LESSONS

A second, more specialized review was conducted in 1992, focusing on transit traffic facilitation in Sub-Saharan Africa, in particular on the requirements of land-locked countries. The study reviewed Bank assistance between 1960 and 1990, and suggested, among others, the following recommendations:

- Donor assistance for transit facilitation is delivered more efficiently when planned as an integrated package and not as an isolated component in a transport project, because investment loans are not necessarily a good way to carry on a policy dialogue or initiate policy reforms.
- Relaxation of institutional barriers, along with technical assistance, and privatization of some of the functions currently performed by parastatal agencies should be priority areas of Bank intervention.
- In terms of operational policy, the Bank should put less emphasis on regulation and more on staff training and career development.

TRADE AND TRANSPORT FACILITATION GUIDELINES

A recent Bank report describes valuable Bank and UNCTAD experiences in improving efficiency of land and maritime transport services of Sub-Saharan economies, but these experiences may be generalized to other regions. The document suggests strongly that any future facilitation program must be based on a regional approach. To create the right environment for the development of national or subregional trade and multimodal transport systems, a project will also have to adopt a multidisciplinary approach. Such an approach should include:

- regulatory measures to harmonize transport liability regimes and insurance practices, and to provide an appropriate legal framework for the establishment and development of multimodal transport operators;
- trade and transport facilitation measures (customs regulations, trade and transport documentation, information network), and their acceptance by the trading community, transport operators, government agencies, banks, and insurance companies;
- development policy measures for smooth
development of transport services, as well as to address misallocation of resources, particularly in the improvement of physical infrastructure and transport equipment; and

• ways of fostering, on a subregional level, harmonization and integration among the different national actors and actions.

CONCLUSIONS

So far the Bank has tried to facilitate the participation of developing countries and their domestic enterprises in international trade, by dismantling market access restrictions and liberalizing services. Achieving the full benefits of trade and transport facilitation requires close cooperation of various parts of the Bank, spread over the diverse stages of the project cycle. It also demands close consultation, and follow-up with regulatory bodies, service and infrastructure providers, and system users to ensure the creation of services and infrastructure that are responsive to demand.

Accessible information and communications technology can significantly improve trade performance, and is an area that can yield positive results in operations managed by the Bank. This technology must be accompanied by simplification of documentation, reengineering of procedures, appropriate training and availability of local expertise, and a reliable and cost-effective communications infrastructure. However, too few Bank projects have created an environment in which government and intergovernment activity on legislative, regulatory, or institutional fronts takes into account the opinions and desires of users, manufacturers, and service providers, even though these are essential in developing sophisticated electronic networks.

What follow are two examples of new World Bank projects in global trade enhancement, one in Jordan and the other in Mauritius.

JORDAN

The Jordan project is for export development and finance. The main objectives of the project are improvements in the following areas:

• access to imports at international prices by reforming customs administration, development of a trade facilitation system, and reform of the free zone regime;

• implementation of preshipment export finance and assistance to the Loan Guarantee Corporation;

• strengthening the metrology, standards, testing, and quality (MSTQ) infrastructure, supporting exporters for technical and marketing know-how, and building the capability of the Jordan Investment Agency.

Observations about the Jordan project

The range of counterpart agencies involved at the implementation level is unusually large and includes both the public sector and private sector: the Ministry of Finance (customs department and income tax department); the Ministry of Industry and Trade; the new Institution for Standards and Metrology; the Jordan Loan Investment Promotion Agency; the Free Zone Corporation; the Jordan Loan Guarantee Corporation; the Jordan Export Development Corporation; and other entities from the private sector.

Government participation and commitment to the project are demonstrated by the scope of legal change accompanying the project. Jordan is drafting a new customs law, discussing a draft Law of Standards and Metrology that is pending in Parliament, and is reviewing a draft income tax law in connection with International Monetary Fund (IMF) intervention.

Private sector financial contributions in project funding, and participation and interest in project outcome, are significant-reaching US$19 million, compared to the government’s own US$8.5 million and the Bank’s US$10 million contribution.

