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POLICY AND PROJECT PROPOSALS FOR THE DEVELOPMENT OF MULTIMODAL TRANSPORT SYSTEM IN THE ESCWA REGION*

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Preface

The transport programmes embarked, during the last five years, on a series of activities related to the development of multimodal transport in the ESCWA region. Among these activities, a 1995 report on ESCWA Strategy for the Development of Multimodal Transport, suggested that the various components of multimodal transport be identified and possible development actions be recommended. Then, an expert group meeting in 1995 on border crossing formalities, proposed that the ESCWA region should utilize the technological advances in telecommunications and information technology for regional and international transport facilitation.

The present study was prepared within the 1996-1997 work programme as a continuation of these efforts. The objective of this report is to bring the region a step forward towards the identification of projects and to proceed in the future to the formulation of the identified projects under the overall concept of multimodal transport development.

The contribution of ESCWA consultant Mr. Abdulilah Dewachi is appreciated. His report on "The application of EDI and UN/EDIFACT to the Transport System in the ESCWA Region" was used in this report as the main input to the sections on EDI and UN\EDIFACT.

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ABBREVIATIONS

ACIS	Automatic Cargo Information System
ANAs	Article Number Associations.
ASYCUDA	Automated System for Custom Data.
BPR	Business Process Re-engineering.
BRI	Basic Rate Interface.
CALS	Computer-Aided Acquisition and Logistic Support.
CFS	Container Freight Station.
CFSS	Container Freight Station System.
CSO	Central Statistical Organization.
CTMS	Container Terminal Management System.
DPA	Dubai Port Authority.
EAN	International Article Number Association.
EC	Electronic Commerce.
EDI	Electronic Data Interchange.
GCC	Gulf Cooperation Council.
GNP	Gross National Product.
GOIC	Gulf Organization for Industrial Consulting.
ICD	Inland Container Depots.
ICT	Inland Container Terminals.
ISDN	Integrated Services Digital Network.
JIT	Just in Time.
LCL	Less than Container Load.
MT	Multimodal Transport.
MTO	Multimodal Transport Operator.
NIC	National Information Center.
OSI	Open Systems Inter-connection.
PRI	Primary Rate Interface.
PSDN	Packet Switched Data Network.
PSTN	Public Switched Telephone Network.
QR	Quick Response.
Q-TEL	Qatar Public Telecommunication Organization.
SPARCS	Synchronous Planning and Real Time Control System.
SSCC	Serial Shipping Container Code.
TCC	Telecommunication Corporation.
TEU	Twenty Feet Equivalent Unit.
UAE	United Arab Emirates.
UN/EDIFACT	United Nations Electronic Data Interchange for Administration, Commerce and Transport.
UNCTAD	United Nations Conference on Trade and Development.
UNESCWA	United Nations Economic and Social Commission for Western Asia.
UNITED	United Nations Trade Interchange Directory.
VAN	Value Added Network.

INTRODUCTION

The changing international economic situation cast its effects on the economic state of the Arab region as a whole and on the ESCWA region in particular. Globalization has been the primary factor effecting the international economic environment and that together with the rush towards market economy have been the basic elements in the drive towards economic restructuring and economic adjustment by most countries in the region. A strong emphasis has been given to commercialization and the private sector participation has also been increasing in many countries in ESCWA region.

Economic adjustment has been advocated by prominent lending agencies and the participation of the private sector has been emphasized by a number of agencies as a major issue in economic restructuring. Many ESCWA countries have been involved in major changes including the privatization of leading public sector enterprises. Telecommunications has been among the sectors that has opened up opportunities for private sector participation. The United Arab Emirates was a pioneer in telecommunication public/private partnership, Egypt involved the private sector in part of its telecommunications services, and both Lebanon and Jordan have their cellular services under the private sector.

The private sector participation in the transport sector continued to be limited to fleet ownership and services in the sub-sectors of road and maritime transport. No serious consideration has been given by the private sector for involvement in the transport infrastructure or in the large size transport enterprises. Efforts to privatize major airline companies did not materialize in spite of declared intentions by a number of ESCWA countries.

ESCWA member countries benefited from the new economic restructuring policies and it is estimated that the Arab countries decreased their financial deficits by around one third in 1995 to reach US$21.4 billion or 4.8% of GNP in 1995 as compared to 7.6% of GNP in 1994.[1]

Among the success stories in this area was Saudi Arabia, they were able to reduce their financial deficit by two thirds in 1995 as compared to 1994. Other success stories were Jordan, Oman and Yemen who were able to decrease their financial deficits by around 50% during the same period that Kuwait, Qatar, Syria and UAE also witnessed decreases in their fiscal deficits.[2]

The successes referred to above indicate that a number of Arab countries are moving on the right track for economic adjustment. Private sector participation has been increasing in a number of economic development and services areas. But, in spite of this important change in economic restructuring, the general trade orientation remains on the same track of Arab trade which is associated with traditional markets. The trade partners remain to be almost the same with higher weights towards Industrial countries sharing half of Arab export trade and more than that of their imports.

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[1] Unified Arab Economic Report, September 1996.

[2] Unified Economic Arab Report, September 1996.

The Arab export trade increased by 9.7% and imports by 6.4% in 1995 compared to the previous year while Arab interregional exports decreased by 1% and imports increased by 4% during the same period. There is a wide scope where inter-Arab trade can be increased and adequate facilitation measures to improve the flow of goods across national boundaries are met in order to achieve such targets.

The development of trade is closely intertwined to an efficient transport system. The North -South trade has been facilitated by a reliable, well established transport and communication system network. The cost of transport provided by the transport routes between developed and developing countries is lower in most cases than the cost of transport between developing countries.[3]

Transport facilitation has the role of increasing the efficiency of the transport system with added value in improved quality of service, lower cost and speed of delivery to the final destination. Within this overall objective a variety of factors are to be considered by the transport suppliers at both the public and private sectors.

The transport systems in developed as well as in a number of developing countries has undergone changes in many areas of technology to improve the utilization of available assets. In the ESCWA region the development of infrastructure was stressed and technology development was very modest. The outcome of these developments in the ESCWA region was infrastructure development at excessive capacities in several areas and large investments that could have been saved with more efforts in the areas of technology development, standardization and transport facilitation.

In the ESCWA region, the transport infrastructure is considered adequate in most countries and of good quality in some. Transport logistics and transport facilitation are not up to the standard of the available infrastructure. But future development aspects should be oriented towards these areas.

The following chapters would attempt to analyze some of the logistics areas that could be considered with the view of developing multimodal transport. The basic development options should be geared towards upgrading productivity, decreasing cost and improving regional and international traffic flows with the least possible investment in infrastructure. To achieve these objectives policy orientation and development projects are proposed. The identified areas for this exercise are the new concept of the transport terminal as well as the technologically developed transport information systems brought together to provide the logistic necessary to enhance multimodal transport development.

[3] ESCWA Regional Strategy for Multimodal Transport Development, E/ESCWA/TRANS/1995/2, p.3.

I. MULTIMODAL TRANSPORT

A. MT REQUIREMENTS

Multimodal Transport (MT) has been advocated as a new transport technology for more than two decades. More specifically, MT is a system of transport designed to facilitate the transport of goods between two points in different countries and under one liability system. Therefore, it is a transborder facilitation system of traffic flows, utilizing different transport modes with established methodology of coordination. The MT procedures are administered under the United Nations Convention on International Multimodal Transport of Goods concluded in 1980 which defines MT as follows:

"The carriage of goods by at least two different modes of transport on the basis of a multimodal transport contract from a place in one country at which the goods are taken in charge by the multimodal transport operator to a place designated for delivery situated in a different country."

From this definition it can be seen that MT has a number of requirements that should be met in order to assume that the transport operation has been concluded according to the MT convention. The qualifications for the MT operation are as follows:

- The contract;
- The operator;
- Two or more modes of transport;
- Border crossing point.

1. *The contract*

The contract is normally based on an agreement or a convention agreed to or signed by the contracting parties. In the case of MT, the convention has been concluded in 1980 under the auspices of UNCTAD and was signed by a large number of countries. Article 37 of the convention stipulates that each contracting party should apply the terms of the MT convention to all MT contracts following the date of entry into force of the convention. Article 36 states that the convention can enter into force after 12 months following accession by thirty member states. Only six states joined the convention as contracting parties and therefore no contract can be assumed under the terms of the MT convention as it has no legal foundation till now. The six states referred to here do not include any of ESCWA members and therefore the convention has no pertinence on ESCWA region.

2. *The operator*

The duties of the MTO cover a wide area of activities associated with the transport of goods. Normally the MTO starts his operation by negotiating a contract with the exporter or shipper and might assume full responsibility for all aspects of transport, insurance and formalities from origin of the cargo till it is received at its final destination. The role of the (MTO) as defined by the MT convention is as follows:

"Any person whom on his own behalf or through another person acting on his behalf concludes a multimodal transport contract and acts as a principal, not as an agent of the consignor or of the carriers participating in the multimodal transport operation, and who assumes responsibility for the performance of the contract."

The MTOs are classified into a number of categories including vessel operating and non-vessel operating MTOs or those who operate more than one mode of transport or those without fleet. The definition as stipulated in the convention is a very strict legal statement while a more liberal definition would include, as an MTO, any one who arranges door to door transport by more than one mode and with a single transport document for the whole journey.

3. *Mode of transport*

The multimodal transport convention adds that the carriage of goods should be undertaken by more than one mode of transport to be considered as a multimodal transport operation. The mode is defined as the method of transport such as rail, air or sea transport while the means of transport is defined as the vehicle used for transport. Therefore transshipment between two road trucks does not mean that the operation is made by two means but one mode.

The problem arises when at some border points the cargo is transshipped not between sea and land modes but between two means of transport of the same mode. An operation like this would not be considered as a multimodal one if the strict meaning of the relevant article in the convention is taken into account. The current definition classifies this type of transshipment under UNIMODAL and not multimodal transport.

A more liberal definition of MT should be contemplated as far as the mode of transport is concerned. In the definition of MT the word "MODE" should be replaced with the word "MEANS" in order to give the MT definition a wider meaning. The means of transport is defined as the vehicle used for the transport of goods or passengers such as truck or vessel. When a change of the means of transport occurs during the journey, then documentation is going to be changed or added to indicate this change while the transport operation continues as MT.

4. *Border crossing*

The definition of MT stipulates crossing an international border is part of the transport operation to qualify it as a multimodal one. Transport operations within the same national boundary do not come under the umbrella of MT even if more than one mode of transport were used. The classification for such carriage would be considered as COMBINED transport.

B. BASIC REQUIREMENTS

Added to the MT requirements, explicitly expressed above, Consideration should be given to the following basic issues that are associated with the development of MT:

1. *Containerization*

Containerization is a transport technology with strong impact on MT development. The need to increase productivity and the escalating cost of labour in developed countries were the main reasons behind its initiation. Containerization requires a large initial capital investment in container terminals. Investments are also required to improve the transport links serving the container terminals because without improved links the benefits of containerization would not be at the level anticipated for this technology development.

2. *Documentation and information*

Documentation and information are two important issues with more impact on the transport cost than many other factors. These two can be treated as one where documentation is information on paper and where information is paperless transactions of transport documents. The main factor in information and documentation efficiency is the availability of suitable communication networks as infrastructure for electronic data interchange.

3. *The terminal*

The terminal is the centre of activity in transport operations as within it and through it all the activities are undertaken. The time spent in the terminal by any vehicle takes up a sizable portion of the vehicle turn round trip. If the travel time is short, then the percentage of time at the terminal may exceed that by several times. The example of short distance air travel in the ESCWA region demonstrates this very clearly. The terminal time in a typical ESCWA airport would take 120 minutes, as requested by airlines, while the travel time would take about half of that time. It is known that more than two hours could be spent at border crossings by passengers on a private vehicle while the travel time itself is no more than three hours. The wasted time per vehicle multiplied by the number of vehicles crossing the borders each year will result in considerable losses to the national economies.

The arrival of information, at border stations or at destinations, before the goods is extremely important in the timely processing of formalities and would provide time and cost savings to the shippers. Computerization and efficient communication networks provide the transport industry with options that were not available in the past. Data flows between computers through telecommunications networks made it possible to move from paper into paperless transactions that secure the timely arrival of information and insure needed communication between the concerned parties.

4. *Development avenues*

The requirements for MT development are many including infrastructure, terminal facilities, fleets, information systems, legal and institutional aspects etc. In most ESCWA countries the infrastructure and transport fleets have given a high priority in the development plans. The legal framework of MT operation was the main concern for the concerned parties initiating its concept. Several years passed without reaching a consensus on the MT convention. Therefore, if MT is to be persued as a valid concept and the transport systems be oriented in its direction, then other avenues of development of MT should be considered.

Previous proposals by ESCWA reports and expert group meetings suggested that the various components of MT be carefully thought about and development be initiated in those areas that have the highest impact on MT development.

