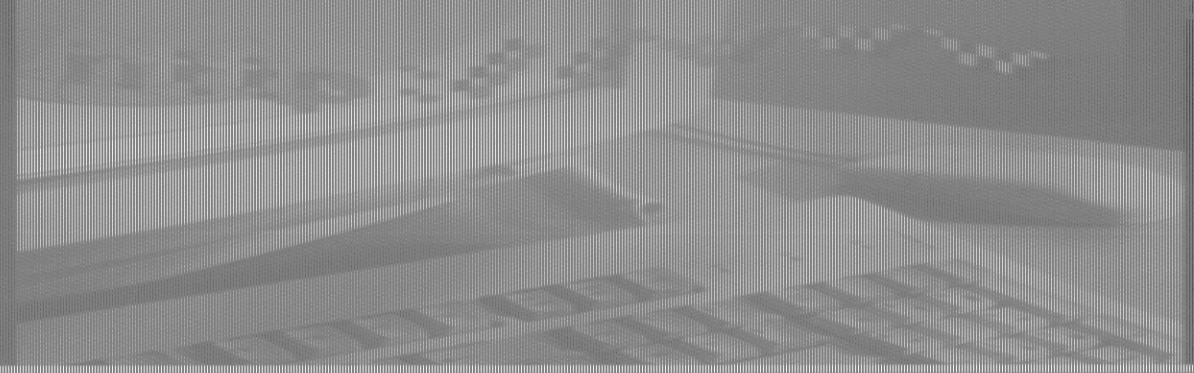


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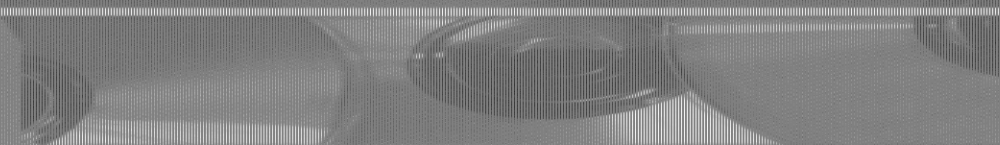
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**TRADE AND TRANSPORT FACILITATION:  
E-BUSINESS AND INFORMATION AND COMMUNICATIONS  
TECHNOLOGY APPLICATIONS**



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New York, 2003

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The views expressed in this study are those of the authors and do not necessarily reflect the views of the United Nations Secretariat.

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## Preface

The present study was carried out by the Information and Communications Technology Division and the Globalization and Regional Integration Division of the Economic and Social Commission for Western Asia (ESCWA) during the biennium 2002-2003. The study focuses on trade and transport facilitation and the related techniques of supply chain management, with an emphasis on the application of information and communications technologies (ICTs) to these disciplines in general, and with regard to the ESCWA region in particular.

This publication paves the way for further studies pertaining to the use of ICT in specific sectors in the ESCWA region.

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ABBREVIATIONS AND EXPLANATORY NOTES

ACIS	Advance Cargo Information System
ASYCUDA	Automated SYstem for CUstoms DAta
ATA	Agents Transfer Authority
CIF	cost, insurance and freight
CSA	Customs Self Assessment
CSI	Container Security Initiative
C-TPAT	Customs-Trade Partnership against Terrorism
CVPC	Commercial Vehicle Processing Centre
DCA	Dubai Customs Authorities
DFZ	Dubai Free Zone
DPA	Dubai Port Authorities
DPI	Dubai Ports International
DTI	Direct Trader Input
ebXML	Electronic Business Extensible Markup Language
EDI	electronic data interchange
EFT	Electronic funds transfer
ESCWA	Economic and Social Commission for Western Asia
EU	European Union
FAL	Convention on the Facilitation of International Maritime Traffic
FOB	free on board
GAFTA	Greater Arab Free Trade Area
GATT	General Agreement on Tariffs and Trade
GCC	Gulf Cooperation Council
GDP	gross domestic product
G2B	Government to business
G2C	Government to citizen
G2G	Government to Government
HS	Harmonized System
ICT	information and communications technology
IMO	International Maritime Organization
ISO	International Organization for Standardization
JIT	just-in-time
LAN	local area network
LITE	Lebanon International Trade Exchange
LP	lean production
MENA	Middle East and North Africa
NAJM	Arabic acronym for ASYCUDA
NAR	NAJM audit resources
NCITD	National Council on International Trade Development
NGO	non-governmental organization
NOC	No objection certificate
NOOR	NAJM online operation
NTTFC	National Trade and Transport Facilitation Committee
OECD	Organization for Economic Cooperation and Development
PCFC	Port, Customs and Free Zone Corporation
PRO	Committee for simpler trade PROcedures
RMD	release on minimum documentation
SAD	single administrative document
SCM	supply chain management
TEU	Twenty-foot equivalent unit
TIR	Transports Internationaux Routiers



## ABBREVIATIONS AND EXPLANATORY NOTES (continued)

TTFSE	Trade and Transport Facilitation in Southeast Europe Program
UN/CEFACT	United Nations Centre for Trade Facilitation and Electronic Business
UNCTAD	United Nations Conference on Trade and Development
UNECE	United Nations Economic Commission for Europe
UN/EDIFACT	United Nations Electronic Data Interchange for Administration, Commerce and Transport
VAN	value added network
WCO	World Customs Organization
WTO	World Trade Organization
XML	Extensible Markup Language

*Notes:* References to dollars (\$) are to United States dollars, unless otherwise stated.

Two dots (..) indicate that data are not available or are not separately reported.

## Executive summary

This study reviews current concepts and developments in supply chain management (SCM) and trade facilitation, and discusses their role and importance with regard to regional and global integration and economic development. SCM and trade facilitation are both concerned with the international movement of goods, means of transport operators. SCM aims at providing the necessary concepts and tools for companies to integrate their supply lines, manufacturing and distribution functions into an efficient and responsive organization. Trade facilitation looks at all links in the international supply chain and search for opportunities to reduce or eliminate trade barriers, introduce better business practices, and to identify and promote necessary reform of rules, regulations and government institutions. Trade facilitation thus complements SCM and vice versa. E-business and information and communications technologies (ICTs) have facilitated a number of new approaches to SCM, trade facilitation, port procedures and customs administration. Consequently, this publication reviews in detail, the application of ICTs to customs and discusses the potentials of electronic data interchange (EDI) in ports with a view to enhancing the seamless flow of transport.

A common theme throughout the report is the importance of an appropriate legal and regulatory framework, modern institutions, streamlined procedures and effective competition for overall trade efficiency. In particular, the report warns against the danger of applying ICT to automate cumbersome procedures, without first simplifying them.

### A. TRADE AND TRANSPORT FACILITATION

The four cornerstones of trade and transport facilitation are simplification, standardization, harmonization, and automation of practices and procedures. Many activities related to international trade and transport are based on the exchange of information. Moreover, the impetus for trade facilitation can be attributed to the fact that goods frequently move faster than the information required for their clearance and release at a port or a border.

A number of trade facilitation endeavours have therefore focused on simplifying and standardizing the content, presentation and flow of trade information, including the development of such information, under the auspices of the United Nations Electronic Data Interchange for Administration, Commerce and Transport (UN/EDIFACT), which is the international standard for EDI. These endeavours are continuing, for example, in the development of EDI standards specifically adapted to the Internet, namely, electronic business extensible mark-up language (ebXML). In addition, many international conventions govern or guide international trade and transport and harmonize practices around the world.

Standards have been applied to means of transport and infrastructure to ensure interchangeability and compatibility in the transport chain. The maritime container standard is one of many examples of successful standardization, without which, the large investments in infrastructure and equipment that have occurred during the past decades might not have taken place. Standardization is also applied to the data elements, codes and data structures that are used in international trade.

### B. SUPPLY CHAIN MANAGEMENT

Supply chain management (SCM) integrates the business processes of organizations that provide products, services and information that add value for customers, from original suppliers to end users. SCM integrates three major and closely related elements, namely, the above-mentioned business processes, which are activities that produce an output for the customer; management components, which structure and manage the business processes; and supply chain structures, which are the links between companies in the supply chain.

Within the framework of SCM, every transfer and border point can be considered a source of potential loss of control, which can lead to additional handling costs or expensive delays. Therefore, reducing friction costs through the efficient management of information, goods, equipment and modes of transport at border and transfer points along the supply chain is a key element of SCM.

ICT and e-business plays a pivotal role in modern SCM in that computers and information networks are used in international trade and transport activities to automate information exchange; maximize planning efficiency; streamline administrative functions; track vehicles and cargo in real time; process financial transactions and payments; and replace the transmission of paper documents.

The widespread application of SCM has initiated structural changes in the trade and transport sectors, and in this context: (a) supply chain operations have been streamlined across countries and regions through the rapid implementation of ICTs; (b) specialized logistic industries have evolved, which act as international middlemen and one-stop-shops between shippers and carriers, for example, freight forwarders, or between shippers and final recipients, for example, express carriers, offering door-to-door services for their customers; (c) logistic operations have been outsourced to third party logistics industries offering new value-added services such as warehousing, inventory and spare-part management, picking and packing, assembly, and after sale service, meaning that transport services are merely one component of a logistic service package and supply chains are increasingly becoming production chains; and (d) the unitization of cargo, in particular containerization, has facilitated the interoperability of various modes in the supply chain and enabled multimodal transport, which combines the different attributes and competitive advantages of air, sea, and land transport modes. The interoperability of these different transport modes into multimodal transport systems has become a necessity for international supply chains.

The elimination of regulatory and physical bottlenecks for seamless SCM, and the creation of proper and transparent conditions for organizations to invest in SCM technologies and practices, is the responsibility of Governments. Generally, regulatory issues are more important than physical bottlenecks.

#### C. ICT IN CUSTOMS ADMINISTRATIONS

ICT and modern e-business practices play a pivotal role in streamlining customs procedures and practices. Computerization, automation of business processes and EDI enable customs administrations to improve service delivery, enhance revenue collection, automate routine processes, ensure the integrity of customs compliance, and strengthen security and border protection. ICT is more specifically used by customs administrations to improve and partially automate the following: the data validation process, cargo inventory control, goods declaration processing, data reconciliation, revenue accounting, release notification, customs enforcement and data capture and processing for external trade and transport statistics.

However, the challenges for customs administrations are multiplying as trade flows and consignments continue to increase and the rules governing trade continue to grow in number and complexity. Modern customs administrations are responding to this situation by introducing new concepts including risk management, trusted traders and pre-arrival processing, which all depend on ICT tools for successful implementation. Risk management involves the concentration of enforcement efforts on consignments of high or unknown risk, while low risk consignments are allowed to cross borders with little procedural impediment. Risk management is selective: trade information is processed and analyzed automatically, based on criteria that includes country of origin, itinerary and the compliance history of the trader. The aim being to identify goods or traders that require inspection. Trusted traders are importers or exporters with good compliance histories who have been screened and certified with regard to the adequacy of in-house procedures and systems. In return, certified trusted traders benefit from faster customs clearance and lower transaction costs and in some cases may be authorized to self-report. Pre-arrival processing and release on minimum documentation (RMD) are other procedures that accelerate the release of goods. RMD is a two-step process, whereby the trader submits his customs declaration and settles his financial obligations after the release of the goods.

The United Nations has supported the reform and modernization of customs in developing countries for many years through the Automated SYstem for CUstoms DAta (ASYCUDA), which is a component of an overall customs reform programme. ASYCUDA has been installed in several ESCWA member countries, namely, Jordan, Lebanon, Palestine and Yemen.

The Government of Lebanon began to modernize its customs administration in the mid-1990s. ASYCUDA (or NAJM in Arabic) was introduced whilst tariff and administrative reforms were being implemented and the Customs Law was being modernized. As a result, the number of stages involved in customs clearance has been reduced from 13 to 5; green line customs clearance rose from 10 per cent in 1997 to 75 per cent in 2001; and the average number of days needed for clearance of goods dropped from six in 1997 to three and a half in 2003, while effective tariff rate remained stable.

The Port, Customs and Free Zone Corporation (PCFC) of Dubai has implemented another commercially available customs system, namely, e-Mirsal. This system has enabled the integration of three previously separate organizational units, namely, Dubai Port Authorities (DPA), Dubai Customs Authorities (DCA) and Dubai Free Zone (DFZ), which now utilize one common Internet communication portal to provide access to their services. As a result of computerization and automation, the Port of Dubai expects that it will be able to handle up to 10 million container units per year, compared to 4.2 million in 2002, with its current level of staffing. PCFC estimates that e-Mirsal produces total annual savings of approximately \$8.5 million for the Dubai transport industry.

Customs reforms in both Dubai and Lebanon have highlighted the fact that computerization and automation do make a difference in the ESCWA region, and that ICT renders customs administrations more efficient and effective, while serving as an excellent facilitator of trade and transport. However, much work remains to be done to reach the performance level of advanced trading nations where goods are frequently cleared within 45 minutes or less.

#### D. ICT IN PORTS

One of the most striking developments in international transport over the past couple of decades is the containerization of general cargo, in other words, the movement of goods in mostly standard 20- or 40-foot containers. Ports around the world, including those in the ESCWA region, are responding to this trend by investing heavily in container terminals. Moreover, to meet financing and performance demands, the private sector is becoming increasingly involved in the development and management of port terminals.

In the ESCWA region, the trend towards private sector participation is particularly evident in ports that specialize in trans-shipment traffic, namely, the Port of Salalah in Oman, which is operated by APM Terminals, the third largest terminal operator in the world, and the Port of Aden in Yemen, where the container terminal is operated by the PSA Corporation of Singapore. The Port of Dubai, which ranked thirteenth in container traffic in the world in 2001, has also set up a subsidiary, Dubai Ports International (DPI), to manage container terminals in other ports. DPI is currently involved in the operation of terminals in Jeddah, Saudi Arabia and Djibouti in the Horn of Africa. The Port of Dubai, which is a Government owned all-service port, illustrates that no single port model has a monopoly on operational success.

The majority of ports in the ESCWA region that handle domestic cargo are public service monopolies with a reputation for inefficiency and red tape. There is little competition among ESCWA ports for local cargo and thus little incentive for ports to excel. The removal of trade barriers among ESCWA member countries is expected to create larger, shared hinterlands for many ESCWA ports, thereby introducing a much needed element of competition.

There are few areas of port operation and management that cannot be assisted by ICT. The new emphasis on security, based on risk assessment and the timely evaluation of trade information, underlines the importance of EDI with regard to trade and transport. Nevertheless, despite the simplicity of this concept, EDI can be difficult to implement. In response to this difficulty, port authorities have often been instrumental in establishing port community systems for the purposes of implementing EDI. The port authority can act as a facilitator or as a provider of EDI services and each port community must determine its own approach in this regard. In general, however, the stronger the private sector and the more deregulated the telecommunication sector, the more likely it is that the port authority will be called upon to act as a facilitator rather than a provider of EDI services.

## E. CONCLUSION

Numerous instruments for trade and transport facilitation are now available. These instruments fall under the heading of either ICTs or the trade and transport environment and are reviewed in greater detail below:

### (a) *ICTs*

Issues that fall under this banner include information retrieval, storage, processing, automation and transmission based on modern ICT and e-business practices. Modern ICT and e-business practices are recommended according to their ability to eliminate inefficient formalities, transmission delays, transcription errors and red tape, and to automate routine and repetitive manual tasks undertaken in public administrations that deal with international trade, particularly customs and ports.

### (b) *Trade and transport environment*

Issues that fall under this banner include quality of service, ownership structure, management and performance of public and private organizations involved in international trade and transport; human and institutional resources; the availability of international transport and logistic services; physical infrastructures and facilities; and willingness to utilize ICT and e-business. Trade and transport environment issues are recommended for implementation in terms of their ability to reduce obstacles related to the management, interoperability and interconnectivity of international supply chains, the provision of appropriate transport services, infrastructures and facilities, and the legal and regulatory framework.

When ICT and appropriate trade and transport regulatory reforms are combined, procedural barriers to trade can be eliminated and the cross border movement of goods can be rendered fast and predictable. This is happening in many developed and some advanced developing countries, and with the appropriate political commitment it can also happen in ESCWA member countries, thereby generating benefits for traders, consumers, national economies and regional integration.

## Introduction

The successful application of ICT to supply chain management (SCM) is one of several key developments that has made the globalization of manufacturing and distribution possible, and which has spurred the growth of international trade in the past three decades.

It is generally acknowledged that international trade is an important motor of world economic growth. Since the second half of the twentieth century, particularly since the 1970s, international trade has grown much faster than world production and world gross domestic product (GDP), both in terms of value and volume.

However, not all regions in the world have participated equally in this development and ESCWA member countries, among others, risk becoming sidelined in the global economy. Total exports from the region, including oil exports as a percentage of total world exports, have hovered at approximately 3 per cent since the early 1990s and imports have declined over the 10-year period from 2.6 per cent in 1992 to 2.1 per cent in 2001.

These numbers, which are proportional to the size of the population of ESCWA member countries in terms of the world population, are not particularly alarming per se. However, the problem lies in the fact that major oil exporters, representing less than a third of the ESCWA population, are responsible for some 70 per cent of the imports of the region and 90 per cent of its exports.<sup>1</sup> Non-oil exporting ESCWA member countries are underperforming compared to the size of their populations, and major oil exporting countries are performing well, a fact that cannot be attributed to inherently strong economies, but rather to the wealth of their natural resources.

When regulatory reforms of the trade and transport system are combined with the application of ICT and e-business practices, procedural barriers to trade and transport can be eliminated and cross border movement of goods can be accelerated and rendered more predictable. Computerization and automation of procedures and transactions, combined with administrative reforms and simplification of rules and practices, have resulted in tangible improvements and gains in efficiency of key processes involved in international trade and transport. This has happened in many developed and some advanced developing countries, in addition to some countries in the ESCWA region. Given appropriate political commitment and adequate support, these improvements can cause a positive impact in all ESCWA member countries, thereby benefiting traders, consumers and national economies, and enhancing regional integration.

There are various reasons for Governments in the ESCWA region to want to establish well functioning trade and transport facilitation systems. Principally, exporters in ESCWA member countries who wish to compete in and be integrated with the global economy face a number of hurdles, including dysfunctional supply chains, bureaucratic red tape, unnecessarily complex and unpredictable procedures, and other non-tariff barriers to trade and transport. Moreover, inefficient trade and transport systems discourage foreign direct investments, increase the cost of imports to consumers and manufactures, and generally reduce economic activities and governments revenues.

Trade and transport facilitation is a practical discipline, will addresses all links in the international supply chain and searches for opportunities to reduce or eliminate trade barriers, introduce streamlined business practices, and identify and promote necessary reform of rules and regulations. Consequently, trade and transport facilitation applies both to the rules and procedures imposed by regulatory authorities for clearing goods, vehicles and operators crossing international borders, and to the business practices between private companies involved in the international supply chain. The way forward is to use modern ICT and

<sup>1</sup> The major ESCWA oil exporters are Iraq, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates. The population and GDP of ESCWA member countries amounts to 165 million and \$480 billion, respectively. World population and GDP are 6,054 million and \$31,171 billion respectively according to the World Bank, *World Development Report 2002: Building Institutions for Markets* (New York, Oxford University Press, 2002); and ESCWA, "ESCWA members". Available at: <http://www.cscwa.org.lb/>.



e-business practices to automate and computerize trade and transport transactions, and to simplify, harmonize and standardize rules and regulations, documentation and procedures that govern international trade and transport, in close consultation and cooperation with the concerned private and public stakeholders.

While ICTs are primarily tools, they are tools that have a profound and transforming influence on the manner in which Governments and businesses are managed, and on the way the relationships between and among Governments, businesses and the public are defined. E-business is a particular aspect of ICT, which refers to the use of telecommunications, particularly the Internet and the World Wide Web (the Web), for diverse information-based operations, including the transfer of money to private or public business.

Without the appropriate application of ICT, many of the modern SCM techniques and trade facilitation methods discussed in this study could not be possible. However, the importance of efficient institutions and processes, whether supported by ICT or not, cannot be overestimated. Indeed, when “customs automate an ineffective process, they simply get poor results faster”.<sup>2</sup>

This report explains how regulatory reforms combined with e-business and ICT applications can make international trade and transport transactions more efficient, transparent and predictable in general, and how they can contribute to the simplification and streamlining of trade and border crossing procedures among customs and port administrations in particular.

Chapter I introduces the concept of trade and transport facilitation and explains the principles and benefits of the simplifications, harmonization, standardization and automation of trade procedures. The importance of consultation and cooperation between all stakeholders in the trade system for effective reforms is emphasized, and the role of National Trade and Transport Facilitation Committees in this regard is discussed.

Chapter II reviews modern SCM concepts and describes how ICT and e-business applications integrate three major and closely related components of international trade and transport organizations, namely, business processes, which are the activities that produce products, services and information to the customer; management components, which structure and manage the business processes; and supply chain structures, which are the links and transactions between companies in the supply chain. Furthermore, this chapter reviews how SCM can contribute to trade and transport facilitation in the ESCWA region.

Chapter III explains how ICT can help customs administrations accomplish their mandates through the computerization and automation of key customs and clearance procedures and practices. This chapter evaluates the Automated System for Customs Data (ASYCUDA), which is a customs reform and modernization programme developed by the United Nations Conference on Trade and Development (UNCTAD), and analyses the experiences of customs reforms through administrative simplification and implementation of modern ICT among Customs authorities in Lebanon and in Dubai, the United Arab Emirates.

Chapter IV analyses ICT solutions for port and terminal management, and investigates how port communities implement Electronic Data Interchange (EDI) in order to address efficiency and security issues. Additionally this chapter reviews technological aspects of the continued growth in the use of containers in international transportation, the trend towards economies of scale, and the impact this has on ports in general and on ESCWA ports in particular. Moreover, the concern for security is addressed, particularly in the aftermath of the terrorist attacks on New York of 11 September 2000 and with regard to the impact on the international container traffic and to the technological and administrative ramifications.

Chapter V presents conclusions and recommendations related to improving trade and transport facilitation in the ESCWA region and the role of ICT in accomplishing that goal. Within that context,

modern ICT and e-business practices can eliminate inefficient formalities, cut transmission delays, transcription errors and red tape, and can automate routine and repetitive manual tasks undertaken in public administrations dealing with international trade, especially by customs and ports. Furthermore, there is a need to reform the trade and transport environment, in the following areas: (a) the management, ownership structure, interoperability and interconnectivity of international supply chains; (b) the provision of appropriate transport services, infrastructures and facilities; and (c) the legal regulatory framework for trade and transport.

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<sup>2</sup> World Customs Organization (WCO), Kyoto Convention, “Application of information and communication technology”, *General Annex Guidelines* (Brussels, WCO, 2002), p. 16.

## I. TRADE AND TRANSPORT FACILITATION

### A. INTRODUCTION

From the mid-1960s until the late 1980s, the Middle East and North Africa (MENA) countries implemented some of the most restrictive trade regimes in the developing world. These policies included an extensive and complex system of import controls, tariff rates and exchange controls. In addition, Governments established comprehensive systems to support domestic import-substituting industries, including investment, credit, price and trade support programmes.<sup>3</sup>

From the mid-1980s a few countries began to pursue extensive economic reforms, which included a general dismantling of quantitative import controls, cuts in tariff levels, streamlining of tariff systems and the elimination of currency controls. Despite these advances in trade liberalization, MENA economies tend to remain relatively closed with comparatively high tariff levels. Moreover, their trade institutions, including Customs, function far less effectively than those in more integrated economies in East Asia.<sup>4</sup>

ESCWA member countries are participating in, or are in the process of joining, a number of trade agreements to improve this situation. These agreements include the multilateral General Agreement on Tariffs and Trade (GATT) of the World Trade Organization (WTO), the regional Greater Arab Free Trade Area (GAFTA), bilateral Euro-Mediterranean Partnerships and bilateral free trade agreements with the United States.

With the exception of Iraq, Palestine and the Syrian Arab Republic, all ESCWA countries are either WTO members or observers.<sup>5</sup> Historically, GATT has focused primarily on the lowering of tariffs. However, it also includes many articles, which contain rules, guidelines and best practices for lowering non-tariff barriers and otherwise facilitating trade. Whilst several of the trade facilitation provisions are on the WTO agenda for possible inclusion in future negotiations, so far none of them have been treated as binding obligations under the WTO dispute settlement mechanism.

GAFTA was established in 1997 and will be fully implemented after a 10-year transition period, which started on 1 January 1998. As of July 2003, 15 of the 22 members of the League of Arab States were signatories to GAFTA.<sup>6</sup> One of the aims of GAFTA is the removal of tariffs on all goods exchanged between the signatories, with an annual reduction of 10 per cent on tariffs applied on 1 January 1998, to reach zero tariffs on 31 December 2007. Other elements include the definition of rules of origin and the requirement that Arab goods exchanged within the programme must not be subject to non-tariff barriers. Means of accomplishing this latter requirement have not been spelt out.<sup>7</sup>

The primary goals of GAFTA are to achieve Arab economic integration, create a positive environment for the investment of Arab and international capital in the Arab world and to ensure that this environment is similar to that of other regions as far as financial and banking services, infrastructure, legislation and

<sup>3</sup> World Bank and Mediterranean Development Forum, *Trade Policy Developments in the Middle East and North Africa*, B. Hoekman and H. Kheir-El-Din, eds., (Washington D.C., World Bank, 2000).

<sup>4</sup> Ibid.

<sup>5</sup> World Trade Organization (WTO) members include Bahrain, Egypt, Jordan, Kuwait, Oman, Qatar and the United Arab Emirates. Observers include Lebanon, Yemen and Saudi Arabia. Observer countries must start accession negotiations within five years of becoming observers.

<sup>6</sup> Greater Arab Free Trade Area (GAFTA) signatories include Algeria, Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, the Libyan Arab Jamahiriya, Morocco, Oman, Qatar, Saudi Arabia, the Syrian Arab Republic, Tunisia and the United Arab Emirates.

<sup>7</sup> "Arab commercial and economic co-operation: The Greater Arab Free Trade Area". Available at: <http://www.cams.fundea.es/research/AFTAra.pdf>.

investment opportunities are concerned. This is particularly important in that it is estimated that for every Arab-owned dollar invested in the Arab world, \$60 is sent abroad.<sup>8</sup>

In addition to the global WTO and the regional GAFTA trade agreements, some countries in the ESCWA region have also entered into bilateral trade agreements with the European Union (EU)<sup>9</sup> and the United States.<sup>10</sup>

These efforts to participate in global, regional and bilateral trade agreements demonstrate that on the whole, Governments in the region are aware of the potential benefits of a liberal trading system. The full benefits of these trade agreements, however, are not likely to materialize until the trade systems of ESCWA member countries have been streamlined, and rendered as efficient, transparent and predictable as trading systems in European, North American and certain East Asian countries.

For example, the "Euro-Med Partnership Jordan Country Strategy Paper 2002-2006 and National Indicative Programme 2002-2004", notes that:

"While the legislative and regulatory framework for trade liberalisation has been profoundly modernised, the improvement of Jordan's performance in external trade requires notably (1) institutional strengthening for effective enforcement, (2) timely clearance of imports and exports..."<sup>11</sup>

This observation, which refers to the ability of Customs administrations to enforce national legislation to protect public health and safety effectively, and to collect Government revenues efficiently, whilst ensuring fast and predictable clearance of internationally traded goods, is valid not only for Jordan, but for all ESCWA member countries.

The following section reviews the concept of trade and transport facilitation and the manner in which its implementation will benefit ESCWA member countries by reducing unnecessary and costly barriers to trade that arise from restrictive regulatory regimes and unnecessarily complicated procedures.

### B. THE TRADING PROCESS

International trade in physical goods is inextricably linked with international transport, and the delivery and distribution of traded products. Some of the many parties involved in international trade and transport include the following:

- (a) Importers and exporters, or traders, who buy and sell internationally;
- (b) Banks, which provide letters of credit that ensure that the exporter is paid when the importer receives the goods;
- (c) Insurance companies that indemnify for loss or damage to the goods;

<sup>8</sup> *Daily Star*, "Arab world still not fulfilling potential", (Beirut, 4 June 2002). Available at: [http://www.escwa.org.lb/information/reviews/2002/4june\\_2.html](http://www.escwa.org.lb/information/reviews/2002/4june_2.html).

<sup>9</sup> In the ESCWA region, European Union (EU) association agreements exist with Jordan, Lebanon and Palestine; and cooperation agreements are in place with Egypt, Jordan, Lebanon and the Syrian Arab Republic. See EU, "External relations". Available at: [http://europa.eu.int/comm/external\\_relations/euromed/med\\_ass\\_agreemnts.htm](http://europa.eu.int/comm/external_relations/euromed/med_ass_agreemnts.htm). The United States-Jordan free trade agreement entered into force in December 2001. See United States Trade Representative (USTR), "The US-Jordan free trade agreement", *Middle East and North Africa*. Available at: <http://www.ustr.gov/regions/eu-med/middleeast/US-JordanFTA.shtml>.

<sup>10</sup> A United States-Bahrain trade and investment framework agreement exists and a free trade agreement has been proposed. See USTR, "Trade initiatives and agreements". Available at: <http://www.ustr.gov/regions/cu-med/middleeast/regional.shtml>; a similar agreement was established with Egypt in 1999. See USTR, "US and Egypt agree on measures to strengthen bilateral economic cooperation". Available at: <http://www.ustr.gov/releases/2001/04/01-21.pdf>.

<sup>11</sup> EU, p. 13. Available at: [http://europa.eu.int/comm/external\\_relations/jordan/csp/index.htm](http://europa.eu.int/comm/external_relations/jordan/csp/index.htm).

- (d) Freight forwarders that organize and arrange transport and warehousing services;
- (e) Transporters, or carriers, that move the goods through the different legs of the journey;
- (f) Terminal operators and stevedoring companies that load and unload vessels and shift goods from one mode of transport to another;
- (g) Sea and airport authorities that provide and manage essential transportation infrastructure;
- (h) Inspection companies which verify that safety, quality, quantity and performance standards or contractual commitments are met;
- (i) Customs brokers that assist importers in clearing goods through customs;
- (j) Customs authorities that protect against the import or export of illegal goods and collect duties, taxes and statistics for Governments;
- (k) Other Government agencies, which are responsible for providing safe navigation or involved in the inspection of goods entering or exiting a country.

The multiple interactions among the many parties involved in international trade and transport are based on documentation. This documentation includes, but is not necessarily limited to, contracts of sale; contracts of carriage; letters of credit; insurance certificates; certificates of origin and other certificates for safety, quality, quantity and contractual specifications; import and export licenses; instructions on how to move or handle goods; receipts pertaining to the process of goods changing hands along the supply chain; and Customs declarations and certificates pertaining to clearance of goods for exit from, or entry into, a country. Documents such as bills of lading also provide proof of ownership.<sup>12</sup>

Documentation, or information, which forms the basis of international trade and transport transactions, is a convenient way to conduct business and was a great innovation centuries ago, when it replaced the need for the trader or his agent to accompany the goods at all times to prove ownership. The concept of documentary trade is likely to survive in the information age, in the form of virtual or electronic documents. The process of replacing physical documents with electronic ones has already been partially achieved by many international companies, carriers and customs authorities.