The informatics component of the project is large: computer systems will be installed or upgraded in most of the agencies touched by the project. Jordan is considering creation of a system that would serve as a central reference source on all trade-related information. UNCTAD’s ASYCUDA trade facilitation software will introduce full computerization of the customs procedures. The new Institution of Standards and Metrology should be a
central provider of access to MSTQ-related information database and access systems as well as provide a link with a quality management system registration service.

The project directly addresses the need for close coordination with other multilateral agencies' programs or requirements in matters of trade by several means: coordination with IMF recommendations for tax structure, a legal framework for customs administration, and other administrative and enforcement procedures. There is also coordination with the General Agreement on Tariffs and Trade-World Trade Organization (GATT-WTO) requirements on MSTQ strategy. Finally, the project addresses implementation of UNCTAD's Automated System for Customs Data (ASYCUDA) software, which will involve technical assistance by UNCTAD.

**MAURITIUS**

In Mauritius, the Bank has financed a project for technical assistance to enhance competitiveness. The main objectives of the project are:

- promoting good technology practices through a Technology Diffusion Scheme designed to be demand-responsive, to encourage private sector delivery of these services;
- strengthening the MSTQ infrastructure to improve export quality;
- facilitating trade through procedure streamlining, documentation rationalizing, and promotion of an environment conducive to the adoption of EDI;
- implementing economic and regulatory reform where specific needs have been identified.

**OBSERVATIONS ABOUT THE MAURITIUS PROJECT**

The country environment of this project is unusually favorable. The Bank's assistance strategy with the Republic of Mauritius is to concentrate on export competitiveness, in consonance with the government's long-term vision of development. Technical assistance and selective lending have been improving the economic environment for private sector entrepreneurs, through advice on overall economic management, productivity increase, and diversification of production and exports.

This project is thus one component of a comprehensive assistance strategy that includes, among other initiatives: a Port Project (fiscal 1995) to finance the expansion of port capacity; a Services Sector Modernization Project (fiscal 1997) to selectively target competitiveness bottlenecks identified in previous work; a Higher Education Project (fiscal 1996) to follow up on a previous Education Sector Project (fiscal 1993); and a Health Sector Project (fiscal 1997) focusing on quality and efficiency of public health services delivery.

There are many counterpart agencies in the government, including the Ministry of Finance, the Ministry of Industry and Industrial Technology, as well as the Mauritius Standards Bureau; private sector entrepreneurs are also involved in the project, which puts strong emphasis on the private sector's contribution to efficient delivery of public services, particularly information services.

Although the project will not finance computer systems, it will provide technical assistance to the government (which has no expertise in EDI) to monitor a new electronic trade facilitation system, to be supplied by the private sector. Technical assistance will also be provided to streamline procedures in customs and excise, and design and implement an EDI training program. The EDI training and awareness program will involve representatives from the customs and excise department, Ministry of Trade and Shipping, commercial banks, Mauritius Marine Authority, Air Mauritius, customs brokerage firms, and clearing and forwarding agents.

After the implementation of the trade facilitation system according to measurable performance indicators, the government will use Bank assistance to further explore EDI within the public sector in such areas as pensions and welfare, and company taxes.

This project exemplifies a new, comprehensive approach to trade enhancement in developing countries, in which informatics is a central component to efficiency improvement, but not an isolated one.
THE WAY AHEAD

Before plotting an accurate course for a destination, the navigator needs to establish a datum, a fixed point identifying the present location from which a course may be plotted. It is the same for reengineered trade processes and EDI practices, as well as for the willing army of helpers: vendors, industry bodies, and international agencies alike. Unfocused assistance applied to an inadequately prepared initiative is likely to do more harm than good. The following is a summary of the next steps for all parties.