MT operation depends largely on the container concept and perfected interface facilities. The container is the transport technology that radically improved interchange of traffic between transport modes. The role of the container concept in modern transport can not be overemphasized and was the leading factor in the development of intermodal transport and promoted the concept of MT.

II. CONTAINERIZATION IN THE ESCWA REGION

A. THE CONTAINER FLEET

The increases in container traffic during the last decade, as demonstrated in Annex III, should have initiated a comparable increase in ESCWA container vessel ownership. Contrary to that, the container ship ownership remained very modest even in comparison to the small size of the region maritime fleet. ESCWA container fleet represents only 5.57 per cent of ESCWA merchant fleet and less than 1% of ESCWA total container gross tonnage (table 2). The world container gross tonnage exceeded 8.4% in 1996 indicating the weight given to container vessels at the international level.

Containerization infrastructure requires higher initial costs as compared to traditional port requirements. Most of this cost goes to the purchase of equipment entailing foreign currency component and while this would create some difficulties to a number of countries, most ESCWA members might not be faced with such a situation. Investing in higher capacity container vessels and container facilities could be a promising business to ESCWA countries especially within joint subregional ventures that proved to be successful.

TABLE 1. ESCWA CONTAINER FLEET COMPARED TO TOTAL FLEET AS OF 1996 IN GT

	No. of containers vessels	Container GT	No. of ships	Total GT
BAHRAIN	..	..	83	164,258
EGYPT	..	..	375	1,230,232
IRAQ	..	..	113	856,889
JORDAN	..	..	5	40,829
KUWAIT	3	85,594	211	2,027,884
LEBANON	..	..	122	275,167
OMAN	..	..	21	16,258
QATAR	3	85,594	59	561,739
SAUDI ARABIA	5	126,117	276	1,208,322
SYRIAN ARAB REPUBLIC	..	..	220	420,193
UNITED ARAB EMIRATES	5	132,667	316	890,401
YEMEN	..	..	42	25,084
ESCWA TOTAL	16	429,972	1,843	7,717,256
WORLD TOTAL	1,949	43,097,097	84,264	507,873,011
ESCWA share of World Total	0.82%	0.99%	2.18%	1.51%

Source: Lloyd's register statistical tables, 1996.

B. THE PORTS INFRASTRUCTURE

Development of sub-regional cooperation projects in infrastructure and transport services should be an area for serious consideration by ESCWA countries. Such projects can include the use of Dubai Ports (Jebel Ali

and Rashid) as hub and distribution centres for the countries of the Gulf (Oman, Qatar, Bahrain, Eastern Saudi Arabia and Kuwait) and Iraq. Also, cooperation in the use of the Oman port of Salalah (Raysut) in the Arabian Sea and Indian Ocean, which is undergoing major expansion as a hub port, could be an area for consideration. Arrangements for cooperation also could be arranged between the Syrian ports of Lattakia and Tartous with the Jordanian port of Aqaba and with Iraq in joint investments in container terminals and facilities and for the promotion of intermodal transport between the three countries. The cooperation can be through implementation of joint projects, participation in the financing of infrastructure, provision of services, etc.

Coordination of activities such as harmonization of transport regulatory policies and transport facilitation would provide the relevant parties with standardized formalities for traffic flows across adjoining borders as well as providing opportunities for use of joint infrastructures and services. Coordination of administrative procedures, particularly in the field of customs through bilateral and multilateral agreements provide a solid ground for transport facilitation.

The efficiency of ports depends not only on the physical infrastructure of the port, but also depends on the performance of the various agencies operating in the port or associated with their operation. The different forms of customs and other controls are unavoidable, at least in the pre-globalization era. However, lengthy documentation and unwarranted delays for clearances are sources of avoidable cost to trade and transport. Time taken to clear cargo can vary between one port and the other but, generally, it takes longer in developing countries ports than in other parts of the world. Containerization has contributed to the improvement of the situation.

The region has more than 24 container terminals with terminal berths totaling more than 81. Some ports in the region have attained a high performance level in container traffic and could generate high volumes of traffic. The ports of Dubai in the UAE have the top container record followed by Jeddah in Saudi Arabia and Damietta in Egypt.

Meeting the high demands for containerization and providing for the efficient reception of highly automated cargo container vessels, the ports of the region should update their container terminals. Deficiencies in the acquisition of modern container handling equipment should be met with appropriate investment policies bearing in mind the value added to the terminal performance.

The Ports of Beirut, Lattakia, Um Qasr, Hodeidah and Aden have many options for upgrading their capabilities for container services. One of the options to be considered is the participation of the private sector so that terminal services could be improved to generate revenues for both private and public participants.

C. TRANSPORT LINKS AND FACILITATION

A well developed transshipment terminal should be capable of receiving large cellular container vessels. The terminal should have sufficient land areas for the temporary storage of transit traffic and infrastructure should be suitable for accommodating large vessels (4500 TEU and over) with adequate gantry cranes and other terminal equipment.

The concept of sea-air has resulted in considerable savings, shorter delivery periods and efficiency in the distribution system. The UAE ports of Fujairah and Dubai have become main centres in the world sea-air cargo movement between Europe and Far East providing the customers with considerable time savings and improved quality of service.

The development of land transport and upgrading interface facilities at sea ports would provide cost effective solutions to traffic congestion at these ports. Inland waterways, in Egypt and Iraq, would provide a natural and low cost transport route up-country while coastal shipping and sea-air connections are added benefits to congested ports.

D. CONTAINER FACILITIES IN ESCWA REGION

A container terminal is usually a designated number of purpose built berths attached to a specified terminal area well paved, equipped and manned to handle, store and distribute containers of all types and specifications. The ESCWA region ports include a large number of container terminals and almost all of them are classified as traditional terminals as far as their functions as are concerned. Most of the transport and related services documentation's are processed manually and the information and documentation procedures are mostly old and outmoded.

The newly developed container terminal has a worldwide standard management, operating and control systems including documentation, data interchange and accounting systems. The success of the containerization concept is dependent on the worldwide standards adopted for truck specifications, container carrying cellular vessels, ship-to-shore and yard gantry cranes, stacking, documentation, etc. As indicated in Table 1, ESCWA member countries made large investments in the container terminals and continued to develop their equipment and facilities in order to improve overall container services.

TABLE 2. ESCWA CONTAINER TERMINALS DELIVERY OF SHIP-TO-SHORE CONTAINER GANTRY CRANES AS OF 1996

Port/Terminal	No.	Outreach (m)	Delivery date
Aqaba (Jordan)	1	37.0	1997
Aqaba (Jordan)	1	46.0	1999
Doha (Qatar)	1	30.0	1996
Fujairah (UAE)	1	44	1996
Khor Fakkan (UAE)	2	48	1997
Mina Qaboos (Oman)	1	38	1996
Mina Zayed (UAE)	2	39	1996
Mina Zayed (UAE)	4	NA	1998
Port Rashid (Dubai, UAE)	2	47	1996
Tartous (Syria)	2	45	1996
Damietta (Egypt)	2	45	1998
Port Said (Egypt	1	45	1998

Source: Containerization International Market Analysis, December 1996.

The efficiency of vessel operations depends largely on the availability of the required number of ship-to-shore gantry cranes, adequate terminal equipment, experienced manpower including gantry and equipment operators, and the application of container operating and control systems.

The safe discharge or loading of a container (ship operation) with an average load of 12 metric tons of goods takes 2-3 minutes in a container terminal. The same load may take more than an hour in a general cargo terminal with more chances for damage to the goods. Upon discharge of containers from vessels or prior to loading of container vessels, the terminal provides temporary storage in the stacking areas by type such as reefer containers, dangerous containers, dry containers, etc.

Upon receipt of container delivery orders from a shipping line or his agent, the container after being physically inspected at the gate, moves to the designated customs yard for inspection and collection by the consignee. This task is totally separated from other terminal operations for safety and other operational reasons.

Delivery of containers also includes the positioning of containers for stripping or stuffing in the Container Freight Station (CFS). These operations enable the delivery of goods from the shared containers or what is known as "Less than Container Load" (LCL containers). After completing customs inspection in the CFS shed, the consignee or the Multimodal Transport Operator (MTO) can move the cargo by road/rail or barge to the consignee's premises.

Currently, containerization is at different stages of development among ESCWA member countries. The region has more than 24 container terminals with container berths totaling more than 81. Although many ESCWA countries such as the UAE, Saudi Arabia, Kuwait and Egypt have constructed large container terminals in their main ports, others are still in the process of developing container terminal facilities and capacities such as Lebanon, Syria, Yemen and Oman.

Annex II shows ESCWA port facilities such as terminal areas for container storage and container freight stations, ship-to-shore gantry and land equipment, computer application and future developments and other transport links such as rail, air, waterways or land. Top ports in the region according to the information in the table include: The ports of Dubai Ports Authority (ranked 14 in the World Container Port Traffic League 1996), Jeddah in Saudi Arabia, Damietta in Egypt, Fujairah and Khor Fakkan in UAE. These ports are also the leading container distribution centres in the region.

The same table shows that other ports such as Beirut in Lebanon, Mina Sultan Qaboos in Oman and the Yemeni ports of Hudeidah and Aden as well as to some extent the ports of Doha, Lattakia and Alexandria, need to upgrade their container terminal capabilities and to modernize their facilities.

The ports of Mina Zayed, Lattakia, Alexandria and Aqaba have succeeded, during the last two years in attracting higher volumes of container traffic by reaching more than double their previous container volumes. These ports enjoy unique geographical locations in international trade routes which helps them to grow as transfer points for intermodal transport in the region.

Proper container interface facilities, efficiency oriented regulatory policies and administrative procedures particularly in the field of customs transit are prerequisites for an efficient flow of regional container traffic. Containers originating from Europe and the Mediterranean could flow to the Syrian Port of Lattakia by sea and use the rail link with the port as well as road and rail connections to Iraq or Jordan. Further transport links could be used for traffic to the Gulf States, resulting in considerable savings in the total transport cost of containers.

Container ship berthing infrastructures (sea-side) in the region could be considered adequate in regard to the present types of container ships in service and the present traffic flows of containers. No serious

incidents of container ship congestion are recorded in any container terminal in the region since the mid 1980s. However, draught restrictions may still exist in some container terminals such as the port of Shuwaikh (Kuwait) with a 9.6 meter water depth.

The availability of adequate number and type of ship-to-shore container gantry cranes to unload and load containers aboard container ships and in particular cellular container ships is incentive for attracting container ships to a port. Cellular container ships are totally dependent on the terminal's ship-to-shore container gantry cranes. Many container terminal authorities in the region have realized the importance of upgrading their handling capabilities in order to attract large cellular container ships. The efficiency and level of productivity of a container terminal depends heavily on the handling equipment.

E. CONTAINER TERMINAL DEVELOPMENT IN THE ESCWA REGION

In their struggle to compete with other neighboring ports, and in order to attain hub or transshipment status, many ESCWA ports have started plans to develop and upgrade their container terminals. In addition, the notable increase in container flows and the introduction of larger cellular panamax with outreach up to 44m, and with 18-row container ships of up to 6,000 TEU capacity, have encouraged ports in the ESCWA region to strengthen their handling capabilities. For this purpose orders were submitted for new deliveries of ship-to-shore container cranes (Table 1).

Mina Raysut in Oman is due to tender 12 super post-panamax container gantry cranes, as a part of a big project to construct a four berth container terminal with an ultimate capacity of 1,500,000 TEU. Ports in Egypt, with plans to capture regional hub container traffic in the Mediterranean, have ordered four post panamax container gantry cranes. Other ports upgrading their ship-to-shore handling capabilities include Aqaba (Jordan), Doha (Qatar), Mina Sultan Qaboos (Oman) in addition to four container terminals in UAE. Container terminals operating without container gantry cranes include Beirut, Mina Zayed and Doha. Ships gear and mobile cranes are used instead.

Most of the ESCWA region ports that witnesses an increase in container flows during the last few years are expanding their handling capabilities by ordering additional container gantry cranes, and that 55 per cent of the new orders of gantries are of post-panamax dimensions. (See Annex III)

The terminal stacking areas are allocated for the temporary storage of containers and used for stripping and stuffing of containers and delivery of goods to consignees and multimodal transport operators. Terminals in the region with insufficient and/or inadequate capacities of terminal stacking areas include Mina Qaboos, Port of Beirut, Port of Hodeidah (CFS only) and the Port of Doha.

The function of yard handling equipment is very significant to the productivity of the container terminal and the speedy delivery of containers to consignees and MTOs. The type and quantity of such equipment is dependent on many aspects such as the annual throughput of the terminal, the operational system adopted in the terminal, the pavement structure, availability of spare parts, etc. Container terminals that require upgrading their terminal equipment include Beirut, Hodeidah, Lattakia and Um Qasr in Iraq.