However, in many countries the trading process is far from smooth and efficient. Instead, traders and transporters are forced to deal with a bewildering and time-consuming array of red tape and arcane procedures that involve a multitude of documents, which must be filled out in many copies and which require approvals and signatures at various offices located in different areas, many of which are often closed when their services are required. Furthermore, this situation is aggravated by a lack of clear and predictable rules, and a frequent need to pay unofficial fees to get the work done.

Local manufacturers and consumers carry the cost of inefficient trading procedures. These costs can be substantial and can lower the living standards of ordinary people, discourage investment and make local products uncompetitive in foreign markets. In addition, unpredictable delays at border crossings make it difficult, if not impossible, to apply modern SCM techniques such as just-in-time (JIT) deliveries, thereby increasing inventory costs accordingly.

<sup>12</sup> An ocean carrier issues a bill of lading to a shipper when goods are loaded onto a vessel. The bill of lading constitutes a contract of carriage, a receipt and proof of ownership. This means that upon arrival, the carrier delivers the goods to whoever possesses the bill of lading, which is negotiable. That means that the owner can sell the goods while they are being transported. The transaction is confirmed by transferring the bill of lading to the new owner. Selling cargo while it is being transported is very common in bulk trades, particularly oil; however, this practice is not common with regard to container traffic owing to the speed of transport and the nature of the cargo. A transport document that is not negotiable is called a waybill.

Trade and transport facilitation is concerned with simplifying, harmonizing, standardizing and automating international trade and transport procedures to achieve efficient trading systems. In many countries, great advances have been made in improving trade procedures and in making Customs administrations both more efficient, and more responsive and client-oriented. However, much remains to be done, in particular with regard to making better use of ICTs. Moreover, such issues as security and terrorism represent new and difficult challenges for the world trading system.

Therefore, customs administrations in advanced trading nations such as Canada, the United States and many others, are continuously involved in ambitious modernization projects. Countries with less efficient trading systems have the possibility to leapfrog many years of developments by learning from the experiences of more advanced nations and implementing whatever reform measures are most appropriate to their specific situations. A great deal of information concerning the modernization programmes of various Customs administrations is available on the Internet.<sup>13</sup>

Globalization and the emergence of regional trade blocs have seen the issue of facilitation grow in importance and complexity. Despite increasingly liberal trade regimes in terms of lower tariffs and fewer quantitative restrictions, the need to control certain classes of goods is constantly growing, and therefore, so is the requirement for more sophisticated control apparatuses. Examples of restricted goods are drugs, alcohol, arms and munitions, child pornography, dangerous goods, hazardous waste, endangered species, and harmful plants and insects.

In addition, customs and other Government control agencies are required to ensure that imported goods meet national standards in terms of health and safety, product labelling and country of origin specifications. The popularity of regional trade blocs has made the latter in particular, a very complicated matter in that many goods are assembled from parts manufactured in a multitude of countries, which makes it difficult to define the country of origin.

The following sections provide a brief description of basic facilitation techniques.

### 1. Simplification

Simplification involves redesigning administrative processes so that duplicate procedures of little or uncertain value are eliminated while the remaining steps are streamlined and simplified. When more than one Government agency is involved in a process, interventions must be coordinated and information must be shared. Even better, one agency can be delegated to do the work of other agencies on their behalf. Whenever possible, collected data need to be reduced to what is absolutely essential for the desired objective and need to be obtained from standard commercial documents; moreover, data in electronic format need to be accepted.

*Example of simplification: Abolishing the legalization of trade documents*

The elimination of the need to legalize trade documents prior to export is an example of simplification. Legalization of trade documents is an antiquated procedure, which is no longer used by most trading nations. However, most, if not all, ESCWA member countries still require commercial invoices and certificates of origin, and often bills of lading, steamship certificates, insurance certificates and various other certificates, to be notarized, certified by an approved chamber of commerce and legalized by an embassy before shipment

<sup>13</sup> Canada Customs and Revenue Agency, "The Customs and trade administration blueprint". Available at: [http://www.ccradrc.gc.ca/customs/general/blue\\_print/blueprint-e.html](http://www.ccradrc.gc.ca/customs/general/blue_print/blueprint-e.html); and Government of the United States, Department of Homeland Security, "Customs and border protection". Available at: <http://www.customs.treas.gov/xp/cgov/toolbox/about/modernization>.

can take place.<sup>14</sup> This is an onerous, expensive and time-consuming procedure. For example, it costs \$160 and takes up to seven business days, excluding mailing time, for the legalization of commercial invoices and certificates of origin for Kuwait, according to the Arab American Chamber of Commerce.<sup>15</sup>

The purpose of the legalization procedure is to ensure that the information provided by the exporter is correct. However, the notary public, the chamber of commerce or the embassy/consulate are all poorly placed to verify the commercial information and therefore, must largely trust the trader. While a trader that intentionally provides untruthful information must be held legally responsible, this can be done without the legalization of documents.

## 2. Harmonization

Harmonization of trade procedures refers to the alignment of domestic laws and regulations with international conventions, recommendations and best practices.

*Example of harmonization: Implementation of the Kyoto Convention*

The International Convention on the Simplification and Harmonization of Customs Procedures, referred to as the Kyoto Convention, represents an effective way of harmonizing trade procedures in the international community.<sup>16</sup> The recently revised version of the Convention, Kyoto 2000 provides instruments that enable contracting parties to achieve a modern customs administration with a more flexible and more effective approach to control methods (see chapter III, section A).

Other international conventions, including the Convention on Facilitation of International Maritime Traffic; the Convention on International Civil Aviation; the Istanbul Convention on Temporary Admission; and the Customs Convention on the International Transport of Goods under cover of *Transports Internationaux Routiers* (TIR) Carnets, address facilitation issues related to specific means of transport or specific customs procedures.

## 3. Standardization

Standardization of trade procedures refers to the use of internationally accepted standard documents, data elements and codes. It also refers to the use of standard electronic business techniques based on the UN/EDIFACT standard and others.

*Example of standardization: Commercial documents, codes and data elements*

Clear and unambiguous communications in international trade are essential, and yet difficult to achieve owing to language barriers and different business practices and cultures around the world. The use of commercial documents designed according to the United Nations Layout Key for Trade Documents can minimize these problems.<sup>17</sup> This standard layout makes it easier for traders to locate and understand information on a commercial document, even when that information is in a foreign language based on the fact that each box on the form relates to a specific item of information.

<sup>14</sup> Arab American Chamber of Commerce. Available at: <http://www.arabchamber.org>; and Australia Arab Chamber of Commerce and Industry. Available at: <http://www.austarab.com.au>.

<sup>15</sup> Arab American Chamber of Commerce, "Legalization of documents to Kuwait". Available at: <http://www.arabchamber.org/kuwait/index.htm>.

<sup>16</sup> WCO developed and administers the Kyoto Convention, which came into force in 1974. WCO, "Text of the revised Kyoto Convention". Available at: [http://www.wcoomd.org/ie/En/Topics\\_Issues/FacilitationCustomsProcedures/kyoto/kyreport.html](http://www.wcoomd.org/ie/En/Topics_Issues/FacilitationCustomsProcedures/kyoto/kyreport.html).

<sup>17</sup> United Nations Economic Commission for Europe (UNECE), "Trade facilitation recommendations", *United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT)*. Available at: <http://www.unecc.org/cefact/>.

Similarly, the use of internationally accepted codes is a means of avoiding errors, ambiguities and misunderstandings. Some of the more familiar codes encountered in international trade are the ISO two-letter codes for countries and the three-letter codes for currencies, for example, LB for Lebanon and LBP for Lebanese pounds, and OM and OMR for Oman and the Omani rial, respectively. Other useful codes exist for measurements, package types, and container sizes and types, many of which are available on the United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) Web site.<sup>18</sup>

## 4. Automation

Automation refers to all uses of ICT, which support international trade and logistics. The application of EDI for the transmission of commercial data must be noted in particular. In the absence of EDI, the same data ends up being copied, entered and re-entered numerous times into the different computer systems of the many parties involved in the international supply chain. This is costly, time-consuming and a persistent source of errors.

The use of ICT is also an integral component of modern customs administrations. ICT is used for data processing and for improving customs risk management and clearance procedures.

ICT is also a powerful tool for achieving predictability and transparency, which are important characteristics of an effective trade and transport regime. Relevant information on laws and regulations, procedures, fees, working hours and staff directories need to be made readily available to users and timely updates of changes need to be posted. The Internet and the Web are a cost effective means of providing essential trade and transport related information to interested parties, both at the local and international level.

## 5. Infrastructure

Facilitation is primarily concerned with improving and simplifying trade and transport regulations and procedures. One of the benefits of successful facilitation is the improved utilization of infrastructure. For example, better use of existing port facilities can eliminate the need for new, costly expansion projects. However, sometimes real and serious infrastructure bottlenecks arise. The ability to identify situations where better utilization of infrastructure can be achieved through administrative reforms, and also where a lack of proper infrastructure is a primary handicap to trade and development, is an integral element of trade and transport facilitation.

### D. TRANSPORT FACILITATION AND E-BUSINESS

E-business plays a special role in trade facilitation owing to the central position of information in international trade and transportation. In particular, EDI is important in that it offers solutions to many bottlenecks in the flow of goods and information caused by errors and delays related to the required documentation for clearing consignments in ports and at border crossings.

The particularity of EDI is that data/information can be tagged and structured in such a way that it can be imported into the internal databases of trading partners without human intervention. The tagging of data elements allows computers to interpret the transmitted information and thus initiate appropriate administrative or other transactions automatically.

EDI is different from other forms of electronic communications in that computers can be made to interpret the information rather than just transmit, store and display it, as is the case with fax and e-mail. The international standard for EDI is UN/EDIFACT, which is developed and maintained under the auspices of

<sup>18</sup> UNECE, "Trade facilitation code lists", *UN/CEFACT*. Available at: [http://www.unece.org/cefact/trafix/bdy\\_code.htm](http://www.unece.org/cefact/trafix/bdy_code.htm).

the United Nations.<sup>19</sup> New EDI standards based on the same basic principle of tagging and structuring data as UN/EDIFACT, and yet better adapted to the Internet, are currently being developed (see box 1).<sup>20</sup>

#### Box 1. EDI standards: UN/EDIFACT and ebXML

The purpose of EDI standards is to establish universally agreed rules that enable computers to receive, interpret and act on information sent from other independent systems, without human intervention. This is accomplished by tagging the data elements with a code that carries semantic information such as the fact that "ESCWA" is an organization and "9611981301" is a telephone number.

An example of the manner in which data and time is encoded in UN/EDIFACT is reviewed below to illustrate the level of detail to which trading partners must agree on both the semantics and the format of each individual data element before it can be interchanged automatically from computer to computer.

The information in the following example pertains to the estimated time of arrival of a conveyance, and the value is "15 July, 2003 at 15:30". In UN/EDIFACT this is encoded as:

```
DTM+178:200307151530:203
```

In UN/EDIFACT, rather than tagging each data element separately, data elements are grouped in segments, which have tags. An individual data element is identified by the segment tag and by the position of the element within the segment. The tag for date and time information is "DTM". The signs "+" and ":" are reserved characters which are used as data element separators. "178" is a code that means "transport means of arrival date/time, estimated"; "200307151530" is the date and time value; "203" is a code that informs the computer that the string of numbers <200307151530> is to be interpreted as CCYYMMDDHHMM where CC is century, YY is the last two digits of the year, MM the month, DD the date, HH the hour and MM the minutes. Finally the apostrophe (') at the end of the string is another reserved character that indicates that the end of the segment has been reached.

A message is a collection of segments, which contain the information for a particular business function, including a purchase order. The message defines the segments that must be transmitted and in which order. The standard also defines whether or not segments and data elements within them are mandatory and if they can be repeated. The relationship between data elements, for example, whether a particular telephone number goes with a particular organization or person, or whether a certain goods description goes with a particular shipper, is known implicitly through the order in which segments are transmitted.

Electronic Business Extensible Markup Language (ebXML) is a new EDI standard that is being developed and which is better adapted to displaying information in a browser and transmitting it over the Internet. One of the rules of XML is that each data element has a tag that can be read by a human user. The above-mentioned UN/EDIFACT example would therefore resemble the following in XML:

```
<EstimatedTimeOfArrival>
  <year>2003</year>
  <month>July</month>
  <date>15</date>
  <time>15:30</time>
</EstimatedTimeOfArrival>
```

It is hoped that this new standard will make EDI more accessible to small and medium sized enterprises; however, the need to agree on the meaning and format of individual data elements among trading partners is still an issue. Furthermore, actual ebXML tags have not yet been agreed upon and standardized. Therefore, the example above is strictly hypothetical.

In terms of trade and transportation, EDI is used to transmit documents including purchase orders, booking instructions and transport documents, namely, bills of lading and manifests, container loading plans, Customs declarations and other common trade documents. EDI is also used for transferring funds and for

<sup>19</sup> Electronic data interchange (EDI) standards can be obtained from UN/CEFACT, or downloaded from UNECE, *United Nations Directories for Electronic Data Interchange for Administration, Commerce and Transport (UN/EDIFACT)*. Available at: <http://www.unece.org/trade/untid/welcome.htm>.

<sup>20</sup> UNECE, "ebXML specifications", *UN/CEFACT*. Available at: <http://www.unece.org/cefact/>.

transmitting information related to tracking and tracing cargo and containers. It is customary to buy off-the-shelf software to implement EDI, which maps and translates data from or to an internal database application and then into an EDI message. A number of companies provide EDI solutions.<sup>21</sup>

EDI has a number of benefits, including the ability to transmit information at high speed and at low cost, automatically integrate data into internal databases and applications thus saving time and expense, and preserve data accuracy and integrity.

EDI in trade and transport started to become popular in the mid-1990s. The standard was originally designed to work with special networks, the so-called value added networks (VANs), which provide services that are required for secure commercial operations, namely, authorization, authentication, confidentiality, integrity and non-repudiation of origin. As the Internet became ubiquitous and inexpensive, VANs became the network of choice, at least for small and medium-sized enterprises (SMEs). Service providers, including Bolero, are offering functionalities on the Internet that are similar to those of traditional VANs.<sup>22</sup>

Two ICT applications, namely, e-mail for communication and the Web for providing information on port facilities, procedures, tariffs, working hours and contacts are easier to implement than EDI, and very cost effective in terms of ensuring predictability and transparency.

#### E. BENEFITS OF TRADE AND TRANSPORT FACILITATION

Pursuant to several successful rounds of trade negotiations, tariff barriers have fallen steeply, and in 1999 were close to an average of 4 per cent in industrial countries. This has made the cost of inefficient procedures more prominent. Therefore, the removal of procedural inefficiencies is particularly important for SMEs, on the basis that the cost of compliance is proportionally higher for them than for larger companies.

In addition, whereas tariffs are often imposed for valid reasons that are dictated by national development strategies and the revenues collected go into the national treasury, inefficient procedures do not entail any national benefits whatsoever, in fact, quite the contrary. The only beneficiaries from inefficient trade regimes are those who legitimately make a living from helping users deal with red tape and corrupt officials.

According to a paper published in 2001, the United Nations Conference on Trade and Development (UNCTAD) estimated that the entire trade transaction, including both direct and indirect costs covering private and public procedures and formalities, represents some 7 to 10 per cent of the total value of world trade, and that trade facilitation measures can reduce that cost by one quarter.<sup>23</sup>

#### F. NATIONAL TRADE AND TRANSPORT FACILITATION COMMITTEES

The United Nations Centre for Trade Facilitation and Electronic Commerce (UN/CEFACT) recommends that "Governments establish and support national trade facilitation bodies with balanced private and public sector participation in order to:

- (a) Identify issues affecting the cost and efficiency of their country's international trade;
- (b) Develop measures to reduce the cost and improve the efficiency of international trade;
- (c) Assist in the implementation of those measures;

<sup>21</sup> Established EDI software and solution providers include Global eXchange Services, available at: <http://www.gxs.com/index.jsp>; and Sterling Commerce, available at: <http://www.sterlingcommerce.com/>.

<sup>22</sup> Bolero.net. Available at: <http://www.bolero.net/>.

<sup>23</sup> Organization for Economic Cooperation and Development (OECD), Trade Directorate Trade Committee. "Business benefits of trade facilitation". (TD/TC/WP(2001)21/FINAL).



(d) Provide a national focal point for the collection and dissemination of information on best practices in international trade facilitation;

(e) Participate in international efforts to improve trade facilitation and efficiency".<sup>24</sup>

The establishment of National Trade and Transport Facilitation Committees (NTTFCs) by the trade and transport community is a means of lobbying and educating Governments, publicizing the benefits of facilitation and the cost of inaction, and also of pushing for reforms of the trading system, even when the public sector shows little enthusiasm for such measures.

Organizations established within the framework of this recommendation are commonly referred to as "PRO" organizations or committees, which is in line with their mission to introduce simpler trade PROcedures.

#### 1. National trade and transport facilitation; the role and structure of PRO committees

From a Government perspective, a PRO committee is a means of gaining the trust and cooperation of the transport and trading community and ensuring that proposed reforms meet the need for speed, predictability, cost effectiveness and transparency. PRO committees also enable Governments to communicate with trading communities and to receive feedback on proposed regulations and procedures.

Without proper consultation with, and the participation of all stakeholders, reforms of the trading system are likely to focus on increasing the internal efficiency of the relevant Government agencies without consideration of the effect that those changes might have on transport and trade operators. Many modern customs procedures also rely heavily on trust between the public and private sector and such trust can only be built through serious consultation and dialogue.

From the perspective of the trading community, a PRO committee can serve as a vehicle to lobby and educate Government and public sector administrators with regard to current trade and transportation problems, and the cost of excessive red tape and cumbersome procedures in terms of money, time and lost opportunities. A PRO committee also enables the private sector to propose reforms to a Government and to participate as a partner in their implementation.

UN/CEFACT lists some 55 trade facilitation organizations.<sup>25</sup> These organizations have adopted a number of different approaches to structuring a Government-private sector partnership to achieve facilitation.

Several PRO organizations have been established in industrial countries since the late 1960s when the focus was on developing codes for country names, currencies and other common pieces of information; standardizing data elements and international business forms; and simplifying paper-based procedures. From the late 1980s many advanced trading nations shifted their focus from paper-based procedures to EDI, e-commerce and other ways of applying ICT to international trade and transportation. These new techniques were seen as an extension of more traditional trade facilitation methods, and as a result, much facilitation work came to be undertaken by EDI or e-commerce associations.

NTTFCs or PRO committees can be established by a Government or the private sector; they can be self financed, non-profit organizations; or they can be under the auspices of a Government department, a chamber of commerce or a council of shippers. The financing and staffing of such committees can be achieved in a number of ways, including through membership fees or selling services; contributions in kind from private sector members; and/or government financial support.

<sup>24</sup> UNECE, "UNECE recommendation No. 4: National trade facilitation bodies", *UN/CEFACT*. Available at: <http://www.unece.org/cefact/rec/rec04en.htm>.

<sup>25</sup> UNECE, "National trade facilitation contacts worldwide", *UN/CEFACT*. Available at: [http://www.unece.org/cefact/trafix/bdy\\_part.htm](http://www.unece.org/cefact/trafix/bdy_part.htm).

There is no single model for a national facilitation body. Indeed, individual countries must devise the model for public sector-private sector cooperation that best suits their particular circumstances. Ultimate success in this regard depends less on the organizational model than on government commitment and the enthusiasm and energy with which NTTFC members strive to achieve the goal of an efficient trading regime.

#### 2. Trade facilitation implementation: a regional initiative

The Trade and Transport Facilitation in Southeast Europe Programme (TTFSE) is a regional initiative that could be relevant and applicable to the ESCWA region.<sup>26</sup>

The aim of the project is to reduce non-tariff costs with regard to trade and transport and to reduce smuggling and corruption at border crossings.

The scope of TTFSE, both in terms of funds to be invested—some \$125 million—and the estimated time required for the reform process—which is up to 10 years—illustrates the complexity of trade efficiency reforms. However, the programme, which was initiated in 2001, has already seen a sharp improvement in performance at six pilot sites where procedural changes have resulted in a 31 to 88 per cent reduced waiting time for trucks at border crossings.<sup>27</sup> This demonstrates that important improvements in trade efficiency can be achieved by a well-defined and properly financed facilitation project (see box 2).

#### Box 2. Trade and Transport Facilitation in Southeast Europe Programme

TTFSE comprises the following components: reform of customs; development of trade facilitation; provision of support to integrated customs information systems; improvement of roads and border crossing facilities; and implementation of the programme and project. In each country, the project supports customs reform; strengthens mechanisms of interaction and cooperation between border control agencies and the trading community; strengthens dissemination of information and provides training to the private sector; and finances infrastructure improvements and equipment at selected border crossings.

The reform process is based on a test-bed approach, which means that new ways of operating are tried, tested, validated and, if necessary, adjusted in a limited number of pilot sites, prior to being introduced at all sites. This requires the active participation of the staff at operational and middle management levels, thereby encouraging local initiatives through ownership of the pilot site projects. At the pilot sites the project finances the implementation of an integrated set of new Customs procedures, information technology systems, human resource management techniques, supportive infrastructure and cooperation mechanisms for agencies at border crossings.

The programme is the result of a collaborative effort between national Governments in the region, the World Bank, the United States and the European Union. Participating countries include Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Moldova, Romania and the Federal Republic of Yugoslavia. The PRO committees in each of these countries, participate in and contribute to the project through working groups that analyze issues related to trade and transport facilitation, propose solutions and monitor their implementation. At the regional level, an association of national PRO committees, SECIPRO supports TTFSE.<sup>28</sup>

<sup>26</sup> European Commission/The World Bank, "Trade and Transport Facilitation in Southeast Europe Program (TTFSE)". Available at: <http://www.seerecon.org/RegionalInitiatives/TTFSE/>.

<sup>27</sup> European Commission/The World Bank, *TTFSE Progress Report 2002*. Available at: <http://www.seerecon.org/RegionalInitiatives/TTFSE/TTFSE-ProgressReport2002.pdf>, p. 5.

**Box 2 (continued)**

The total cost of the programme has been estimated at \$125 million. Of this, recipient Governments provide approximately 25 per cent, and the remainder is financed by loans, credits and grants from the World Bank and the Government of the United States. The design of TTFSE has taken into account lessons learned from previous projects that addressed border crossing problems and which concluded that to lessen transaction costs, border crossing investments must be supplemented by: (a) reliable traffic data; (b) accurate information concerning waiting times; (c) adequate remedial actions on both sides of a border crossing; (d) attention to multi-agency needs; (e) linkage to national transport policies; and (f) coordination and simplification of Customs procedures and removal of state controls on international trade.

Source: European Commission/The World Bank, "Trade and Transport Facilitation in Southeast Europe Program (TTFSE)". Available at: <http://www.secrecon.org/RegionalInitiatives/TTFSE/>.

a/ United Nations Economic Commission for Europe, "SECIPRO", available at: <http://www.unece.org/secipro/secipro.htm>; and Southeast European Cooperative Initiative (SECI), available at: <http://www.secinet.org/>.

**G. THE SITUATION IN THE ESCWA REGION**

Jordan and Lebanon have taken steps to modernize their customs administrations. In addition, Dubai in the United Arab Emirates has become a successful international hub for trade and commerce. However, on the whole, importers and exporters in the region face considerable barriers to international trade and transport.

A number of problems in this area are listed below:<sup>28</sup>

- (a) Lack of information regarding rules and regulations is common and users are not informed about amendments in a timely fashion;
- (b) Procedures often involve direct dealings between clients and the employees of Government agencies, which increases the likelihood of corrupt practices;
- (c) Lack of qualified and motivated manpower can result in mistakes and slow action;
- (d) Lack of information sharing and coordinated action among the relevant parties in the clearing process can lead to costly delays even when individual agencies have efficient internal procedures;
- (e) The clearing of goods through ports and customs involves, on average, 40 steps and requires 20 signatures, many of which have no clear logical purpose;
- (f) Many Government agencies make rules and regulations regarding international trade and transport, often without considering their effect on users;
- (g) Customs authorities on the two sides of a border crossing do not coordinate their operations;
- (h) Working hours at ports and customs authorities are often unsuitable for commercial operations;
- (i) Legal obligations and/or lack of risk management procedures result in a high percentage of consignments requiring physical inspections. Therefore most, if not all, containers must be unloaded and

<sup>28</sup> ESCWA, (E/ESCWA/TRANS/2000/4) (in Arabic).

their cargo inspected. Not only is this inefficient, costly and time-consuming, it results in damage, loss and pilfering, and leads to a crowded and poorly utilized infrastructure;

- (j) Few ESCWA countries have joined international conventions related to the facilitation of trade and transport, or do not abide by those that they have signed;

This situation hampers economic and social development, prevents ESCWA member countries from benefiting from regional integration and globalization, discourages exports and foreign investment and increases the cost of imports for manufacturers and consumers alike, without bringing any benefits to the country or Government in terms of industrial development, increased tax revenues or otherwise.

Several ESCWA member countries have expressed an interest in creating NTTFCs to establish a framework for consultation and cooperation between the public and private sector to promote a trade facilitation agenda. In support of this, ESCWA recently published a manual on the establishment of such committees.<sup>29</sup>

**H. INDICATORS PERTAINING TO TRADE AND TRANSPORT FACILITATION  
IN THE ESCWA REGION**

Many factors influence trade and transportation and ideally, a complete review must include an evaluation of total door-to-door freight barriers and costs, including transport costs and procedures, port costs and procedures, customs and general trade conditions.

However, few ports, customs administrations and other Government agencies publish indicators related to cargo clearance times, ship dwell times, total cost for cargo handling from ship to gate and cost recovery ratios of ports. A number of selected trade and transport indicators are reviewed in the following sections. These indicators illustrate some of the current barriers and opportunities that exist with regard to trade and transport facilitation regimes in the ESCWA region.

**1. Freight costs**

In 2000, the world total value of imports increased by 13 per cent, while total freight costs increased by an impressive 27 per cent, reflecting the high freight rates that prevailed during that year. Therefore, in 2000, the share of global freight payments measured against the total world import value increased to 6.2 per cent, up from 5.5 per cent in 1999.

The freight cost of imports in terms of developed market economy countries continued to be lower, at 5.2 per cent, than the corresponding figures for developing countries, which was 8.8 per cent in 2000. This situation reflects the lack of economies of scale, insufficient infrastructure facilities, inadequate management practices, particularly in relation to transit transport, and also the low productivity of ports and inland transport in developing countries.<sup>30</sup>

The freight cost index for ESCWA member countries, excluding Palestine, was 9.8 per cent in 2000, which was significantly higher than the average freight cost index for developing economies, which amounted to 8.8 per cent.<sup>31</sup> In fact, the freight cost index for ESCWA member countries was only exceeded by Oceania and Africa (see table 1).

<sup>29</sup> ESCWA, (E/ESCWA/TRANS/2002/3/Rev.1) (in Arabic).

<sup>30</sup> United Nations Conference on Trade and Development (UNCTAD), *Review of Maritime Transport, 2002* (UNCTAD/RMT/2002, including Corr.1).

<sup>31</sup> The freight cost index of a country is the total freight costs for imports as percentage of total imports.

TABLE 1. ESTIMATES OF TOTAL FREIGHT COSTS FOR IMPORTS IN WORLD TRADE,  
BY COUNTRY GROUPS  
(Billions of dollars)

		World Total	Developed economies	Developing economies	ESCWA <sup>a/</sup>	Africa	America	Asia	Oceania
1980	Total imports <sup>b/</sup>	1 856	1 426	431	-	78	123	211	2
	Freight costs <sup>c/</sup>	123	78	45	-	10	11	22	0.3
	Percentage <sup>d/</sup>	6.6	5.5	10.4	-	13.4	8.9	10.4	12.8
1990	Total import	3 314	2 662	653	-	82	118	428	4
	Freight costs	173	117	56	-	9	10	35	0.5
	Percentage	5.2	4.4	8.6	-	11.1	8.2	8.2	12.3
2000	Total import	6 187	4 486	1 700	133	111	403	1 156	5
	Freight costs	384	234	150	13	14	35	98	0.6
	Percentage	6.2	5.2	8.8	9.8	13.0	8.6	8.5	11.9

Source: United Nations Conference on Trade and Development (UNCTAD), *Review of Maritime Transport, 2002* (UNCTAD/RMT/2002, including Corr.1); and information provided by the Transport Section of UNCTAD in 2003.

a/ Excluding Palestine.

b/ Value of import: cost, insurance and freight.

c/ Estimation of total freight costs of imports.

d/ Freight costs as a percentage of import value: total import (1)/freight costs (2).

Freight costs vary considerably within the ESCWA region, from highs of nearly 13 per cent in the Syrian Arab Republic, 12.8 per cent in Jordan, 12.1 per cent in Egypt, Kuwait, Qatar and Yemen, and 10.6 per cent in Lebanon and Oman to lows of between 6.5 and 9.75 in Saudi Arabia, the United Arab Emirates and Bahrain. Even in the best performing ESCWA countries, freight costs are higher than the average world total of 6.2 per cent. Very few ESCWA countries have lower freight costs than the average for developing economies.<sup>32</sup>

The average freight costs for ESCWA member countries are significantly higher than the freight costs of Turkey, 4.7 per cent; Chile, 6 per cent; Mexico, 7.3 per cent; and Israel, 8.1 per cent. In certain ESCWA member countries freight costs are even higher than those of landlocked countries such as Paraguay, 11.3 per cent and Bolivia, 12.8 per cent.

The comparatively high freight costs for ESCWA member countries illustrate that the implementation of efficient trade and transport facilitation regimes can realize important potential gains. The large gap between the freight costs of the region, and those of developed countries, suggests that more efficient trading systems in ESCWA member countries could result in savings of 2-5 per cent of the total value of export and import equal to some \$6 billion to 16 billion per year in terms of freight costs.<sup>33</sup>

Furthermore, figures pertaining to direct freight costs tend to underestimate the true economic costs of transport sector inefficiency. In this regard, it is important to note the following factors:<sup>34</sup>

<sup>32</sup> D. Müller-Jentsch, "Transport policies for the Euro-Mediterranean free-trade area; An agenda for multimodal transport reform in the southern Mediterranean", Technical Paper No. 527, (Washington D. C., World Bank, 2002), p. 9; and information provided by UNCTAD in 2003.

<sup>33</sup> In 2000, total imports (cost, insurance and freight) for the ESCWA region, excluding Palestine, amounted to approximately \$124 billion and total exports (free on board) to \$186 billion; therefore, the total trade value of the region amounted to \$310 billion. Information on ESCWA member countries is available at: <http://www.escwa.org.lb>.

<sup>34</sup> D. Müller-Jentsch, op. cit.

(a) Expensive and unreliable transport reduces the overall level of trade, thereby creating a deadweight loss for the economy;

(b) Transport inefficiencies and logistic bottlenecks impose additional economic costs by reducing foreign direct investment in a country;

(c) Delays, uncertainties and friction in the supply chain impose higher costs on traders and consumers;

(d) Statistics pertaining to freight costs do not account for hidden subsidies.