POTENTIAL NATIONAL INITIATIVES

The case for trade facilitation using EDI is quite clear, as are the ultimate objectives for the technologies and processes. The question is how to participate, and define the current local status of development. The first step is an audit of current trade processing procedures, and an evaluation of the role that IT presently plays. This may be an internal or external study. The objective is to establish the datum, or starting point. Other studies may follow along the lines described in the section on best practice.

The choice of external advisers is extremely important. It may be necessary to have full terms of reference drafted by proven experts from one of the international agencies before entering into a major consultancy study. External moderators should also be considered to ensure the reliability of results. There are several examples of consultancy reports making unrealistic proposals for local implementation. Hence, in addition to technical knowledge and specialist experience, the adviser should be able to demonstrate sensitivity to local conditions. Whatever the recommendations, the public sector must very carefully consider its role in relation to:

- funding for an awareness campaign;
- departmental participation;
- departmental coordination and agreed objectives;
- leadership, or coleadership with the private sector;
- choosing and funding the technology vendor;
- ongoing participation in management,

funding, and the use of the service;
- ultimate ownership of the technology vendor;
- commitment to international standards, the standards setting process, and technology transfer;
- liaison with the private sector, the education sector, industry bodies, and international agencies;
- diligent and timely attention to legal issues and new legislation;
- national marketing and exploitation of the new electronic commerce facilities;
- inducement and infrastructure schemes for early users and small and medium enterprises.

PRIVATE SECTOR INITIATIVES

In some ways this is easier, since a business plan and adequate funding are all that is required. Thereafter, to encourage participation, the operator has to persuade the government to follow most of the activities listed in the previous section. It is more difficult to make a private sector initiative work successfully without the wholehearted support of the government.

INTERNATIONAL AGENCIES

There is no dearth of desire to help, nor lack of advice from any number of agencies, some of them with funds. But the scenario is confusing for countries and organizations wishing to use such help. This is because much of the advice offered is aligned with the mandate of the agency, and not necessarily in the best interests of the client.

It is now time to bring the objectives, work plans, and resources into line, to agree on priorities, and then to implement a joint plan between all international agencies concerned. This can lead to optimum use of skills and resources, minimum overlap, demonstration projects, and effective international liaison on projects, technology, best practice, standards, message, and implementation guidelines.

Global activity illustrates the need for further and faster progress. Perhaps an international vision is needed in addition to national shared visions to override the inhibitors to progress so amply illustrated in the case studies in this volume.
In October 1994, UN Secretary General Boutros Boutros-Ghali opened a UN symposium on Trade Efficiency in Columbus, Ohio. His speech concerned the global need for improving trade efficiencies and the risks for those who were unwilling or unable to participate. Some of his remarks are consolidated in this section, in order to emphasize the crucial role of IT-empowered trade facilitation.

The Uruguay Round has signalled a liberalization of world trade. It is estimated that global income will increase by at least US$500 billion over the coming decade. This will add US$50 billion each year to international trade flows. The volume of trade of developed countries will be 7 to 8 percent higher than it would have been without GATT. But developing country trade is likely to increase by at least 14 percent over the same period.

Even so, not every developing country will be able to participate effectively, because of lack of expertise and infrastructure; hence, many may miss out. The trade efficiency initiative is designed to prevent that from happening.

It aims to facilitate the participation of developing countries, and their domestic enterprises, in international trade. It seeks to reduce trade transaction costs. A country may possess excellent natural resources, a highly motivated work force, good technical skills, and gifted entrepreneurs, and yet—because of trade inefficiencies—not be able to take advantage of market opportunities.

The areas of difficulty for developing countries include the following.

**Government Controls**

Some degree of government control and intervention in the movement of goods and financial flows is required to protect the national economy, health, and security. This, however, can easily become excessive or inefficient. Billions of dollars are lost every year in hold-ups and delays—often because of needless bureaucracy. Government intervention should be transparent and clear. It should be concerned not only with short-term government revenue, but also with the implications for long-term trade efficiency.

Customs efficiency is crucial. Gains from modern transport techniques and new information technologies can be lost if inspection procedures are slow, or if heavy paper or forms requirements cause delay. The modernization of customs is essential to an efficient trading system.