The facilities of the container terminals are prequisites for MT operation. They provide the required services for the exchange of cargo between the various modes of transport converging into the terminal. The facilities should include a range of services and infrastructures that are necessary for efficient terminal operation. The terminal infrastructures and most of the services are adequately provided in most sea ports and

other terminals. The analysis of the sea ports container terminals indicate that most countries invested heavily in infrastructure and handling equipements. There is no evidence that investments were allocated to modernised or reasonably developed information systems. Communication infrastructure and appropriate information systems are necessary to facilitate terminal operation and integrate it with other related terminals and with the rest of the transport network..

For transport facilitation in the ESCWA region, more attention should be given to establishing and improving existing the infrastructure in the container terminals. Equally important, beside infrastructure, is the development of operational, legal, institutional aspects that would transform the conventional terminal into a transport logistic terminal and a trade facilitation centre.

III. THE TRANSPORT LOGISTICS TERMINAL

The transport terminal is an interface point between modes and means of transport around a pool for the convergence of cargo and passengers. It works as a clearing house for traffics routed in and out for diverse destinations. It is designed to provide three main functions and those are:

1. Provide accessibility for goods and passengers to/from transport fleets.
2. Allow interchange between transport modes and to different destinations.
3. Provide a center for passenger grouping and cargo collection and distribution.
4. Provide easy access to markets.

The planning of the terminal should be made within the context of the economy of the region it is going to serve. This means that while the transport project design is being considered in line with the specific objectives of the project, the transport system planning as a whole should be taken into consideration. The economic environment within which the terminal is going to survive should also be analyzed as part of the project planning.

The terminals can be classified into traditional and non-traditional terminals in accordance with their locations and the kind of services they provide. The traditional terminals are those normally used by ships, airways and railways for cargo handling or passenger transport. They are part of the transport mode and designed mainly to serve that mode and mostly characterized by large storage areas. The non-traditional terminals are those which are established, as distribution centres, without a link to a specific mode of transport and are pools for cargoroutin to specific destinations but never meant for cargo storage. The various transport modes interface at this type of terminals that normally include Inland Container Terminal facilities.

Inland Container Depots (ICD) while situated away from water fronts, are mostly associated with sea ports. Their basic function is to provide a location for container services as close as possible to cargo collection and distribution centers. Customs and other relevant authorities transfer all formalities from the sea port to be completed at the ICD.

This type of terminals (ICD) although away from ports, is treated in the same way as other terminals in the ports. The various operations of customs and other formalities are carried out as for any other cargo arriving from abroad at the sea port. They are given sometimes the name "DRY PORTS" to ascertain their association with the ports. An example of this type in the region is the Riyadh (Saudi Arabia) ICD where containers are moved by trains from the port of Dammam to the container terminal at Riyadh.

The Zarqa free zone in Jordan provides another example of terminals involving commercial activities and transport services within the free zone. The goods are transported, before being customs cleared at the sea port or border crossing station, to the site near Amman. At the site commercial activities are undertaken by foreign and local companies including goods for consumption within the country and those for other destinations.

The extension of railway services between Aqaba port and Zarqa can provide the opportunity to establish a large scale terminal for transit and intermodal transshipment. With suitable transport facilities the free zone area could be turned into a regional cargo distribution centre serving traffic within Jordan East bound from Aqaba and South bound from the Mediterranean ports to the Gulf region or further East.

In a number of developed countries the transport terminal has been transformed into a multipurpose institution providing the transport services and playing the role of a market place. That was made possible through the development of trade and transport facilitation measures and with maximum dependence on information technology. The example of a number of European airports gave an indication of the benefits of a multipurpose terminal where more revenues are generated from the commercial services of the airport than from air transport operations.

The private sector participation is a deriving force in enhancing commercial activities associated with the terminal. The present layouts of most terminals are made is such a way as to serve customs and security with minimum attention being given to commercial activities other than airline service offices and a government duty free shop for easy to carry merchandise.

The decision on whether to establish a traditional or non-traditional terminal will depend on a number of technical, economic, social or political factors. The social and political factors would be government policy issues and would be dealt with by policy makers. The technical factors are primarily associated with the technical characteristics of each mode airport for landing of planes or a berth for ships. The economic decision is dependent on cost benefit analysis ,supply and demand interaction and the generated cost to the supplier and the price to the customer.

The terminal layout will depend on the final objective for which the terminal was established. Basically there are several types of terminals and those are either general purpose or specialized terminals. The specialized terminals are also subdivided into several categories but generally considered in respect of type of cargo such as minerals or to type or mode of travel such as railway terminal or type of consignment like containerized traffics.

The transport terminal is a transit point in the transport chain and should not be viewed as a storage depot. It is a distribution centre and the layout and design must reflect this characteristic The more transport links and connections the terminal has, the more it would be competitive to shippers, MTOs and consignees. Adequate transport links would lead to more traffic flows with minimum space requirement as compared to a poorly linked terminal.

An important party in the services of the terminal is the trade partner. The modernized terminal is not only a transport centre but also a commercial and communication center. Merchandise, banking, retailing, insurance, transshipment and transport activities are performed in the terminal.. The terminal would more than a specialized port or an airline terminal, it is rather a multipurpose institution.

The port of Rotterdam acquired its international and regional prestige as a distribution center mainly due to the diverse connections to other European countries by inland waterways of the river Rhine and through the extensive European rail and road networks. The port is internationally linked with regional and international sea ports as well as by the sea-air interconnection to many regional and international destinations. Statistics from the two major ports in north-west Europe, Antwerp and Rotterdam, show that in 1996, 35 per cent of container transshipment traffic, approximately 1.2 million TEU, was transshipped to/from the ports by barge (Containerization International, June 1997).

The ports of Jebel Ali and Rashid (Dubai Ports Authority) provide a similar example, in the ESCWA region, to that of Rotterdam. Several modes of transport provide connections with the ports for transshipment traffic. Port links and connections include sea-air, truck, barge and transshipment services by feeder vessels and other types. Neighboring countries are utilizing the services of UAE ports for traffic routed from Asia or Europe through these ports and then transshipped by small vessels or trucks to final destinations.

IV. INFORMATION TECHNOLOGY FOR MT

A. BACKGROUND

The transport terminal is the centre of activity for cargo, passengers and information associated with their movements. The terminal efficiency depends on the level of development of the information system applied in its internal operation as well as linking it with the trade and transport network. Transport information technologies were developed with view to increasing the efficiency of infrastructures and the management with tools that improves substantially transit operations and reduce the effects of non-physical barriers. These are important elements in MT operation and without the interconnection between the various modes and related fields the MT operation would be reduced to segregated transport operations.

EDI as an effective business technology has been developed three decades ago. It has been a very successful business communication system in the transport industry which had been the deriving force behind its development. On the footprints of EDI a range of information technologies and applications had been developed in transport, trade and associated industries. The airlines, almost worldwide, were pioneers in utilizing the connectivity availed through EDI. This enabled the airlines to have immediate access and paperless transactions with fleets management, terminals, travel agents and the rest of air transport parties.

In recent years the business community has been introduced to a number of strategies to improve productivity. These include Just In Time (JIT) manufacturing, Quick Response (QR) retailing, and Computer-aided Acquisition and Logistic Support (CALS). The main objective for adopting one or more of these strategies is to be more efficient by eliminating procedures that do not add value to the business process. Increasing efficiency will make it impossible to effectively process orders manually, and thus the introduction of EDI.

A majority of multinational and large regional organizations are implementing EDI and are increasingly requiring their trading partners to be "EDI capable". EDI has now been integrated into routine business procedures. More recently, EDI in now available on the Internet as part of a global trend toward Electronic Commerce. EDI can no longer be considered as a technical exercise, but rather as a business strategy.

B. EDI DEFINITION

EDI is generally defined as the computer-to-computer transfer of commercial and administrative transactions using an agreed standard to structure the data pertaining to transaction.[4] A definition capturing most of the qualities normally associated with EDI is:

Electronic exchange of predefined messages (structured data), structured according to agreed standards, between computer applications without manual intervention

The key characteristics in this definition are:

1. Messages are of predefined types.

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[4] Multimodal Transport Handbook, UNCTAD/SHIP/Misc.68/Rev.1, p. 160.

2. Data are structured according to agreed standards.
3. Exchange takes place electronically between computer applications without manual intervention.
4. Common standards independent of hardware, software and applications.

The definition of EDI deliberately excludes "unstructured data". In fact there are means of electronics transmission that do not use predefined and standardized formats or computer to computer exchange like electronic mail, fax messages, systems for remote or local inter-departmental work flow in proprietary formats. All these, provide invaluable means to facilitate trade, but they are not EDI. Both EDI and non-EDI functions can be grouped in a recently coined term "electronic commerce", EC.

The basic elements of EDI are:

(a) A computer system and one or more applications;
(b) Telecommunications access and communications devices (e.g. modem);
(c) Any form of public or value added network;
(d) Translation software;
(e) Standards;
(f) Article numbering;
(g) Communicating partners.

EDI message standards has evolved over the last two decades as the result of many groups seeking common formats for data interchange. The overheads of keeping and maintaining individual formats compound as each new trade partner is added. The availability of a library or directory of common messages and message data elements was recognized as a means to promote standards for exchanging business data. Initially, this was achieved in different ways by various initiatives at a sector, industry and country level. The need for a single international standard led to the development of the United Nations Electronic Data Interchange for Administration, Commerce and Transport (UN/EDIFACT).

UN/EDIFACT is a set of principles that facilitate the electronic interchange of data between the different parties associated with any business transactions and include Manufacturers, exporters, importers, forwarders, brokers, Shippers, carriers, banks, insurers, customs, rail and ports authorities etc.[5]

The syntax rules of EDIFACT is an ISO standard (ISO 9735). The structure is based on standard messages, which in turn consist of sequenced segments. The segments consist of data elements features such as integrity, authentication, non-repudiation of receipt and origin and confidentiality, which are data security requirements. Together with audit and error reporting are all an integral part of the UN/EDIFACT standard. The most recent version of the syntax also supports ideographic characters such as Chinese and Japanese.

C. TECHNICAL OVERVIEW OF EDI

In order for EDI to be successfully integrated within an organization there needs to be computerized applications that can accept electronic data as input and can generate electronic data as output. EDI software is available and can be developed on many hardware platforms ranging from the low end PC to large servers and

[5] The previous source.

mainframes. Besides the basic hardware and software EDI implementation needs the following additional components:

1. A connection of interface to the outside world and the equipment to control that interface. This may, in many cases, be:

   (a) A dial up or leased line(s), and
   (b) Modem(s).

2. Message standards and translation software to enable the translation of outbound EDI messages to the standard, and the translation of inbound EDI messages from the standard.

3. Communications software to control the communications, as well as interact, with the public or value added network or the Internet.

4. Software to extract data from the required application for outbound messages and/or for batch input to applications for inbound messages. This software can either be procured or specifically written in-house, or by software developers.

5. Product marking/Bar code allows the identification of message sender, the product, the location, etc. Depending on the application, bar coding may or may not be necessary.

6. Networking with trading partners through a Value Added Network (VAN) or any other type of network including the Internet. Network services will affect the type of modem and communications software used, which may, in turn, affects costs and other factors. For example, an X.400 or X.435 connection would be more expensive, but less error prone, than a dial up connection using simpler protocol.

7. Skills within the user organizations are required to allow easy access and utilization of the system by the various partners and this could be provided through appropriate training.

8. EDI can be implemented in an organization with little alteration to the way it operates internally and externally. However, to take advantage of the full aspects of EDI an organization may have to alter itself and its operation quite radically. This is known as Business Process Re-engineering (BPR)

V. FUTURE DEVELOPMENTS

A. INTERACTIVE EDI

Interactive EDI is widely used in industries such as travel and cargo booking where it is essential for both operator and user to always have up-to-date information. Such systems have been adopted in several ports in both Europe and the United States. EDI systems have also been adopted in inland transport networks throughout European road and rail networks. Also, manufacturers as well as service providers developed their own EDI systems.

The North American Trade Automation Protoype is a demonstration project of how the North American trade processes and systems of Mexico, the United States, and Canada could function more effectively through the use of common data elements, documents and processes for commercial customs clearance. Using a prototype permits us to take advantage of the newest automation technology while allowing evaluation of system design and performance without the expense and commitment needed for a full system. The prototype will operate parallel to current systems.[6]

In the ESCAP region, EDI development has taken reasonable strides despite its relatively short history. In many cases the development has been on a national level with linkeage to global EDI systems. The main areas for EDI development were found in trade and the transport sub-sectors of ports and airports.

In the ESCWA region, EDI practices are limited to air transport. As for the other sub-sectors, EDI development is still in its conceptual stages. In a number of ESCWA countries such as Lebanon and Jordan, customs authorities have started to accomodate some EDI applications. ASYCUDA is being initiated in these countries with the assistance of UNCTAD and hopefully will spread to other ESCWA member countries in the near future.

Many traditional applications like accounting, and order processing are being rewritten to incorporate EDI. "EDI aware" is a phrase coming into use by software companies. This move will push UN/EDIFACT more into the main stream of business as more personnel become exposed to it. With the increasing use of the Internet EDI will become an important cost/effective tool for the facilitation of trade. The future will witness more and more the availability of Internet aided EDI services.