## 2. Container penetration

A high rate of containerization is vital for the overall efficiency of the trade and transport system, in that it can increase opportunities for interconnectivity and interoperability of the supply chain system. The total world average containerization rate of general cargo is approximately 50 to 60 per cent, and can rise to up to 80 per cent for the busiest trade routes. In contrast, the containerization rate for many ESCWA countries is lower. In 1997, containerization the rate of general cargo in Egypt was 27 per cent for imports and 36 per cent for exports.

Another indicator for the penetration of containers is the handling of 20-foot equivalent units (TEU) per million dollars of GDP. Again, most ESCWA member countries have a low penetration rate in this regard. According to Drewry Shipping Consultants, the Syrian Arab Republic recently had a rate of 7.4 TEU per million dollars of GDP; Egypt, 19; and Lebanon, 26. In contrast, Israel had 30.5 TEU per million dollars of GDP.<sup>35</sup>

## 3. Commercialization of the operations of ports

Compared to other regions of the world, private participation in port investment and operations is limited in the ESCWA region. The majority of ports are still owned, managed and operated by Governments; and commercial and regulatory functions are not separated. The absence of competition means that ports lack incentives to increase efficiency, innovate and respond more effectively to the needs of users.

According to the World Bank more than 100 new port concession contracts were signed during the period 1990-1999, in most cases for container terminals. The majority of these projects were in Asia and Latin America; only four originated in the Middle East and North Africa (see table 2).

TABLE 2. PORT PROJECTS WITH PRIVATE PARTICIPATION IN DEVELOPING COUNTRIES BY REGION

	Eastern Europe and Central Asia	Middle East and North Africa	Africa	South Asia	East-Asia and Pacific	Latin America and Pacific
Projects	2	4	4	10	42	58

Source: D. Müller-Jentsch, "Transport policies for the Euro-Mediterranean free-trade area; An agenda for multimodal transport reform in the southern Mediterranean", Technical Paper No. 527, (Washington D.C., World Bank, 2002).

A concession is a legal arrangement by which a private company obtains the right to provide a particular service. Examples of private concessions in the ESCWA region include the container port in East Port Said, which is run by a consortium led by ECT-Netherlands and Maersk Sealand of Denmark. Additionally, APM Terminals has the concession for the Port of Salalah in Oman, while the PSA Corporation has the concession for the container terminal in the Port of Aden. So far, only the Dubai Ports Authority (DPA) concession for the Port of Beirut, which was awarded in 1999, does not seem to have

<sup>35</sup> Ibid., p. 110.

worked out. Owing to contractual problems, DPA pulled out of the contract, and the container port has since been idle.

It is interesting to note that the ports and terminals that have shown the biggest increase in container throughput volumes include Aden and Salalah, which recently awarded private concessions.

However, the achievements of the Port of Dubai, a Government-owned all service port illustrates that no single port model has a monopoly on operational success. In 2001, the Port of Dubai handled over 3.5 million TEU and ranked thirteenth in the world among container ports.

TABLE 3. CONTAINER PORTS IN THE ESCWA REGION, BY GROWTH

Country	Port	World rank	Container traffic (TEU)		Growth
			2001	2000	Percentage
Bahrain	Mina Salman	..	..	..	..
Egypt	Port Said <sup>a/</sup>	85	569 436	503 793	13.0
	Damietta	79	639 325	616 759	3.7
	Alexandria	97	500 229	505 049	-1
Jordan	Aqaba	..	..	..	..
Kuwait	Shuaiba	171	195 973	185 904	5.4
Lebanon	Beirut	(141)	(263 000)	(271 409)	(-3.1)
Oman	Salalah <sup>a/</sup>	52	1 187 753	1 032 692	15.0
	Sultan Qabous	198	137 740	128 857	6.9
Qatar	Doha	..	..	..	..
Saudi Arabia	Jeddah <sup>a/</sup>	53	1 180 427	1 043 617	13.1
	Damman	99	489 966	454 640	7.8
United Arab Emirates	Dubai (Jebel Ali and Rashed)	13	3 501 820	3 058 886	14.5
	Mina Khalid	(211)	(102 018)	(90 140)	(13.2)
	Sharjah	218	110 310	102 018	8.1
	Khorfakkan	58	1 089 866	1 014 122	7.5
	Mina Zayed	(125)	(340 000)	(360 774)	(-5.6)
	Fujairah	119	379 968	540 775	-29.7
Yemen	Aden <sup>a/</sup>	120	377 708	248 177	52.2
Total			11 065 539	10 157 612	8.9

Source: *Containerisation International Yearbook 2003*, (London, Informa UK, 2003). Information pertaining to Beirut, Mina Zayed and Mina Khalid is from *Containerisation International Yearbook 2002*, (London, Informa group, 2002).

Note: Two dots (..) indicate that data are not available or are not separately reported.

a/ Port with privately operated container terminal.

b/ Figures in brackets indicate the years 1999 and 2000.

## II. SUPPLY CHAIN MANAGEMENT

### A. INTRODUCTION

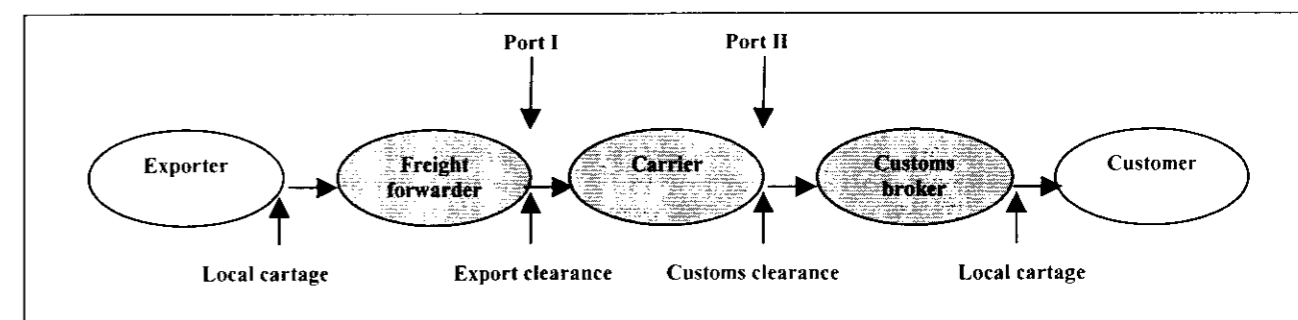
Transport and logistic operations have been revolutionized in past decades, driven by the introduction of containers in the 1960s and 1970s; the adoption of lean manufacturing and JIT production in the 1980s; SCM and the widespread introduction of ICT for advanced logistics in the 1990s; and most recently, the emergence of the Internet.

The objective of SCM is to integrate the supply and distribution functions of companies with their other business processes, whilst linking the internal processes of firms with those of their suppliers and consumers. Real-time information concerning market demand is provided along the supply-chain from retailers, to manufacturers, and then to first and second tier suppliers, where JIT production and supply are initiated. Ideally, all components of the supply chain must operate as one integrated system and processes must be demand-driven, whereby products are pulled through the supply chain instead of being supply-driven or pushed. By shifting the emphasis from moving products to managing flows, SCM permits a significant reduction in lead-times and eliminates the need for expensive buffer stocks. Companies such as Dell are employing SCM techniques to deliver a customized product to the customer within 48-72 hours of the order being placed (see box 5).

The transport sector has grown considerably during the past decades; much faster indeed than the underlying GDP. In the 1980s and 1990s, the growth of international trade was twice that of the increase in global production output. A significant amount of that trade growth has taken place between subsidiaries of multinational companies. It has been estimated that intra-company trade accounts for 35 to 40 per cent of total world trade. In addition, factors such as the increasingly sophisticated division of labour in the global economy; global sourcing; rising rates of foreign direct investment; and accelerated trade liberalization have resulted in trade and transport supply chains that are becoming increasingly spatially separated, within countries, between countries and between regions.

The international flow of goods, from raw material to the final consumer, involves a sequence of transactions (see figure I). Freight forwarders, carriers, and customs brokers link the exporter with the final customer, and these actors facilitate local transport, export clearance, customs clearance and other operational tasks.

Figure I. Transactions involved in international trade and transport operations



Customs and ports are the most important friction points in international trade and transport, and their employment of information, communication and automation technologies shape the international supply chain.

Every transfer point is a source of potential loss of control, additional handling costs, or expensive delays. If transport operators cannot deliver on time, manufacturers can be forced to pay contract fines or risk losing orders. Slow or unpredictable delivery induces customers to hold costly buffer stocks. Inflexibility and lengthy lead-times delay the response to new market opportunities and rapidly changing demand patterns. In addition, poorly performed transport services increase the proportion of cargo that is damaged or lost.

Therefore, the reduction of friction costs through the efficient management of documentation, duties, and inspections at customs, border and transfer points is a key element in SCM. Previously, this was a manual operation. More recently, shippers, carriers, customs and port authorities are automating the recording and processing of information to reduce costs and increase the speed of transactions. Computers and information networks are used to exchange information and thus replace paper documents, including purchasing orders, invoices and advanced shipping notices.

The following complementary solutions for electronic information and data exchange prevail in international SCM:

(a) *E-commerce and the Internet*

E-commerce and its main tool, the Internet, are essentially based on non-structured information, which renders them open and accessible to a great number of users, including individuals. This enables a large volume and scope of transport-related information to be exchanged electronically, resulting in the sending of e-mails and the creation of e-marketplaces, e-auctions, e-catalogue services, e-bookings, e-purchase orders and e-payments.

(b) *EDI*

EDI facilitates the exchange of data in a structured way, which has to be familiar to both sender and receiver through bilateral agreements and a process of standardization of the information system. Whilst EDI has been used for more than 20 years in the transport industry, it has proven to be too complicated and expensive for many small companies. Consequently, EDI has largely been employed for high volume transactions among large enterprises and institutions, using VANs to exchange information. EDI is currently in the process of being adopted to the Internet, particularly given the development of XML (extensible mark-up language) that paves the way for the transmission of structured and standardized information from computer to computer through the Internet.

The complexity of international supply chain operations has stimulated the emergence of intermediaries, namely, international freight forwarders, express companies, third-party logistics providers and export trading companies, which manage operations and are often contracted to other parties including brokers and carriers. Intermediaries now offer services beyond the framework of transport, namely, processing orders, warehousing, handling documentation, picking-and-packing, light assembly and managing relations with local customs and port officials. Indeed, logistic providers are being asked to enter new markets with companies to provide services that other parties in the supply chain cannot perform.

These transformations within firms and in supply chain networks have broad economic repercussions for countries in the ESCWA region. Industrial restructuring is transcending national boundaries and many of the stages of production have become footloose in terms of location. Any country, including ESCWA member countries, can enter global manufacturing chains without the basis of strong local markets for final products or a strong initial technological capability. At the same time, however, the location of such activities has become more volatile and the struggle to maintain position has become more competitive. Logistical and SCM excellence is, thus, the essential counterpart to production process efficiency.

The majority of ESCWA member countries are still poorly integrated in international supply chains, with the exception of a few external links and products, namely, oil and petrochemical exports. This deficiency is reflected by the limited volume of trade in manufactured and intermediate goods in the trade accounts of many ESCWA member countries. The economies of the ESCWA region, with few and limited exceptions, are underrepresented in manufacturing relative to economies with similar economic characteristics. In some countries, namely, Egypt, merchandise exports declined during the 1990s.<sup>36</sup>

<sup>36</sup> The World Bank, *World Development Indicators 2001*, (the World Bank, 2001).

Therefore, full integration in global logistics and supply chains, and improving the performance at key transaction points is of pivotal importance to ensure economic development in the ESCWA region.

B. FROM LOGISTICS TO SUPPLY CHAIN MANAGEMENT

The origins of activities pertaining to logistics are as old as trade and commerce itself. The contemporary notion of logistics has largely been developed from military logistic operations in the 1940s. The concept was then employed in civil and private business operations in the 1950s. Many professionals involved in warfare logistic operations during World War II became engaged in private transport companies, where they utilized their logistic skills.<sup>37</sup>

In the 1950s, logistics tended to be focused on narrow cost and profit concerns; inter- and intraorganizational issues became more dominant in the 1960s and 1970s; and in the 1980s and 1990s, developments in ICT began to dominate logistics. The history of logistic concepts and approaches is described in box 3.

**Box 3. Early history of logistics**

(a) *Pre-logistic era (pre-1950s)*

This era is largely synonymous with the early history of industrial traffic management. The prevailing conceptual approach to logistics system design aimed to minimize the overall transport costs of each mode, rather than simply minimizing the rates between origin and destination. Generally, the first traffic managers of the pre-logistic era worked in companies where there were large-volume movements of freight and where transportation cost was an important factor in the total cost of goods, namely, steel, coal, crude oil and other raw materials.

(b) *Logistic era (1950s, 1960s and 1970s)*

This era focused on designing optimal and comprehensive logistics systems, whilst the logistics discipline continued to add new activities to its portfolio. Management of inbound and outbound flows was now regarded as an essential component of comprehensive logistics system design; the scope of logistics became more international, mass production raised industrial output; computer technology enabled the handling of large volumes of data, the application of mathematical techniques for solving business problems became common, and the success of military logistics in managing transportation, inventory and warehousing systems spread to business and trade. The dominant new logistic system was the total channel approach. This involved a basic switch from reliance on private distribution systems to shared or third party facilities and services, thereby resulting in a more external perspective on inter-organizational or inter-firm tradeoffs for the total logistic channel. This approach is primarily based upon organizational reforms and modifications rather than technological change.

(c) *Neo-logistic era (1980s and 1990s)*

As a result of accelerated growth in trade and transport, the pace of technological change, globalization, intensified competition and inflationary impacts, this period is also known as second generation logistics, in that it is characterized by a desire to broaden systems beyond strictly logistical activities and tasks. The total enterprise approach, which characterizes this period, views the logistics function as a critical subsystem or component of the overall firm management system. It emphasizes the role of logistic considerations in the formulation of corporate strategy and strategic planning, as is the case with other key functional areas including marketing, production and finance. Two factors provided extra impetus for the total enterprise approach, namely, the widespread use of personal computers and the impact of modern ICT.

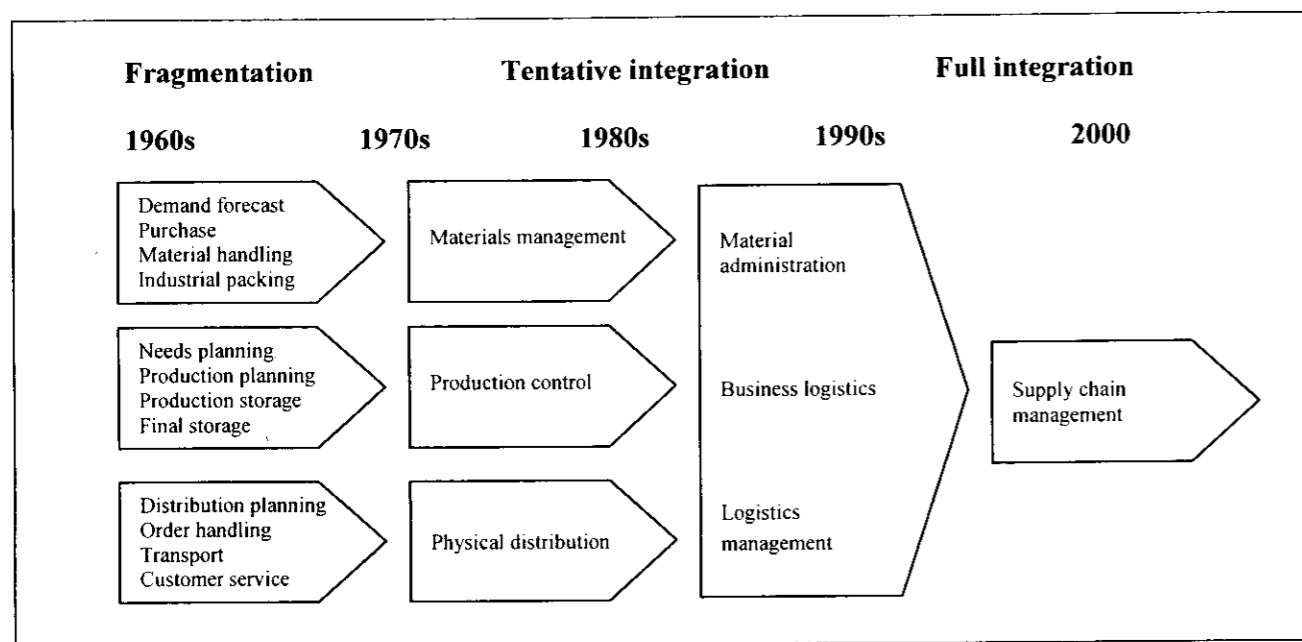
Source: Ricard Poist. "Evolution of conceptual approaches to designing business logistic systems", *Journal of Transportation*, (Fall 1986).

<sup>37</sup> At present, the flow of expertise is in the opposite direction. Dictated by advances in technologies and restricted budgets, military operations are often heavily dependent on 'commercials of the shelf' logistic solutions, which have demonstrated efficiency, competitiveness and productivity in private companies.



Logistics has been transformed over the decades. The fragmented focus on narrow cost and profit oriented aspects of transportation and logistics, which was prevalent in the early 1950s, gave way to a wider integration of organizational and management activities, namely, planning, purchase, forecasting and warehouse management in the 1960s. From the early 1970s, the integration of business processes and logistic operations began to be recognized as a means of propelling the competitive advantages of companies. During that period, logistics was integrated into three main activities/disciplines, namely, material management, production control and physical distribution (see figure II). In the 1980s, the term logistics management was widely used to reflect the increased internal/external focus on physical distribution and the integration of modern production control technologies.<sup>38</sup> At the same time, the concepts of material management and production control, assisted by computerization and communication technology, combined to become what was termed material administration. Aspects of production control and physical distribution were also integrated, and labelled business logistics. By the end of the twentieth century, the strategic importance of logistics, the accelerated adoption of computers and ICT, in addition to the intensified integration of markets, consumers and suppliers made SCM the umbrella term for all logistic activities and processes involved in the value chains of companies. Value chain refers to the principle that in a well managed company, each step in the chain from raw material to final delivery must add value.

**Figure II. Development of logistics and supply chain management concepts**



Sources: J.S. Arlbjorn, *Et overblik over international forskning i logistik og supply chain management*, (Aalborg, Denmark, Aalborg University, Centre for Logistics and Transport, 2002) (in Danish); and M.C. Cooper, D.M. Lambert and J.D. Pagh, "Supply chain management: more than a new name for logistics", *International Journal of Logistics Management*, Vol. 8, No. 1 (1997), pp. 1-14.

It has been noted that the concepts of logistics and SCM have become more and more broadly defined, primarily as a result of the integration of related business disciplines and corresponding activities.

<sup>38</sup> In 1986, the Council of Logistics Management Logistics described logistics management as: "The process of planning, implementing, and controlling the efficient, cost-effective flow and storage of raw materials, in-process inventory, finished goods, and related information flow from point-of-origin to point-of-consumption for the purpose of conforming to customer requirements". See M.C. Cooper, D.M. Lambert and J.D. Pagh, "Supply chain management: more than a new name for logistics", *International Journal of Logistics Management*, Vol. 8, No. 1 (1997), p. 1.

An overwhelming amount of literature has been produced on SCM. In fact, contributing to the theoretical and conceptual development of SCM seems to be a fast growing industry in itself. Moreover, contributing researchers, consultants and practitioners seem to have exerted little effort to integrate key historical contributions and approaches in this regard (see box 4). Instead, a constant wave of new and complementary concepts are promoted and marketed, including the following: value chain management; value stream management; demand chain management; supply chain partnership; and collaborative planning, forecasting and replenishment. All of these appear to be complementary and indeed, similar to existing SCM concepts in that they typically focus on selected industry characteristics, business processes, product categories or logistic levels, namely, internal enterprise logistics, dyads, chains or networks, without specifying explicitly whether or how they treat key logistic problems in a different manner than previous concepts. The ICT revolution has accelerated this trend by creating a whole new generation of electronic SCM concepts and approaches.

The four main perceptions of the relationship between SCM, logistics and other functional disciplines are reviewed below.

- (a) SCM is subordinated logistics: This can be called the traditional approach, which claims that the key elements of SCM are already expressed and included in logistics;
- (b) SCM is the same as logistics: This can be called the name changing approach, which states that SCM merely changes the names of key logistics terms, concepts and theories;
- (c) SCM incorporates logistics as a subset: This can be called the unionized approach, whereby SCM covers a wider domain and range of activities, and includes business disciplines, namely, logistics, procurement, marketing, production and organizational development;
- (d) SCM absorbs logistics: This can be called the intersection approach, which means that SCM becomes the synthesis of-and meeting point between-traditional business disciplines, on the basis that SCM absorbs elements that include logistics, marketing and procurement, and transforms them into a complete new operational and theoretical discipline.

There seem to be some agreement regarding the idea of integrating logistics and other business disciplines into the concept of SCM, which indicates that SCM must be considered as more than just a traditional approach to subordinated logistics; and cannot really be considered within the framework of the name changing approach.

There is a general consensus among relevant literature that SCM does the following:

- (a) Evolves through several stages of increasing intra- and inter-organizational integration and coordination; and in its broadest sense and implementation, it spans the entire chain from initial source, to the ultimate consumer;
- (b) Potentially involves many independent organizations. Therefore, managing intra- and inter-organizational relationships is extremely important;
- (c) Includes the bi-directional flow of products (materials and services) and information, and the associated managerial and operational activities;
- (d) Seeks to fulfil the goals of providing high customer value with an appropriate use of resources, and to build competitive supply chain advantages;

(e) Embraces all business processes cutting across organizations within the supply chain, from initial point of supply to the ultimate point of consumption.<sup>39</sup>

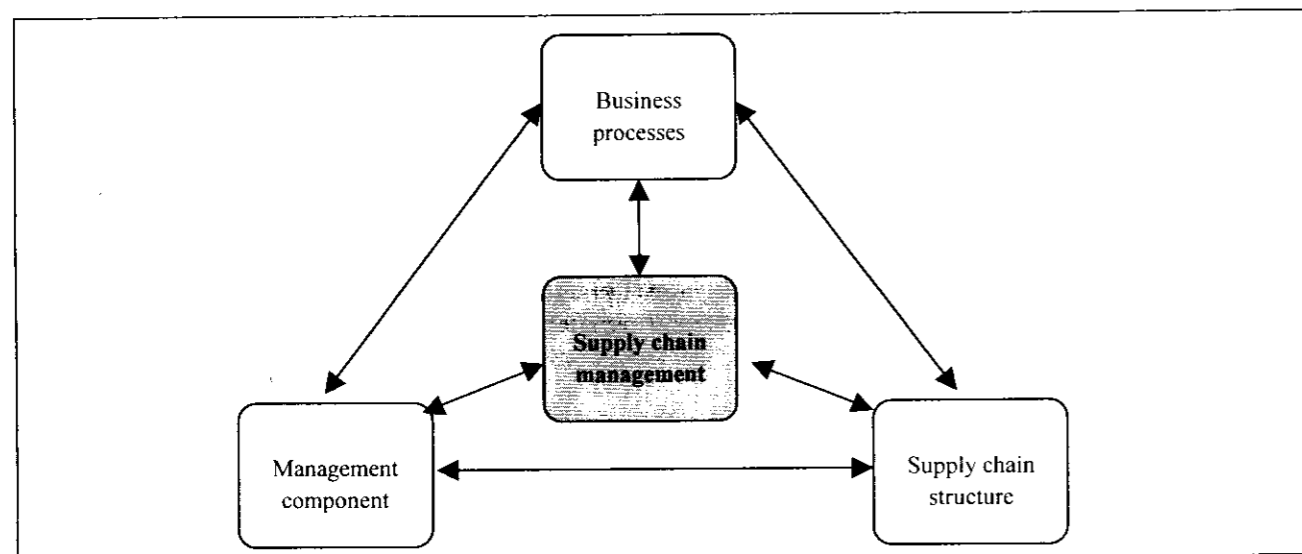
Modern SCM practitioners clearly identify a need to integrate business operations, including product development, marketing, customer service, manufacturing flow management and procurement. This integration moves SCM beyond traditional logistic concepts.<sup>40</sup>

Consequently, this study employs the following definition of SCM, which was equally issued by the International Center for Competitive Excellence in 1994: "Supply chain management is the integration of business processes from end user through original suppliers that provides products, services, and information that add value for customers".<sup>41</sup>

According to this definition, there is more to SCM than traditional logistics, in that it integrates three major and closely related elements. These are detailed below, and are illustrated in figure III.

- (a) Business processes, which are the activities that produce an output for the customer;
- (b) Management components, which structure and manage business processes;
- (c) Supply chain structures, which refers to the configuration of companies in the supply chain.

**Figure III. Elements in the framework of supply chain management**



Source: M.C. Cooper, D.M. Lambert and J.D. Pagh, "Supply chain management: more than a new name for logistics", *International Journal of Logistics Management*, Vol. 8, No. 1 (1997).

### 1. Business processes

Business processes have the following components, which have the ability to cross intra- and inter-organizational boundaries, independently of any formal structure:

(a) Customer relationship management: this involves the identification of customer markets and the subsequent development and production of products in cooperation with key customer preferences;

(b) Customer service: this provides the customer with a single, unified point of access using online information systems to provide current information concerning the order, and the production and distribution status;

(c) Demand management: this recognizes that the flow of materials and products is intertwined with customer demand and is concerned with forecasting and reducing variability;

(d) Order fulfilment: this provides timely and accurate delivery of customer orders with the objective of meeting the needs of customers in terms of prioritized delivery dates;

(e) Manufacturing management: this involves the physical production of the product or service ordered by the customer;

(f) Procurement process: this refers to the management of long-term relationships with strategic suppliers, which is becoming the norm, replacing the traditional bid and buy system;

(g) Product development and commercialization: this ensures that key customers and suppliers are integrated into the development process to reduce time to market.

### 2. Management components

An essential premise of the SCM framework is that there are certain management components that are common across all business processes and among members of the supply chain. It is the management of these common components that is important on the basis that they determine how the business processes, and therefore the manner in which the supply chain is managed and structured. These components are reviewed below:

(a) Planning and control structure: This is key to moving an organization or supply chain in a desired direction, and can be supported by various monitoring, forecasting, planning and control techniques and practices;

(b) Work structure: this indicates how the firm and its network of suppliers organize and perform their tasks and activities;

(c) Organizational structure: this incorporates the division of work in such organizational structures as hierarchy, matrix organization and cross-functional teams;

(d) Production flow facility structure: this refers to the network structure for sourcing, manufacturing and distribution across the supply chain;

(e) Information flow facility structure: this is often the first component that is integrated across part or all of the supply chain. It is important in that the kind and nature of information exchanged among network members and the frequency of information updating has a strong influence on the efficiency of the supply chain;

(f) Product structure: this involves coordinated new product development across the supply chain and the product portfolio;

(g) Management methods structure: this incorporates dominant organizational philosophy and management techniques;

(h) Power and leadership structure: this affects the form of the supply chain;

<sup>39</sup> M.C. Cooper, D.M. Lambert and J.D. Pagh, "Supply chain management: more than a new name for logistics", *International Journal of Logistics Management*, vol. 8, No. 1 (1997).

<sup>40</sup> P.B. Schary and T. Skjott-Larsen, *Managing the Global Supply Chain*, (Copenhagen, Copenhagen Business School Press, 2001).

<sup>41</sup> M.C. Cooper, D.M. Lambert and J.D. Pagh, *op. cit.*, p. 2.

(i) Risk and reward structure: this pertains to the anticipation of sharing risks and rewards across the chain, which affects long-term commitment of supply chain members;

(j) Culture and attitude structure: this incorporates issues that include the manner in which employees are valued and incorporated into the management of firms.

The above-mentioned components span the range of management decision-making within an organization, and can be applied to the management of a supply chain. Given that supply chain management often has to deal with multiple independent entities located in different national contexts, differences in the application of management components across the supply chain can often be exacerbated.

### 3. Supply chain structure

All organizations participate in supply chains. How these supply chains can be managed depends on several structural factors, including the following:

- (a) The complexity and value of the product;
- (b) The length of the supply chain;
- (c) The number of suppliers and customers involved;
- (d) The transport modes involved, namely, air, rail, road, sea and intermodal transport;
- (e) The number of available suppliers;
- (f) The availability of materials, including raw materials, bulk, spare parts and finished products.

Not all links throughout the supply chain need to be closely coordinated and integrated. The most appropriate mix is dependent on the above-mentioned structural channel factors, and must be weighted against organizational capabilities and commercial importance.

#### D. IMPACT OF SUPPLY CHAIN MANAGEMENT

Developing new trade and transport facilitation concepts and approaches is only meaningful in the event that subsequent impacts and advantages for companies, the trading community and Governments are real. Modalities and disciplines describing the impacts of efficient SCM on the wider trading and business community are reviewed below. Classical logistics problems and bottlenecks in the flow of products, materials and information, which can be addressed by SCM, are examined in box 4.

The identification of the positive impacts and benefits for the trading and business community that directly result from efficient SCM is based on interviews undertaken in 2002 and 2003 with key stakeholders involved in trade and transport facilitation in the region, namely, port managers, customs authorities, trade and transport companies and policy makers, and on academic contributions in this area. These impacts and benefits are reviewed in the subsections below.

#### 1. Streamlining value chain operations

SCM streamlines operations in the value chain. When a company competes in any industry, it performs a number of interconnected value-creating activities, including inbound and outbound logistics, production, sales and marketing, and product delivery, which together constitute the value chain. Such value-creating activities have points of connection with the activities of suppliers, channels and customers. The value chain serves as a framework for identifying the above-mentioned activities, highlighting supporting activities, and providing a means of understanding of how these activities affect both the costs of a company and the value delivered to buyers and customers who are connected in the same value chain. Supporting activities include firm infrastructure, management of human resources, technology development and procurement.<sup>42</sup>

<sup>42</sup> M.E. Porter, *Competitive Advantage: Creating and Sustaining Superior Performance*, (New York, The Free Press, 1985).

#### Box 4. Key logistic problems addressed by supply chain management

##### (a) Delays: the whiplash effect

Organizations involved in moving products and managing flows aim to stabilize supply and demand, with the objective of ensuring that product flows are as continuous as possible. However, even small fluctuations in, for example, retail demand can result in large fluctuations among suppliers. The reasons for these fluctuations are information bottlenecks, uncertainties and delays in the transmission of market signals to suppliers and trading partners. This effect is known as the Forrester effect, and has also been termed the whiplash effect, and the demand amplification effect, all of which relate to J.W. Forrester's original analysis of industrial market dynamics. Forrester found that each time demand signals were transferred from one member, or entity, of a supply chain to another, demand fluctuations and forecasting uncertainties increased dramatically. A typical result of the whiplash effect is the building of avoidable buffer storages, inaccurate product forecasts, uncertain production planning and additional production costs.