**Business Information**

In developed country markets, windows of opportunity must be located, and production geared towards them. Fast and accurate information is vital if business opportunities are to be grasped. Knowing what the customers want, and planning to meet their requirements, call for a sophisticated information system, and the capacity to manage the enterprise to meet those requirements.

**Telecommunications**

Global information highways tend to bypass the developing world. Yet information is the key to trade. Telecommunications are the vital carriers of that information. A good example is
This means that attention must be paid to unit costs, to transportation, and to local business practices.

Uniform commercial codes can be of immense importance.

So modern business practices and methods must be made more generally available. Training and business education must be expanded. Business schools can be helped to extend their activities to countries where business has not extensively been taught before.

The Trade Point concept can concentrate efforts and resources. It can spearhead efforts to improve trade efficiency. The Trade Point (see page 9, UNCTAD’s Trade Point Initiative) brings together all providers of services required to make a commercial transaction: customs, foreign trade institutes, freight forwarders, transport companies, banks and insurance firms.

BUSINESS PRACTICES

Global traders need to adopt global standards and practices. The world market will leave behind those who do not adapt to what their customers require.
## Appendix 2

### Cooperating National and International Organizations

Many organizations have assisted us in the preparation of this report. These include end users, industry organizations, telecommunications companies, government departments, customs departments, consultancies, and the media from many countries. In particular, we would like to thank the following agencies and organizations for their assistance and generosity:

<table>
<thead>
<tr>
<th>Organization and Source</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>APEC (Asian Pacific Economic Corporation)</td>
<td>Singapore</td>
</tr>
<tr>
<td>ASEB (Asia EDIFACT Board)</td>
<td>Japan</td>
</tr>
<tr>
<td>American Trucking Association</td>
<td>United States</td>
</tr>
<tr>
<td>ANZEB (Australia New Zealand EDIFACT Board)</td>
<td>Australia</td>
</tr>
<tr>
<td>ANA (Article Numbering Association)</td>
<td>United States</td>
</tr>
<tr>
<td>BIFA (British International and Freight Association)</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>British Computer Society</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>BULPRO (Chamber of Commerce and Industry)</td>
<td>Bulgaria</td>
</tr>
<tr>
<td>Canada Ports Corporation</td>
<td>Canada</td>
</tr>
<tr>
<td>Cargo Clearance Automation Planning and Promotion Task Force, MOF</td>
<td>Taiwan (China)</td>
</tr>
<tr>
<td>CEEEB (Central and Eastern Europe EDIFACT Board)</td>
<td>Bulgaria</td>
</tr>
<tr>
<td>CEN (Comité Européen de Normalisation)</td>
<td>Belgium</td>
</tr>
<tr>
<td>Centrale für Coorganisation GmbH</td>
<td>Germany</td>
</tr>
<tr>
<td>Central Chamber of Commerce</td>
<td>Finland</td>
</tr>
<tr>
<td>Computing Services Association</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>DANPRO</td>
<td>Denmark</td>
</tr>
<tr>
<td>DI (Confederation of Danish Industry)</td>
<td>Denmark</td>
</tr>
<tr>
<td>DISA (Data Interchange Standards Association)</td>
<td>United States</td>
</tr>
<tr>
<td>Distribution Code Center</td>
<td>Japan</td>
</tr>
<tr>
<td>ECLAC (UN Economic Commission for Latin American Countries)</td>
<td>Chile</td>
</tr>
<tr>
<td>EDI Forum</td>
<td>The Netherlands</td>
</tr>
<tr>
<td>EDI Malaysia</td>
<td>Malaysia</td>
</tr>
<tr>
<td>EDINet</td>
<td>Philippines</td>
</tr>
<tr>
<td>EFTA (European Free Trade Association)</td>
<td>Switzerland</td>
</tr>
<tr>
<td>EIRPRO</td>
<td>Ireland</td>
</tr>
<tr>
<td>ESCAP (UN Economic and Social Commission for the Asia Pacific)</td>
<td>Thailand</td>
</tr>
<tr>
<td>EU (European Union)</td>
<td>Belgium</td>
</tr>
<tr>
<td>European Affairs Department</td>
<td>Ireland</td>
</tr>
<tr>
<td>Financial Information Service Center</td>
<td>Taiwan (China)</td>
</tr>
<tr>
<td>Finnish Data Communication Association</td>
<td>Finland</td>
</tr>
<tr>
<td>FINPRO</td>
<td>Finland</td>
</tr>
<tr>
<td>General Directorate of Economic Research and Assessment</td>
<td>Turkey</td>
</tr>
<tr>
<td>Group of Terrestrial Freight Forwarders</td>
<td>France</td>
</tr>
<tr>
<td>HUNPRO</td>
<td>Hungary</td>
</tr>
<tr>
<td>IAPH (International Association of Ports and Harbors)</td>
<td>Japan</td>
</tr>
<tr>
<td>ICAO (International Civil Aviation Organization)</td>
<td>Canada</td>
</tr>
<tr>
<td>ICC (International Chamber of Commerce)</td>
<td>France</td>
</tr>
<tr>
<td>IFFA (International Freight Forwarders Association)</td>
<td>United Kingdom</td>
</tr>
</tbody>
</table>
Banks in Australia, Brazil, Canada, Hong Kong, Korea, Malaysia, Singapore, Thailand, the Netherlands, New Zealand, Taiwan, United Kingdom, and the United States.