B. COMMUNICATION CHOICES

Certain criteria need to be looked for in the data transmission media, these are:

1. Speed of transmission.
2. Accuracy.
3. Security and privacy.
4. Connectivity.
5. Flexibility and expandability.
6. Availability.
7. Reliability.

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[6] International Trade Data System Home page at http://www.itds.treasgov/

8. Recovery option(s).
9. Cost-effectiveness.

Naturally, magnetic disks and tapes could be used for data transfer, however, there are problems associated with this. One, being the compatibility of format, but the fundamental problem is that of time and distance. To interchange data physically is slow and will not allow EDI to work effectively, if at all.

To achieve the speed required there are many ways of carrying the data. The voice telephone network and better quality than voice lines can be used. In some cases data is converted into light impulses with a laser. The signal can then be carried out by fiber optic cables.

Where longer distances are to be covered, or the geography of the region makes land-based lines difficult or expensive, radio transmission is used. This can be achieved by satellites in orbit or from terrestrial-based transmitters. In the event of a disaster involving communications, then physical transfer of data may take place. In practice, one or a combination of the various methods are used.

In most cases the user is not concerned with the method as long as it meets his/her speed, security and reliability requirements. Value added networks (VANs) and other third party networks are used extensively in EDI. The Internet is also becoming more and more acceptable for EDI with the provisions that are being made to improve on the privacy and security aspects of the Internet.

Decisions on the type of connection (VAN, direct, Internet, etc.) have to be made. The choice is governed by:

(a) Options available for connection;
(b) Required criteria for data transmission listed above;
(c) Data volumes.

Dedicated analogue or digital lines that can be used as permanent links between two points are usually provide better performance than normal voice lines. They offer good speed of transmission, accuracy, security, privacy, reliability and availability but are not as good for connectivity, flexibility, expandability and recovery options. Cost-effectiveness depends on the volume of use that is made of the line.

The public switched telephone network (PSTN) is the simplest and perhaps the most used for connecting two points. This is particularly true in the early stages of EDI introduction into an organization. In theory, any telephone line can connect to any of the millions of other telephone lines in the world.

Modems are required to make the connection. Recent models of modems are very sophisticated giving high speed data transmission over normal telephone lines and many of these modems offer sophisticated error checking and error correcting facilities. High data volume users may run into time delay problems with this type of connection and circuits are prone to noise interference or failure. The integrated services digital network (ISDN) is a network designed for voice and data. It will carry high volumes of data and combines the benefits of temporary connection and quality of transmission.

ISDN is a digital service, and as such, a modem is not required, but devices using the ISDN line will need to be ISDN compatible. ISDN offers good all round performance as it combines the flexibility of dial up, high speed and good throughput, but not all countries have ISDN services and it can be an expensive option.

Packet Switched Data Network (PSDN) is the type of network that complies with X.25 CCITT standard. It is designed to transmit data with high degree of quality, speed and reliability. In PSDN, the data sent is split up into data packets. The software ensures that all packets arrive in the correct order at the point of destination. It will also ensure that the packets are error free and will re-transmit packets that have detected errors. PSDN's have built-in redundancy and are extremely fault tolerant.

PSDN offers good connectivity, accuracy, flexibility, reliability, availability, expandability and recovery options. It performs less well for high speeds, security and privacy. Again, cost-effectiveness depends on the volume of use against the requirements of the other criteria.

If direct connection is to be made, then a number of points need to be taken into account and those are:

(a) Communications: All parties in the direct connection will need to agree on a common transmission and communications standard;

(b) Capacity: Depending upon line capacity, several access points may need to be provided to allow for volume transmissions as partners may find the access point in use by another trading partner;

(c) Timing: As there is no store and forward system in direct connection, the operational window will need to be defined so that the receiving system is open at the correct time;

(d) Use of standards: It is important to agree on using Open Systems Interconnection (OSI) compliant standards for file transfer such as FTAM or OFTP. X.400/X.435 is another standard that can be used. X.400 is an international standard that was developed to overcome the problems of incompatible electronic massaging systems. It can be used as an alternative to direct connection through a VAN;

(e) Third party services: Direct connection to trading partners can be via VANs. Using a VAN removes the need to have multiple in-house protocols and buffers. Other features such as security and audit facilities may also be available.

C. ARTICLE NUMBERING

An important aspect of EDI is the ability to identify products in an unambiguous way. Article number associations (ANAs) are bodies that control and issue product numbers in various countries of the world. The overall controlling body is the International Article Numbering Association (EAN) in Belgium. Local ANAs with varying names and constitutions are in over 50 countries. The 13-digit code is used to identify the product. It does not contain any information on its own and is only meaningful when used in a computer system where it can be linked to a definition. The number consists of:

1. 2 or 3 digits - country prefix (not the country of origin).
2. 4 or 5 digits - company number issued to the company by ANA.
3. 5 digits - product number issued at the discretion of the company.
4. 1 digit - check digit.

Also in use is an 8-digit number for restricted use. Some countries have opted for systems that are compatible with the 13-digit number and code markings.

The 13-digit number is represented by a machine readable bar code, and can be read by fixed or hand-held scanners. The bar code is not only used to track a product through its supply chain without ambiguity, it can also be used for location numbering.

Code 128 is so called because it encodes the whole ASCII character set. It can be used to transmit much more information than other marking numbers such as EAN-13 which is only a product identifier. The standard EAN/UCC supplementary code provides:

(a) Standard format for the data to be encoded, consisting of application identifier followed by the relevant data;

(b) Unique symbol architecture which distinguishes standard supplementary codes from the standard symbols used to represent article numbers and from non-standard symbols;

(c) A serial shipping container code (SSCC) is used to mark pallets and containers. Larger labels are attached which carry data on shipping information in both machine and human readable form. The codes can be combined with EDI messages on dispatch and delivery for greater control.

VI. COMPONENTS OF EDI PROJECTS

A. EDI INITIATION IN ESCWA REGION

Most of the pioneering work in EDI has been initiated and undertaken in Europe and the United States. The initiation of EDI project could come from any of the concerned parties with its application. In the ESCWA region most of the initiatives in this area are generated in public owned enterprises. These include airlines, airports authorities, customs etc. Despite this fact it is believed that the private sector could play a much larger share in EDI development than what the public sector would be to do.

The information flow cycle for international trade involves a wide web of partners within public and private sectors at national, regional and international levels. Within this information net it is observed that the transport sector has the main role in the transaction operation which might involve a number or all of the following sectors:

- Importers;
- Exporters;
- Bankers;
- Insurers;
- Transport operators;
- Ports and border authorities;
- forwarders and clearing agents;
- Customs authorities.

Under perfect conditions these partners generate and share data amongst themselves. For intraregional trade, the number of partners may be reduced. For example, between countries that have free trade movements, customs procedures may be bypassed. In internal trade within one country, the number of partners may be reduced even further. For example, customs, ports, clearing companies may be excluded. In the ESCWA region, the following trade characteristics prevail:

1. International trade constitutes the major part of total trade in any country.

2. Border and customs formalities are generally time consuming and slow. Invariably, Ports and Customs agencies are governmental departments.

3. Location of ESCWA region away from the main trading partners makes the availability of reliable communications extremely important.

4. The private sector is not as mature as its counterpart in the developed countries.

For EDI and EDIFACT to be recognized and implemented, adoption of the standards by government organizations involved in trade is most important. In the absence of active focal points for trade facilitation in the member States the following generic governmental organs must be kept informed and aware of the importance of EDI and EDIFACT for trade facilitation, productivity improvement and customer (partner) satisfaction. The task will become easier when a focal point for each member State is identified and its role for the facilitation of trade is initiated.

(a) Chambers of Commerce and Industry: For the promotion of EDI and EDIFACT standards amongst importers and exporters;

(b) Transport operators, shipping and Clearing Associations: For the shipping and clearing companies;

(c) Ministries of Transport: For seaports, airports and other cross-border activities;

(d) Customs authorities, and in some countries the National Customs Board;

(e) Insurance companies associations;

(f) Telecommunications authorities for the adequacy of the telecommunications infrastructures to EDI needs;

(g) Central Statistical organizations which are concerned with speedy consolidation of trade statistics and therefore interested in the setting up of efficient operational systems at customs and ports authorities;

(h) National information and information technology authorities concerned with the introduction of new technologies that efficiently network governmental organizations together;

(i) National Planning Authorities or Councils.

B. EDI PROJECTS IDENTIFICATION

It is not sufficient that one individual organization gets convinced about the benefits of EDI. It takes two, at least. In the developed countries, the commercial incentives very much depend on the applications and message types concerned, and it is quite likely that the business partner, although convinced about EDI, give priority to different application areas or types of messages. In the case of developing countries, most of ESCWA member States included, most partners are government organizations and therefore the commercial benefits may not be so apparent. In many cases, these government organizations require to put their internal working procedures in order and to try to upgrade their internal efficiency before thinking of connecting to other working partners.

The selection of a pro-active organization that realizes the potential of EDI is an essential step in the initiation of an EDI project in a member State. Such an organization must already have sophisticated internal systems, and EDI gets the attention of the management, or alternatively is willing to improve its internal systems through business re-engineering procedures as a prior phase to any EDI project. Such an organization must have the power to set or greatly influence the standards to be used. The most important step is to establish EDI firmly in the organization. It takes both time and efforts to make people realize the benefits and work in the same direction. Several experimental projects in various areas may be needed to get sufficient experience before EDI is launched on large scale. Good computerized internal systems should be in place. Though the first ambition level is substitution of paper document, the ultimate objective should be EDI integration.

C. THE EDI DEVELOPMENT CYCLE

The main steps for the development of specifications, implementations and review can be outlined as follows:[7]

1. *Initial deliberations*

Based on a promising idea or proposal for an EDI project, an analysis is made to evaluate it in detail. The evaluation should include clarification of the scope, identification of potential partners in EDI, cost/benefit analysis, etc. If the proposal is found acceptable, suitable partners are invited, a work plan is prepared and resources are made available for the work.

2. *Construction of specifications*

Technical EDI specifications should be developed with representatives from both sides of the planned EDI links. The material should build on common international standards and recommendations. EDI user community specifications should be adhered to. Guidelines for implementation are needed to explain how user-specific concepts are handled. Valid documentation is important since the specifications have to be fully understood by those who are not part in the construction activity.

3. *Pilot implementation*

The pilot implementation combines tests of software/hardware and trial of the EDI specification.

4. *Implementation plan*

To promote a wide implementation of the EDI project, the results of the pilot implementation must be discussed and highlighted with the potential partners. Incentives to all parties to EDI must be thought of, as this will help the implementation process.

5. *Implementation*

Implementation and tests of new EDI relations must be made in projects with one party at a time, possibly some projects can be run in parallel.

6. *Operation support*

From the first day the implementation is made operational, the parties have to supervise the systems and daily operations. The quality of EDI has to be maintained, with procedures for error handling and correction fully defined.

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[7] See Guide to the implementation of EDI-EDIFACT, European Free Trade Association, 1994.

7. *Review of specifications*

The specifications are kept stable for a period of time. It may then be appropriate to review and adapt these specifications to meet additional requirements. A version handling mechanism must be in place from the very beginning.