##### (b) Postponement: the decision point effect

Postponement refers to the dilemma of whether to produce for a warehouse or on demand. When producing for a warehouse (push), the producer optimizes his production capacity and speculates in future product demand. When producing on demand (pull) the producer must wait for incoming orders, whilst taking risks in terms of production capacity and efficiency. The postponement decision marks the line between push and pull production, and is perceived as a classic logistics problem, which has also been termed the order penetration point and the decision point. Generally, five different modes of postponement exist, namely, production, assembly, packing, labelling and logistic postponement. The main difference between these is where and when product customization takes place in the supply chain.

##### (c) Constraints: the constraint management effect

The synchronized flow of material and information is one of the important challenges and sources of bottlenecks for logistics and SCM. Various forms of constraints tend to break the stability of this flow. E.M. Goldratt's "theory of constraints", focuses on how constraints can interfere and become bottlenecks in the flow of materials and information. Constraint management is concerned with physical, capacity, material, market, mindset, measurement and method constraints.

An analysis of the impact of SCM on the trading and business communities can be based on the value chain approach. In particular, the application of the Internet and related ICTs in SCM has created groundbreaking value chain optimizations.<sup>43</sup>

The major impacts of ICT-assisted SCM on the value chain is its ability to link one activity with others and also to make real-time data created in one activity widely available, both within the company and to outside suppliers, channels and customers. The streamlining of value chain operations involving suppliers of spare parts, assembly, sales and final distribution at Dell, illustrates how the availability of real-time data communication within a company and among business partners and customers, can optimize the performance of the total value chain (see box 5).

The technological options related to managing the supply chain derive not only from the Internet, but also from complementary technological advances including scanning, object-oriented programming, relational databases and wireless communications. Some advances involve moving physical activities online, whilst other advances are concerned with making physical activities more cost effective.

The evolution of ICT in relation to SCM can be considered in terms of five overlapping stages. The earliest ICT systems automated discrete back-office transactions, namely, order entry and accounting. The next stage involved the fuller automation and functional enhancement of individual activities, including human resource management, sales force operations and product design. The third stage, which is being

<sup>43</sup> M.E. Porter, "Strategy and the Internet", *Harvard Business Review*, (March 2001).

accelerated by the Internet, involves cross-activity integration, namely, linking sales activities with order processing. The fourth stage, which has recently been initiated, enables the integration of the major value chain components, namely, the merger of SCM and customer relationship management, product development and product design. In the upcoming fifth stage, it is envisaged that ICT will be used to connect the various activities and players in the supply chain, and to optimize the working of production units, supply chains and customer interaction in real-time.

#### Box 5. Supply chain management at Dell

At Dell, SCM combines a build-to-order production/assembly system with an Internet-based ordering system. Customers can order a computer with customized specifications through the company web site or through its call centres, where orders are automatically passed on to suppliers. Order lead times are short, two to three days in some cases, and inventories can be as low as two hours on the factory floor.<sup>3</sup> Inventory hubs of suppliers are located close to Dell factories, and these are capable of feeding factories with replenishing inventories within two hours owing to a real-time order registration and online purchase ordering system.

The supply chain at Dell comprises the Dell Internet Model and Dell Direct. The Dell Internet Model enables customers to place orders via the Internet. This process is aided by the modularity of the computer, in that common industry standards allow complete components to be interchanged. The order process allows customers to configure and price their own orders (mass customization), and to track their orders through production to shipment and delivery.

Dell Direct processes inventory orders to suppliers whilst the customer submits his order. This reduces holding inventories, limits cash outflow and reduces the cost of excess and obsolete inventory. Processing speed and inventory turn-over dominates the supply chain. Inventory reduction begins in the design stage, by utilizing parts that are in common through the product line, and by reducing the number of stock-keeping units and combinations of components. This reduction process goes on to closely manage the transition between product generations to ensure that production is not saddled with obsolete inventory.

Sources: P.B. Schary and T. Skjøtt-Larsen, *Managing the Global Supply Chain*, (Copenhagen, Copenhagen Business School Press, 2001); and Dell. Available at: [www.dell.com](http://www.dell.com).

a/ Dell, "Dell's supply chain management". Available at: [http://www.dell.com/us/en/gen/casestudies/casestudy\\_dell\\_i2.htm](http://www.dell.com/us/en/gen/casestudies/casestudy_dell_i2.htm).

## 2. Development of a specialized logistics industry

The intensity of technology and the economies of scale involved in modern SCM have led to the emergence of a specialized logistics industry. A variety of players act as middlemen between shippers and the final recipients, or between shippers and the carriers. The most important of these are freight forwarders and express carriers, who both offer door-to-door services, and therefore act as one-stop-shops for their clients.

Freight forwarders package transport services from different carriers according to the needs of their customers. They collect freight from shippers; handle paperwork, Customs procedures and payments; they also arrange for goods to be delivered to customers. Given that freight forwarders maintain long-term relationships with carriers and consolidate shipments, they can optimize flows and negotiate better prices than individual customers. The freight forwarding industry handled 60 million shipments across the world in 1996 and generated combined annual revenues of \$42-48 billion.<sup>44</sup>

<sup>44</sup> OECD, "Chairman's summary", OECD Workshop on Regulatory Reform in International Air Cargo Transportation, Paris, 5-6 July 1999. Available at: <http://www.oecd.org/dataoecd/1/19/1820925.pdf>.

Express carriers, contrary to freight forwarders, usually own and operate their own transportation infrastructure. Whereas freight forwarders handle any kind of consignment, express carriers mainly handle letters and small packages. Global express carriers, such as DHL, UPS and Federal Express only came into existence a couple of decades ago, initiated by air cargo liberalization in the United States. Under earlier regulations, cost minimizing and speed maximizing networks were difficult to build and operate, owing to the many technical and route design constraints that affected carriers. Express carriers use technology intensive SCM approaches, in addition to proprietary infrastructure, in other words their own transport equipment, storage facilities and communication systems, which enables them to offer real-time tracking of goods, and time-definite and overnight delivery services. This results in closer coordination between different elements of the supply chain and more efficient management of information, which gives customers lower costs, higher speed and greater reliability. Express carriers have reduced the number of points at which delays can occur to 11; however, for traditional national forwarder-airlines delays can occur at 40 points. Moreover, the capital-intensive nature of the industry has led to market consolidation, with the four largest express carriers accounting for 90 per cent of the global market.<sup>45</sup>

The ESCWA region has its own success story in the form of the Jordan-based express carrier and freight forwarder ARAMEX International (see box 6).

#### Box 6. ARAMEX International

ARAMEX International was established some twenty years ago in Amman, Jordan, and was the first Arab company to be listed on the NASDAQ. Amman still hosts the headquarters of ARAMEX, in addition to the recently opened logistics facility in the free zone at Queen Alia International Airport. Other regional logistic hubs are located in Bahrain and Dubai.

Since 1982, ARAMEX has developed into an international express package delivery operator, forwarder and catalogue service provider. The freight forwarding arm of the company offers air, land and ocean freight forwarding, consolidation, warehousing, customs clearance, break-bulk services and full door-to-door service to and within the Middle East and the Indian sub-continent. Locally, ARAMEX has domestic distribution networks for express delivery of documents and small parcels, and can pick up and deliver shipments from city to city in 34 countries, where 132 ARAMEX offices are located. Customers that utilize domestic express delivery include local distributors, pharmaceutical companies, manufacturers, banks, TV home shopping networks and Internet shopping businesses. ARAMEX is now privately owned by the Dubai-based Rasmala Buyout Fund.

Source: ARAMEX. Available at: [www.aramex.com](http://www.aramex.com).

## 3. Outsourcing of logistics operations

Companies are increasingly outsourcing their entire logistics operations and SCM functions to single logistics providers or lead logistics providers, who bundle the services of subcontractors, from whom they receive comprehensive solutions for their logistics and SCM operations. As postponement and pull production concepts become more widespread, related stages of the value chain are also being outsourced. As a result, the third-party logistics industry is increasingly offering value-added logistics services. Transport services are merely one component in such comprehensive logistics packages and the supply chain is increasingly becoming a production chain.

Postponement, where products are customized at the end of the delivery chain for particular markets and customers, is another facet of supply chain re-engineering (see box 4 above). Increasingly, the final configuration of products, in-transit-assembly of components and breakdown of container loads into smaller consignments for JIT delivery is taking place in transportation hubs close to the market or in free zones. In the other direction, consolidation and inventory management centres are pooling supplies within a sourcing

<sup>45</sup> D. Müller-Jentsch, op. cit.

region before exporting them to the manufacturing base. The natural locations for the clustering of such functions are gateway ports, airports and free zones. These modal transfer points are no longer simply a place for cargo exchange; they are also a functional element in the dynamic supply chains through which commodities and goods flow. However, for such a transformation to occur, a favourable regulatory environment, adequate infrastructure and space are needed, for example dry ports, free zones and warehousing capabilities. The Dubai Port and its free zone, is an example of an international hub in the ESCWA region that offers a wide clustering and variety of value added services and logistic operations. One company that offers such services in the Dubai Free Zone is MMI Logistics, which has since become part of PWC Logistics (see box 7).

#### Box 7. Port of Dubai and PWC Logistics

The Dubai Port, including the Jebel Ali and Rashed terminals, is ranked amongst the leading container ports of the world and has witnessed a remarkable growth in container throughput and total tonnage handling in the past decade. The growth in container throughput nearly tripled in the period 1991-2001, from 1.2 million to 3.5 million TEUs, whilst total tonnage handling more than doubled in the same period from 20 million to 47 million.<sup>a/</sup> The Jebel Ali Port and Free Zone is geared towards large-scale industrial development, and has attracted major aluminium, gas, oil and cement projects. More than 1,600 companies have taken advantage of the offshore status of the port, and also of its operations and distribution facilities, by setting up logistics and value adding operations in the free zone, whilst many other organizations make use of the services provided to facilitate redistribution to other parts of the region.

PWC Logistics is located in the Dubai Port and Free Zone. It offers a full range of logistics and freight forwarding services including distribution, warehousing, accounting-services, information, pick and pack, and also a wide range of other value added services, which are carried out from the Jebel Ali Distribution Centre. Value added services of the company include the ability to postpone the final configuration of electronic consumer goods, which enables product supply to match specific market requirements in the Gulf region. PWC Logistics can reprogramme user displays in English or Arabic. It also provides promotional packaging, co-packing, shrink-wrapping, labelling and insertion of free items, which can all be carried out in high volumes and at short notice. A number of countries in the ESCWA region require inspection and testing to be carried out on specific items prior to import. PWC Logistics arranges for certification on behalf of its customers. A similar service is offered for Customs clearance and documentary requirements.<sup>b/</sup>

a/ Dubai Ports Authority, "Total throughput from 1991-2001", *Information Kit* (no date).

b/ *Dubai Port and Customs Handbook 2000*, (Dubai, Land & Marine CIS, 2000); and PWC Logistics. Available at: <http://www.pwc.com.kw/>.

#### 4. Containerization of cargo

A high rate of containerization is important for the overall efficiency of the trade and transport system, and containerized cargo can increase the interconnectivity and interoperability of the entire supply chain system. Modern SCM is therefore dependent on containerized cargo, terminals and facilities.

Containerization has become one of the dominant driving forces of international trade and transport. Recently, there were an estimated 15 million containers on the market, and in the period 1997-2001, an average of 1.5 million TEUs were produced annually.<sup>46</sup> The total capacity of the world container fleet tripled during the past decade, and international container port traffic increased from 79 million to 147 million TEUs between 1989 and 1996.<sup>47</sup>

Since the introduction of containers, delays, handling and damage costs, transfer times and precision in international SCM have drastically improved. Countries that want to benefit from advantages associated with

<sup>46</sup> *Containerisation International Yearbook 2002*, (London, Informa Group, 2002).

<sup>47</sup> UNCTAD, *Review of Maritime Transport, 2002* (UNCTAD/RMT/2002, including Corr.1).

containerized SCM must provide basic container infrastructures, including access for container vessels in ports, terminals, cranes, storage capacity and repair facilities.

A particular challenge for efficient transport in the region is the strong asymmetric flows of import and export. In many container ports and airports in the region, the relationship between export and import varies between 1:2 and 1:8, which is counterproductive to efficient trade and transport flows, see box 8.<sup>48</sup>

#### Box 8. Trade and freight transport patterns in the ESCWA region

Transport flows in the ESCWA region reflect underlying economic and trade patterns. Traffic flows inside the region are small due to negative trade balances, non-diversified and often low value-added export base, and modest intraregional trade. This is partly an indicator of similarities in non oil-related economic endowments and therefore provides little potential for trade and transport driven by competition and comparative advantages. However, it is equally a reflection of impediments imposed by Governments, including, inter alia, red tape and closure of land borders. Most cross border trade is sea or airborne, particularly in the Gulf countries. The land-based road and rail modes are mostly used for domestic transport and for the land connections of maritime and air transport. In terms of weight and value, the majority of imports and exports are shipped by sea.<sup>a/</sup> Since ESCWA member countries without oil exports have negative trade account balances, these countries have cross-border transport flows, which tend to be strongly biased towards imports, resulting in asymmetric transport flows. In oil exporting countries, exports are predominantly transported in oil tankers compared to imports that typically enter in container vessels or general cargo transporters, or as air freight. This asymmetric transport flow translates into widely different infrastructure, terminal, and operational requirements in these countries. The relation between export and import in many container ports and airports of the region vary between 1:2, 1:4 and 1:8, thereby impeding on efficient trade and transport flows. These are further compounded by the nature of traffic flows, which is often concentrated in a small number of key ports and airports, that effectively control external trade in each country without any significant competition, synergy, or viable supply chain alternatives to their operations. Timely modernization and maintenance is often limited due to lack of funds and limited access for private investment, ownership, and management of ports and related facilities.

a/ The World Bank, *World Development Indicators, 2001* (the World Bank, 2001).

#### 5. Multimodal transport systems

The integration of multimodal transport in regional and international supply chains is an important task for the ESCWA region. Neither the wider economy of the ESCWA region nor the more narrow trading community can enjoy the full benefits of trade and transport facilitation without an efficient multimodal transport system that integrates both the region and beyond. In this regard, the seamless integration and efficient coordination of individual modes into multimodal transport networks is both the result and means of achieving efficient SCM.

Compared to unimodal transport, multimodal transport has decisive advantages. These are located in the fact that multimodal transport permits greater route and mode flexibility, and increases customer choice without a direct need to increase the stock of physical infrastructure. Furthermore, multimodal transport unlocks network externalities between modes and it increases competition, thereby providing incentives for supply chain managers and investors to improve services, and to reduce costs and cut prices.

Given that different modes have clearly defined competitive advantages, an effective division of labour between modes can considerably increase efficiency. Air, sea and rail have advantages in terms of long-haul cargo. Sea and rail are better suited to transport bulk freight. Air transport is the preferred option for goods with a high value-to-weight/volume ratio, including, inter alia, electronics and textiles, and such

<sup>48</sup> In 2000, the main ports in Egypt registered 9.8 million tons of imports and 3.2 million tons of exports in the general cargo category. With regard to all cargo types, Egyptian ports registered 37.2 million tons and 8.6 million tons, respectively. In 2000, the Queen Alia International Airport in Jordan unloaded 17,400 tons of air freight, and loaded only 8,900 tons. See D. Müller Jentsch, op. cit.



perishable products as cut flowers and fruit, where speed is essential. Trucking has a door-to-door advantage and plays a vital role in the first and last leg of a journey. Rail freight can be more efficient for long-distance journeys. Logistics parameters including annual movement volume, shipment size, the transportation density, length of haul and the characteristics of the goods themselves determine the comparative advantage of one transport mode versus another. Maritime and air transport can only deliver goods and passengers between ports and airports. To provide the door-to-door service that most customers demand, effective integration with land-based modes is necessary.

As a result of the obvious interdependencies between its elements, a multimodal system is more than the sum of its parts. However, this fundamental strength is also its Achilles heel. As a consequence of the complex interoperability of multimodal transport, related coordination needs and interdependencies between its constituent parts, the system is very sensitive to any bottlenecks in the supply chain. Since a chain is only as strong as its weakest link, good policies, information exchange gateways and state-of-the-art SCM in all parts of the system are vital. Even small inefficiencies and frictions can have important negative multiplier effects in subsequent stages of the transport chain. For example, in certain ESCWA member countries, customs clearance in ports can take several days and sometimes up to three weeks. The unpredictability of customs clearance makes it difficult to optimize the subsequent hinterland transportation of goods, manage inventories and plan production activities.

Despite the fact that multimodal transport has been integrated into modern SCM, a number of reforms must be implemented to ensure efficient and swift transfer between transport modes at border points, ports, customs and among trading partners.

The EU, which for more than a decade has actively promoted the interoperability and interconnectivity of different transport modes and means, is a source of inspiration with regard to building and maintaining a multimodal transport system. A 1997 European Commission Communication on Intermodality defines the main principles of multimodal transport policies in the EU. It states that intermodality is an essential component of the Common Transport Policy of the EU. The Communication also provides a policy tool for a systems approach to transport with the aim of integrating different modes into one coherent transport system. The Communication further states that the main challenge lies with the market, in that it must organize seamless and customer-oriented door-to-door transport services. The role of the Commission and of the EU member States is to define the framework in which the market can operate. The rules and conditions must be such that they create a level playing field for all operators and foster innovation, whilst favouring competition between transport operators. Intermodality therefore, complements other EU transport policies, namely, liberalization of transport markets, development of a Trans-European Transport Networks and the promotion of a fair and efficient pricing system. Finally, operators must not find themselves unduly disadvantaged by competitors who receive state aid. Therefore, a key element of the Common Transport Policy is the scrutiny and regulation of any abuse of dominant positions by carriers and operators, which carries heavy fines under EU laws.

ESCWA is involved in creating a regional integrated multimodal transport system through the Integrated Transport System in the Arab Mashreq (ITSAM) project, and also by means of road, rail, sea and air agreements.<sup>49</sup> The agreements largely focus on standardizing the infrastructure in the region. However, greater efforts must be exerted in this domain to help remove the legal, regulatory and institutional bottlenecks related to transport, and also to improve the interoperability and interconnectivity of various transport modes. The manner in which Governments can contribute to developing a multimodal transport sector in the region, and the means of removing physical bottlenecks are highlighted in box 9.

<sup>49</sup> Economic and Social Commission for Western Asia (ESCWA), Agreement on International Roads in the Arab Mashreq (E/ESCWA/TRANS/2001/3; and Agreement on International Railways in the Arab Mashreq (E/ESCWA/TRANS/2002/1/Rev.2).

#### Box 9. Regulatory framework and multimodal infrastructure bottlenecks in the ESCWA region

Ideally the role of Governments must be confined to the provision of a transparent and stable regulatory framework, including commercial incentives for private investors. Market dynamics then determine what type of infrastructure is needed and whether the risk-return ratio of a particular project justifies the necessary investments. Private investors tend to be better at planning and operating infrastructure to minimize costs. According to a report concerning the Euro-Mediterranean Transport Partnership, policy and administrative reform measures must be given priority over physical infrastructure investment measures on the basis that "many transport bottlenecks have their principle cause in software rather than hardware".<sup>a/</sup> Software in this context refers to regulations and procedures, while hardware refers to infrastructure. In the early stages, policy reforms in the EU were given priority over infrastructure investments. Indeed, it was only once a common transport market had largely been completed that the European Commission and the European Investment Bank began to systematically address physical bottlenecks, particularly in land-based transport, through the Trans-European Transport Networks.

However, infrastructure investments are necessary to address capacity constraints, lack of intermodal facilities and missing link infrastructure. Many of the State-owned ports in the ESCWA region lack modern infrastructure and equipment that is capable of accommodating large container vessels, container handling and storage facilities. Policy makers have a range of policy instruments at their disposal to encourage private participation in infrastructure planning, building and operation. In certain ESCWA member countries, the public sector has a track record of under-investment and insufficient maintenance of transport infrastructure, and also of poor planning and execution of investment projects. In Lebanon, for example, a new container port terminal has been standing idle for some years since an operation concession with DPA broke down. In Egypt, the Port of Damietta stood idle for five years after its completion in 1985.<sup>b/</sup> New modes of involving private participation in planning, investing, operating infrastructure projects must be devised to modernize, maintain and operate the infrastructure and facilities that are currently in place.

<sup>a/</sup> D. Müller-Jentsch, Transport policies for the Euro-Mediterranean free-trade area: An agenda for multimodal transport reform in the southern Mediterranean", Technical Paper No. 527, (Washington D.C., World Bank, 2002), p. 21.

<sup>b/</sup> Ibid.

#### E. SUPPLY CHAIN MANAGEMENT IN TRADE AND TRANSPORT FACILITATION

SCM is a means of managing business processes and logistic operations in an efficient and effective manner. SCM has its roots in military logistic operations, and during the second half of the twentieth century it became a component of the commercial operations of private and public enterprises. However, there remains a need to further develop SCM, and indeed, a number of efforts must still be exerted to ensure that trade and transport is appropriately facilitated with the assistance of SCM techniques and methods in the ESCWA region (see section B above).

SCM is largely being promoted as a tool for private enterprise operations, and many concepts have clearly been tailored towards commercial needs. A number of management techniques, which integrate modern SCM into private business operations are highlighted in box 10 which also indicates how organizational, managerial and technological innovations have influenced and modified concepts over time, according to new trends and insights. SCM and related management concepts are not restricted to private organizations and enterprises; indeed, the fact that many other domains can benefit from SCM techniques is highlighted in the paragraphs below:

(a) Throughout the ESCWA region, certain State-owned airlines, airports and ports have failed to introduce SCM techniques and modern ICTs that are compatible with the systems employed by their clients. This not only reduces the efficiency of these systems, it also disrupts the system-wide flow of information, and thus the operations of other players in the industry. Furthermore, State-owned enterprises are not ready to introduce such ICT systems, since outdated institutional structures and bureaucratic working procedures are incompatible with modern ICT. Commercialization and privatization of State-owned entities, in tandem with the joint involvement of strategic partners from the private sector, can result in beneficial restructuring, training and investments in modern technologies;

(b) Governments can facilitate the efficient use of modern logistics procedures in the event that public administrations, and particularly customs authorities, adopt EDI or Web-based communication methods to interact with their customers. Given that Government agencies require the submission of large amounts of data on consignments and transactions, they must permit their clients to utilize electronic systems that are compatible with those used by the private sector. In maritime transport, the electronic exchange of information between shipping lines and their agents via EDI is already the norm. Ideally, detailed information on consignments is electronically channelled from the shipper to the final recipient, and copies are provided to the ship's agents and handling operators. The same information must be sent via electronic manifest to customs for clearance; at the same time, electronic declaration and payment of import duty must be feasible via the same system. Only customs authorities in a few countries in the ESCWA region, for example the United Arab Emirates, offer elements of such business convenience;

(c) With a few exceptions, ports and airports in the ESCWA region continue to be regulated by multiple agencies with overlapping responsibilities and bureaucratic governance structures. Commercial and regulatory functions are insufficiently separated, whilst regulatory regimes tend to be unclear. In the absence of competition and private participation, port and airport operators lack the incentives to increase efficiency, innovate and respond to the needs of users. Whilst SCM cannot replace privatization, liberalization or regulatory reform, it is a useful tool in that process. ICTs increase the transparency of procedures and operational processes and can streamline operations. Moreover, SCM can play a significant role in developing more competitive and market oriented transaction processes in such entities.

NTTFCs are one means of promoting SCM at the national level, in that they can lobby and educate Governments, promote the benefits of facilitation, highlight the cost of inaction, and therefore, advocate reforms of the trading system (see chapter I, section F).

Furthermore, at the regulatory level, cross cutting sector expertise and effective institutional structures can promote trade and transport facilitation. Transport and trade policies in many ESCWA countries tend to be ad hoc and decision-making remains fragmented. Multiple institutions with overlapping responsibilities are a common problem, while sector policy and planning capacities at the ministerial level are often weak, all of which hampers efficient trade and transport facilitation regimes.

Governments must establish the conditions related to regulatory frameworks, infrastructures and transport sector reforms, which will allow and stimulate market actors to apply a systems approach to trade and transport in the ESCWA region. The defining characteristics of a system are the interdependencies between its elements, which make the whole more than the sum of its parts. Compared to an individualized approach to various transport modes, ports, airports and routes, a system perspective of transport operations offers additional insights. It takes into account interdependencies, linkages and trade-offs between the individual components of the transport system. In this regard, a multimodal system approach and comprehensive trade and transport facilitation strategies will benefit ESCWA member countries.

**Box 10. Management and production concepts containing supply chain management elements**

(a) *Just-in-time*

This production concept was developed by Toyota and its main principle is to deliver and produce on order, and to pull products from previous stages through the value and supply chain. It also aims to eliminate stocks and storage, and to customize products by postponing the customization processes.

(b) *Total quality management*

This is a key concept in the quality revolution, which occurred in the United States in the 1980s. It is customer oriented and aims to achieve maximum customer satisfaction. Other elements of this concept include fact-based management through measurement and evaluation; quality focus; human resource development through sound management regimes and teamwork practices; and continuous quality enhancement through cycles of improvements and preventive measures.

**Box 10 (continued)**

(c) *World class manufacturing*

This idea is based on the Japanese production technique of JIT and total quality management (TQM). It is concerned with knowledge of the customer and the ability to remain flexible by reducing the lead time, maintaining limited stock, shortening production time, reducing supplier base and lowering the variety of spare parts. In addition, this concept encourages the use of simple, cheap and mobile equipment, and promotes automation when it is not possible to reduce variety in terms of processes.

(d) *Value chain*

This concept in particular, has strongly influenced logistics and SCM. It focuses on identifying the specific business processes that create value and competitive advantages, namely, primary and secondary activities. Primary activities are linked to the physical flow through the company, namely, inbound logistics, production operations, outbound logistics, marketing/sales and after-sale services; secondary activities are supportive and include firm infrastructure, human resource management, technology and procurement. The main objectives of this concept are to identify value creation and to eliminate non-value creating activities.<sup>81</sup>

(e) *Time based management*

This concept was developed in the late 1980s as a reaction to the strict quality focus on previous concepts. It emphasizes the whiplash effect (see box 4 above) on the basis that time delays in information transfer lead to inappropriate buffer storages and sub-optimization throughout the supply chain. This concept focuses on internal production delays, and also on delays in sales, product development and external distributions channels. Flexible production and quick response times increase innovation and create competitive advantages.

(f) *Alliance management*

Companies are now components of global networks, which is a scenario that entails certain consequences. Competitive advantages are created across companies and across national borders. Alliances are crucial with regard to developing common resources, knowledge and capabilities. The main principles of this concept include, ensuring rapid product development and the highest quality at the lowest cost, and maintaining a core-business focus on unique competencies. In addition, gaps are filled by alliances and through alliance management.

(g) *Partnership*

This is concerned with the further development of alliances, whilst opposing the traditional arm's length alliance relationship. This concept is concerned with business integration and extended joint ventures, in which information, risk and reward are shared; long-term commitments; integration of key processes and activities; commitment to cooperation; and the creation of win-win situations through agreements concerning costs, prices and profits for all relevant parties.

(h) *Agile manufacturing*

This concept was introduced in a research report on production strategies for the twenty-first century, carried out by the Iacocca Institute and published in 1991. Companies are compared to successful sports athletes, who must stay fit, flexible and lean to survive. The main principles of this idea include the following: product customization; rapid introduction of new or modified products; employment of advanced network technology between companies; easy product upgrading; focus on the knowledge economy and highly skilled staff; interactive customer relations; and the dynamic reconfiguration of production processes.

Box 10 (continued)

(i) *Next generation manufacturing*

This concept identifies certain global drivers, including, inter alia, technology, globalization, environmental care and customization that effect changes in companies, and incorporates success criteria and actions that need to be taken to achieve next generation winning capabilities. Next generation manufacturing (NGM) is based on a combination of quantitative research, analysis of successful production systems and the application of modern sports mentality and psychology. In addition to identifying global drivers, this concept highlights certain attributes, namely, responsiveness, flexibility and reconfiguration of production processes; and identifies certain accelerators, including product development, innovation, technology, and extended partnerships and alliances.

(j) *Lean production*

This concept was developed through the Massachusetts Institute of Technology International Motor Vehicle Program, in the period 1986-1990. Lean production (LP) identifies best practices, mainly in the automotive industry, including strategy, assembly, human resources, supply systems, product development and distribution/retail. The main principle of LP is to focus on using less of everything and to eliminate non-value creating costs through a strong focus on real value creating operations. Within this context, value creation must be identified from a customer perspective; the value creation process must be streamlined; demand pull must be the main production incentive; and non-value creating operations must be systematically eliminated.

(k) *Six sigma*

This concept was developed by Motorola in the late 1980s to improve product quality in a period dominated by falling market shares. Six sigma incorporates a statistical approach, which highlights the importance of data sets and measurements. In addition, this concept focuses on reducing errors to improve product quality. Six sigma involves the definition of "critical to quality" business processes from a customer perspective; statistical measurement of business processes; analysis of collected data; identification of reasons for defects and errors; identification of improvement opportunities and cycles; and control.<sup>b/</sup>

(l) *Efficient consumer response*

This is a supply oriented concept which was developed by management consulting firms in the early 1990s in response to the identification of high friction costs and long transaction times in the supply chain. Efficient consumer response has been further developed by Coopers and Lybrand Management Consultants, and comprises three main principles, namely, category management, product replenishment and enabling technologies.

(m) *Mass customization*

This approach opposes mass production by relying on different forms of postponement. Based on customer pull, customization relates to the following: design, production, distribution, sales and delivery. This concept also emphasizes that products must be modular, thereby ensuring a higher level of postponement and customization opportunities.

(n) *Business process re-engineering*

This is a management concept, which refocuses business processes towards the needs of customers. It involves the following: splitting and re-engineering the value creating business processes of companies, and tailoring them towards the changing needs of customers in terms of such benchmarks as time, quality, costs and service. Key re-engineering tools include ICT, new process oriented organizational structures and performance measurement and reward systems.

Box 10 (continued)

(o) *Change management*

Change management is an umbrella approach that deals with the management of various organizational, technical and commercial processes involved in change and re-engineering processes. Change management has increased in importance owing to the fact that 70 per cent of all supply chain and re-engineering efforts are said to fail.<sup>c/</sup> The main principles of this approach include: awareness, analysis, implementation and operation of changes; and differentiation between technical change, technical understanding and technical acceptance.

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Source: J.S. Arlbjørn, *Et overblik over international forskning i logistik og supply chain management*, (Aalborg, Denmark, Aalborg University, Centre for Logistics and Transport, 2002) (in Danish).

a/ M.E. Porter, *Competitive Advantage: Creating and Sustaining Superior Performance*, (New York, The Free Press, 1985).

b/ A. Nordang and T. Christiansen, "Six sigma", *Difl Orientering*, April 2003 (in Danish).

c/ Saad Al Barrak, "Adopting new business approach to face-up to the challenges in the Arab telecom industry", presentation at the Arab Telecom and Internet Forum, Beirut, 28-31 May 2003.