EDI Associations or Councils in Australia, Canada, Denmark, Ireland, Finland, France, Hong Kong, Sweden, Norway, New Zealand, and the United Kingdom.

EAN members from EAN International Belgium, Argentina, Australia, Brazil, Chile, Colombia, Czech and Slovak Republics, Denmark, Finland, France, Germany, Hong Kong, Hungary, Ireland, Japan, Malaysia, Mexico, the Netherlands, New Zealand, Norway, Singapore, Sweden, Taiwan (China), and the United Kingdom.

Technology vendors in Argentina, Australia, Brazil, Canada, Chile, Colombia, Denmark, Finland, Germany, Hong Kong, India, Italy, Korea, Malaysia, Mexico, New Zealand, Singapore, South Africa, Spain, Sweden, Taiwan (China), the United Kingdom, and the United States.
<table>
<thead>
<tr>
<th>Country</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>Carlos Ibañez, 1220, Avenida Pedro de Mendoza, Buenos Aires 1103, (11) 4813-9273</td>
</tr>
<tr>
<td>Australia, Papua New</td>
<td>Solomons Island, Western Island, Australia, Postfach 6, 1740, 13300, (2) 204893</td>
</tr>
<tr>
<td>Brazil</td>
<td>Distributors of World Bank Publications, Parque I, Brasilia, Brazil, 11911-900</td>
</tr>
<tr>
<td>China</td>
<td>Distributors of World Bank Publications, P.O. Box 302, 100046, 100092</td>
</tr>
<tr>
<td>Colombia</td>
<td>Distributors of World Bank Publications, C.U.A. 115-1 811, 11511-900</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>Distributors of World Bank Publications, P.O. Box 212, 11211-900</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>Distributors of World Bank Publications, Avenida Independencia, Santo Domingo,</td>
</tr>
<tr>
<td>Ecuador</td>
<td>Distributors of World Bank Publications, P.O. Box 19501, 11703-000</td>
</tr>
<tr>
<td>El Salvador</td>
<td>Distributors of World Bank Publications, P.O. Box 3001, 11240-900</td>
</tr>
<tr>
<td>Egypt</td>
<td>Distributors of World Bank Publications, P.O. Box 3000, 11200-900</td>
</tr>
<tr>
<td>Fiji</td>
<td>Distributors of World Bank Publications, P.O. Box 1010, 11100-900</td>
</tr>
<tr>
<td>Greece</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Guatemala</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Honduras</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Indonesia</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Jamaica</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Japan</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Jordan</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Kenya</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>South Korea</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Mexico</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Micronesia</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Mozambique</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Namibia</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Netherlands</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>New Zealand</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Pakistan</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Paraguay</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Peru</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Philippines</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Portugal</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Romania</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Russia</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Spain</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Switzerland</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Thailand</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Trinidad