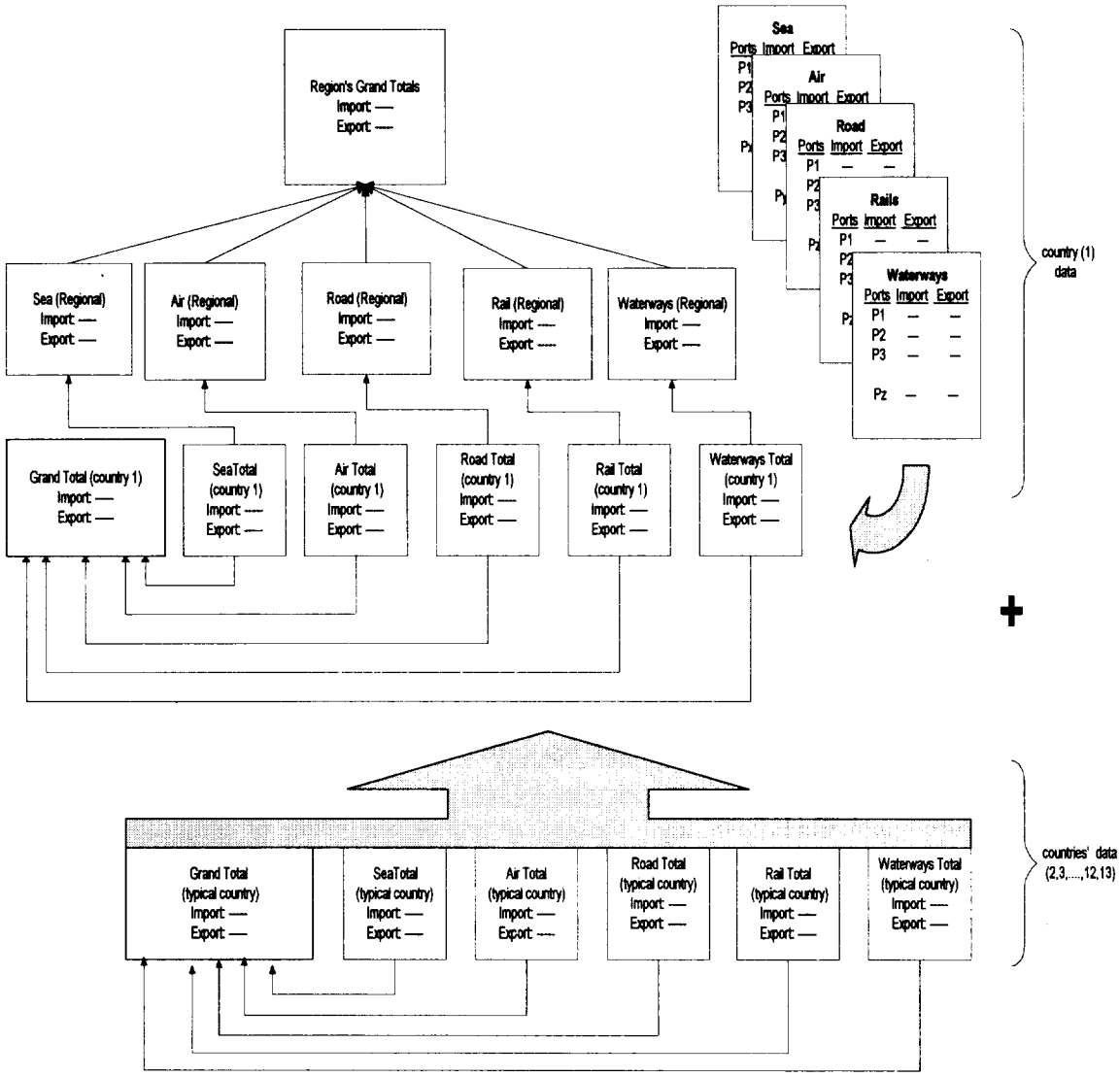


Figure 1. Simple Input/Output Model for Import/Export transactions

VII. POLICY ORIENTATION

The definition of MT has been built on the main objective of facilitating international transport of goods. Its concept has been developed with the overriding principal that sea transport is the centre issue in developing a new transport system and that traffic is outbound from the developed countries towards developing countries.

With these objectives and assumptions in mind a highly developed system was proposed for the transport of goods via sea transport with an additional mode, as a second leg, to complete the journey from Europe to an overseas destination.

The system has taken for granted that a number of pre-requisites are already there in developing countries in Africa and the Middle East. The pre-requisites for a developed transport system include fairly developed infrastructure, essential logistics such as interface facilities between transport modes, inland and ports container terminals and efficient communications and transport information systems.

The absence of the essential factors for MT operation at one end of the traffic flow, as in Africa for traffic arriving from Europe, defeats the objective of the MT system. Here the traffic might move from European ports with minimum or no delay and gets stuck at the first African port. The reason could be late arrival of documentation or failure in communication links. There many explanations that could be given to justify delaying dispatch or delivery of consignments in many parts of the developing countries while real reason may attributed to incompatibly of the systems between developed and developing countries or merely for inefficiency at one end.

The administrative procedures and custom formalities across borders are among the main constraints of an efficient transport operation in many regions. Custom procedures can delay traffics for days instead of hours if the documentation is not complete or different from the established procedure at different custom stations.

The various factors contributing to transport operation should be taken into consideration if the operation is to competed efficiently, otherwise the whole system would not work at all. The MT convention signed in 1980 by over 70 countries has not been ratified by more than six out of twenty countries needed to ratify convention to enter into force.

Most of the countries in the developing regions are not yet ready to adopt an advanced transport system such as the MT. This is due mainly to the absence of the basic logistics in these countries. Apart from the basic infrastructure and the fleet, there are two other issues to be considered by countries who opt to develop their transport system irrespective of it being a multimodal or another intermodal system.

The policies adopted by the developing countries do not, necessarily, be the same as the policies adopted by the developed countries. However, the commercial links between trade partners require a certain level of coordination that should be established to facilitate the flow of traffic among them. Coordination and the minimum level of standardization are essential not only for transit traffic but are integral part of any activity for trade development. Bilateral and multilateral agreements are worked for this purpose and for the same objective a number of regional and international organizations are involved in establishing agreements and conventions among their members.

The MT convention has been developed by UNCTAD to enhance MT application at the international level. In the absence of the required consensus on the MT convention other options for the development of MT were investigated. Among these efforts were the introduction of special voluntary rules for MT and the establishment of special TIR carnet for multimodal transport.

The establishment of a MT system could be enhanced through the development of the various factors associated with it at both origin and destination of traffic and along the route the traffic would cover. The components of MT include infrastructure, installations, fleets, logistics and administrative and managerial support. They differ between regions and countries in as far as the local conditions might dictates but the overall concept and requirements remain similar under most conditions.

Infrastructure is the backbone of the transport system. National transport links are, mostly aligned to link with neighboring countries and form part of regional or international routes. International corridors would provide the appropriate infrastructure for international MT. At the regional level a number of continental links have been under consideration for decades and are envisioned as transcontinental corridors. Those are basically road transport links including the Trans-Asian highway, the Pan-American highway, the Trans-African Highway and the Western Asia highway system.

The intercontinental railway links were not foreseen to take shape in the foreseen future but recent development gave the railway better options than a decade ago. The Transcontinental link between Asia and Europe was inaugurated recently on the silk road trail. In Western Asia, several projects involving rail links are being considered within the peace process initiative.

The development in intercontinental corridors has been modest. Individual countries, normally, end their enthusiasm for such projects at the international conferences. Coordination is not easy to reach when the matter comes to large investments in regional projects as national interest are always given the priority in development plans.

Investment in transport infrastructure has been a stable chapter in almost all national development plans in ESCWA region. Large investments has been channeled to infrastructure development to the extent of resulting in overcapacities. In most cases the investments provided a needed infrastructure and made ESCWA region among the well linked regions and that could be demonstrated by an extensive network of roads, sea ports and airports.

All the infrastructure investments came from public sector where the governments provided the only source for financing roads, airports and sea ports. Recent calls to the private sector to get involved in infrastructure development got no serious response. This area of investment is not among the traditional areas for the private sector in the developing regions. Therefore, a reasonable involvement by the private sector, in infrastructure, is not foreseen in the near future.

The transport fleets are financed by both public and private sectors in ESCWA region. Land transport fleets have more private sector involvement while the air transport companies are predominantly in the hands of the public sector. However, tendencies towards privatization are bringing more private sector participation to the airlines in ESCWA region.

Following the changing economic conditions in the region with less investments available to ESCWA states, the policy makers are turning towards possible areas of selling out public property to the private sector

and inviting private participation in government owned enterprises. The efficiency of management and new techniques in operations are areas where public and private sectors could achieve savings and improve the returns on their investments.

Most of the border stations are not designed in a way that provides for the maximum efficiency of operation. The information system is part of terminal structure and is as important as the physical structure of the terminal. Without the appropriate information system the terminal would be inefficient as far as the speed and quality of service are concerned.

The result of the inefficiency of the terminal would be reflected in congestion of goods at the terminal and the planners normally resort to solve this problem by increasing storage space. Additional space means land usage and capital investment the cost of which would carried over to the services provided. Therefore the solution leads to higher transport cost that could have been avoided with better planning.

The problems encountered in the terminal are in the logistic areas. The delay in information arrival at the terminals affects the traffic flow and formalities would be interrupted until the required information arrives and the formalities for releasing the goods are completed. The complexity of procedures in route or at destinations often adds to the delays even if the documents are expedited by courier.

The logistic areas should be areas of interest to policy makers and more attention should be given to improve the services and utilization of the existing assets. This attitude necessitates further consideration to the role of information technology. Less importance should be given to additional investment in infrastructure and fleets.

VIII. PROPOSALS AND CONCLUSIONS

Transport planners in their search for sector development might consider varying options depending on the stage of development reached, technology level acquired, manpower expertise, the demand for transport and the resources available or foreseen. All the relevant factors are taken into consideration in the planning process with the view of providing the optimum transport capacity with the supply and demand matrix and modal balance as important factors in the planning process.

The present situation in ESCWA region indicated that the transport infrastructure is, to a large extent, adequate. It is anticipated that by increasing the efficiency of the present system savings in future investments would be realized. Transport logistics would provide options for increasing efficiency with lower costs than what could be attained through more investments on additional infrastructures. Improved terminal design and services as well as improved communications with more reliance on information technology development can revolutionize transport management and operation. The transport terminal could be planned as a logistic centre providing an integrated transport and communications environment with all the associated services of a business enterprise.

Large amounts of investment funds were channeled to the physical structures of traditional terminals but little attention was given to modernized multipurpose terminals. Also, even less attention was paid to developing communications and information systems linking those terminals. The unfortunate outcome of these policies was that there were more investments in infrastructure than what could have been made if transport logistics were given the appropriate priority.

The terminal in its proposed sense as a commercial, transport and information pool would be an important factor in the transport and trade development in the region. Plans should be initiated for the establishment of these types of terminals as logistic centres with their primary role as collection and distribution centres for transport and trade information as well as pools for cargo distribution.

The introduction of a well defined information system based on the international standards available would ensure regional and global connectivity for the transport terminal. An established plan should be worked out for upgrading terminal facilities to adapt to the technological developments and cope with the increasing demands of traffic.

The projects proposed for MT development relate to the integration of both the transport terminal and information technology to form the TRANSPORT LOGISTIC CENTRE. This centre should be designed in a way that would enable it to be an active centre for directing the flow of cargo and information. Storage should be minimum and commercial activities be central in its operation.

The proposed project should be subjected to detailed analysis to take into account the objectives of the terminal and what services it should provide in order to accommodate these objectives. The modal choice would determine the infrastructure requirements and should be at the minimum investment level as compared to other requirements. The level of information technology to be adopted should be decided on the basis of standard systems internationally accepted or at least recognised by trading partners.

The decision of the location of the terminal is an important one and it has always been determined primarily by the mode of transport used. The new concept of the terminal is not determined merely by mode of

transport but on these other overriding factors such as available information technology, markets and population centres.

EDI and UN/EDIFACT are internationally accepted basic vehicles for applications in information technology. Applications of ASYCUDA in customs are being considered by a large number of countries including a few in ESCWA region. Other options are found in the application of ACIS in ESCWA transport system as seen by its success in East Africa. The SAFETIR is also an option that can be considered by contracting countries to TIR convention.

The list of technology options is a long and expanding one and detailed project analysis is proposed to arrive at the appropriate applications. The development of EDI involves a number of public and private agencies. Coordination among these various agencies is an essential element in the establishment of an EDI system that has national recognition.

It is proposed that a council be established to include the various agencies involved in EDI system. Besides customs, the following parties might be members of the Panel:

- Ministy of Finance;
- Ministry of Trade;
- Ministry of Transport;
- Ministry of Communications;
- Prime Minister's Department;
- National Chamber of Commerce;
- National Shipowner's Association;
- National Road Transport Association;
- National Freight Forwarder's Association;
- Railway Authority;
- Port Authority.

Information technology can provide solutions to many problems associated with transport in general and border crossing in particular. It is important to note that information technology does have flaws such as the question of security of information. In the United States, traders are complaining from the increasing number of thefts. These thefts are a result of the easy access to electronic information and the divergence of cargo to other destinations by thieves. Nevertheless, the savings to national economies and private business exceed the losses. Developments in security measures would improve the situation and materialize the benefits of information technology in business.

EDI offers a tool that would probably have more comprehensive and far-reaching effects than any other transport and trade facilitation measure. Documentation in any organization represents a sizable portion of overhead costs. EDI relieves the organization of a large part of these costs and provides added value as a result of time savings in any transport operation.

It is not merely a tool replacing old ones, but also one offering new ways of doing business and provides one of the best tools for transport and trade facilitation. In border crossings, customs claims the highest share of time waste and contributes to the increasing cost of trade and transport. Therefore, customs would be the prime target of any radical development activity and keeping in mind the other formalities in the transport process.

EDI provides customs authorities with facilities that speed up clearance of goods and saves on border crossing formalities. It provides the various parties involved in trade and transport with valuable medium of on-spot information that naturally leads to :

1. Saving on documentation cost.
2. saving on time through immediate communications among concerned parties.
3. Improving information management.
4. Facilitating cash flow within business environment through speeding clearance of documentation.
5. Improving customer service.
6. Enhancing trading opportunities.

EDI can contribute to the speeding up of formalities when information related to goods in transit is transferred electronically from one point to the other. EDI through EDIFACT standards will ensure the transfer of data through the business environment network by linking shippers, banks, insurers, border points, traders etc. and providing IN-TIME information and channeling of decisions in a way that transforms businesses into new dimensions and radically changes the way businesses in ESCWA countries are handling their trade.