### III. ICT IN CUSTOMS

#### A. INTRODUCTION

Customs authorities fulfil a number of important and often difficult operational and regulatory tasks, which include the following:

- (a) Collection of revenue from duties on imported goods;
- (b) Enforcement of laws and regulations that apply to imports and exports;
- (c) Prevention of smuggling and control of restricted or forbidden materials;
- (d) Collection of international trade statistics.

Some border regulations originate from and are administered by Government departments or special agencies. This is usually the case with food safety and animal and plant health regulations, namely, sanitary and phyto-sanitary measures. Other regulations are administered by customs. For example, in addition to its own statutes, the United States Customs Service enforces more than 400 provisions of law for 40 other federal agencies.<sup>50</sup>

The approach of customs was, and to a large extent still is, transaction oriented. The essence of this approach is that each consignment is considered on an individual basis and receives the same treatment.

For Customs administrations, the challenge of international trade has grown considerably since the early days of computerization. The international trade volume of manufactured goods increased by 666 per cent, between 1970 and 2001.<sup>51</sup> The number of consignments has grown even faster. In fact, between one-third and a half of all international trade today is made up of intra-company transactions, in which materials, components and partly processed, or finished products, are moved across national frontiers within an integrated commercial management system. The growth of express package delivery services and the emergence of e-commerce have also contributed to a dramatic increase in the number of consignments handled by customs authorities.

The trading community expects predictable and transparent procedures and the fast release of goods. At the same time, Governments expect efficient collection of revenues, and the effective enforcement of regulations and control of restricted or forbidden materials. To meet these divergent requirements with the same or diminishing resources, many customs administrations have started reviewing and modernizing their procedures and processes and have introduced new ways of using ICT and e-commerce to support their operations.

A prominent aspect of this development is a shift away from transaction processing. Instead, modern customs administrations have introduced the concepts of risk management and the special treatment of trusted traders. An example of such special treatment is the fact that authorized traders are permitted to perform self assessment procedures and to report imports and exports periodically. This approach allows customs to focus its enforcement efforts on consignments of high or unknown risk. In other words, consignments are no longer treated individually and similarly. Rather, authorized and certified traders are given more favourable treatment depending on their risk profile and compliance history. A full range of modern customs procedures are defined in the Kyoto Convention (Kyoto 2000).<sup>52</sup>

<sup>50</sup> Government of the United States, Department of Homeland Security. "Customs and border protection". Available at [http://www.Customs.ustreas.gov/xp/cgov/enforcement/authority\\_enforce/](http://www.Customs.ustreas.gov/xp/cgov/enforcement/authority_enforce/).

<sup>51</sup> WTO, "Trade developments of least developed countries". Available at: [http://www.wto.org/english/res\\_e/statis\\_e/its2002\\_e/its02\\_bysubject\\_e.htm#trends](http://www.wto.org/english/res_e/statis_e/its2002_e/its02_bysubject_e.htm#trends).

<sup>52</sup> WCO, "Conventions: summary of position (as at 30 June 2002)". Available at: <http://www.wcoomd.org/ie/En/Conventions/conventions.html>.

Consultation with the trading community is of paramount importance when considering reforms of customs authorities to ensure that automated and computerized e-commerce systems offer maximum benefits to the national trading system as a whole, rather than just streamlining the internal operations of customs. This consultation can be formalized through consultative and advisory committees or NTTFCs (see chapter I, section F).

#### B. MODERN CUSTOMS PRACTICES

Modern customs administrations in all parts of the world are in the process of reformulating means of strengthening enforcement and security while simultaneously improving services for law abiding traders and travellers. Like other businesses that have successfully implemented ICT, many customs administrations have discovered that whereas computerization is a critical element in enhancing operations, it is not enough to merely automate outdated procedures and requirements. In this regard, rules and regulations must be applicable to modern ways of conducting business; institutions must be adapted to the new circumstances; and procedures must be simplified, harmonized and standardized. The guiding principles for modern customs procedures are illustrated in box 11.

##### Box 11. Guiding principles for modern customs administrations

- (a) Efficiency and simplification: streamlining requirements and operations to reduce the cost burden placed on the trading community;
- (b) Harmonization and consistency: implementing to the greatest extent possible, new or revised procedures and obligations based on existing international trade instruments and standards;
- (c) Transparency: achieving procedural clarity through mechanisms for information dissemination, publication of clearance requirements, procedures for advanced rulings, appeals and redress mechanisms;
- (d) Protection and compliance: introducing measures that provide an appropriate balance between facilitation and enforcement and also strike a balance with public safety;
- (e) Integrity: ensuring effective management of operations and personnel, including recruitment, appropriate training and internal staff controls;
- (f) Cooperation: providing technical assistance and exchange of information on best practices including cooperation among the customs administration and other border authorities;
- (g) Consultation: consulting and engaging all players involved in the international movement of goods, namely, customs brokers and carriers, including express carriers, insurance providers, freight forwarders, shippers and warehouse operators.

Source: World Trade Organization, Council for Trade in Goods, "Trade facilitation: Canada's national experience", 31 October 2000, (G/C/W/238).

Kyoto 2000, which is the basis for a modern customs vision, established minimum standards for predictability, transparency, legal process, use of ICT and modern techniques, including, risk management, pre-arrival information and post-clearance audits.

Risk management is fundamental to the effective targeting of high-risk consignments for examination and is based on selectivity, which is the process of determining whether a particular consignment or person needs to be examined in more detail. Selectivity criteria and profiles typically include the origin of a particular consignment, its itinerary and whether the importer is unknown or trusted. Such profiles are usually based on a combination of international, national, and local criteria complemented with a random selection system.

Some of the specific customs programmes that have been put in place, or are being developed in accordance with these principles are discussed in the sections below.

### 1. Partnership with trade and streamlined processes for low risk

Traditionally, customs administrations have dealt with consignments on a transaction basis. In this context, every shipment must be reviewed and released individually and all shipments must be treated in the same fashion. Furthermore, in a traditional context, shipments tended to be released in a single step process whereby the release is accorded only when all declarations and supporting documents have been submitted and accepted, and all financial obligations have been settled.

A number of modern customs procedures enable transactional processing to be rendered more efficient. These procedures include two-step processing and pre-arrival processing. In two-step processing, commonly referred to as Release on Minimum Documentation (RMD), the consignment is released before the accounting documentation and financial settlement have been completed. With pre-arrival processing, the importer or his agent is allowed, or is required, to submit the documentation related to a consignment before the arrival of the goods to ensure that a release decision is ready when the transport arrives at the border. The two-step process usually requires the importer or his agent to have posted a financial security or bond to safeguard customs against financial loss. The two procedures are complementary and are often implemented in tandem.

However, many customs administrations believe that they can achieve more efficient and more effective enforcement by moving away from the transactional approach. One example in this regard, is the Customs Self Assessment (CSA) programme, which was launched in December 2001 by Canada Customs and Revenue Agency, see box 12.

#### Box 12. Customs Self Assessment

Within the framework of the CSA programme, approved traders are authorized to self assess duty and tax payments and to report these periodically rather than on a transaction basis. The same approach applies to trade statistics. This streamlined accounting and payment process gives importers the ability to use their own business system and processes for trade data and revenue reporting. Furthermore, the CSA clearance process permits the clearance of eligible goods based on the identification and validation of the approved importer, carrier and registered driver at the border.

To take advantage of the benefits of the CSA programme, applicants must undertake a comprehensive pre-approval process, which includes risk assessment to ascertain whether they have a history of compliance, and that their business processes, and their books and records have the necessary linkages, controls and audit trails to support CSA requirements. Shipments cleared through the CSA process, like all other shipments, are still subject to random examinations. Moreover, CSA approved carriers and importers continue to be subject to post-audit verifications.

The CSA programme allows Canada Customs and Revenue Agency to focus on trade and travellers of higher or unknown risks while approved importers enjoy the benefits of lower transaction costs, faster border clearance and increased predictability owing to the fact that border delays are reduced or eliminated.

Source: Canada Customs and Revenue Agency, "Customs Self Assessment Program". Available at: <http://www.ccr-adrc.gc.ca/newsroom/factsheets/2003/jan/csa-e.html>.

Similar partnership arrangements with traders have been developed by other customs administrations. For example, for several years, Swedish Customs has used the accreditation of traders as a working method to promote and facilitate international commerce for importers and exporters, who through the application of sophisticated risk management techniques, have been found to be compliant. This has enabled Swedish Customs to decrease compliance costs for the business community in Sweden by up to 76 per cent for medium-sized companies and by 50 per cent for multinational companies.<sup>53</sup>

<sup>53</sup> Swedish Customs, *White Paper on Accreditation of Operators and the Supply Chain Security (StairSec)*, (Swedish Customs, June 2003). The Swedish Customs web site is available at: [http://www.tullverket.se/TargetGroups/General\\_English/frameset.htm](http://www.tullverket.se/TargetGroups/General_English/frameset.htm).

In a similar fashion, the United States Customs has established the Customs-Trade Partnership Against Terrorism (C-TPAT), which involves a number of accreditation schemes and aims to "develop and sustain a secure supply chain while maintaining a high level of trade compliance that provides reliable cargo release targeting data. C-TPAT is designed to enable customs to ensure safe and secure borders against terrorism while providing an import process marked by the efficient release of cargo and the prompt resolution of issues affecting C-TPAT participants".<sup>54</sup>

### 2. Border agency coordination: single window interface

In addition to customs, other Government agencies are often directly involved in controlling goods at border points. Prior to taking possession of a consignment therefore, a trader must ensure that the goods have been released by such agencies as well as by customs. These Government agencies often require information to be presented on proprietary forms. Moreover, they can carry out inspections at different times, maintain their own working hours and have offices in different localities to those housing the facilities of customs. This situation increases costs for traders, and exacerbates the unpredictability factor with regard to the time a consignment remains in custody prior to clearance.

To improve this situation, the WCO and other customs bodies, are promoting the so-called single window concept. The ultimate single window solution is that customs administrations are empowered to administer the regulations of other agencies. However, when this is not practical, as is the case when specialized expertise is required, a virtual single window can be achieved, whereby, from the perspective of the trader, all separate controls are converged into a single entity to meet all Government requirements. In this case, the required information or data elements only need to be submitted once by the trader or his agent to a single agency, usually customs, which then ensures that the information is forwarded to the other concerned parties. In the event that physical inspection is required by different agencies, such inspections are coordinated to take place simultaneously as a single inspection.

There are several intermediate steps that can be taken towards the single window solution. One such step is to locate the offices of the separate controlling agencies in the same building and ensure that they work the same hours as the traders and their agents. However, even advanced trading nations may have some way to go before the single window concept can be fully implemented, see box 13.

#### Box 13. Single window implementation

The single window approach is in evidence in Canada, where the Canada Customs and Revenue Agency has established an electronic interface with the Canadian Food Inspection Agency. This initiative, which in 2003 represented approximately 4 to 6 per cent of shipments of low-risk food, plant and animal commodities, removes the burden of requiring traders to provide import information to more than one authority. The electronic interface operates on the basis of receiving as much information as possible in advance of a shipment to ensure that examinations are carried out expeditiously on arrival.

The Canada Customs and Revenue Agency is endeavouring to extend this single window concept to medium and higher risk cargo and also to other agencies with regard to issues that include packaging and labelling of goods. It is expected that full realization of these enhancements are three to five years away.

Source: World Trade Organization, Council for Trade in Goods, "Trade facilitation: Canada's national experience", 31 October 2000, (G/C/W/238).

<sup>54</sup> Government of the United States, Department of Homeland Security, "Customs statistics and accomplishments". Available at: <http://www.Customs.usrcas.gov/xp/cgov/toolbox/about/accomplish/accomplishments.xml>.



### 3. Cross border cooperation

Strengthened cross border cooperation is an effective means of improving efficiencies in customs, for the benefit of the trading and traveller communities, and also for those customs administrations involved. This cooperation can incorporate sharing facilities and conducting joint inspections, or alternatively, concluding agreements whereby the import formalities of one administration are accepted as the export formalities of the other administration.

Cross border cooperation can also include collaborating in finding more efficient ways to combat contraband and jointly developing or procuring contraband detection equipment. In particular, many customs administrations are interested in acquiring equipment that permits faster, non-intrusive contraband examinations. The cost of such equipment can be very high and sharing it renders it more affordable.

In addition, countries can agree on the collection of trade and transport statistics, whereby the export statistics of one country are based on the import statistics of the other country. This often increases the accuracy of the data since import statistics, with its relevance for the collection of duties and taxes, are usually collected with greater care than export statistics. It also reduces exporters reporting requirements. An example of cross-border cooperation is highlighted in box 14.

#### Box 14. Canada-United States border cooperation

Canada and the United States share the longest border in the world. Each year, hundreds of billions of dollars worth of goods cross this border and more than 200 million border crossings are made by individuals. In 1995, the two countries announced an Accord, which commits both Governments to promote international trade, facilitate the movement of people, provide enhanced protection against drugs, smuggling and the illegal and irregular movement of people, and reduce costs for the Governments and the public. This programme has led to several innovative customs programmes, which could serve as models for other customs administrations with shared borders. The projects that have emanated from the Accord include the following:

##### (a) Commercial Vehicle Processing Centre

The Commercial Vehicle Processing Centre (CVPC), which was developed to address processing delays and congestion that are directly attributable to the lack of document preparation on the part of trucks heading towards the United States from Canada. Prepared carriers are allowed to proceed directly to the United States for customs processing, whilst unprepared carriers must stop, park their trucks at a staging area, deliver paperwork to a document clerk, await affixation of a unique bar code to each commercial invoice and truck manifest and make sure paperwork is faxed to a Customs broker in the United States. Once documentation has been submitted to United States Customs, drivers are allowed to proceed. The initiative was implemented at one of the busiest border crossings in 1999 and the application of the CVPC concept at other high-volume cross-border sites is under consideration.

##### (b) Collaboration on developing and procuring sophisticated contraband detection equipment

Sophisticated contraband detection equipment includes vapour detection techniques; gamma-ray systems, which can probe deeper than X-ray systems, and are designed to conduct quick and effective inspection—usually in three minutes—without the time and expense of unloading cargo; and roll-in X-ray systems that can be rolled into the back of containers, thereby eliminating the need for customs offices to unload cargo to conduct search and seizure activities. Future plans include joint evaluation of new or emerging non-intrusive technologies, namely, high-energy X-ray systems; infrared imaging; and ultrasound detection devices. This collaboration has resulted in reducing costs related to research, development and equipment acquisition, and enabled customs officers to minimize delays for legitimate travellers and commercial goods by expediting clearance processes and conducting faster, non-intrusive contraband examinations.

#### Box 14 (continued)

##### (c) Constructing joint facilities

This endeavour aims to reduce costs for both Governments by sharing amenities for border inspection services. Three joint construction projects are nearing completion. One facility is at the border crossing with the highest traffic volume between Montana and Alberta. The location will house the customs, immigration and agricultural staff. In addition, a concept for joint animal inspection is being developed. Despite the difficulties that have been encountered as a result of differences in policies and legislation, both countries are committed to the concept of joint/shared facilities.

##### (d) In-transit highway simplification project

This streamlines the documentation requirements for the in-transit movement of highway cargo through the two countries. The previous process comprised the following four steps: (a) carriers stopped at customs as they left the country of export to have their documentation and load verified; (b) carriers then stopped again at customs as they arrived in the country of transit; (c) they reported at the point of export as they left the country of transit; and (d) then stopped again at customs as they re-entered the original country of export.

The new two-step process enables the carrier to present documentation for in-transit movement upon arrival at customs in the transiting country and stops again at customs upon re-entry into the original country of export. The benefit arising from this initiative includes less congestion in export lanes, and therefore a better flow of traffic; reduction in the health and safety risks to drivers who previously had to cross export lanes to present documentation; and significant savings in time and money for highway carriers, amounting to some 30 minutes per trip.

Source: Citizenship and Immigration Canada, "Canada-United States Accord on our shared border". Available at: <http://www.cic.gc.ca/english/pub/border2000/border2000.html>.

### C. E-BUSINESS AND ICT POTENTIALS IN CUSTOMS ADMINISTRATION

E-business can broadly be defined as the delivery of information, products, services and payments using any kind of automated media, ranging from telephones to networks of computers to the Internet. The emergence of the Internet and the Web has accelerated the use of e-business in that it allows traders to shift from manual or closed EDI network transactions to information exchange using the open, easily accessible and often less expensive Internet. However, it is important to note that the growth of the Internet is just one more application of ICT, which a customs administration can make use of to support its administrative and service needs, and that closed networks, including VANs, can still support or even remain the dominant mode of information exchange between customs and traders.

E-business allows customs administrations to better meet the objectives of the main stakeholders involved in international trade and transport, and offers the following benefits to the following parties:<sup>55</sup>

(a) Benefits to clients include improved levels of service and information access, and ability to meet the needs of trusted traders by identifying and granting concessions to those clients who present the least risk to revenue collection;

(b) Benefits to the national economy include increased trade competitiveness through faster goods clearance, enhanced revenue and security and border protection;

<sup>55</sup> WCO, Kyoto Convention, "Application of information and communication technology", General Annex Guidelines, (Brussels, WCO, 2002).

(c) Benefits to customs administrations include streamlined customs operations and improved integrity and on-going effectiveness of services through the automation of routine processes, allowing more focused enforcement and compliance checking.

The trend towards easily accessible and broader-based e-business technologies on the Internet means that customs administrations must move towards a more open business information system philosophy that will make it easier for small- and medium-sized traders to exchange information electronically with customs. The use of open networks poses a new set of security risks that must be addressed, most notably, the issues of data authentication, authorization, confidentiality, integrity and non-repudiation of origin.<sup>56</sup>

The Internet offers no guarantee of up-time and delivery of electronic data, unlike most VANs. What the Internet does offer, however, is wider accessibility, easily available software solutions, messaging and data exchange based on well-established Internet protocols, at a lower cost to users than traditional VANs. As such, customs administrations seeking to expand their user base must consider providing Internet based solutions.

Standards for Internet based data exchange are still being developed. In particular, the ebXML initiative is expected to provide a full range of standards for e-business. This work is done under the auspices of UN/CEFACT and has been endorsed by WCO. Still, UN/EDIFACT standards remain the sole set of standards for defining data structures on a global basis for almost all types of business and Government transactions that occur in the course of international trade.<sup>57</sup> However, new developments in e-business technologies in the private sector are taking place, namely, the Internet based "peer-to-peer" technologies, which in future might challenge standards developed by inter-governmental organizations.<sup>58</sup>

Many customs administrations have implemented or are in the process of implementing EDI solutions using standard message formats such as UN/EDIFACT. EDI permits automatic data transfer from the computer systems of traders to customs. Given that some small- and medium-sized trading partners are reluctant to adopt EDI owing to its perceived complexity and high costs, alternative and less sophisticated solutions to EDI can be used to ensure that customs receives the required information electronically. Examples of this include, direct traders input (DTI) or use of the Internet to transmit the information. These solutions usually require traders to enter information manually; however, traders still benefit owing to the fact that transactions conducted in this manner are faster than paper based procedures.

E-business is currently being used as an umbrella term to describe various electronic relationships and it has a wide scope in terms of user relationships. The three e-government relationships of relevance to customs are: Government to business (G2B); Government to citizen (G2C); and Government to Government (G2G). It is also useful to distinguish between national and international relations. A number of parties capable of potentially conducting e-business activities with customs administrations are categorized in table 4.

#### 1. Barriers to e-business in customs

There are authentication implications with regard to the manner in which trading parties conduct electronic transactions with customs authorities. Many rules and regulations pertaining to customs still require that information and documents, which are forwarded and processed, must be personally signed in original. This requirement for written, signed and original documents is also an important barrier to e-business. However, these problems are increasingly being solved using digital certificates and digital signatures.

<sup>56</sup> N.R. Adam and others, *Electronic Commerce: Technical, Business and Legal Issues*, (New Jersey, Prentice-Hall, 1999).

<sup>57</sup> Ibid.

<sup>58</sup> Internet based "peer-to-peer" technologies enable the creation of trade communities with open links to those outside the community. These networks allow real-time information exchange between authenticated systems and end-users.

Another barrier to e-commerce is cultural resistance, which can be a problem in that some customs administrations or groups of employees view automation and computerization as a potential threat to their jobs and therefore resist its implementation. Adequate education, training and incentive programmes can eliminate this resistance and transform customs employees into a more effective workforce.

TABLE 4. NATIONAL AND INTERNATIONAL E-COMMERCE RELATIONS OF CUSTOMS ADMINISTRATIONS

National relations	Private business	Government	Citizens
Government/customs	Import/export declarant; Manufacturer/producer; Customs broker/agent; Carrier/shipper; Port/airport authority; Bank; Parcel/postal carrier.	Permit issuing agencies; Regulatory agencies; Statistical agencies.	Consumers; National travellers.
International relations	Private business	Government	Citizens
Government/customs	Foreign manufacturer; International carrier/shipper; International bank; International parcel/postal carrier.	Other customs administrations; International regulatory and enforcement agencies, including WTO and WCO.	Foreign citizens; International travellers.

Source: WCO, Kyoto Convention, "Application of information and communication technology", *General Annex Guidelines*, (Brussels, WCO, 2002).

Lack of automated source data can also render automation unattractive to certain customs trading partners. For example, if commercial documentation has not been transmitted electronically then the trading partner cannot re-use this information as the basis for a customs declaration. However, given the fact that computerization and automation are becoming the norm throughout the supply chain, this problem might gradually be solved. In some cases, service agencies can be used for data input if commercial documentation is not received in electronic format.

Another potential problem with regard to e-business transactions is inadequate infrastructure, particularly in developing countries. However, the rapid spread of wireless technologies, Internet and satellite communications are expected to offer alternatives to missing or unreliable fixed line connections.

Finally, the great number of often bewildering non-standard documents required for customs clearance is a serious barrier to e-business. One of the first steps in a customs modernization programme must therefore be to reduce the proprietary forms and documents required for clearing goods into a standard single administrative document (SAD).

#### D. OVERVIEW OF ICT APPLICATIONS IN CUSTOMS

The use of ICT has transformed the traditional procedural rules of customs. ICT allows customs to automate business processes and to receive control information well in advance of the arrival of goods. ICT also makes it possible to postpone the collection of fiscal data for a number of days or weeks after the goods have been released.

ICT has also permitted customs to respond to, and facilitate, a range of commercial innovations, namely, express delivery service, multimodal transport and global intra-company supply, and production and distribution systems supported by JIT logistical networks.

However, it is often the case that when customs administrations implement ICT, manual procedures are simply replaced by their electronic equivalents, without proper attention to simplifying, harmonizing and standardizing the underlying processes.

The *General Annex Guidelines* to Kyoto 2000 contains a chapter that deals with the application of ICT, which stresses the importance of ensuring that the business processes of customs are simplified and modernized in close consultation with the trading community, and also with the staff of customs, prior to automation. The Guidelines note that "automating a manual process won't necessarily make a customs administration more productive. When customs automate an ineffective process they simply get poor results faster".<sup>59</sup>

The following sections review the manner in which customs administrations utilize ICT and highlight a number of modern concepts that illustrate new approaches to enforcement that are not transaction based. The Automated SYstem for Customs DATA (ASYCUDA); a customs software and modernization programme, which has been developed and sponsored by the United Nations, is also described below. Finally, customs reform programmes in the ESCWA region are examined.

### 1. Data validation

One of the most basic challenges of any automatic data processing system is to ensure that information that has been received and entered is complete and error free. Computers provide assistance in this regard by verifying that all mandatory information is present, that the correct number of characters or numbers have been entered for specific fields, and that numbers or codes are contained within prescribed code lists. Other techniques to confirm data integrity include check digits, which are used to locate transcription or transposition errors.

Additional verifications, including checks for credibility and reasonable values, use preset parameters to attempt to identify incompatible inputs such as the price of a commodity that is lower than expected, or quantities that are too low or too high.

Errors are often introduced when data is entered into a computer from source documents that are prepared in a foreign language or which are otherwise difficult to read, and also as a result of operator fatigue or carelessness. EDI, or the transmission of data electronically directly from one computer to another, eliminates the need to re-enter data every time a trade or transport document is exchanged and thus eliminates transcription errors.

### 2. Cargo inventory control

Customs authorities must ensure that all cargo that enters a country is properly reported and accounted for. Customs does this by matching the cargo reported by the carrier that brings the goods into the country against the goods declarations presented by the importer.

Carriers report to customs by submitting copies of transport documents, namely, bills of lading or waybills, or by submitting a manifest, namely, a summary report of the transport documents, accompanied by a report describing the voyage itinerary and the means of transport. Transport documents contain a summary description of the goods that are being moved.

<sup>59</sup> WCO, Kyoto Convention, "Application of information and communication technology", General Annex Guidelines, 2002, (Brussels, WCO, 2002), p. 16.

Furthermore, to verify that traders declare imported and exported goods, the information on transport documents is used by customs to make decisions as to whether cargo requires further inspection or not. This is referred to as risk assessment and is reviewed in greater detail below. Transport documents also provide information for compiling transport statistics, namely, statistics on cargo flow based on volume and mode of transportation, in contrast to trade statistics, which are based on cargo value.

Transport documents are commercial documents, which constitute receipts, contracts of carriage and, in the case of bills of lading, proof of ownership. This information can usually be found on the computer systems of carriers; customs authorities can receive it through EDI, without the need to enter additional data manually.

### 3. Goods declaration processing

Processing goods declarations for imports and exports is a major task for any customs administration. Goods declarations are submitted by importers and exporters and are used to calculate customs duties and to establish trade statistics based on detailed goods description and classifications, origin, destination and value. Modern Customs administrations use the WCO Harmonized System (HS) for the classification of goods and coding. This system contains some 5,000 commodity classifications, each identified by a six-digit code. More than 177 countries and economies now use the HS system as a basis for their customs tariffs and for the collection of international trade statistics.<sup>60</sup>

Much of the information on a goods declaration is based on the commercial invoice, in particular the description and declared value. However, classifying and coding the goods correctly requires expertise and is often done by specialized customs brokers.

Goods declaration data is captured by the computer systems of customs in a number of ways. Customs officials can key in the data; the trader, his agent or a service bureau can input the information directly into the computer system of customs from their own premises, referred to as Direct Trader Input (DTI); or data can be received through EDI. Data processing usually involves data validation; verification of classification and origin; verification that declared values are reasonable; calculation of duties and taxes; and confirmation of payments.

### 4. Data reconciliation

Automating the reconciliation and matching of data between, for example, the cargo inventory control system and the goods declaration system is another important functionality of the computer system of customs. The application of computerized data reconciliation techniques can also be applied to control transit and trans-shipment movements and to manage temporary admission of goods for subsequent re-exportation.

### 5. Release notification

Electronic notification that goods have been processed and are available for collection by the trader, permits faster and more timely release, and less port and terminal congestion. An automated release notification system is often an extension of the goods declaration processing system; however, it can be implemented as a separate initiative even when all other processes are paper-based. An electronic release notification can be posted on the Internet or distributed by e-mail or fax to all concerned parties including the trader, his agent, the transporter who will pick up the goods and the warehouse or terminal operator who has custody of the goods while they are being processed by customs.

<sup>60</sup> WCO, "Conventions: summary of position (as at 30 June 2002)". Available at: <http://www.wcoomd.org/ie/En/Conventions/conventions.html>.

## 6. Revenue accounting

Revenue collection is a basic functionality, which is particularly important in developing countries where customs duties and import/export taxes are often the main sources of Government revenue. A revenue accounting system must do the following:

- (a) Account for all duties collected and refunded;
- (b) Provide a mechanism for the collection or refund, in the case of re-export, of the duties at the time of clearance;
- (c) Provide a mechanism for the deferment of duty payments for a specified period of time.<sup>61</sup>

In a revenue accounting system the following tasks are ideally suited to the application of ICT:

- (a) Automated control of duty security;
- (b) Maintenance of the deferred payment accounts of trading partners;
- (c) Production of fast and accurate revenue accounts.

The payment of duties as a condition for clearance requires the use of cash, cheques, bank drafts or credit cards by the trader, or the use of electronic funds transfer programmes. Customs must be able to reconcile the actual duties collected, with the total duties calculated by the goods declaration system. Typically, the actual duty amounts collected for each transaction, in addition to the customs declaration number, must be recorded by the system. In addition, the means of payment must be recorded. Normally, the type of duty, for example, excise, customs duty and export tax, and the duty amount for each type, are also recorded, thereby allowing the customs authority to identify how much duty has been collected for each duty type.

## 7. Customs enforcement

Despite the growth of globalization, and the concomitant liberalization of international trade, customs administrations must manage a steadily increasing number of complex legislations that govern the cross border flow of goods.

Establishing the origin of a particular merchandise, which has often been assembled in a number of countries, is a particularly difficult task that is being further complicated by the growing number of bilateral and regional trade agreements, each with its own rules of origin. Other issues that are becoming more complex include the threat and control of foreign plant species and pests, health and product safety, child pornography, illegal trade in endangered species, dangerous goods and hazardous waste, and sophisticated labelling requirements.

<sup>61</sup> The application of a deferred payment system necessitates the establishment of a trading partner registration system, which can keep track of guarantees and revenues payable for a specified period of time. A deferred payment system is different from collecting duties at the time of goods clearance. The advantage is that this system permits the rapid release of cargo. Such systems are based on maintaining individual accounting information for each approved declarant or trading partner who agrees with customs on a maximum limit for deferred duties and issues a bank guarantee as security. A manual system requires a large amount of resources for control and maintenance and is more open to fraud or errors. However, the implementation of an automated revenue collection system ensures that a national deferred payment system can be easily operated. In an automated environment the latest deferred account balance is always available, whereas in a manual environment this cannot be guaranteed. Furthermore, in a manual environment the possibility of the deferred duty amounts exceeding the guarantee is always a possibility, and can potentially expose Customs to a risk of revenue loss. However, an automated revenue accounting system can alert customs when the duty amount for a particular transaction is greater than the balance of the guarantee.

It would be very difficult for customs officers to keep track of the multitude of regulations and special requirements without IT. ICT can make a vast amount of information easily available to all authorized customs officials when, and where they need it.

## 8. Other ICT applications

In addition to the above-mentioned applications, ICT is used for numerous other customs functions including external trade and transport statistics, the administration of fines and penalties, and office automation and reporting. A modern customs administration is also capable of providing information to all interested parties on rules and regulations, tariffs, classification decisions and other information required for transparency and predictability. This information can be provided in a number of formats including on the Internet and the Web.

### E. UNITED NATIONS AND CUSTOMS MODERNIZATION: ASYCUDA

The United Nations has been involved in customs reform programmes throughout the developing world for more than 20 years through the Automated SYstem for CUstoms Data (ASYCUDA) programme, which has been developed by UNCTAD, and is a computerized customs management system that handles all major steps in the customs process, from pinpointing high-risk consignments for inspection, to processing payments.