and Tobago</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Tunisia</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>United States</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Uruguay</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Venezuela</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Vietnam</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Yemen</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Zambia</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>Distributors of World Bank Publications, P.O. Box 1000, 11000-900</td>
</tr>
</tbody>
</table>
No. 275 Heggie, Management and Financing of Roads: An Agenda for Reform
No. 276 Johnson, Quality Review Schemes for Auditors: Their Potential for Sub-Saharan Africa
No. 277 Convery, Applying Environmental Economics in Africa
No. 278 Wijetilleke and Karunaratne, Air Quality Management: Considerations for Developing Countries
No. 279 Anderson and Ahmed, The Case for Solar Energy Investments
No. 280 Rowat, Malik, and Dakolias, Judicial Reform in Latin America and the Caribbean: Proceedings of a World Bank Conference
No. 281 Shen and Contreras-Hermosilla, Environmental and Economic Issues in Forestry: Selected Case Studies in India
No. 282 Kim and Benton, Cost-Benefit Analysis of the Onchocerciasis Control Program (OCP)
No. 283 Jacobsen, Scobie and Duncan, Statutory Intervention in Agricultural Marketing: A New Zealand Perspective
No. 286 Tavoulareas and Charpentier, Clean Coal Technologies for Developing Countries
No. 287 Gillham, Bell, Arin, Matthews, Rumeur, and Hearn, Cotton Production Prospects for the Next Decade
No. 288 Biggs, Shaw, and Srivastiva, Technological Capabilities and Learning in African Enterprises
No. 289 Dinar, Seidl, Olem, Jorden, Duda, and Johnson, Restoring and Protecting the World's Lakes and Reservoirs
No. 292 Gorriz, Subramanian, and Simas, Irrigation Management Transfer in Mexico: Process and Progress
No. 293 Preker and Feachem, Market Mechanisms and the Health Sector in Central and Eastern Europe
No. 294 Valdés and Schaeffer in collaboration with Sturzenegger and Bebczuk, Surveillance of Agricultural Price and Trade Policies: A Handbook for Argentina
No. 295 Pohl, Jedrzejczak, and Anderson, Creating Capital Markets in Central and Eastern Europe
No. 296 Stassen, Small-Scale Biomass Gasifiers for Heat and Power: A Global Review
No. 297 Bulatao, Key Indicators for Family Planning Projects
No. 298 Odaga and Heneveld, Girls and Schools in Sub-Saharan Africa: From Analysis to Action
No. 299 Tamale, Jones, and Pswarayi-Riddihough, Technologies Related to Participatory Forestry in Tropical and Subtropical Countries
No. 300 Oram and de Haan, Technologies for Rainfed Agriculture in Mediterranean Climates: A Review of World Bank Experiences
No. 301 Edited by Mohan, Bibliography of Publications: Technical Department, Africa Region, July 1987 to April 1995
No. 302 Blythe, Calamari, and Yaméogo, Environmental Impact Assessment of Settlement and Development in the Upper Léraba Basin
No. 303 Heneveld and Craig, Schools Count: World Bank Project Designs and the Quality of Primary Education in Sub-Saharan Africa
No. 304 Foley, Photovoltaic Applications in Rural Areas of the Developing World
No. 305 Muir and Saba, Improving State Enterprise Performance: The Role of Internal and External Incentives
No. 307 Edited by Elder and Cooley, Sustainable Settlement and Development of the Onchocerciasis Control Programme Area: Proceedings of a Ministerial Meeting
No. 308 Kapur, Airport Infrastructure: The Emerging Role of the Private Sector