Grounds should be prepared for the terminal development and acquisition of technologies to improve its operation. The situation in the ESCWA region indicates that the telecommunication infrastructure in the GCC countries can provide reasonable support for the development of information technology in trade and transport. Some of the GCC countries have moved further ahead than most other countries in the Arab region in availing telecommunication infrastructures that can support EDI application. The telecommunication infrastructure in most other member states is undergoing fast changes that would make it in the near future conducive to the promotion of electronic commerce in general and EDI in particular.

Terminal development would require a radical change of the terminal concept from a modal station into a transport and business centre. The location should be decided on weighing averages of production, consumption and distribution centres. A port is a transit station as any other border crossing point and the traditional concept of port association with container terminals should reconsidered.

The vast area of development in information technology provides the option for moving terminals away from ports and further inland as close as possible to the markets. Further investigations are required to assess the level of information technology necessary for the transformation of the transport concept in general and terminal concept in particular, into the new dimensions that would meet the requirements of the coming generations.

Annex I

SURVEY OF EDI APPLICATIONS IN SELECTED ESCWA MEMBER COUNTRIES

A. UNITED ARAB EMIRATES

Visits in the UAE are made to the following authorities:

- Dubai Ports Authority (DPA);
- Dubai Customs;
- Mina Zayed;
- Abu Dhabi Customs;
- Sharjah Port;
- Ajman Port and Customs;
- General Information Authority.

Although all modes of transports are developing fast in the UAE, but maritime transport constitutes the main growing mode of transport.

Sea ports have been a major development priority in UAE since all Emirates and major towns are located on the coastline. Furthermore, UAE is home to a large regional re-export and redistribution trade which extends beyond the countries around the Gulf to East Africa and the Indian subcontinent. Traffic at the UAE ports increased at an average of 8 per cent per annum in the last 8 years, during which period the number of docking ships has almost doubled. [Reference 6]

UAE's geographic location between Europe and Far East has certain distinct advantages. It has enabled it to become a major point in the world sea-air cargo movement, after Singapore and Seattle. Such transshipment has emerged because of:

- Long shipment time between Far East and Europe;
- Unavailable capacity for air cargo on this route;
- Abundance of air cargo space out of UAE.

Most cargo received from the Far East in containers has to be restuffed in Dubai. Roughly 70 per cent of the sea-air cargo is handled by Fujairah port, and the remaining 30 per cent by Port Rashid in Dubai.

Dubai dominates shipping activities in UAE. It has the largest shipping capacity with 103 berths, headed by Port Rashid which is the leading port of the Gulf, though Jebel Ali Port is larger. Jebel Ali is not only the largest port in UAE, but is also the largest man-made port in the world. It largely handles bulk cargo and industrial materials relating to manufacturing units in the Jebel Ali Industrial Zone.

Fujairah's importance is derived from transshipment rather than imports. In 1996, for example, over 4000 ships called at its offshore anchorage.

Abu Dhabi Port handles most of UAE's export of crude oil. There are major expansion plans to meet demand for the next 20 years.

Sharjah is the only Emirate to have a port on both coastlines of UAE (Khalid, Khor Fakkan and Hamriya). Khor Fakkan is a dedicated container port. The three ports are linked by a coast-to-coast modern multi-lane highway network, and have a common customs system.

Mina Saqr at Ras Al-Khaimah has traditionally handled its export of limestone, crushed rocks and aggregates. The port is also poised for transshipment growth. Ajman port facilities have been improved to support the Ajman Free Zone established in 1988 and the growing garment manufacturing industry in the Emirate. Um Al-Quwain, being one of the smallest Emirates, has the smallest port traffic, but it has developed a free zone area with 40 factories.

The more than adequate port capacity means that UAE ports authorities are more interested in support facilities and services that result in productivity and efficiency improvement that will allow them to attract more traffic and to compete amongst themselves and other ports in neighboring countries.

Intermodal transport for intercontinental sea-air cargo and intra-regional sea-land transshipment is becoming an important issue. Most ports have access to an international airport nearby. Another critical factor will be the growth and success of free trade zones.

The Information Systems and Technology Department, Dubai Port handles a number of important ports applications, these include, inter alia:

- Container Terminal Management System (CTMS) which supplies details of vessel movements, crane bookings and container movement. CTMS also supplies data for the synchronous Planning and Real Time Control System (SPARCS) which provides a graphic tracking display of container movements anywhere in the terminal, while also having the capacity to create plans for loading and discharging. The system also distributes information to the numerous Mobile Data Terminals located in every straddle carrier, RTG, top loader and forklift. Linked to this application is the port's Global Positioning System technology which automates the process of locating containers, thus virtually eliminating human errors. Dubai Ports Authority (DPA) is in the process of combining databases of both terminals (Rashid and Jebel Ali) so that customers will be able to view the available information in both ports simultaneously.

New developments in the Container Freight Station System (CFSS) will include the use of bar coding and radio data terminals. This will enable tally clerks supervising the unstuffing operations to do on-line recoding of the unstuffed cargo on bar-coded pallets with the aid of manifest data. Forklift operators will also use integrated radio terminals and bar-code scanners while shifting pallets to shed locations which are also bar-coded.

- DPA also went on-line with Manifest and Documentation System which is claimed to be the first application of its kind in the Middle East. Starting from end of 1997, electronic manifests will become compulsory. The manifests are sent electronically by shipping agents to DPA which will be used by both DPA and Dubai Customs, (Figure 2).

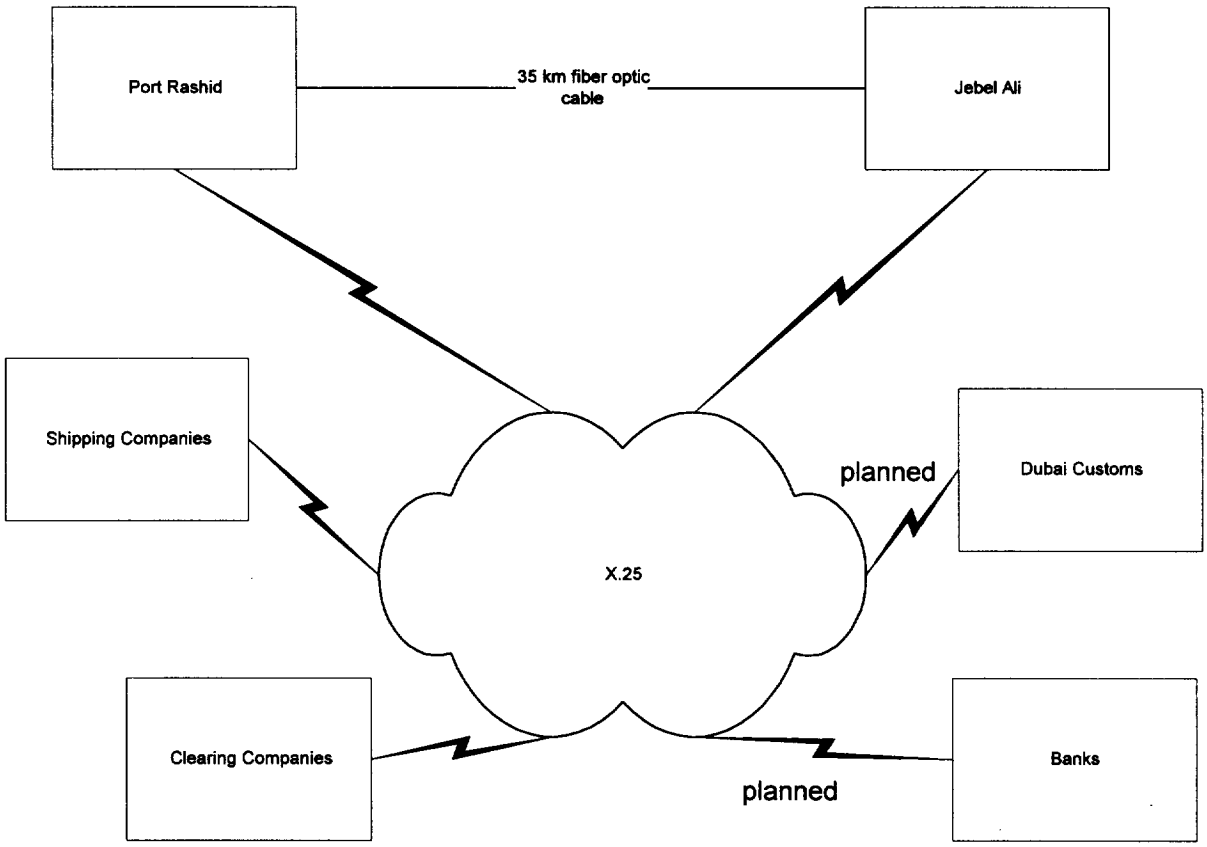


Figure 2. DPA connectivity

- DPA is also working on a Customer Services System that will handle inquiries and complaints that may be received from customers.

The dual backed computer systems at both Port Rashid and Jebel Ali terminals, which are 35 kms apart, are connected by a fiber optic cable providing DPA with an extremely secure configuration allowing both terminals to operational continuity in case of failure of any of the two systems.

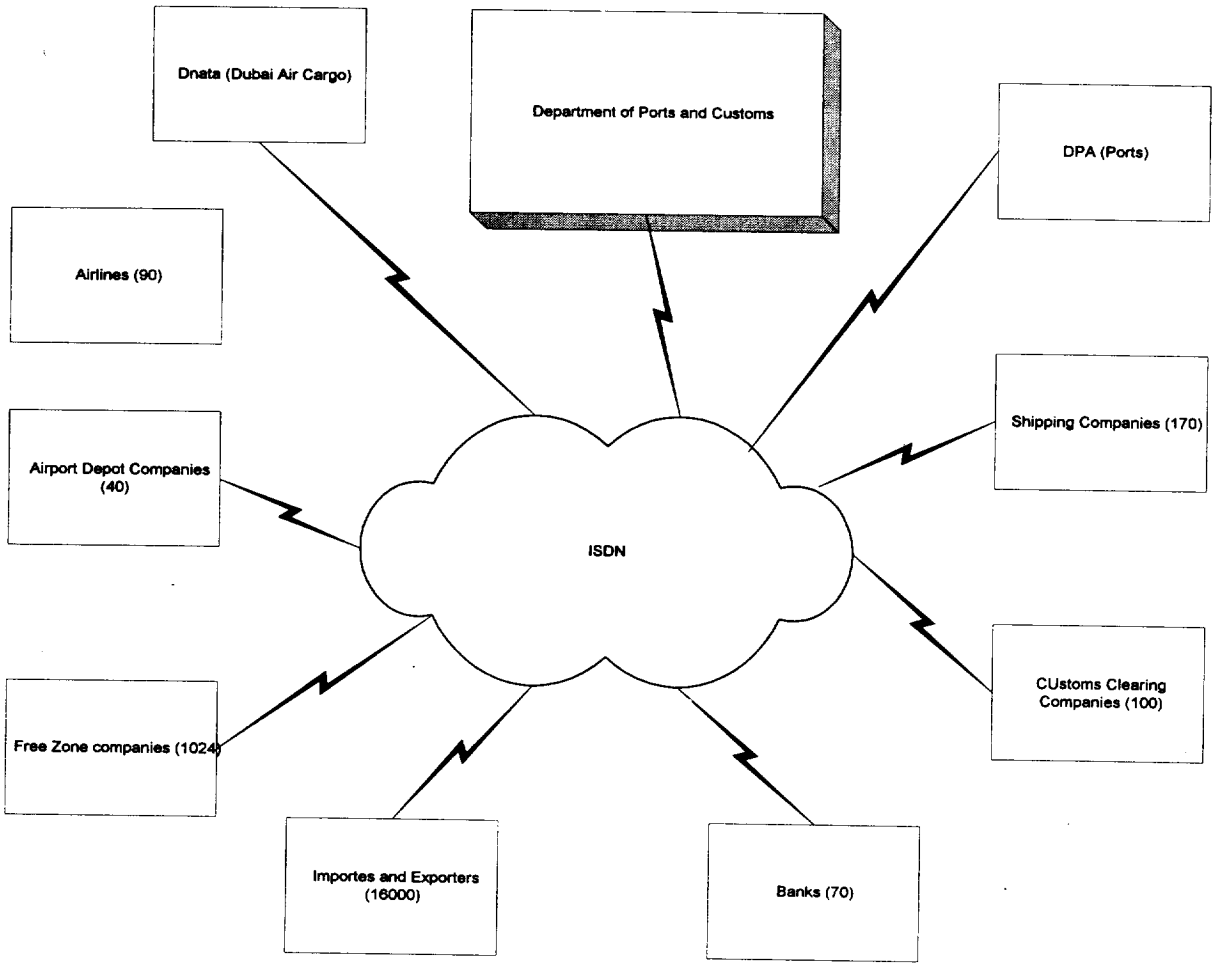
The hardware consists of:

4 VAX7000 used as Oracle servers
2 Compaq servers for Sybase
2 Compaq servers for Windows NT running a maintenance management application (IMPAC)
400 workstations

The Information Technology Centre of the Department of Ports and Customs are presently working on an ambitious project which they named Vision 2000. The project aims to provide EDI connectivity to all trading partners to Dubai business.