ASYCUDA is being used for customs administration and trade facilitation in more than 80 countries.<sup>62</sup> From the early 1980s, ASYCUDA aimed to benefit national economies and the trading community by implementing efficient and effective customs administration and revenue collection regimes. The objectives of the ASYCUDA programme are directed towards the following goals:<sup>63</sup>

- (a) Reforming the customs clearance process;
- (b) Speeding up customs clearance through the introduction of computerization;
- (c) Simplifying procedures;
- (d) Minimizing administrative costs for the business community;
- (e) Increasing customs revenue;
- (f) Ensuring that all goods are declared;
- (g) Guaranteeing that calculations are correct;
- (h) Ensuring that duty/exemptions and preference regimes are applied correctly;
- (i) Producing reliable and timely trade and fiscal statistics;
- (j) Implementing the systems as efficiently as possible with full transfer of know-how to national customs administrations at the lowest possible cost;
- (k) Combating fraud and illegal trafficking of prohibited and restricted goods;
- (l) Assisting Governments in implementing national and international trade policies.

<sup>62</sup> Automated SYstem for CUstoms Data (ASYCUDA), "ASYCUDA user countries". Available at: <http://www.asycuda.org/countrydb.asp>.

<sup>63</sup> UNCTAD, "ASYCUDA++ Description of application software (functional overview)". Available at: <http://www.asycuda.org/pdf%20docs/sffunct.pdf>.

According to UNCTAD estimates, ASYCUDA saves customs administrations 50 million work hours annually; increases customs revenue by 20 to 30 per cent; and makes it easier for agents to keep abreast of, and thus enforce, frequent changes in customs tariffs and regulations. UNCTAD states that ASYCUDA typically costs less than \$2 million to install and adapt to local conditions. Countries that have been developing their own systems have sometimes paid up to \$20 million, and have eventually decided to use ASYCUDA.<sup>64</sup>

ASYCUDA is designed to use object-oriented tools with a client/server architecture, and is based on a relational database management system, called ASYCUDA++. In 2002, UNCTAD launched a new Web-based version of ASYCUDA, AsycudaWorld, which allows the majority of customs transactions to be handled via the Internet. The technical and functional features of AsycudaWorld are reviewed in box 15.

#### Box 15. AsycudaWorld

AsycudaWorld is based on technical architecture that abolishes the need to maintain permanent connections with a national server, a feature that is particularly important for countries with unreliable telecommunications and locations where poor fixed-line telecommunications are a major problem for modern e-government applications. Technically, AsycudaWorld is compatible with all major database management systems, including Oracle, Sybase, DB2, Informix and SQLServer, and also with most operating systems, namely, Linux, Windows and Solaris. User countries can determine their choice of software and hardware suppliers. The use of XML allows for the exchange of any document inside and outside the system, between customs administrations and traders (G2B) and between customs administrations in different countries (G2G). AsycudaWorld is Java-native, meaning that it is designed as an open standard to be used with the Java programming language. Countries can thus modify or extend the application without assistance from UNCTAD. AsycudaWorld also exploits mobile Internet access devices.

Source: UNCTAD, "press release No. 40: UNCTAD launches new e-customs system", (Geneva, UNCTAD, 26 March 2002) (TAD/INF/PR40). Available at the following two locations: <http://r0.unctad.org/en/Press/pr0240en.htm> and <http://www.asycuda.org/asycom/wfiles/40asycuda.em.pdf>.

The implementation of ASYCUDA is typically carried out in three phases, see box 16. Moreover, its success depends upon strong political commitment and support from the highest levels. This success also relies the availability of a motivated and multi-skilled national team of customs and technical staff.<sup>65</sup>

The ASYCUDA programme comprises six modules, which provide computerization and automation for all major customs administration processes. The six modules are presented in box 17.

ASYCUDA has so far been implemented in four member countries in the ESCWA region, namely, Jordan, Lebanon, Palestine and Yemen. The customs authorities in Jordan and Lebanon are reportedly both satisfied with ASYCUDA and would choose the system if they were asked to make that decision again. The fact that ASYCUDA is based on the experiences of customs practices in many countries has been noted as one of its most important features. This, and the fact that it also carries the United Nations label, has made it easier to advocate reforms of customs to decision makers and politicians.

<sup>64</sup> UNCTAD, "press release No. 40: UNCTAD launches new e-customs system". (Geneva, UNCTAD, 26 March 2002) (TAD/INF/PR40). Available at the following two locations: <http://r0.unctad.org/en/Press/pr0240en.htm> and <http://www.asycuda.org/asycom/wfiles/40asycuda.em.pdf>.

<sup>65</sup> UNCTAD, "ASYCUDA++ Description of application software (functional overview)". Available at: <http://www.asycuda.org/pdf%20docs/sffunct.pdf>.

#### Box 16. ASYCUDA three step implementation process

##### (a) Preparation phase

Initially, a national team, in coordination with international advisers, identifies areas that require reforms, namely, the introduction of international codes, the streamlining and simplification of clearance procedures, the alignment of forms to international standards and the modernization of national customs laws to conform to the Kyoto Convention. While some of these reforms can be achieved and introduced early in the project, others need to be established through legislation and can therefore take much more time to implement. During this phase, technical and functional ASYCUDA implementation courses are delivered to strengthen the national implementation team and to prepare them psychologically.

##### (b) Pilot implementation phase

This phase includes the preparation of the national ASYCUDA configuration, namely, the coding of the tariff and the related regulations and legislation, the data entry of the control tables, including declarant codes and addresses and customs office codes, and the preparation of valuation and selectivity systems. Computers for the pilot offices, normally headquarters, airports, sea ports, land boundaries and inland clearance offices, are installed and tested to confirm that the configuration of the system fully meets the requirements of the national regulations. The reform activities initiated in phase one are continued as necessary. A work plan for the implementation of the system throughout the country, and an estimate of the resources required, are devised. A significant ASYCUDA familiarization training programme for customs staff and trade users is delivered during this phase. The first two phases have a minimum duration of 18 months.

##### (c) Roll-out phase

If the transfer of skills and know-how was successfully completed during the first two phases, this phase can be implemented by the national team with little or no assistance from international experts. This phase is more of a logistics challenge than an intellectual problem in that: (a) the physical preparation of all sites involves a certain amount of computerization; (b) a large amount of training is based on the model training course of phase two; and (c) technical installation and computer system support is necessary in the identified locations. In addition, the configuration of the customs software is simply copied from the appropriate pilot sites.

Source: UNCTAD, "ASYCUDA++ Description of application software (functional overview)". Available at: <http://www.asycuda.org/pdf%20docs/sffunct.pdf>; and "ASYCUDA++ Description of application software (technical overview)". Available at: <http://www.asycuda.org/pdf%20docs/sw+tech.pdf>.

Indeed, political and cultural issues seem to have been more important than system-specific, technical, functional and pricing concerns with regard to decisions to utilize ASYCUDA. In this context, the roll out of the system has been comparatively simple, and the main barrier to successful implementation has been the difficulty of adapting local procedures to international ones.

UNCTAD notes that the success of ASYCUDA is based on certain factors, including strong political commitment and support from those at the highest political and administrative levels; system implementation accompanied by thorough customs reforms and reengineering of existing practices; and the full time availability of a competent and motivated multi-skilled national team of customs experts and technical staff.

Indeed, the fact that the installation ASYCUDA has not been entirely successful in some countries can be largely attributed to resistance to the in-depth reform and necessary re-engineering of customs practices or to the fact that the business community and customs employees have not been sufficiently prepared/trained, rather than as a result of system-specific technical or functional matters.



### Box 17. ASYCUDA customs administration modules

#### (a) *Cargo control module, or the manifest module*

To ensure that all goods arriving within the customs territory comply with customs regulations, cargo control assists the activities that take place when a particular mode of transport arrives at either a border office or at an inland clearance office. The cargo is immediately placed under Customs control and the transport documents are keyed into the system. This module supports all types of transport documents, namely, bills of lading, airway-bills, rail consignment notes, road transport documents and transit documents, including TIR carnet, transit manifest or any legally-specified customs document accompanying the goods. The transport documents are processed to verify that each consignment is covered by a declaration.

#### (b) *Declaration processing module*

The declaration module supports all customs regimes, namely, import, export and suspense. These regimes can be subdivided at will using customs procedure codes to assist in the identification of goods liable to special procedures and/or duty exemptions, both full and partial. The format of SAD provides the basis of the input/output customs declaration document and the input screens. The system manages the SAD declaration by using a common processing base for every type of declaration and its applicable customs procedure.

#### (c) *Taxes and Customs duties collection (accounting) module*

The system accommodates the payment of duties and taxes in a number of ways. Payment can be made in cash, which in this context also refers to payment by cheque or any other means deemed acceptable by the customs department. The system permits cash payments to be made either directly to customs or at another institution, namely a bank or post office. A pre-payment scheme is also available, which is particularly useful for customs, which benefits from cash in advance and a substantial reduction in the number of transactions handled by the cashier, as well as the trader, who benefits from being able to take delivery of the goods immediately after the removal note has been issued. Traders can be initially reluctant to adopt this scheme given that it places cash with customs; however, the disadvantages are short-term in nature, and the subsequent benefits can outweigh interest that has been lost. Cash-flow problems can be kept to a minimum owing to the fact that traders can top up their account at any stage. The pre-payment scheme operates in several ASYCUDA countries, and has satisfied both traders and customs. A credit scheme is also available, which permits the clearance of goods from official charge and for which duty and tax is collected at the end of a specified period.

#### (d) *Selection module*

The selection of the type of examination procedure to be applied to goods is facilitated by the selectivity module, which is based on information in the criteria files. The system allocates a particular category of channel, which are colour coded and are as follows: green, whereby cargo is released without examination; yellow, where cargo is released after further documentary validation; red, whereby cargo is released after a physical examination; and finally, blue, which covers post audit control. The criteria files are built using national and local control file data. According to their nature, data elements are compared individually and/or in combination with the criteria contained in the control files. The results of such risk analysis must be periodically analysed to maintain, change, extend or eliminate certain parameters.

#### (e) *Tariff and tables module*

ASYCUDA has a decentralized philosophy, which means that copies of the tariff and tables are available in both regional and local offices for declaration processing. Users are given look-up facilities only. The files at local and regional offices can be serviced and updated by electronic transmission from customs headquarters or, if not available, on magnetic media. This can be coordinated across all divisions at the headquarters by the computer project team. Copies of control tables and the tariff files are also kept on client workstations, and each and every time the user logs on to the system the customs server verifies the system files in full and carries out an automatic update if required. Based on the tariff and tables, all calculations can be fully automated.

### Box 17 (continued)

#### (f) *Trade statistics and management information module*

This module comprises a number of factors, which include the following: (a) data compilation: information production systems are based on files of customs declarations that have been assessed and cleared at each customs office; (b) data extraction: the design of the ASYCUDA database enables data to be selected and extracted from the Customs system at will; (c) data security: data in the declaration processing and control systems is sensitive, and therefore, access to the databases of information is protected by various levels of system security. Extraction of data from the databases is carried out and distributed to users in accordance with relevant Data Privacy Protection Legislation in a particular country; and (d) data manipulation features: data can be transferred to commercial systems, spreadsheet and statistical software packages at will. To date, ASYCUDA utilizes Lotus 123, dBASE and SAS, in addition to EUROTRACE to produce the reports and outputs required.

Source: UNCTAD, "ASYCUDA++ Description of application software (functional overview)". Available at: <http://www.asycuda.org/pdf/%20docs/sfifunct.pdf>.

The latest reforms of customs systems, including, computerization and automation of customs procedures in Lebanon and Dubai are reviewed in the sections below. Lebanon uses ASYCUDA, whilst Dubai utilizes a system that has been designed in accordance with its own needs.

### F. CASE STUDY: CUSTOMS REFORM IN LEBANON

In the mid-1990s, the Government of Lebanon initiated an ambitious restructuring and reengineering of its customs clearance system.<sup>66</sup> The World Bank sponsored the reform process, which aimed to do the following:

- (a) Reduce the cost and time of customs clearance procedures by streamlining, simplifying and automating customs clearance;
- (b) Ensure customs compliance with the laws and regulations of Lebanon, and make the whole system as transparent as possible;
- (c) Provide accurate and swift international trade statistics by computerization and implementation of IT in all customs clearance processes;
- (d) Combat fraud and corruption by establishing a non-confrontational relationship between customs agents and their clients.

The most important events in the reform process are reviewed in the following subsections.

#### 1. *Tariff reform*

In 1995, the first step in the reform process of customs was initiated by a tariff reform. The internationally accepted harmonized system of tariffs, the six digit coding system, was implemented on 1 January 1996. This process enabled the tariff regime to be significantly simplified by reducing the number of duty categories and rates and aligning them with international standards.

<sup>66</sup> The information in this section is based on interviews conducted in 2001 and 2002 with a number of individuals based in Beirut or at the Port of Beirut, including representatives of customs authorities; the ASYCUDA port operation manager; managing director of Saleh Shipping; management information systems manager at the Port of Beirut; ASYCUDA/NAJM project manager; and the DHL country manager. Statistics and data pertaining to this section are from the Lebanese Customs web site, which is available at: <http://www.Customs.gov.lb/Customs/English/>; and Ministry of Finance of Lebanon, "NOOR (NAJM online operations)", an information kit which was presented at the launch of NOOR (NAJM online operations), Beirut, 15 February 2002.

## 2. Adoption of single administrative document

In 1996, SAD was introduced, replacing 23 previous documents. This contributed to the streamlining of operations whilst rendering them more transparent. In addition, SAD was translated into Arabic and used in the Arab region for the first time. Initially, the trader or his agent submitted the SAD to customs with all supporting documents; then customs officials entered the data into the ASYCUDA system (see below). The Direct Trader Input feature was later added, allowing the agent or trader to input the data directly from his office on a remote terminal affiliated to the ASYCUDA system. However, it is still necessary to print a computer-generated version of SAD for signature.

## 3. NAJM

ASYCUDA is known as NAJM in Lebanon. It was implemented in the Port of Beirut in 1997; the Beirut International Airport in August 1998, and the Port of Tripoli in 2001. A complete roll out was scheduled for completion by the end of 2002. The software was donated, free of charge, by UNCTAD; and the total expenses for hardware, training and facility renovation amounted to \$2 million, of which the private sector contributed \$1.2 million.

## 4. NAJM Express

The next step was that customs clearance was relocated to the shop floor of some of the main importers and exporters, including DHL and Libanpost. This service has been labelled NAJM Express. The key element of NAJM Express is that goods can be released on manifest information only. Full documentation must be submitted, and payment must be within 36 hours of release. Beneficiaries of this service pay an extra fee for the availability of customs inspectors on their premises. In addition, DHL for example, x-rays all parcels and keeps a record for six months.

## 5. Modernization of customs law

A Customs Law, which came into effect on 23 April 2001, was introduced to apply the principles of simplification, openness and transparency. The previous customs legislation had not been updated since 1934. The new legislation eliminated practices, which gave room for corruption and specified that the customs administration must provide the trading community with direct access to information, data, tariff modifications and other customs procedures that enable a compliant trader to make sound business decisions. Pursuant to the implementation of the new customs laws, the Lebanese customs administration incorporated the Lebanon International Trade Exchange (LITE) into NAJM. LITE offers online access to customs tariff, trade statistics, trade regulations, exemptions and customs laws.<sup>67</sup>

## 6. NAJM online operation

The next step in the customs reform programme was to augment the functionality of NAJM. This was achieved in Beirut International Airport in May 2001 with the implementation of the NAJM online operation (NOOR). NOOR allows the trader or customs broker to enter and track declarations from his own office electronically via a personal computer, rather than a remote terminal and a modem, at all times. Benefits include fewer overheads in the preparation of declarations and a reduction in the number of processing stages from four to three.

Whilst NAJM was initially a purely intra-governmental network, it now gives importers and exporters the ability to interact electronically with customs in real-time through EDI transactions. NOOR-I offers the customer access to store and track declarations, while NOOR-II and NOOR-III will allow customers to register, assess and pay declarations online. In 2000, NOOR users represented 40 to 50 per cent of all declarations. The goal is to have 2,000 to 3,000 clients on the system.

<sup>67</sup> See Lebanese Customs. Available at: <http://www.Customs.gov.lb/Customs/English/>.

NAJM Audit Resources (NAR) has boosted the efficiency of the control and risk management departments with the objective of increasing the level of green line clearance without losing customs revenue. Furthermore, NAR provides information to customs concerning exporters/importers, brokers, product types as categorized by HS, origin and destination of products and other declaration data.

## 7. Results of customs reform in Lebanon

The computerization and automation that has been achieved through the implementation of ASYCUDA/NAJM/NOOR, combined with the tariff reform, the simplification and alignment of clearance procedures and the harmonization with international standards, has enabled Lebanese customs to reduce the number of stages involved in customs clearance from 13 to the following five basic steps:

- (a) Entry of declaration;
- (b) Acceptance of declaration;
- (c) Inspection of goods (verification of declared information);
- (d) Assessment of information for automatic computer calculation of taxes;
- (e) Payment of customs duties and taxes.

Prior to the reform process, Lebanese customs was a major logistic bottleneck and source of economic inefficiency. Lebanese customs procedures were cumbersome, non-transparent and time-consuming, in addition to being a fertile breeding ground for corruption. Most of the seven to twelve days needed for container delivery were attributable to customs delay. In Lebanon, 45 per cent of public revenue originates from customs duties, and therefore, it was acknowledged that it was imperative to reflect this economic importance in customs procedures and efficiency.<sup>68</sup>

Performance indicators for the first five years after the reforms of Lebanese customs show significant improvements in efficiency and effectiveness. The green line clearance, which is the customs clearance without inspection, rose from 10 per cent in 1997 to 75 per cent in 2001, whilst the average number of days needed for clearance of goods dropped from six to three and a half (see table 5).

TABLE 5. NAJM RESULTS ON SELECTED PERFORMANCE INDICATORS

Year	1997	1998	1999	2000	2001
Green line (percentage)	10	30	40	40	75
Effective tariff rate (percentage)	16	18	22	22	16
Average Customs clearance days	6.07	5.07	4.98	4.54	3.50

Source: Ministry of Finance of Lebanon, "NOOR (NAJM online operations)", an information kit, which was presented at the launch of NOOR (NAJM online operations), Beirut, 15 February 2002.

The key advantages of NAJM are its data and information storage, processing and retrieval functionalities. The system builds track records of traders' compliance. This permits customs officials to assess the individual risk of a client and to apply modern risk management and selectivity criteria to determine whether goods require physical inspection or not. Inspections are costly and time consuming and must be reserved for consignments or companies presenting a high risk or an insufficient track record. Such computer assisted risk management and selection techniques build trust between the trading community and customs, and improve efficiency.

Problems regarding the relationships between customs and their clients still exist. According to some clients, certain signatures still cannot be obtained without a tip. Traders are also frequently fined for even very minor mistakes. Given that customs inspectors receive a portion of this fine, some 25 per cent, they are very keen on noting anything that can be construed as an error. Another concern is that the professions of freight forwarder and customs broker are unregulated.

<sup>68</sup> D. Müller-Jentsch, op. cit.

According to Lebanese Customs, the problem of penalties and tips will be addressed through further simplification of procedures, staff education, better remuneration and by eliminating or reducing to a minimum, personal contacts between traders and Customs officials.

#### G. CASE STUDY: PORT, CUSTOMS AND FREE ZONE CORPORATION OF DUBAI (PCFC)

Dubai is the second largest Emirate and the commercial capital of the United Arab Emirates. The Jebel Ali and Rashed terminals of the Port of Dubai, and Dubai International Airport handle more than 70 per cent of non-oil trade for the United Arab Emirates. The growth in volume of non-oil foreign trade (import, export, and re-export) has been remarkable during past decades, growing from \$294 million in 1970 to \$2.04 billion in 1975. In 1988 it reached \$7.97 billion; and in 1993 it took another giant leap to reach \$17.51 billion. The growth has continued throughout the past decade. From 1991 to 2001 container throughput nearly tripled, from 1.23 million to 3.50 million TEU, while general cargo tonnage more than doubled from 3.3 million to 7.3 million tons.<sup>69</sup>

In response to the fact that Dubai is a regional trade hub in the Gulf region, Dubai Customs has gone through several reforms and developed from a mere collector of duty and inspector of cargo, to a facilitator of trade, while still playing a vital role in preventing entry of goods that are detrimental to the society of the United Arab Emirates.<sup>70</sup> Dubai Customs has the following facilitation functions:

- (a) Economic: It regulates the flow of trade into the business sector;
- (b) Financial: It collects duties and revenues;
- (c) Statistical: It generate trade statistics reports and analyses;
- (d) Social: It regulates import and exports into and out of Dubai.

To make trade facilitation and customs clearance more effective, Dubai merged the three previous independent entities, namely, Dubai Port Authorities (DPA), Dubai Customs Authorities (DCA) and Dubai Free Zone (DFZ), into one organization, the Port, Customs and Free Zone Corporation (PCFC) in 2001.<sup>71</sup>

As a result of this organizational merger, the two, previously separated, port and customs IT services are progressively becoming incorporated into a single system. The ICT systems and services of the new PCFC are currently being re-engineered to facilitate this merger. In addition, three separate portals will be merged into one common corporate portal, which will allow companies to settle their outstanding obligations with the port and customs, and to clear their goods in the same operation, which means that the back-end-computerization processes of all, previously separate organizations are being re-engineered and integrated.

This internal re-engineering process in the PCFC has been complicated by the fact that as of 1 January 2003, the six Gulf Cooperation Council (GCC) countries implemented an economic agreement to create a common customs zone, and to harmonize common customs rates. According to the agreement, members will accept the first entry point in any of these countries as valid for clearance and payment of duty. This means that Dubai has raised its 4 per cent customs tariff to a unified tariff amounting to 5 per cent on imported goods to any of the GCC countries. A complex countervailing customs duty system is therefore being established whilst the organizational merger and re-engineering of internal processes and procedures at the PCFC is taking place.

The external and internal pressure for organizational and procedural change has still not been completely translated into clear operational procedures, and the consequences for the trading partner community, and for the efficiency and effectiveness of the organization, have yet to be evaluated.

<sup>69</sup> Dubai Customs. Available at: [http://www.dxbCustoms.gov.ae/index\\_frame.asp](http://www.dxbCustoms.gov.ae/index_frame.asp); and Dubai Ports Authority (DPA) Information Kit.

<sup>70</sup> Dubai Customs. Available at: [http://www.dxbCustoms.gov.ae/index\\_frame.asp](http://www.dxbCustoms.gov.ae/index_frame.asp).

<sup>71</sup> The following section is based on interviews conducted in January 2003 with DPA; Jebel Ali Free Zone Authority; Customs Center of Dubai; and the National Association of Freight and Logistics of Dubai.

The Mirsal system is the backbone of the streamlining process in Dubai Customs. Its implementation and development is reviewed in the following subsection.

#### 1. *Mirsal*

The Arabic word *mirsal* means carrier pigeon or messenger, and was denoted as the name for the online EDI system introduced by Dubai Customs in 1997 to streamline the process of cargo clearance. The concept of Mirsal first emerged in 1994 when the IT centre at Dubai Customs was attempting to find a method of speeding up Customs procedures to keep pace with the rapid growth in cargo transport throughout the Gulf region.

The first application of Mirsal was in June 1997, in coordination with an Agents Transfer Authority (ATA) programme to connect customs with agents in the Dubai Cargo Village. With regard to agents, the principal advantage of Mirsal has been that documents no longer have to physically delivered to the customs counter. In addition, agents can use Mirsal as an information service, to maintain and retrieve transaction records.

With regard to customs, the main advantage of Mirsal has been that the entry of cargo manifests and other documents can largely be done by shipping agents, thereby freeing customs to focus on other duties.

Mirsal works on a client server architecture. For a modest subscription, each Mirsal user can connect to Mirsal through a tailor-made programme that processes the type of customs transactions that are relevant to the company. All links are in one database, namely, a Microsoft SQL database.

The first generation of Mirsal incorporated the following features for electronic/computerized processing:<sup>72</sup>

- (a) ATA: this feature enabled air agents to generate an ATA for transferring the goods to their warehouses;
- (b) Rotation details: this facet enabled rotation details issued by DPA consisting of such voyage details as vessel name, shipping line and expected arrival date, to be sent automatically to customs, which would automatically upload them to the server for further processing;
- (c) Manifest registration: this enabled shipping agents to submit manifests electronically;
- (d) Bills of lading: this feature enabled shipping agents to submit, modify, or delete submissions of bills of lading electronically;
- (e) No objection certificate (NOC): this enabled shipping agents to issue NOC electronically for consolidated bills of lading;
- (f) Delivery orders: this enabled shipping agents to issue delivery orders to consignees electronically, thereby permitting consignees to go directly to the Customs counter to generate the Customs Bill;
- (g) Trans-shipment bill: this facet enabled shipping agents to generate trans-shipment customs bill electronically, and automatically submit them electronically to the port authorities;
- (h) Customs bill: this feature enabled the customs counter to generate all types of customs bills based on electronically submitted delivery orders from shipping and air agents;

<sup>72</sup> ESCWA, "Evolution of e-Mirsal", a paper presented at the Expert Group Meeting on Coordination of Transport Policies to Facilitate Transboundary Flows within the Global Context, Beirut, 26-28 September 2000 (no symbol).

(i) Vehicle clearance system: this subsystem enabled vehicle clearance certificates to be printed prior to submission to the Traffic Department;

(j) Account facility: this enabled customs to ascertain the status of its revenues and expenses, in addition to the status of credit given to various consignees;

(k) Reports: this feature enabled the generation of online reports on accounts and statistics, in addition to daily, monthly and yearly transactions.

As a result of computerization and automation, it has been calculated that even if Dubai is able to reach 10 million container units per year, customs will be able to handle the additional volume with its current level of staffing.<sup>73</sup> In terms of cost savings, the ATA programme alone saved air agents a total of \$550,000 in its first year of operation. In 2000, savings for sea shipping agents amounted to \$3 million, and future savings for clearing agents and brokers were estimated at \$4.5 million per year until 2001. Therefore, Dubai Ports and Customs estimated that Mirsal produces total annual savings of approximately \$8.5 million for the transport industry of Dubai.<sup>74</sup>

## 2. E-Mirsal: Web-based customs administration system

The growth of the Internet has seen the gradual transformation of Mirsal into a web-based application, known as e-Mirsal. In addition to ensuring that all Mirsal functionalities are web-enabled, this process incorporates other features, namely, *Al Munassaq*, which provides online access to the HS commodity code for Customs clearance purposes. Furthermore, statistical reporting has become more sophisticated, and monthly and annual publications of key economic and external trade statistics have become available; a web-based customer help service, which is able to respond to online enquiries, has been established. The Ettisal project has also been launched to develop rapport between customs and the trading community, and to identify needs, obstacles and trends in the Dubai trading community.

Dubai has made changes in its Customs Law during the last number of years to further facilitate trade and transport. The new Customs Law, which came into effect in February 1999, made the following possible: a single bill of entry can be accepted for multiple consignments; goods can be cleared prior to arrival; duty can be paid through banks or by credit card; duty can be partially or fully refunded if the evaluation is proved to be incorrect, if the goods did not enter the Emirate, or if goods are proven to be exempt; goods valuation plus other costs, namely, shipping charges, handling and insurance for customs purposes can be based on the export price; duty cannot be levied on goods imported on a temporary basis for display in exhibitions, or stored in bonded warehouses; and customs checkpoints and warehouses can be set up at new locations.<sup>75</sup>

## H. LEBANON AND DUBAI CASE STUDIES: CONCLUSIONS

Whilst Lebanon opted for a fairly inexpensive solution in the form of ASYCUDA, Dubai preferred to develop its own tailor-made customs administration system, which has probably entailed a higher degree of cost. However, it is difficult to compare the strengths and weaknesses of the two solutions directly, or to advise third parties to choose one over the other. Nevertheless, it is evident that computerization and automation are vital, and also that ICT renders the internal administration of customs much more efficient and effective, which means that ICT is an excellent facilitator of international trade and transport. Consequently, it can be noted that in the countries studied, customs automation and reform processes have

<sup>73</sup> In 2002, 4.2 million TEU were handled. DPA, "Dubai ports achieve growth in global container throughput", (23 March 2003). Available at: [http://www.dpa.co.ae/news/news\\_6.html](http://www.dpa.co.ae/news/news_6.html).

<sup>74</sup> Dubai Ports and Customs Handbook 2000, (Dubai, Land & Marine CIS, 2000).

<sup>75</sup> Ibid.

clearly stimulated and accelerated economic development and interaction with other economies. The advantages generated by ICT with regard to customs in Lebanon and Dubai, are reviewed below.<sup>76</sup>

### (a) *More effective customs controls*

In cases where the functions of cargo control and/or goods declaration processing have been automated, risk assessment and consolidation of selectivity criteria can be carried out on a much more informed and thorough basis. Intelligence gathered by customs can be fed into a computer system and can be taken into account when selectivity processing occurs. The probability of uncovering fraudulent practices, duty/tax evasion and smuggling is therefore increased in an automated environment, where selectivity profiles can be analyzed more systematically, accurately and in a more timely manner.

### (b) *More efficient customs clearance*

Automation of customs procedures in conjunction with the electronic exchange of information concerning, for example, cargo data and goods declarations, enables pre-arrival information processing. Processing of regulatory information in advance of the physical goods arriving in the customs territory allows customs to verify the information and carry out an initial risk assessment of the consignment. The fact that information is already available means that decisions regarding the release status of the goods can be transmitted once the goods arrive using e-commerce techniques. Such efficient processing of goods declarations is one of the main advantages of automation, which provides the following benefits:

- (i) Increased productivity and reduced transaction costs for customs and trading partners;
- (ii) Better use of resources;
- (iii) Expedited release of goods;
- (iv) More accurate and timely information;
- (v) Better enforcement capabilities;
- (vi) Less congestion at ports and airports.

### (c) *Uniform application of customs laws*

The increase in the quantity and complexity of the laws which customs are obliged to enforce is significant. In a manual environment, customs can find it difficult to ascertain whether they have taken all existing regulations into account when processing individual importations and exportations. In a computerized system, all transactions are processed in a consistent manner, which ensures a uniform application of national laws and the equitable treatment of all traders.

### (d) *More efficient revenue collection*

Revenue that has been collected by customs is a significant source of income for Governments in many countries in the ESCWA region. The efficient collection and accounting of this revenue is vital for national economies. The automation of the revenue collection process can help to ensure that revenue is collected and accounted for in a timely manner. Outstanding or bad debts can be identified and dealt with swiftly. In a manual environment, reconciliation of revenues received and revenues due is slow and prone to errors, fraud and corruption.

### (e) *Improved quality of data and more effective data analysis*

Customs is the primary source of international trade data. Information that is held in manual form is bulky and time-consuming to evaluate and organize properly. Moreover, manual extraction of data from a variety of files is extremely labour intensive. Automation allows Customs immediate access to up to date

<sup>76</sup> These advantages have also been identified by WCO. See: WCO, Kyoto Convention, "Application of information and communication technology", General Annex Guidelines, (Brussels, WCO, 2002).

information and offers a way of analysing this information in a meaningful fashion. customs automation also enables more effective post-audit control at the national and local level. Another advantage is that electronic data is likely to be more accurate as a result of validation and credibility checks built into the automated data capture process.

(f) *Efficient production of external trade statistics*

Most customs administrations bear responsibility for the collection of trade data. Timely production of trade statistics is important for critical political and economic decisions. Data pertaining to the compilation of external trade statistics is extracted from import and export goods declarations. In cases where goods declarations are processed manually, the capture of data must take place at a later time. However, in cases where automated goods declaration processing takes place, trade data are captured at the time of release. This is highly cost effective and the statistics produced from this data are accurate and up to date.

#### IV. ICT IN PORTS: SECURITY AND FACILITATION

##### A. INTRODUCTION

It is estimated that the cost of international trade logistics, which includes all physical and non-physical services and transactions required to move international trade, exceeds one thousand billion dollars per year and is growing at an annual rate of 6 to 8 per cent.<sup>77</sup>

The rise in transport and logistics costs can be attributed to the growth of trade in general, and also to factors that include the increasing use of global outsourcing of manufacturing and assembly in many industries. As a result, logistics and transportation costs have come to play a progressively more prominent role in the cost structure of many enterprises including, inter alia, the automobile industry where logistics now accounts for over 20 per cent of total costs.<sup>78</sup>

It is often assumed that logistics costs largely comprise transportation costs; in reality, however, the cost of transport itself frequently represents less than 50 per cent and sometimes as little as 30 per cent of total door-to-door logistics costs. The other costs include port and terminal handling charges,<sup>79</sup> which can cost as much as sea and land transportation; and information, management and transaction costs.

The fact that transportation costs represent a relatively small part of total door-to-door logistics costs is particularly true with regard to container transport where larger ship sizes, double stack unit trains and other innovations have resulted in major economies of scale. This also means that there are few opportunities to drastically lower overall logistics costs by further increasing transportation efficiencies.

However, there are plenty of opportunities to improve overall logistics management through better information handling. Indeed, many ports are still inefficient and costly and thus not well integrated into the international logistic chain.

For example, time delays caused by information requirements, including documentation, inspection and customs clearance, usually account for as much as 35 to 46 per cent of the door-to-door time in international trade flows.<sup>80</sup> The majority of these delays occur in seaports where goods are loaded and unloaded from vessels, cleared by customs and other cargo controlling agencies, and then shifted to other modes of transportation for inland distribution and delivery.

To become well-integrated links in international supply chains, ports must ensure that they are efficient and competitive. In particular, ports must simplify administrative procedures in cooperation with customs authorities and other port stakeholders. In other words, ports and customs must implement trade facilitation measures to accelerate the handling and clearance of goods through seaports. This requires both structural reforms and the appropriate application of ICTs.

The increasingly prominent concern for maritime security that has arisen since the events of 11 September 2001 in the United States is an additional new challenge for ports. There is considerable fear that terrorists might use containers to smuggle weapons of mass destruction. As a result, the Government of the

<sup>77</sup> E.G. Frankel, "Where the money goes: Economics of international trade logistics: opportunities for improvements and cost savings", an unpublished paper, 2001.

<sup>78</sup> Ibid.

<sup>79</sup> Ibid. The example of a 40-foot container heading from the United States to Germany is mentioned by Frankel in another paper. In this case, the total freight charge amounted to \$3,000; trucking amounted to \$496 and ocean shipping, excluding port and terminal charges, amounted to \$426, which is a total transportation cost of \$920 or 31 per cent of total door-to-door logistics cost. See E.G. Frankel, "The e-port terminal operations in the Internet age: Information and transaction management as a key to profitability for shipping and ports", an unpublished paper, 2001.

<sup>80</sup> E.G. Frankel, "The e-port terminal operations in the Internet age: Information and transaction management as a key to profitability for shipping and ports", an unpublished paper, 2001.



United States, which feels particularly vulnerable to new attacks, has taken a number of steps to increase the security of ocean container traffic.

New security measures, involving risk assessment and in some cases physical inspections of containers before they are loaded onto vessels destined for the United States, have already been introduced in several international ports. These developments are expected to affect ports and maritime traffic in all parts of the world.

This chapter reviews current trends related to port reforms and operations, the role of facilitation in improving port efficiency and the impact of new security concerns. Terminal operating systems and the manner in which the application of ICT in general, and EDI in particular, can be used to meet growing demands for efficiency and security are also examined.

#### B. TRENDS IN INTERNATIONAL OCEAN FREIGHT TRANSPORT

The introduction of the freight container in the mid-1950s was a turning point for the ocean transport of manufactured goods and general cargo. Despite the fact that the deep-sea container proper is only approximately 40 years old, it is estimated that at present, 60 per cent of all general cargo transported by sea is carried in containers. With regard to trade between highly industrialized countries, this figure approaches 80 per cent.<sup>81</sup>

The importance of containerized cargo stems from the fact that while it represents only some 10 per cent of the total sea-borne trade volume, it represents approximately half the sea-borne trade in terms of value and also approximately half the revenue of ship operators. Moreover, containerized traffic is a key ingredient in the globalization of manufacturing and consumption.

Container shipping is a fiercely competitive business, which requires extremely high investments. For example, the expansion of the Port of Salalah in Oman, which includes two 400 metre-long containership berths, is expected to cost \$245 million.<sup>82</sup> The total cost of the four-phase master plan for the Jebel Ali terminal at the Port in Dubai, which is scheduled for completion in 2020 and will see the creation of 82 berths equipped with 125 quayside cranes and supporting yard equipment, is expected to amount to \$1.14 billion.<sup>83</sup>

The cost of container vessels is not usually disclosed; however, in February 2003 the price of a newly built vessel with a capacity of 2,450 TEU was listed at \$30.8 million.<sup>84</sup> In the same month, the largest container vessel operator in the world, Maersk Sealand, took delivery of vessels with a total estimated capacity of some 8,100 TEU,<sup>85</sup> with a likely cost in the range of \$80 million to 100 million. Vessels with a capacity of over 5,000 TEU already represent over 16 per cent of present slot capacity and close to 40 per cent of slots on order.<sup>86</sup>

Few ports are equipped to handle such large ships and therefore, an increasing number of containers are being trans-shipped to and from feeder vessels for further transport to and from smaller ports.

<sup>81</sup> The World Bank, "Module 2: The evolution of ports in a competitive world", *World Bank Port Reform Tool Kit*, (Washington D.C., World Bank, 2001).

<sup>82</sup> Matthew Beddow, "Filling the gaps in the Gulf", *Containerisation International Regional Review: Mid-East*, (December 2002), p. 91.

<sup>83</sup> Containerisation International, "Terminal update", (March 2003), p. 41.

<sup>84</sup> Robert Willmington, "World fleet changes in February 2003", *Containerisation International*, (April 2003), p. 17.

<sup>85</sup> *Ibid.*, p. 16.

<sup>86</sup> *Containerisation International Yearbook 2003*, (London, Informa UK, 2003), p. 6. This was the situation as of 1 November 2002.

In 1999, trans-oceanic container vessels carried approximately 49 million TEU, while ports handled some 190 million TEU. This means that each container was lifted an average of 3.8 times in ports, which is up from 2.2 in 1990. It has been estimated that by 2010, containers will be handled an average of 5 times in ports.<sup>87</sup>

This projected development is supported by the fact that in 2000 container handling in ports expanded by 15.4 per cent while world sea-borne trade grew by only 3.9 per cent.<sup>88</sup> In 2001, the annual growth rate of world sea-borne trade was negative for the first time in 15 years, at -1 per cent; nevertheless, port container handling continued to grow by 2.2 per cent to reach 237 million TEU.<sup>89</sup>

Ports must therefore, respond to the challenge of increases in container traffic and the concurrent demand for fast, efficient and predictable clearance of cargo, by introducing competition between terminals in a port, between ports, or both; attracting private capital and management expertise; and streamlining ports and customs clearance procedures. The latter will necessarily include the use of ICTs to automate the exchange of information and handling that is absolutely critical to international trade.

#### C. TRENDS IN THE PORT INDUSTRY

A few decades ago, competition between ports was minimal and port-related costs were insignificant in comparison to the high cost of ocean and inland transport, which means that there was little incentive to improve port efficiency.

However, at present many ports compete with one another at the local, regional and global level. Regionally, this competition is particularly evident in Europe and North America where ports share large hinterlands as a result of the streamlining, and in some cases, total absence of border controls. At the global level, competition is strong between hub-ports such as Hong Kong and Singapore, or between such ports as Aden and Salalah in the ESCWA region, where trans-shipments are important.

In terms of international container trans-shipment, ports in the ESCWA region are able to compete with the highest-ranking ports in the world. This is demonstrated by the Port of Dubai, which handled more than 3.5 million TEU in 2001, and was ranked thirteenth in the world.<sup>90</sup> However, with regard to the handling of domestic traffic, the performance of most ESCWA ports and Customs remains at a much lower standard than that of European and North American ports.

Data on actual port clearance performance is difficult to obtain; however, given that customs clearance is traditionally the dominant part of this process, data related to this aspect of clearance can be utilized instead. In this context, RMD, or the release of cargo on the basis that accounting and reporting will take place at a later date, in one typical modern customs administration was 45 minutes, and was achieved in 80 per cent of cases in the period 2001-2002.<sup>91</sup>

This has yet to be achieved in Lebanon, where customs procedures have undergone a radical overhaul since 1995. Despite the fact that there has been an impressive improvement in the time taken to clear cargo in

<sup>87</sup> E.G. Frankel, "Where the money goes: economics of international trade logistics; opportunities for improvements and cost savings", an unpublished paper, 2001.

<sup>88</sup> UNCTAD, *Review of Maritime Transport, 2002* (UNCTAD/RMT/2002, including Corr.1), pp. ix-x.

<sup>89</sup> *Containerisation International Yearbook 2003*, (London, Informa UK, 2003), p. 9.

<sup>90</sup> *Ibid.*

<sup>91</sup> Canada Customs and Revenue Agency, "Comprehensive discussion of our performance by business line, in support of accountability - 2001-2002 annual report to Parliament". Available at: <http://www.cera-adrc.gc.ca/agency/annual/2001-2002/supplementary-c/Customs.pdf>.

the Port of Beirut, which was reduced from 6.25 days in November 1997, to an average of 3.2 days in April 2003, much work remains to be done before clearance can be achieved in 45 minutes.<sup>92</sup>

In the same vein, the commercial manager of the Siyanco DPA terminal in Jeddah stated that "... it would be safer for shippers to allow between five to ten days for all formalities to be completed". Still, when everything is in order clearance can be accomplished in less than 24 hours, which is still a long time by European or North American standards.<sup>93</sup>

Land transport between neighbouring countries in the ESCWA region is severely restricted and the difficulty or, in some cases, the impossibility of moving containers across borders means that there is no shared hinterland and little competition between ESCWA ports for traffic destined for neighbouring countries.<sup>94</sup>

Containerization will continue to increase in importance, and therefore, so will competition among ports. According to the World Bank, a typical container terminal has a storage density of 250 to 1,250 TEU per hectare (depending on the yard stacking system), 25 to 30 moves per gantry crane per hour, an average container vessel time in port of five to six days and a truck turnaround time of one hour.<sup>95</sup>

Future terminal requirements will be far more demanding. To accommodate the mega container ships, the World Bank predicts that new terminals will require a storage density of 2,500 to 5,000 per hectare, crane productivity of 200 moves per ship per hour at berth, maximum three days average vessel dwell time in port and truck turnaround time of less than 30 minutes.<sup>96</sup>

The growth of container traffic and the increasing reliance on trans-shipments also means that container terminal operations have become big business and therefore more attractive to investors. A relatively new feature in port operations is the growth of specialized international container terminal operating companies. The top four of these, namely, Hutchinson Port Holdings, PSA Corporation, APM Terminals and P&O Ports, operate in more than 90 ports around the world and handled some 67 million TEU in 2000, giving them a market share of approximately 30 per cent.<sup>97</sup>

The majority of ports are structured according to one of the four models that are illustrated in figure IV. These range from fully public to fully private ports with tool ports and landlord ports as intermediary models.<sup>98</sup> The current trend is for public service ports to seek the involvement of the private sector and to move towards becoming either tool or landlord ports.

The next advances in port productivity will be based on institutional reforms of ports that are still hampered by bureaucratic control and operated as monopolies; the simplification of unnecessarily complicated procedures; and the judicious introduction and application of ICT.

<sup>92</sup> Lebanese Customs, "Performance statistics for April 2003" (in Arabic); D. Muller-Jentsch, op. cit.

<sup>93</sup> Matthew Beddow, "All roads lead to Riyadh", *Containerisation International*, (January 2003), pp. 46-47.

<sup>94</sup> Containers destined for Jordan must enter the country through the Port of Aqaba; containers that are trans-shipped from Lebanon to Iraq must be returned by the same truck.

<sup>95</sup> The World Bank, "Module 2: The evolution of ports in a competitive world", *World Bank Port Reform Tool Kit*, (Washington D.C., World Bank, 2001), p. 25.

<sup>96</sup> Ibid., p. 25.

<sup>97</sup> Clive Woodbridge, "The big four", *Containerisation International*, (March 2002); and company web sites.

<sup>98</sup> Tool ports are public authorities, which provide port infrastructure and major equipment, namely, container cranes, and lease the operation of terminals to private companies. Landlord ports are public authorities, which provide port infrastructure and lease terminals to private companies, which provide all necessary equipment for the operations.

Figure IV. Ports: Institutional models

Port Activity	Port Administration	Nautical Management	Nautical Infrastructure	Port Infrastructure	Superstructure (equipment)	Superstructure (buildings)	Cargo Handling Activities	Pilotage	Towage	Mooring Services	Dredging	Other Functions
Public Service Port	Public	Public	Public	Public	Public	Public	Public	Public	Public	Public	Public	Public
Private Service Port	Private	Private	Private	Private	Private	Private	Private	Public	Public	Public	Public	Public
Tool Port	Public	Public	Public	Public	Public	Public	Public	Public	Public	Public	Public	Public
Landlord Port	Public	Public	Public	Public	Private	Private	Private	Public	Public	Public	Public	Public

Legend:  Public Responsibility  Private Responsibility

Source: The World Bank, "Module 1: Framework for port reform", *World Bank Port Reform Tool Kit*, (Washington D.C., World Bank, 2001).

#### D. PORTS IN THE ESCWA REGION

The above-mentioned trends in the international port industry can be witnessed in the ESCWA region and certain ports, namely, the Port of Dubai, rank among the top container ports in the world in terms of throughput.

The ESCWA region is strategically located on the busy trade route between Asia and Europe, and several ports have taken advantage of this situation to develop into trans-shipment hubs. Nearly half the cargo handled at the Jebel Ali and Rashed terminals of the Port of Dubai for example, is trans-shipment cargo. Other ports that focus on trans-shipment are Khorfakkan in the United Arab Emirates, the Port of Salalah in Oman and the Port of Aden in Yemen.<sup>99</sup>

The trend towards container terminals being operated by large specialized international companies is also evident in the ESCWA region. DPA created a subsidiary, Dubai Ports International (DPI) in an effort to become a player on the international port management scene. DPI is currently involved in the operation of terminals in Jeddah, Saudi Arabia and Djibouti in the Horn of Africa.<sup>100</sup>

Other regional ports where international terminal operating companies manage terminals include Aden, where PSA Corporation is operating a container terminal.<sup>101</sup> APM Terminals, which belongs to the same family of companies as Maersk Sealand, have leased the Port of Salalah, and is also involved in the Suez Canal Container Terminal in Port Suez East.<sup>102</sup>

<sup>99</sup> Matthew Beddow, "Filling the gaps in the Gulf", *Containerisation International Regional Review: Mid-East*, (December 2002), pp. 90-93.

<sup>100</sup> DPA, "Dubai ports achieve growth in global container throughput" (23 March 2003). Available at: [http://www.dpa.co.ae/news/news\\_6.html](http://www.dpa.co.ae/news/news_6.html).

<sup>101</sup> PSA. Available at: <http://www.psa.com.sg/>.

<sup>102</sup> APM Terminals, "Salalah". Available at: <http://www.apmterminals.com/Global+Terminals/Asia/Salalah/Terminal/>.

However, despite the movement towards the landlord model region, many local ports are still public service monopolies.

The competitive situation among the load centres serving the Arabian Peninsula is shown in figure V.

ESCWA member ports that wish to perform better and become more competitive must remove the artificial barriers. This applies in particular to the ports that primarily serve the region with little or no competition.

Governments must also work towards the reduction and eventual elimination of artificial trade borders with the objective that ports will eventually share a larger hinterland. With more competition, thereby generating benefits for exporters, importers and the region.

In addition, Governments must encourage the private sector to pursue the goals of attracting foreign and local investment and enabling ports to benefit from their own experience.

With regard to port reform, proper regulations or competition should be considered, rather than being replaced with a private one.

**Figure V. Competition for the Arabian Peninsula**

**Load Centers Competing for the Arabian Peninsula Market**

Several major ports are positioning to be points of entry and exit for containers to and from the Arabian Peninsula. It is producing a fierce competition for load center status. The outcome of this competition could significantly change the way ocean carriers service the Arabian Peninsula market.

**Dubai** — The port has established itself as a world-class transshipment hub serving the Arabian Peninsula load center for markets in the Arabian Gulf. Dubai now handles about 2.8 million TEUs annually, about a quarter of which is transshipment traffic within the Gulf, with Saudi Arabia, Kuwait and Iran the major destinations. The port authority clearly plans to expand its role in current transshipment markets, as well as position as the load center for the Arabian Gulf. Containers to and from Iraq once trade resumes. As part of its strategy to control market position, the port has been acquiring management contracts for other ports in the region, effectively gaining control over regional logistics networks.

**Salalah/Aden** — These two new transshipment hubs on the Arabian Sea clearly have designs on being load centers for the region. Their major advantage is proximity to the Europe/Asia trunk line route. Both require little diversion by line haul ships, allowing a quick pit stop to pick up and drop off containers for the Arabian Peninsula and Indian/Pakistan markets. Already, the two new ports have drawn transshipment traffic that had previously been captive to Dubai and Colombo - and have drawn some transshipment traffic from Jeddah. The terminal operators have made major investments in these facilities and obviously intend to promote their presence in the region.

**Jeddah** — This port now largely services the Saudi market and only 20 percent of containers through the port are for transshipment. However, the proposed rail link to the bridge to Dammam could enable the port to function as a load center for the Arabian Gulf market. The investment in infrastructure is substantial and major hurdles are being overcome, particularly establishing a process for allowing transit containers to move freely across the country without regard to contents. But if the rail investment is made and the hurdles resolved, Jeddah could be a major contender for traffic to and from the Arabian Gulf.

**Beirut** — Then there's the new container terminal in Beirut that will begin operations in late 2000. This terminal has the potential to become the major load center for containers moving between the Arabian Peninsula and Europe/North America. Cross-border issues are hurdles that must be resolved. But use of Beirut as a load center will allow a direct passage through the Suez Canal and save 3,400 miles sea voyage to the western Arabian Gulf.

Source: The World Bank, "Module 1: Framework for port reform", World Bank (2001).

ESCWA has been promoting the establishment of NTTFCs for some time, with the objective of institutionalizing the crucial public-private sector consultation process, and has also published a manual for establishing such committees.<sup>106</sup>

## F. PORT SECURITY

A number of security initiatives were initiated following the events of 11 September 2001 in the United States. Some measures were initially developed by the United States Customs and others subsequently by the World Customs Organization (WCO) and IMO.

### 1. Security: United States Customs and border protection

The Container Security Initiative (CSI) of United States Customs is expected to have an impact on container traffic in all parts of the world in the future.<sup>107</sup> CSI involves the following four core elements:

- (a) Utilizing intelligence and automated information to identify high-risk containers;
- (b) Pre-screening high-risk containers at the port of departure, prior to arrival at ports in the United States;
- (c) Utilizing technology to pre-screen high-risk containers swiftly;
- (d) Developing and utilizing tamper evident containers.

The first phase targeted the 20 ports that shipped the highest number of containers to the United States. As of June 2003, 18 of these ports had agreed to participate in CSI and United States Customs officials have been stationed in several of these.<sup>108</sup> In addition, CSI has been deployed in Canada, Malaysia and Sweden and will be expanded to at least 11 other ports.<sup>109</sup>

To qualify for participation in CSI, the Customs administration of a country must be able to do the following:

- (a) Inspect cargo originating from, or being trans-shipped through the country;
- (b) Maintain or be in the process of acquiring non-intrusive inspection equipment, namely, large X-ray type systems, to conduct security inspections;
- (c) Ensure that its seaports maintain regular, direct and substantial container traffic to ports in the United States.

Whilst CSI adds complexity to the international trade flow, it does make the use of containers for the transportation of illegal weapons of mass destruction more difficult. Moreover, CSI-verified containers are cleared faster once they arrive at an American or Canadian border point.

<sup>106</sup> ESCWA, (E/ESCWA/TRANS/2002/3/Rev.1) (in Arabic).

<sup>107</sup> Government of the United States, Department of Homeland Security, "Container security initiative (CSI)". Available at: [http://www.Customs.treas.gov/xp/cgov/import/cargo\\_control/csi/](http://www.Customs.treas.gov/xp/cgov/import/cargo_control/csi/).

<sup>108</sup> Government of the United States, Department of Homeland Security, "CSI: Phase I ports". Available at: [http://www.Customs.ustras.gov/ImageCache/cgov/content/import/cargo\\_5fcontrol/csi/ports\\_5fcsi\\_5flandscape\\_2eppt/v6/ports\\_5fcsi\\_5flandscape.ppt](http://www.Customs.ustras.gov/ImageCache/cgov/content/import/cargo_5fcontrol/csi/ports_5fcsi_5flandscape_2eppt/v6/ports_5fcsi_5flandscape.ppt).

<sup>109</sup> Government of the United States, Department of Homeland Security, "Container security initiative guards America". Available at: [http://www.Customs.ustras.gov/xp/cgov/import/cargo\\_control/csi/csi\\_factsheet.xml](http://www.Customs.ustras.gov/xp/cgov/import/cargo_control/csi/csi_factsheet.xml).

EU trade and taxation commissioners have expressed the concern that "offering advantages in the USA to containers coming from a few ports only will have a significant impact on trade patterns and could lead to recriminations damaging to our commercial exchanges".<sup>110</sup> Nevertheless, other ports have agreed to join CSI, including Antwerp, Bremerhaven, Hamburg, Le Havre and Rotterdam in Europe, and the Port of Singapore in Asia.

United States Customs has also introduced a voluntary Government-business initiative, known as C-TPAT, to strengthen overall supply chain and border security (see chapter III, section B).

Businesses must apply to participate in C-TPAT and participants must sign an agreement that commits them to conduct a comprehensive self-assessment of supply chain security using guidelines that have been jointly developed by United States Customs and the trade community. These guidelines encompass procedural, physical and personnel security; education and training; access control; manifest procedures; and conveyance security.

In addition, participants must submit a supply chain security profile questionnaire to United States Customs; develop and implement a programme to enhance security throughout the supply chain in accordance with C-TPAT guidelines; communicate C-TPAT guidelines to other companies in the supply chain; and work towards integrating the guidelines into relationships with these companies.

In return for these commitments, United States Customs offers participants a number of benefits, including a reduced number of inspections, or reduced border times, and an emphasis on self-policing rather than customs verifications.

### 2. Security: World Customs Organization

In June 2002, the Resolution of the Customs Cooperation Council on Security and Facilitation of the International Trade Supply Chain was passed.<sup>111</sup>

The Resolution, which is similar to CSI, states that "Guidelines are developed for cooperative arrangements between Members and private industry to increase supply chain security and facilitate the flow of international trade" and that "Guidelines are developed to assist Members in developing a legal basis and other necessary steps to enable the advance electronic transmission of Customs data".

An international task force of customs experts and representatives from inter-governmental organizations, non-governmental organizations (NGOs) and private sector interests involved in trade and transport submitted proposals to the WCO Council in June 2003, regarding the following issues:

- (a) The 27 data elements required by customs administrations to identify high-risk consignments; the manner in which such information can be obtained; and the earliest possible time it can be provided, by mode of transport;
- (b) A draft international convention, designed to enable the exchange of information and the provision of assistance between customs administrations;
- (c) Draft international guidelines concerning customs/business cooperation.

The WCO is also in discussion with the World Bank and other international donor institutions concerning the need to assist in the capacity-building of customs administrations in developing countries,

<sup>110</sup> Carter Dougherty, "A broad security measure", *The Washington Times*. Available at: <http://asp.washtimes.com/printarticle.asp?action=print&ArticleID=20020901-6608535>.

<sup>111</sup> WCO, "Resolution of the Customs Cooperation Council on Security and Facilitation of the International Trade Supply Chain". Available at: <http://www.wcoomd.org/ie/En/Press/Declaration%20Final%20Council%20June%202002%20-%20E.html>.

with the goal that "Customs administrations would be better positioned to play a significant role in poverty reduction and economic and trade security".<sup>112</sup>

### 3. Security: International Maritime Organization

A comprehensive regime for international shipping is set to enter into force in July 2004. The most far reaching initiative in this regard is a new International Ship and Port Facility Security Code, which contains detailed mandatory security-related requirements for Governments, port authorities and shipping companies, in addition to a series of guidelines concerning means of meeting these requirements.

In essence, the Code operates on the basis that ensuring the security of ships and port facilities is a risk management activity and therefore, to determine what security measures are appropriate, an assessment of the risk must be made in each particular case. However, the Code will include a number of minimum functional security requirements for ships and ports which are related to security plans; security officers; certain security equipment; and monitoring and controlling of access, and activities of people and cargo.<sup>113</sup>

### 4. Impact of transport security initiatives on ESCWA member countries

Certain aspects of the security initiatives that are being developed or implemented are of particular relevance to ports in the ESCWA region. In this context, the following points can be noted:

(a) The trend towards increased security will not be limited to ports in the United States, and an increasing number of countries can be expected to adopt stricter measures in this regard;

(b) The trend towards performing risk analysis and subsequent inspections in the port of departure rather than in the port of arrival can, as noted by EU trade and taxation commissioners, disrupt trade patterns with a potentially negative impact on ports in the ESCWA region;

(c) The trend towards increased security will entail more delays and more complex procedures. The strong linkage of security and facilitation has created a new challenge in trade and transport systems. However, ports can turn this challenge into an opportunity to increase efficiency and productivity by introducing such modern customs procedures as computer assisted risk management; by applying ICT techniques, including EDI; and by establishing better gate controls at terminals for cargo, vehicles and people.

Measures that will improve both port efficiency and security include the following:

- (a) Stuffing and sealing containers at the plant of the shipper rather than in the port;
- (b) De-stuffing containers at the facility of the importer rather than at a port terminal;
- (c) Receiving cargo plans and manifest information electronically, prior to the arrival of a vessel;<sup>114</sup>
- (d) Tracking the movement of incoming and outgoing cargo;

<sup>112</sup> WCO, "Future security and facilitation of the international trade supply chain takes shape under guidance of Customs task force", a press release, (14 February 2003). Available at: [http://www.wcoomd.org/ie/En/Topics\\_Issues/FacilitationCustomsProcedures/taskforce\\_14feb\\_E.html](http://www.wcoomd.org/ie/En/Topics_Issues/FacilitationCustomsProcedures/taskforce_14feb_E.html).

<sup>113</sup> IMO, "IMO urges early implementation of maritime security measures". Available at: <http://www.imo.org/home.asp>.

<sup>114</sup> A new United States Customs requirement states that manifest information must be submitted 24 hours before vessel departure. This is a difficult requirement and one that is unpopular with many American shippers. It may eventually be relaxed.

(e) Maintaining the accuracy of information received, including the shipper and consignee name and address; first and second notifying parties; and description, weight, quantity and unit of measure of the cargo being cleared.

The appropriate application and the efficient use of ICT in general, and EDI in particular must be ensured to accomplish the majority of the above-mentioned goals.

### G. ICT IN PORTS

Most areas of port and terminal management can benefit from ICT, including vessel traffic control, planning and optimization of terminal space, utilization of equipment, and entry and exit control of goods and conveyances. In addition, most aspects of financial administration, human resource management, engineering and maintenance are accomplished using different applications of ICT.

#### 1. Terminal management systems

Within the context of terminal management systems, a number of functionalities are reviewed in greater detail in the subsections below, including the harbour master functions of managing and supporting the vessel traffic in and out of the port; stowing and unloading vessels; optimizing the use of equipment, conveyances and people at the terminal; planning the utilization of vessels, container yards and depots; controlling the traffic in and out of the port and terminal; and coordinating and integrating upstream and downstream traffic and information flows.

#### (a) Commercial systems

A number of companies supply terminal management software solutions and support. Navis is generally considered the leader in the field; its products have been installed in more than 150 terminals and nearly 200 ship planning stations in 34 countries.<sup>115</sup> Navis solutions are used by DPA and Port Zayed in the United Arab Emirates; Salalah Port Services Company in Oman; terminals in the Ports of Damman and Jeddah in Saudi Arabia; and by the new Port of Ain Sukhna in Egypt. Navis functionalities are reviewed in greater detail in box 18.

The competitors of Navis include the Indian company CMC, whose marine container handling (MACH) software is installed in terminals at the Port of Felixstowe in the United Kingdom of Great Britain and Northern Ireland, Bremerhaven in Germany, the Mumbai Port Trust in India, and the Port of Klang Container Terminal in Malaysia.<sup>116</sup> In the ESCWA region, CMC software is installed in the Port of Fujairah in the United Arab Emirates. Portnet, a subsidiary of PSA Corporation, has also developed a terminal system, which is installed in the Port of Aden, Yemen.<sup>117</sup>

Other companies that provide software solutions for ports in general, and container terminals in particular, include Cosmos of Belgium, which despite being Navis' strongest competitor, does not seem to have been installed in the ESCWA region.<sup>118</sup>

<sup>115</sup> Navis. Available at: <http://www.navis.com>.

<sup>116</sup> CMC, "Ports and cargo". Available at: [http://www.cmcltd.com/ports/pnc\\_mach.htm](http://www.cmcltd.com/ports/pnc_mach.htm).

<sup>117</sup> Portnet.com. Available at: [http://www.portnet.com/esolutions\\_1.htm](http://www.portnet.com/esolutions_1.htm).

<sup>118</sup> Cosmos. Available at: <http://www.cosmos.be>.



**Box 18. Navis resource optimization technology for transportation and logistics**

Integrated Navis products are briefly reviewed below:

(a) *Navis PowerStow*

This product enables multi-port vessel stowage planning; EDI transmissions; ship stress and stability calculations; hazardous cargo segregation management; graphical vessel views; detailed error checking; real-time container information; cargo stowage restriction management; and port rotation management. PowerStow provides graphical views of a ship and its container bays to facilitate the planning process.

(b) *Navis Express*

The key features of this product include gate operations management; import/export processing; bookings management; integrated EDI support; work order management; vessel, rail and yard operations management; equipment management; billing and accounting system interface; container freight station management; and break-bulk and roll-on/roll-off cargo management.