In most ESCWA member States Customs departments are the hearts of cross border trading as all transactions have to pass through them, even if they are exempted from customs duties. Dubai Customs handles around one million transactions a year and deals with around 17,000 customers. The system that Dubai Customs is working on will provide EDI connectivity to all. The first phase is expected to become operational by September 1997 and EDI and EDIFACT facilities will become available in 1998.

Figure 3 reflects the future as conceived by Vision 2000. Figures in brackets are estimates of the number of different companies within each category.



Note: (numbers in brackets indicate approximate number of partners in each category)

Figure 3. Dubai Customs Future Plan (Vision 2000)

Before embarking on this project, Dubai Customs investigated traditional hardware/software solutions. They also considered UNCTAD ASYCUDA (Automated System for Custom Data). Decision was made to go for Windows NT based environment with SQL server as a data base engine. ASYCUDA was dismissed as an

expensive and technically insufficient solution for Dubai's requirements. The software is being developed in-house bearing in mind EDI and EDIFACT compliance. Dubai hopes that its system will become the de-facto standard for UAE, and ultimately for other GCC countries.

Abu Dhabi is the second busiest trade Emirate next to Dubai. Its transactions volume is about one eighth of Dubai. The seaport Authority at Mina Zayed and Abu Dhabi Customs use relatively outdated Wang VS systems. The Seaport Authority is in the process of selecting a consulting company that will specify new requirements for hardware, software and applications design and are anxious to get technical support to ensure new systems compliance to international standards.

At present, Mina Zayed has several applications running on the Wang VS system, they include:

(a) General cargo system which handles manifest data;

(b) Container Terminal Operations System: is an on-line system that handles containerized cargo;

(c) Marine Operation System for handling voyages calling at Mina Zayed. Data include rotation number, vessel code, vessel type (general cargo, container carrier, multipurpose, etc.). The application is the base for the general cargo and the container terminal operations systems.

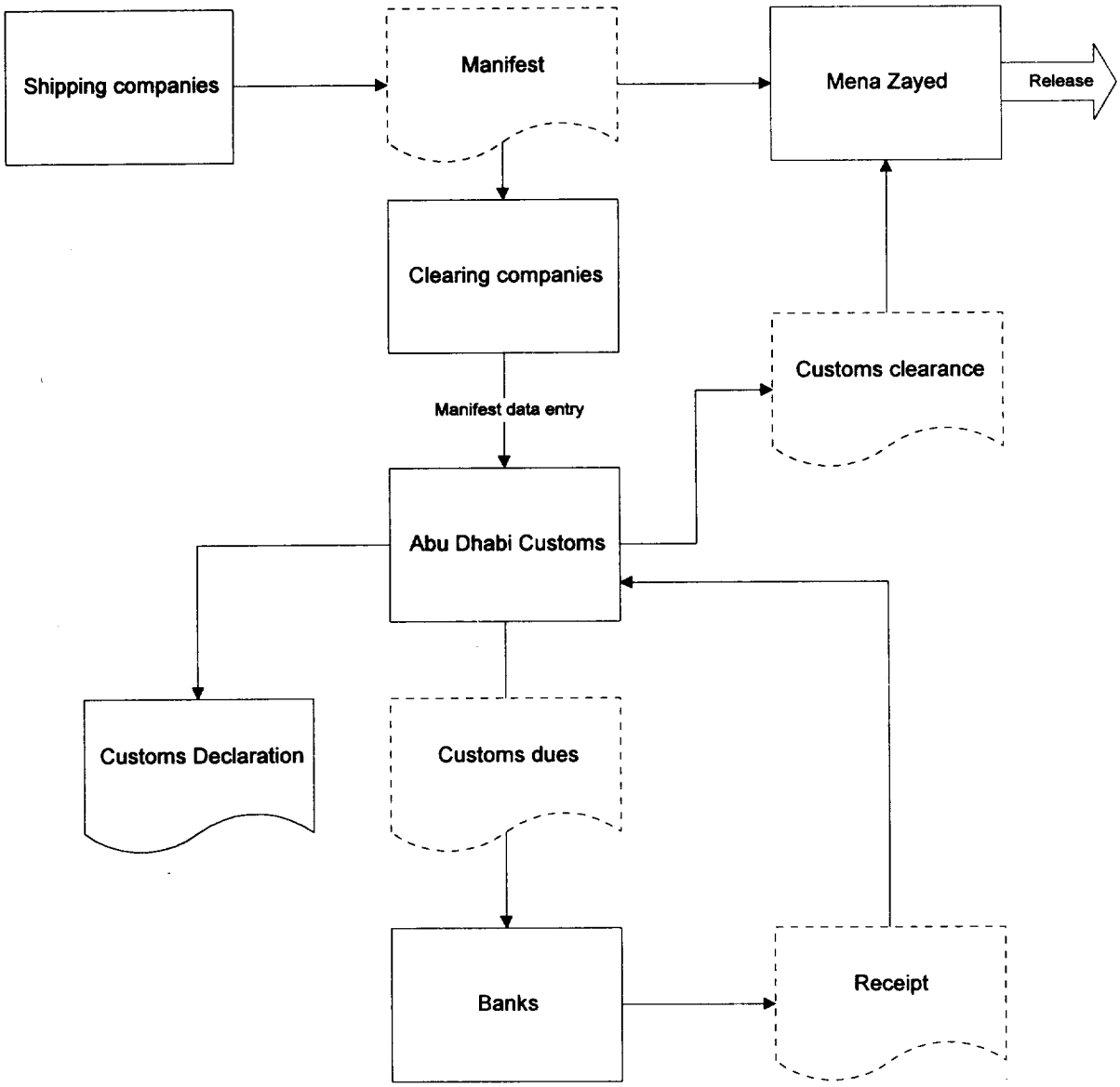
Manifest data is handled separately from customs. Data received from shipping companies either electronically or manually is re-entered into the port system. Abu Dhabi Customs has an internally efficient system that handles manifest data through customs clearing companies which normally receive manifest data electronically. An arrangement was made with these companies to enter manifest data directly, thus saving on customs data entry staff. The customs declaration form is computer produced. customs issues its clearance form through the system which is taken by the clearing company to the port for clearing formalities.

Both authorities can share many processes. The most obvious ones are:

- Manifest data;
- Clearance form;
- Payments.

They are fully aware of the importance of data sharing and standards and both authorities hope to get technical support for the development of the new system based on EDI and EDIFACT standards.

Figure 4 shows the existing system. The dotted sections are possible future bypass for manual work.



Note: (dotted lines are possible manual links that can be replaced by EDI links)

Figure 4. Goods Clearance Procedure

Port Khalid in Sharjah was also visited. It is one of three ports situated in Sharjah. The other two are Khor Fakkan and Hamriyah. The port handles a wide variety of shipping services. The port has an interesting location in the heart of Sharjah and only 10 km of downtown Dubai, thus making it attractive to some customers to direct their business to Sharjah. Both the port and customs are located in the same building. The work is mostly manual but efficiently handled by the clerical staff and further computerization and EDI are not on their priority list. However, Sharjah's ambitious plan to divert traffic and business to their ports will sooner or later persuade them to look into more efficient procedures for handling paper work.

Ajman Ports and Customs Authority is fully manual but appreciated the importance of standards and paperless procedures. Ajman follows UAE Customs Board's recommendations and are willing to go along a system that can be adopted at GCC and Emirates level.

Coordination amongst customs authorities in the UAE is carried out through the Customs Board. It is a permanent set-up attached to the Ministry of Economics and Commerce situated in Dubai. It has a permanent secretariat at the Ministry. At present, it is headed by the Director General of Dubai Customs. This board ensures coordination amongst the various Emirates and is also the interface with the GCC and the harmonized system for customs promoted by the GCC.

The General Information Authority in Abu Dhabi is the official organ responsible for computerization of government offices. It is also responsible for the dissemination of information related to new developments in hardware, software and applications.

The communications infrastructure of the UAE is probably the best in the ESCWA region. ISDN services in the UAE conform to the ITU 2.931 set of standards or the Europe ISDN (ETSI) standards. Etisalat offers its users a choice of two options while connecting to ISDN. Connections from an ISDN-ready digital switch can be obtained through:

- Direct Basic Rate Interface (BRI);
- Primary Rate Interface (PRI) connection.

Etisalat also offers users seeking international ISDN applications, connections to major commercial centres around the world.

B. STATE OF QATAR

Doha International Airport handles cargo shipment mostly manually. They have no immediate plans for further computerization until the move is made to the new airport in July 1999. Airport Authorities are more interested in computerized immigration control systems.

Department of Planning and Follow-up at the Ministry of Communications and Transport was also visited. The purpose of the consultant visit and the importance of EDI and EDIFACT to the transport sector were explained.

The Central Statistical Organization (CSO) was visited and the importance of EDI and EDIFACT was explained. CSO has an indirect vested interest in the application of standards in customs and transport data. The CSO is the organ responsible for the collection and normalization of the country statistics. One of their main concern is the structure and timeliness of the data they receive from its source. Foreign trade statistics is one of their concern and would like to link with customs for data retrieval and inquiries.

Qatar Customs is part of the Ministry of Finance, Economics and Trade. There are about seven major entry points to Qatar. Three of them are computerized through a central system located at the Ministry. The remaining points enter manifest data into the system manually, figure 2.7. Customs operates an in-house developed system that allows clearing companies staff to enter manifest data through computer terminals installed on Customs premises. The manifest data is further verified by Customs staff and customs dues are calculated. Once the importer pays his/her dues then a customs clearance form is issued. The customs

declaration form, unlike Mina Zayed in Abu Dhabi, is issued manually. The Customs staff were not aware of EDI and EDIFACT, but they are fully aware of the importance of data interchange with the ports, clearing companies, banks and customers. They have plans to locate terminals in clearing companies offices and to connect the system to the banks, so that payment notification is received electronically.

The Supreme Planning Council where country plans and future studies are carried out was also visited. Their interest in trade and transport data are met through the Central Statistical Organization which consolidate data from all sectors. The SPC can help promote EDI and EDIFACT. SPC is in the process of revising a study on the transport sector that was carried out before 1990 and expects ESCWA's assistance in this process.

The Gulf Organization for Industrial Consulting (GOIC) is a regional organization consisting of the six GCC States. Being concerned with projects and information related to industrial development it is only natural to assume that trade facilitation and data interchange are subjects that are part and parcel of GOIC's list of interests.

Qatar communications infrastructure is managed by the Qatar Public Telecommunication Organization (Q-TEL) which is a governmental company responsible for networks and services. It is an autonomous body run on commercial basis. Qatar enjoys a high-level, efficient and relatively modern telecommunications system. It will have no problem meeting EDI and EDIFACT communications requirements.

C. HASHMITE KINGDOM OF JORDAN

Jordan has one main port at Aqaba which does not only serve Jordan's trade activities, but also Iraq, that has depended on Aqaba Port heavily since 1980 due to the Iraq-Iran war and subsequently the UN imposed embargo.

Apart from Aqaba seaport and Amman airport there are four inland entry/exit point, and a free zone area in Zarqa.

There are about 60 shipping agents operating in Jordan. Some receive manifest data electronically. However, manifests at entry points, with the exception of the airport, are handled manually.

Customs formalities are also handled manually and customs declarations and customs dues are issued manually. However, the data produced is entered in the customs computer system for control and accounting purposes. Due to lack of funds, the transport and customs systems have not yet been computerized.

Jordan's Customs has recently signed for the implementation of a UNDP/GTZ (Germany) funded project for what is termed a Sector Reform Programme at the Institutional Level. As part of the project, Jordan's Customs is to implement UNCTAD ASYCUDA in stages. The pilot implementation will take two years. The full implementation will cover about 30 customs sites throughout Jordan. It is not yet clear whether the ASYCUDA software that will be used in the project is EDIFACT compliant.

Road transshipments and free zone activities constitute a good portion of Jordan's trade and therefore should be taken into consideration.

The National Information Centre (NIC) is the responsible organ for information and networking in the government sector. NIC is interested to coordinate the promotion of EDI and EDIFACT with ESCWA.

The telecommunications infrastructure of Jordan is the responsibility of the Telecommunication Corporation (TCC) which was transferred in 1997 from a governmental department into an autonomous company. Jordan enjoyed a high level of telecommunications service up to 1987. However, between 1987 and 1993 no major switching equipment was installed owing to lack of funds. Since TCC transformation into an autonomous company there are now plans to expand and offer new services. Local and international fast links for data can be provided. The need for such lines has increased over the last 2 to 3 years due to the wide spread and acceptance of the Internet. With Jordan's interest in world trade and the European partnership agreement it is expected that the subject of EDI and EDIFACT will soon become an important issue.