(c) *Navis SPARCS*

This product incorporates graphical planning and control software for terminal operations with otherwise similar functionalities as Navis Express.

(d) *Navis WebAccess*

This is a customer service product; its characteristics include access to a wide range of standard reports, namely, detailed accounts of gate transactions. It also ensures that truck, container and booking problems can be tracked online. Other features include the ability to create a Customs report by downloading data to a spreadsheet programme. Furthermore, customers can enter data regarding delivery requirements and schedule gate appointments for pick-ups and deliveries; upload and download EDI files and request automatic notification regarding more than 200 events, including the discharge of a container from a vessel or a train. WebAccess also entails provisions for online payments of storage fees by credit card or by guarantee.

(e) *Navis Depot*

This is a fully functional depot management system, available entirely over the Web. This model requires minimal up-front capital investment, while per transaction pricing eliminates the inherent risks of typical software system purchases. The main features of this product include, system support maintenance, ability to perform administrative tasks, namely, back up and recovery, EDI support and system upgrades. Truckers, surveyors and adjacent terminal operators benefit from a system that ensures secure equipment visibility and the availability of Web services technology at all times.

(f) *Navis DC*

The features of this product include real-time graphical interface to build and view inbound and outbound dock appointments and to plan and optimize the use of loading docks and yard space based on priority queues and business rules. The system also provides real-time visibility of trailers and their contents, in addition to tracking status and trailer moves in the yard.

Source: Navis. "Products and solutions overview". Available at: [http://www.navis.com/prod\\_sol\\_overview.jsp](http://www.navis.com/prod_sol_overview.jsp)

ACIS is a set of computer applications that are designed to produce management information regarding issues related to cargo and transport equipment of all modes, and at the interfaces of different transport modes. ACIS comprises a number of modules, the purpose of which are to track transport equipment and cargo in and out of ports, along and within railways, on lakes and possibly on roads. The port and rail tracking modules are developed and installed in several African and Asian countries.

ACIS comprises four modules that pertain to various modes of transport, namely, PortTracker, RailTracker, RoadTracker and LakeTracker. In addition, a TrackerInterface module manages the exchange of information between ACIS and other information systems, including port management information systems, customs systems and various clearing and forwarding systems. PortTracker includes many of the same features as other commercial terminal operating systems, see box 19.

**Box 19. ACIS PortTracker**

The ACIS port system, PortTracker, comprises the following modules:

(a) *Harbour master*

This covers the boarding of a pilot to the mobilization of tugs and mooring gangs, berthing and subsequent occupation at a quay. It also covers the various services provided to the ship during its stay in port until final sailing.

(b) *Electronic manifest transfer*

This enables ship owners/brokers/shippers to receive and transmit electronically manifest data to and from carriers, their agents and other interested parties, using the UN/EDIFACT standard manifest message.

(c) *Cargo handling*

This sub-module for general and break bulk cargo comprises storage and warehousing, including the assignment of gangs and handling equipment. It monitors these operations by producing time sheets and shift reports, and also by reporting on the utilization and availability of cranes and forklifts. In addition, it prepares maintenance schedules.

(d) *Gate-pass*

This module monitors goods entering and exiting the port, and provides a link to bill of lading and hinterland connections.

(e) *Interface*

This gives operators and clients the option of interfacing with the above-mentioned sub-modules to exchange data among shippers, agents, Customs, stevedores, freight forwarders and road and rail transporters.

(f) *Statistics and performance indicator*

This module provides indicators based on operational information, and has been adapted from the UNCTAD Uniform System of Port Statistics and Performance Indicators. It automatically produces standard daily, weekly, monthly, quarterly, annual and special frequency reports. It also permits users to define specific statistical or operational reports for internal port management purposes or reports that might be requested by national maritime authorities, councils of shippers or Ministry data banks.

(g) *Port billing*

This sub-module is based on operational information provided by the system;

(h) *Container terminal inventory control system*

This monitors container movements and handling operations from ship to delivery or vice versa, including storage, and where appropriate, container stripping and stuffing. This module is available as an associate package developed by a commercial terminal;

(i) *Port equipment maintenance monitoring system*

This is available as an associate package from a commercial source, and uses the same architecture as PortTracker.

(b) *Advance Cargo Information System*

UNCTAD developed the Advance Cargo Information System (ACIS) after conducting studies in the late 1980s on the physical and non-physical obstacles in the transport chain in certain developing countries, in particular, the issues and challenges related to the transportation to and from landlocked countries in Africa.

ACIS is funded from multi- and bilateral sources including the EU and the World Bank, and increasingly from national operators themselves. The system can be installed in any country that requests it provided that the appropriate trust fund is set up within UNCTAD.

(c) *In-house systems*

Many companies prefer to remain in control of their own computer systems, with the objective of being able to respond more appropriately to the uniqueness of the layout of a terminal and its operations, and to be in a position to adapt more easily to continuous changes.

For example, Terminal Systems Inc. (TSI), which operates two terminals, and which maintained a combined activity of approximately 1,200,000 TEU in 2002, has always used its own software for yard planning.<sup>119</sup> While TSI previously used Navis SPARCS for vessel planning at one of its terminals, it has now written its own application for that functionality, for a total cost of some \$750,000. The TSI manager of information systems gave the following reasons for the decision to write a new vessel planning software package rather than using Navis SPARCS:

(a) Ensuring lower costs: The cost of Navis is high. Installing the SPARCS vessel planning software costs an estimated \$600,000 to 1.3 million. In addition, 20 per cent of the initial cost is charged every year as maintenance cost;

(b) Facilitating problem solving: A company that writes its own software can normally sort out any problems that occur in-house without resort to a third party;

(c) Satisfying unique needs: A company that writes its own software can tailor it to its own terminal, rather than having to tailor terminal operations to fit the software;

(d) Adapting to changes: In-house software can be adapted much more quickly to changing market conditions or developments in the terminal, for example, the addition of new automation systems.

TSI has sold its vessel planning software to three other container terminals in North America.<sup>120</sup>

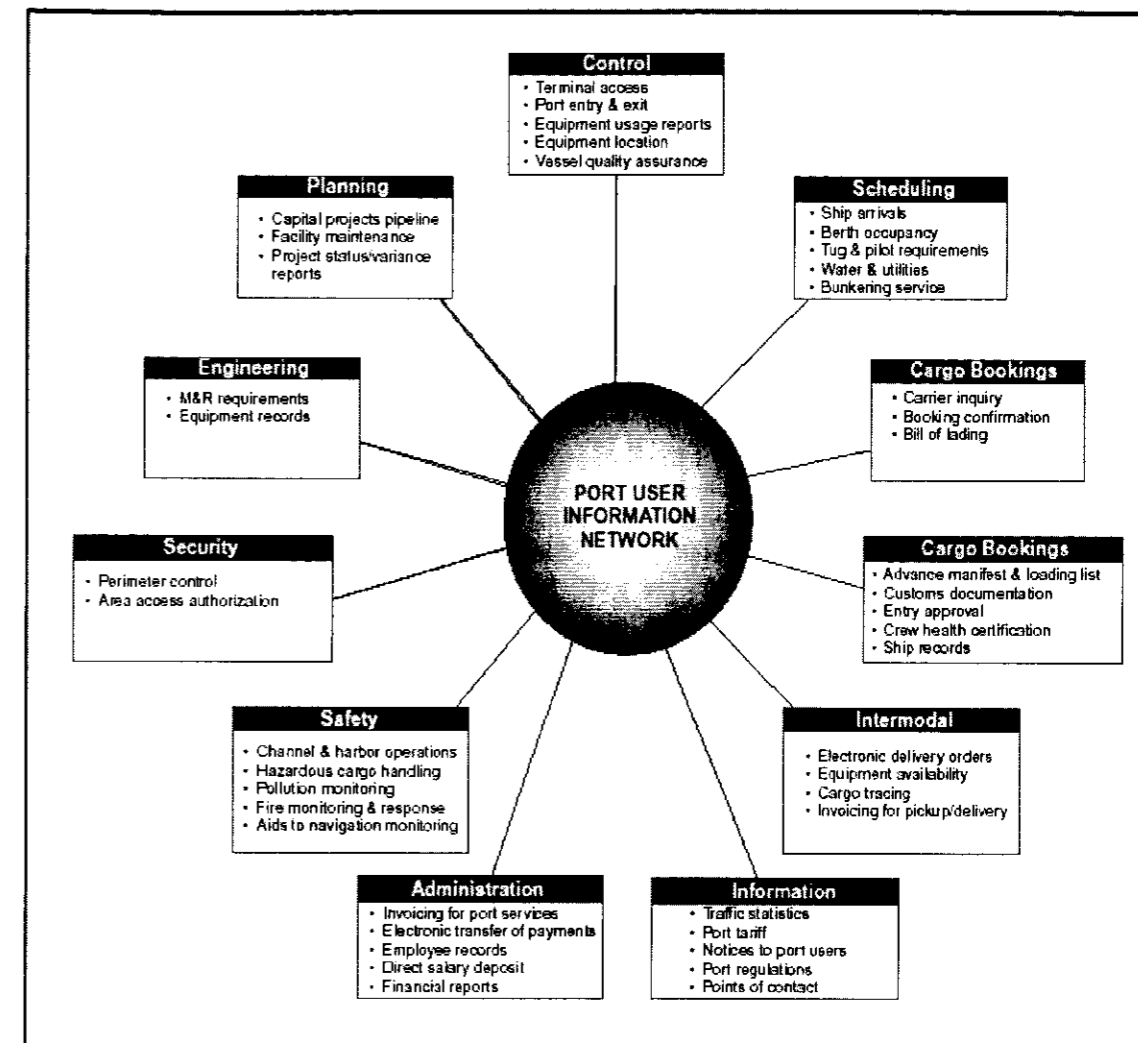
2. *EDI implementation in ports*

EDI is of particular interest to ports owing to the importance of efficient information exchange among the many independent, yet inter-dependent stakeholders to ensure a smooth flow of cargo. Whereas this has always been the case, it is now being further emphasized by new container security initiatives that require border control agencies to be able to evaluate risks through an early evaluation of manifest information.

However, despite the fact the EDI is a simple concept, which entails many benefits, it is not easy to implement and it is often costly. The primary difficulty in this regard is the need for trading partners to agree in great detail on each piece of information that must be exchanged. Data elements and code lists must be aligned; internal databases must be adjusted to correspond to the data elements that will be received; and automated business rules must be agreed upon. Agreements must also be reached regarding performance standards and liabilities and also on how to handle errors and conflicts. The difficulty of this task increases with the number of trading partners that are involved in the EDI exchange.

To address these difficulties, port EDI community systems have been established to implement EDI in ports and among port users. Port community systems link port administrations, terminal operators, truckers, customs, freight forwarders, ship agents and other members of the port community (see figure VI).

Figure VI. Members and activities: Port community system



Source: World Bank, "Module 2: The evolution of ports in a competitive world", *World Bank Port Reform Tool Kit*. (Washington D.C., World Bank, 2001).

Port authorities have often been instrumental in establishing such community systems. In some cases the port authority has acted as a facilitator in uniting stakeholders and enabling them to define appropriate EDI services for each community and negotiate contracts with third party service providers. In other cases, ports have established organizations that provide both networks and e-commerce services for the benefit of members of the port community. Some of the best known of these community systems include the following:

- (a) Maritime Cargo Processing in Felixstowe, United Kingdom;<sup>121</sup>
- (b) Seagha in the ports of Antwerp, Zaventem and Zeebrugge, Belgium;<sup>122</sup>
- (c) Portnet in the Port of Singapore.<sup>123</sup>

<sup>121</sup> Maritime Cargo Processing. Available at: <http://www.mcpplc.co.uk/html/corefrm.html>.

<sup>122</sup> Seagha. Available at: <http://www.seagha.com/>.

<sup>123</sup> Portnet.com. Available at: <http://www.portnet.com>.

<sup>119</sup> Terminal Systems Inc. (TSI). Available at: <http://www.tsi.bc.ca/>.

<sup>120</sup> Karl Jeffery, "Recent developments in information technology for container terminals", Cargo Systems, (London, IIR Publications Ltd., 1999).

A group of major container carriers has established the Information System Agreement to facilitate the implementation of EDI in the maritime industry. This system includes implementation guides for some 20 EDI messages related to maritime and container transportation.<sup>124</sup>

#### H. CONCLUSION

There are several modern container ports in the ESCWA region, which are successfully competing with the best in the world. However, the majority of local ports serving domestic markets are still public monopolies that face little or no competition. Handling and clearing procedures are reported to be slow, inefficient and characterized by red tape.

ESCWA member countries that wish to benefit from globalization must ensure that efficient trade regimes are put in place. Governments and private entities in the trade and transport sectors must coordinate to define and implement reforms to modernize customs and port authorities.

The manual, paper-based handling and transmission of information is possibly the biggest bottleneck and the greatest source of errors and delays in international trade. Port communities, including customs, must implement EDI to improve the flow of information. EDI ensures pre-arrival submission of manifest information and better risk management, which are requirements of the new container security measures.

Considerations must be given to the container traffic security measures that are being introduced in order to turn this new challenge into an opportunity. This can be achieved through the proactive introduction of better procedures and appropriate technologies in ports rather than to wait for them to be imposed from outside.

## V. CONCLUSIONS AND RECOMMENDATIONS

### A. INTRODUCTION

ICT and trade and transport environment issues are discussed, and recommendations pertaining to the successful implementation of trade and transport facilitation in the ESCWA region are reviewed below.

#### (a) *ICTs*

Issues that fall under this banner include information retrieval, storage, processing, automation and transmission based on ICT and e-business practices. Modern ICT and e-business practices are recommended according to their ability to eliminate inefficient formalities, transmission delays, transcription errors and red tape; and automate routine and repetitive manual tasks undertaken in public administrations that deal with international trade, particularly Customs and ports.

#### (b) *Trade and transport environment*

Issues that fall under this banner include quality of service, ownership structure, management and performance of public and private organizations involved in international trade and transport; human and institutional resources; availability of international transport and logistic services; physical infrastructures and facilities; and the readiness to use ICT and e-business effectively. Trade and transport environment issues are recommended according to their ability to reduce obstacles related to the management, interoperability and interconnectivity of international supply chains; to provide appropriate transport services, infrastructures and facilities; and to improve the legal and regulatory framework.

### B. ICT AND E-BUSINESS APPLICATIONS

#### 1. *ICT and e-business in customs*

The experiences of Lebanon with regard to ASYCUDA and that of PCFC Dubai, in relation to the Mirsal system, have been very positive. ICT and e-business applications that have been implemented have improved the efficiency of Customs procedures and practices; rendered Customs control and clearance more effective; enabled Customs laws to be processed in a more uniform and consistent manner; ensured that traders receive faster, more uniform and transparent services; and ensured that revenue collection is more efficient, and that trade data capture and analysis is more effective, resulting in more precise trade statistics. In Lebanon, reforms pertaining to Customs reduced the average clearance time for consignments imported through the Port of Beirut, from 6.3 days in November 1997 to 3.2 days in April 2003. However this achievement, while impressive, is still a long way from the average clearance time of less than 45 minutes, which was achieved for 80 per cent of consignments by a modern Customs administration in North America in 2001-2002.

Indeed, a great deal remains to be achieved in the ESCWA region with regard to ensuring timely clearance and the effective enforcement of procedures on a par with advanced trading nations. The appropriate application of ICT is a key element in meeting these goals. However, it must be noted that automating a manual process does not necessarily make a customs administration more productive; it has been observed that when customs automate an ineffective process, it simply gets poor results faster.

Within this context, customs administrations are recommended to do the following:

(a) Modernize and simplify business processes in close consultation with the trading community and customs staff before initiating an automation process;

(b) Develop and implement performance criteria to ensure that progress can be monitored and measured;

(c) Consider ASYCUDA system when evaluating modernization and new ICT solutions.

<sup>124</sup> Washington Publishing Company, "ISA ocean transportation EDI implementation guides". Available at: [http://www.wpc-edi.com/Ocean\\_40.asp](http://www.wpc-edi.com/Ocean_40.asp).

## 2. ICT and e-business in ports

Ports are the nodes and friction points of international trade; they are also critical links in the international supply chain. Most areas of port operation and management, from the traffic control of vessels, planning and optimization of terminal space and utilization of equipment, to the entry and exit control of goods and conveyances, can be rendered more efficient by the appropriate application of ICT and e-business solutions. In addition, most aspects of financial administration, human resource management, engineering and maintenance are accomplished or supported by ICT applications.

This study reviews the use of terminal management systems in ports in the ESCWA region. In this regard, ports can choose a commercially available system, or develop an in-house solution. Smaller ports in particular, need to consider ACIS, the port management system that was developed by UNCTAD.

The current emphasis on security, intelligence and risk assessment underlines the necessity of implementing ICT tools and techniques in ports. For example, the new Container Security Initiative (CSI) requires manifest information to be transmitted to United States Customs 24 hours before a container heading to the United States is loaded onto the carrying vessel. Therefore, it must be possible to transmit manifest information electronically in EDI format. As of July 2003, the CSI initiative only affected ports that ship directly to the United States; however, it is expected that its influence will spread to other countries and ports sooner rather than later.

Within this context, port authorities are recommended to do the following:

- (a) Introduce security, intelligence and risk assessment systems in all major ports in the region, along the lines of CSI and in accordance with the recommendations being developed by WCO;
- (b) Facilitate or establish electronic port community systems for EDI communication among port administrations, terminal operators, truckers, customs, freight forwarders, ship agents and other trading partners in close cooperation with all port stakeholders;
- (c) Consider ACIS when evaluating modernization and new ICT solutions.

## 3. ICT and e-business in SCM

The successful application of ICT to SCM is a key development that has made the globalization of manufacturing and distribution possible. This in turn has been one of the driving forces of the growth of international trade and transport during the past three decades.

The application of ICT supports the integration of the three main elements of SCM, namely, business processes, management components and the supply chain structure.<sup>125</sup> Modern ICT ensures that instant information concerning new market demand is provided down the supply-chain from retailers, to manufacturers and onto suppliers to initiate JIT production and delivery. This means that products are pulled through the supply chain (demand-driven) instead of being pushed (supply driven). Therefore, SCM has the ability to reduce lead-times and transaction costs, and to eliminate the need for expensive buffer-stocks.

ICT and e-business plays a pivotal role in SCM. Computers and communication technologies can be utilized to deliver market information and product specifications; execute payments; automate administrative and planning functions; track vehicles and cargo in real time; and transmit trade and transport related documents in electronic form.

<sup>125</sup> This is expressed in the central definition of SCM: "supply chain management is the integration of business processes from end user through original suppliers that provides products, services and information that add value for customers". M.C. Cooper, D.M. Lambert and J.D. Pagh, op. cit., p. 2.

SCM is not restricted to private enterprises. Public organizations and authorities that provide products, services and information can also benefit from the integration of supply chain operations.

Within this context, the following recommendations can be made:

- (a) State-owned airlines, airports and seaports must be mandated to facilitate trade and transport and apply SCM concepts to the modernization of organizational structures and working procedures;
- (b) Governments must permit and enable electronic transmission of information between Government agencies, and between themselves and the private sector.

## 4. Electronic data interchange and the Internet

EDI offers solutions to bottlenecks in the flow of goods, which arise as a result of errors and delays related to the documentation required for clearing consignments in ports and at border crossings. EDI is used to transmit purchase orders and transport documents, to transfer funds, and to track cargo and containers. The benefits of EDI include the fact that information can be transmitted at high speed and at low cost; data can be automatically integrated into internal databases and applications, thus saving the time and expense associated with manual data entry; and data accuracy and integrity can be preserved.

EDI messages are usually transmitted over VANs, which offer services such as authorization, authentication, confidentiality, integrity, security and non-repudiation of origin. However, the open and easily accessible Internet has emerged as an attractive alternative for SMEs. In this regard, specialized companies, such as, Bolero, provide services that are similar to those of traditional VANs.

The international EDI standard is UN/EDIFACT. A new EDI standard, ebXML, specifically designed for data transmission over the Internet and display in a browser, is being developed and will provide electronic tools for a full range of Internet based business processes.

Within this context, customs and ports are recommended to do the following:

- (a) Implement UN/EDIFACT for the transmission of bills of lading and manifests, container loading plans, customs declarations and other common trade documents;
- (b) Utilize the Internet for communication, and for the sake of transparency, use the Web to provide information to the public and to users regarding customs tariffs and procedures, working hours, contact information and facility descriptions;
- (c) Utilize the Internet and other appropriate techniques, including DTI, to facilitate electronic information exchange between themselves, Government agencies and small traders and agents.

## C. THE TRADE AND TRANSPORT ENVIRONMENT

### 1. Simplification of procedures and legislative reform

In many ESCWA member countries, traders and transporters are faced with a bewildering and time-consuming array of red tape and bureaucratic procedures that involve a multitude of documents, authorizations and signatures, and which are often aggravated by a lack of clear and predictable rules and a frequent need to pay unofficial fees to get the work done. This means that local manufacturers and consumers must carry the cost of inefficient trading procedures. These costs can be substantial and can lower the living standards of ordinary people, discourage investment and make local products uncompetitive in foreign markets. In addition, unpredictable delays at border crossings increase inventory costs and make it difficult, if not impossible, to apply modern SCM techniques.

ICT enables Government organizations, customs and ports to automate many procedures, and to improve the delivery of services and the enforcement of rules and regulations. However, before applying

ICT, proper attention must be afforded to simplifying, harmonizing and standardizing the underlying processes.

Within this context, Governments are recommended to do the following:

- (a) Ensure that governmental procedures, transactions and regulations are rendered more transparent by making trade and transport information available electronically, preferably on the Internet;
- (b) Modernize their regulatory frameworks, and initiate reforms of State-owned transport entities;
- (c) Harmonize trade and transport laws, and technical standards;
- (d) Establish joint customs facilities at adjacent land border crossing points;
- (e) Reduce the number of required steps, signatures, official stamps, endorsements and documents.

#### *2. National Trade and Transport Facilitation Committees*

NTTFCs are forums for public-private sector consultation. From a Government perspective, NTTFCs serve to gain the trust and cooperation of the transport and trading community and ensure that proposed reforms meet the need for speed, predictability, cost effectiveness and transparency. NTTFCs also serve as vehicles for Governments to communicate with trading communities and to receive feedback on proposed regulations and procedures. From the perspective of the trading community, NTTFCs are a means of lobbying and educating Governments and public sector administrators regarding trade and transportation problems and the cost caused by excessive red tape and cumbersome procedures in terms of money, time and lost opportunities. A NTTFC can also be a vehicle for the private sector to propose reforms to the Government and to participate as a partner in their implementation.

Within this context, Governments are encouraged to establish NTTFCs, which will be regionally coordinated by ESCWA.

#### *3. Multimodal transport*

Neither the wider economy of the ESCWA region, nor the more narrow trading community can enjoy the full benefits of trade and transport facilitation without an efficient multimodal transport system that spans the region and beyond.

In contrast to unimodal transport, multimodal transport has decisive advantages in that it permits greater route and mode flexibility, which increases customer choice without a direct need to increase the stock of physical infrastructure; increases competition between transport modes; unlocks unimodal network externalities like capacity constraints and congestions and provides incentives to improve service levels, reduce costs and cut prices.

Some state-owned transport operators in the ESCWA region, in addition to ports and airports, lack modern facilities and equipment that are capable of accommodating containerized multimodal door-to-door transport. Addressing this issue is vital; however, more importantly, rules and regulations must be harmonized, standardized and streamlined in advance to establish a transparent and level playing field for all transport operators involved in the multimodal transport system. Reforms must favour competition between transport operators; eliminate exclusivity rights and unregulated monopolies; and enable containers, trains and trucks to cross freely from one country to another, thereby allowing users and consumers to benefit from competition.

Within this context, ESCWA member countries encouraged to identify and remove regulatory barriers and infrastructure bottlenecks for customer oriented door-to-door multimodal transport services in the ESCWA region.

#### *4. Commercialization of ports operations*

The majority of ports in the ESCWA region are still owned, managed and operated by Governments. The absence of competition for domestic cargo means that many ports lack the incentive or the need to increase efficiency, innovate or respond more effectively to the needs of users.

Ports and terminals in the ESCWA region that have shown the biggest increase in container throughput volumes include Aden and Salalah, which have lately been awarded private concessions. The Port of Dubai, which has also done well, is a notable exception in this regard. It is a Government owned all service port, and it illustrates that no single port model has a monopoly on operational success.

Private involvement and investment in the operation, building and planning of ports must be encouraged through the issuing of private concessions, thereby increasing competition, attracting foreign capital and gaining from international operating experience. However, care must be taken to avoid a private monopoly taking the place of a public one. These goals can be achieved by eliminating barriers pertaining to the cross-border flow of multimodal transport, as recommended above, with the objective that national ports become regional in nature, with a larger, shared hinterland for which they will have to compete.

Within this context, it is recommended that Governments do the following:

- (a) Encourage private participation and investment in port infrastructure, facilities and operations;
- (b) Commercialize and liberalize state owned transport infrastructure and operators.

#### *5. International agreements*

ESCWA member countries are participating in, or are in the process of joining, a number of international trade agreements. With the exception of Iraq, Palestine and the Syrian Arab Republic, all ESCWA countries are either WTO members or observers. Furthermore, ESCWA member countries are involved in GATT, GAFTA, bilateral Euro-Mediterranean Partnerships and bilateral free trade agreements with the United States.

Such efforts to participate in global, regional and bilateral trade agreements demonstrate that the Governments in the region, on the whole, are aware of the potential benefits of a liberal trading system. The full benefits of these trade agreements, however, are not likely to materialize until the trade systems of ESCWA member countries have been effectively streamlined, and made efficient, transparent and predictable, in the same manner as the trading systems of European, North American and some East Asian countries.

In addition, the adoption of international recommendations and best practices has the ability to boost the trade and transport environment in the ESCWA region. In particular, The Kyoto Convention, developed and administered by WCO, is an effective means of harmonizing trade procedures with the international community. Moreover, it provides the instruments to achieve a modern customs administration, which incorporates flexible and effective control methods.

Other international Conventions, which should be effectively implemented and enforced, include the Convention on Facilitation of International Maritime Traffic; the Facilitation Annex 9 to the Convention on International Civil Aviation; the Istanbul Convention on Temporary Admission; the TIR Convention on the International Transport of goods under TIR Carnet, which address facilitation issues related to specific means of transport or specific customs procedures; and the FAL Convention, which specifies six documents and the associated data elements that should be sufficient for entering, clearing and exiting passenger and cargo vessels. While many of these Conventions are signed by ESCWA member countries, they are either not implemented or are not enforced efficiently.



Within this context, Governments are encouraged to do the following:

(a) Implement and enforce international, regional and bilateral trading agreements, paying particular attention to obligations to remove procedural trade barriers;

(b) Accede to, and effectively implement, international trade facilitation conventions, namely Kyoto 2000 for a modern customs vision, TIR for international road transport and FAL for international maritime traffic.

Annex

SELECTED PORTS IN THE ESCWA REGION

Country	Port	Traffic <sup>d/</sup> (tons)	Containers (TEU) and rank (where applicable) <sup>d/</sup>	Computer system <sup>d/</sup>
Bahrain <sup>d/</sup>	Mina Salman	2 820 439	122 000	IBM hardware
Egypt <sup>d/</sup>	Alexandria	26 579 000	500 229 (97)	Available
	Ain Sukhna			
	Damietta	12 808 000	639 325 (79)	Oracle and EDI
	Nuweiba			
	Port Said	6 232 000	569 436 (85)	Oracle and EDI
Safaga	2 109 000			
Iraq	Basrah			
	Umm Qasr			
Jordan	Aqaba		215 000 <sup>d/</sup>	Under consideration
Kuwait	Shuaiba	5 091 000	195 973 (171)	Linked to Ministry of Planning International turnkey system
	Shuwaikh	3 823 000		
Lebanon	Beirut		263 000	
Oman	Salalah	1 523 000	1 187 753 (52)	Navis
	Sultan Qabous		137 740 (198)	IMTAC
Palestine	Gaza			
Qatar	Doha	5 512 000	80 000	None
Saudi Arabia <sup>d/</sup>	Damman	11 378 866	489 966 (99)	In-house and Navis Sparcs and Express and Express Navis Sparcs and Express, and EDI Siemens/IPM (Singapore)
	Jeddah	18 120 327	1 180 427 (53)	
	Jubail: Commercial port	1 594 546	12 844	
	Jubail: Industrial port	33 215 480		
	Yanbu: Commercial port	1 969 771	5 299	
	Yanbu: Industrial port	27 361 198		
Syrian Arab Republic	Lattakia			None
	Tartous			
United Arab Emirates	Dubai (Jebel Ali and Rashed)	39 703 000	3 501 820 (13)	Navis Sparcs, Oracle and EDI CMC MACH UNIX-based  In-house and Navis Sparcs and Express are being installed
	Fujairah <sup>d/</sup>	16 347 427	379 968 (119)	
	Khorfakkan	12 620 000	1 089 866 (58)	
	Mina Khalid		102 018	
	Sharjah	1 348 000	110 310 (218)	
	Mina Zayed	3 751 000	340 000	

Country	Port	Traffic <sup>a/</sup> (tons)	Containers (TEU) and rank (where applicable) <sup>b/</sup>	Computer system <sup>c/</sup>
Yemen	Aden	9 635 000	377 708 (120)	PSA-CITOS
	Hodeidah	4 704 000		

Source: Compiled by ESCWA, from various sources.

Note: Two dots (..) indicates that data are not available or are not separately reported.

a/ Traffic statistics for Oman, Dubai, Khorfakkan, Sharjah, Aden, Hodeidah, 1999; Kuwait and Qatar, 1997; Port Zayed 1995. Institute of Shipping Economics and Logistics (ISL), *Shipping Statistics Yearbook 2000*, (Bremen, Germany, ISL, 2000).

b/ *Containerisation International Yearbook 2003*, (London, Informa UK, 2003). All statistics refer to 2001, excluding those for Mina Salman and Doha, which refer to 1999.

c/ Karl Jeffery, "Recent developments in information technology for container terminals", *Cargo Systems*, (London, IIR Publications Ltd., 1999); and *Containerisation International Yearbook 2001*, (London, Informa Group, 2001).

d/ Government of Bahrain, "Mina Salman", *Bahrain Ports*, (2000). Available at: <http://www.bahrainports.gov.bh/>.

e/ Traffic statistics from Rafimar, "Statistics Egyptian ports total 2000", (2000). Available at: <http://www.rafimar.com/shipping/statistics/total-2000.html>.

f/ Paul Clegg, "Activity at Aqaba", *Containerisation International*, (May 2001).

g/ Traffic statistics from Government of Saudi Arabia, "Ports statistics" (2000). Available at: <http://www.ports.gov.sa/statistics.htm>.

h/ Traffic statistics from Port of Fujairah, "Statistical information" (2000). Available at: <http://www.fujairahport.com/statinfo1.html>.

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