D. REPUBLIC OF LEBANON

With the continuation of economic recovery of Lebanon and despite budgetary and investment constraints, the improvement of the infrastructure has witnessed unprecedented achievements. When the reconstruction efforts start paying off in two to three years from now, Beirut is anticipated to be one of the most modern cities in the region in terms of infrastructure.

With life getting back to normal and trade becoming an important issue, shipping agents and ports authorities will start getting interested more and more into moving to electronic means of transforming manifest data. The Chamber of Commerce and Industry will act as a catalyst for the promotion of EDI and EDIFACT in the private sector. The Chamber expressed members' interest is speeding up the creation of free zones and the efficient handling of transit trade.

The ports handle most of the manifest data manually. There seem to be a need for awareness and, perhaps, technical support in the introduction of computerized procedures in Lebanese ports.

As of August 1997, Lebanese Customs is in the first phase of a UNDP funded project for the implementation of ASYCUDA in their offices.

The Office of the Minister of State for Administration Reform is highly interested in the introduction of new technologies and procedures in government authorities. Introduction of EDI and EDIFACT activities in Lebanon can best be coordinated with this office.

The Ministry of Post and Telecommunications has set up a plan they term "Horizon 2000" in which they hope to move from 10 per cent penetration in 1995 to 35 per cent in 2000. They plan to install 100 per cent digital equipment, fiber optics networks and backbone and offer ISDN and later ATM services. More than 55,000 new lines have been installed and 110,000 old lines have been transferred to the new network. The average number of lines introduced every month is between 20,000 and 30,000.

Annex II

CONTAINER TERMINAL CAPABILITIES IN THE ESCWA REGION

	Bahrain	Egypt			Iraq
	Mina Sulman	Alexandria	Damietta	Port Said	Um Qasr
Number of container berths	2	4	4	3	3
Overall length in meters	600	1,270	1,050		650
Water depth in meters	11	14	14.5	13.7	12.5
Terminal area in m^2 and storage in TEUs	300,000 Storage 6,503 TEU	Total 163,000 storage 10,000 TEU	1,000,000 storage 5,400 TEU	575,000 storage 140 TEU	NA
Container Freight Station (CFS) in m^2	Total 40,000 Covered 17,000	covered 34,000	4,400 m^2 covered	2,500 covered 2,272 storage 80 TEU	NA
Ship-to-shore container gantry cranes	2 x 30.5 t 2 x 35 t	3 x 40 t	4 x 40 t	3 x 41 t	2 x 40 t
Straddle carriers	12	NA	NA	NA	NA
Yard gantries	1 yard gantry	4 yard gantries	NA	2 x 32 t	NA
Front-end handlers/reachstackers	11	25	25	15	NA
Yard tractors/trailers/Tug masters	8 tractors various trailers	25 yard tractors 30 chassis/trailers	41 chassis/trailers 30 yard tractors	12 yard tractors 7 chassis/trailers	NA
Ro/Ro Ramp	One available	One available	One available	Available	One available
Developments	2 x 300m container berth and 1 x 300m Ro/Ro berth plus equipment	NA	storage area to be increased by 25,000 m^2. Two post-panamax container gantries for delivery in 1998	NA	NA
Computer	Hardware IBM	for vessels and cargo movements	Hardware IBM container operations	Hardware DEC MICRO VAX terminal operations	NA
Rail/Road/Sea-air and inland waterway connections	Road and Sea	Rail link to terminal marshaling yard/road	Rail connections to Cairo and other parts of the Nile Delta/transshipment	Rail connection to Cairo and other parts in Egypt/transshipment	Rail linked to Basrah and Baghdad and road

Annex II (*continued*)

	Jordan	Oman	Saudi Arabia		Syria
	Aqaba	Mina Sultan Qaboos	Jeddah	Dammam	Lattakia
Number of container berths	2 + 1 Ro/Ro	2	7	6	NA
Overall length in meters	580	458	1,681	1,440	NA
Water depth in meters	14-20	13	12-14	14	NA
Terminal area in m^2 and storage in TEUs	311,000	47,000 Storage 30,000 TEU	768,000 storage 43,923 TEU	716,000 storage 7,188 TEU	120,000 storage 3,200 TEU
Container Freight Station (CFS) in m^2	covered 72,000 m^2	5,000 m^2	235,000 covered 47,000 m^2 storage 800 TEU	281,000 covered 37,000 m^2 storage 651 TEU	90,000
Ship-to-shore container gantry cranes	2 x 40-45 t	2 x 41 t post panamox 1 x 38 t 1 x 35 t	4 x 30.5 t 2 x 40 t	2 x 30.5 t 6 x 40 t	2 x 30 t
Straddle carriers	7 x 30-35 t	NA	69 x 30.5 t	28 x 30.5 t	4 x 32 t
Yard gantries	4 x 25 t	8	6 yard gantries	NA	1 tower crane
Front-end handlers/reachstackers	6 x 20-35 t H. Fork lifts 1 x 7-12 t H. Fork Lifts	29	139	90	2
Yard tractors/trailers/Tug masters	46 towins tractors 197 trailers 25 tug master	25 yard tractors 25 chassis, roll trailers	64 yard tractors 70 yard trailers	42 yard tractors 78 yard trailers	37 yard tractors 88 yard trailers 3 tug masters
Ro/Ro Ramp	available	available	available	available	NA
Developments	1 panamax container gantry for delivery in 1997. 1 post-panamax container gantry for delivery in 1999.	NA	NA	NA	NA
Computer	for administrative, finance and operations not yet in container operations	Hardware Hewlett-Packard containers management and other functions	Available for container administration, planning, tracking and recording.	Hardware ICL vessel planning, administration and container tracking	None
Rail/Road/Sea-air and inland waterway connections	Road	Road	Road	Rail connecting Inland Container Depot (ICD) in Riyadh and road connection	Road/rail

Annex II (*continued*)

	Kuwait		Lebanon	Yemen	
	Shuaiba	Shuwaikh	Beirut	Hodeidah	Aden
Number of container berths	4	2	3	2	
Overall length in meters	880	NA	890	495	
Water depth in meters	14	9.6	10.5 - 13	11	
Terminal area in m^2 and storage in TEUs	310,000 storage 3,500 TEU	27,000 storage 12,600 TEU	50,000	100,000	
Container Freight Station (CFS) in m^2	14,000 covered 8,000 storage 64 TEU	50,000 covered 25,000	NA	NA	
Ship-to-shore container gantry cranes	3 x 41 t	2 x 40 t	NA	1 x 30 t 1 x 40 t	
Straddle carriers	11 x 41 t	NA	NA	NA	
Yard gantries	NA	NA	NA	NA	
Front-end handlers/reachstackers	21	20	23	NA	
Yard tractors/trailers/Tug masters	16 yard tractors 19 yard trailers	28	115 yard trailers/chassis	NA	
Ro/Ro Ramp	available	available	available (3)	available (1)	
Developments	NA	NA	Massive. Container terminal expansion of 1,000 m quays with 16 m water depth and equipment	NA	
Computer	Hardware IBM container terminal and CFS control	Hardware Tandom container control and other functions	None	NA	
Rail/Road/Sea-air and inland waterway connections	Road	Road	Road	Road	

Annex II (*continued*)

	United Arab Emirates			
	Fujairah	Khor Fakkan	Mina Zayed	Port Khalid (Sharjah Terminal)
Number of container berths	Multipurpose/container berths	3	4	3
Overall length in meters	780	710	920	583
Water depth in meters	12.5	12.5	10.5-13	10.5-11.5
Terminal area in m^2 and storage in TEUs	240,000 storage 15,000 TEU	300,000 storage 15,000 TEU	410,000 storage 15,000 TEU	125,000 storage 5,600 TEU
Container Freight Station (CFS) in m^2	covered 3,500	covered 5,000	15,000 covered 13,000	covered 50,000 storage 200 TEU
Ship-to-shore container gantry cranes	5 x 40 t	6(40-41) t	NA 32 mobile	2 x 40
Straddle carriers	NA	NA	6	NA
Yard gantries	7	6	2	2
Front-end handlers/reachstackers	10	10	4	11
Yard tractors/trailers/Tug masters	38 yard tractors	23 yard tractors 49 yard chassis/trailers	25 yard tractors 8 H. fork lifts 40 yard chassis/trailers	7 yard tractors 17 yard chassis/trailers
Ro/Ro Ramp	NA	NA	NA	available (1)
Developments	1 x 44 container gantry crane and 4 yard gantries	2 x 48 post-panamax container gantries and yard equipment	6 container gantries and 2 straddle carriers in order	NA
Computer	Hardware Digital container control, planning and CFS management.	Hardware NCR. container control, planning statistics, stowage and EDI	Harware Wang container and vessel operations, control, statistics and invoices	Hardware NCR container control, ship planning, statistics, stowage and EDI
Rail/Road/Sea-air and inland waterway connections	Road and transshipment available	Road and transshipment available	Road	Road

Annex II (*continued*)

	United Arab Emirates (Dubai Ports Authority)		Qatar
	Jebel Ali	Port Rashid	Doha
Number of container berths	9	5	2
Overall length in meters	2,379	1,350	600
Water depth in meters	14	11.5	13.5
Terminal area in m^2 and storage in TEUs	793,000 storage 44,108 TEU	500,000 storage 34,437 TEU	60,000 storage 200 TEU
Container Freight Station (CFS) in m^2	9,140 storage 300 TEU	64,800 storage 300 TEU	NA
Ship-to-shore container gantry cranes	5 x 30 t 5 x 40 t 1 x 41 t	10 (30-41) t	NA
Straddle carriers	NA	26	2
Yard gantries	34	NA	NA
Front-end handlers/reachstackers	9	18	3
Yard tractors/trailers/Tug masters	43 yard tractors 95 yard trailers/chassis	69 yard tractors 100 yard chassis/trailers	33 yard tractors 91 yard trailers
Ro/Ro Ramp	available (2)	available (3)	available
Developments	NA	NA2 x 47 t panamox container cranes	A new fully equipped container terminal, length 600m depth 13m is planned and 1x30t container gantry is in order
Computer	Hardware Apple Mac. and Oracle container planning, operations, control invoicing and engineering maintenance	Hardware Applice Mac. and Oracle, container movements, planning invoicing and maintenance	None
Rail/Road/Sea-air and inland waterway connections	Sea-air, truck, barge and transshipment available	Sea-air, truck, barge and transshipment available	Barge transshipment and trucks mainly with UAE ports

Source: 1. Ports of the world, 1996.
2. ESCWA questionnaire, 1996.

NA: Information not available.

Annex III

ESCWA MAJOR CONTAINER PORT FLOWS, 1986, 1992-1995 IN TEU

Country/Port	1986	1992	1993	1994	1995	Percentage change	
						1986-95	1994-95
BAHRAIN							
Mina Sulman	80393	89829	102092	103162	99445	23.7	-3.6
EGYPT							
Alexandria	134386	204102	257773	284427	301841	124.6	6.1
Damietta(1)	--	416032	559899	702257	532288	187.7	2.3
Port Said	35896	116884	120000	130000	324487	804.0	149.6
JORDAN							
Aqaba	121614	99632	108958	111299	108819	-10.5	-2.2
KUWAIT							
Shuaiba	91078	158338	109962	48466	51500*	-43.5	6.3
Shuwaikh	109521	28305	91796	172258	172396	57.4	0.1
LEBANON							
Beirut	7544	80989	203661	229922	257764	3316.8	12.1
OMAN							
Mina Qaboos	110635	115206	89536	87878	95603	-13.6	8.8
QATAR							
Doha/Um Said	15212	38714	38196	37348	37420	146.0	0.2
SAUDI ARABIA							
Jeddah	605048	847252	938402	880187	926637	53.2	5.3
Damman	206707	303277	301181	287206	278300	34.6	-3.1
SYRIA							
Lattakia	64568	92554	120495	132961	132547	105.3	-0.3
UNITED ARAB EMIRATES							
Port Rashid(2)	383189	1481807	1678778	1881990	2073081	441.0	10.2
Jebel Ali(2)	146073						
Fujairah	NA	527046	649332	694452	558247		-19.6
Khor Fakkan(3)	--	358760	446475	433806	580618	217.3	33.8
Mina Zayed	21226	101409	101809	125416	245952	1058.7	96.1
Port Khalid	53657	30400	57320	66894	52866	-1.5	-21
YEMEN							
Aden	3990	9747	8370	8091	8913	123.4	10.2
Total	2373737	5100283	5984035	6418020	6838724	188.1	6.6

Source: 1. Containerization International Yearbook for the years 1988-1996.
2. The compiled replies of some of ESCWA countries to the Transport Section questionnaire of 1997.

1. The port of Damietta became operational as of 1990.
2. Jebel Ali and Port Rashid merged in Dubai Ports Authority as of May 1991.
3. The port of Khor Fakkan became operational as of 1987.

\+ Container terminal only.

* 1995 estimates.