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The development of container logistics in intermodal transport in South Africa : training in shipping

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THE DEVELOPMENT OF CONTAINER LOGISTICS AND INTERMODAL TRANSPORT IN SOUTH AFRICA:

Training in shipping.

By

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South Africa

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DECLARATION

I certify that all the material in this dissertation that is not my own work has been identified, and that no material included for which a degree has been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

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ABSTRACT

Title of Dissertation: The development of container logistics and Intermodal transport in South Africa: Training in shipping.

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South Africa serves as a gateway to Africa. The port of Durban Container Terminal is used as a hub port, but it is not up to the standard to facilitate intermodalism within the country and to other overboarder countries. The flow on intermodal operations face a wide range of challenges, including inadequate modal infrastructure, intermodal networks, constrained terminal capacity and door to door service quality and overall performance by interfering with the smooth flow of goods and information over the multimodal network.

The Durban Container Terminal requires a large capital investment in handling equipment. The transshipment introduces delays as cargo is moved in and out of storage and can lead to complications in the assignment of legal and insurance responsibilities. Concerning overboarder countries, there are currently no regional procedures to transit traffic, border post delays and lack of backhaul opportunities, non standard gross vehicle mass dimension, and miscellaneous permits, road and user charge.

It is for the above reasons that this paper attempts to examine the current development of container logistics and intermodal transport in South Africa. Central to the problem of integrated intermodal transport, this paper also strives to propose an integration of education and training.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF ABBREVIATIONS

ASEAN	Association of South East Asian Nations
CIT	Chartered Institute of Transport
CITSA	Chartered Institute of Transport in South Africa
CMR	Contract for the International Carriage of Goods by Road
COFC	Container-on-flat-car
DCT	Durban Container Terminal
DMI	Dar-Es Salaam Maritime Institute
EDI	Electronic Data Interchange
EU	European Union
GATT	General Agreement on Tariffs and Trade
GCM	Gross Combination Mass
GVM	Gross Vehicle Mass
ICC	International Chamber of Commerce
IMCs	Intermodal Marketing Companies
IOCCI	International Ocean Container Carriers Industry

ISL	Institute of Shipping Economics and Logistics
ISO	International Standardization Organization
IT	Information Technology
JIT	Just in time
MARAD	Maritime Administration
NAFTA	North American Free Trade Agreement
NDOT	National Department of Transport
NORAD	Norwegian Agency for the International Development
OECD	Organization for Economic Co-operation and Development
RAF	Road Accident Fund
RAU	Rand Afrikaans University
RAF	Road Freight Association
SAARC	South Asian Association for Regional Cooperation
SABOA	Southern African Bus Operators Association
SADC	Southern African Development Community
SAMSA	South African Maritime Safety Authority
SATCC	Southern Africa Transport and Communications Commission

SATCC-TU	Southern Africa Transport and Communications Commission Technical Unit
STCW	Standards of Training, Certification and Watchkeeping
TEU	Twenty foot equivalent units
TIR	Transit International Router
TOFC	Trailer-on-flat-car
UCT	University of Cape Town
UNCITRAL	United Nations Commission on International Trade Law
UNCTAD	United Nations Conference on Trade and Development
UNISA	University of South Africa
UN	United Nations
USMMA	Unites States Merchant Marine Academy
VAT	Value Added Tax
VPD	Vehicle per day
WTO	World Trade Organisation

CHAPTER 1

INTRODUCTION

1.1 Background to the problem

Approximately 95% of Southern African imports and exports are moved by sea. The cargo container has a very significant role and influence in the movement of goods in the maritime industry. Containerization, for instance, has reduced the labour-intensive handling of general cargo and provided a means for the ultimate interchange of freight among ships, trucks and trains. Intermodal transportation has provided a paradigm for the integration of two or more transport modes.

The development of container logistics and intermodalism not only has significant benefit, but problems as well. In South Africa shippers, forwarders and ocean carriers have suffered losses from extensive transport-related crime. The figures are constantly rising. As the global chains become more complex, the opportunities for criminals to steal high value products are increasing. The current intermodal transport techniques are opening up new opportunities for criminals. Theft in the supply chain is more difficult to detect that when goods are being transported conventionally.

Research has shown recently that certain products, which have a high street marketability profile, such as sportswear, are at risk. In South Africa they say, products like these are often being sold on the streets two hours after they have been stolen (Eller. 1999, March. p. 77).

It should be pointed out that over the years, marine transportation education has largely focused on the movement of passengers and goods from port to port. As a result, marine educational institutions were primarily concerned with developing in their students the knowledge and skills necessary to conduct waterborne transportation. However, this is no longer sufficient. Today an understanding of the relationships between waterborne transportation and other modes of transport, such as the rail and road transport system, are necessary components of maritime education.

According to Helmick (1998), merchant marine officer training and courses offered in logistics programs should be seen as complementary, not mutually exclusive. Some officers may sail for a while and then come ashore into management. Others may go directly into shoreside employment. Much depends on the needs of the industry at any given time. Students should be prepared both to serve at sea as licensed officers and to go into management positions.

Marine transportation is but one piece of the larger logistics transportation system. It is important for students, truck drivers, terminal operators, shipping companies, etc, to have knowledge about the significance of cargo. They should understand the interface between ports, marine and other modes, as well as to be able to adopt a system perspective. The intermodal concept was, after all, borne in the maritime industry.

It is for this reason that this paper tries to examine the current development of container logistics and intermodal transport in South Africa, and also identify the role and needs of the industry in intermodal transport with particular reference to shippers and ports. It is in this regard that it has become necessary to consider the advantages,

strengths, weaknesses and opportunities that exist and to decide what actions may be taken in order to optimize the use of ports. This can be done through the integration of ports and transport operations using the logistics approach in the total transport chain for the financial benefit of the national economy as well as commercial service to industry and the neighbouring countries.

The dissertation concentrates on the development of container logistics and intermodal transport in South Africa, training in shipping. Some other areas which do not fall directly within the theme of the study, but which are considered as important elements of the study, are also considered.

The opening chapter of the study highlights the background of the problem, the objectives of the research, the methodology and a brief review of literature search.

Chapter 2 looks at the development and significance of container logistics in South Africa. Particular emphasis will be focused on the revolution of containerization as it has dramatically reduced the labour-intensive handling of general cargo and has provided a means for the ultimate interchange of freight among ships, trucks and trains. The study will also examine the impact the container revolution has generated in competitive vessel design and has also caused the shipowners, especially in the early years to become creative in converting tankers and freighters into containerships. And lastly, the problem geared by the revolution of containerization will also be identified.

In chapter 3, the author will analyze the role and needs of the shipping industry in intermodal transport with particular reference to shippers and ports. In addition, the study will look at the escalating needs of customers and shippers. Finally a case study has been done to identify the strengths and weaknesses of the port of Durban as it is a hub port with feeder services to and from Mozambican and Namibian ports.

Intermodal transport demands a close coordination and cooperation among the participants. A participant must have a diverse approach in integrating the cargo

transport logistic chain as illustrated by a diagram exhibit 6 in chapter 4. It is in this chapter were forces of change, changes in trade patterns and trends of growth and development in transport are being examined due to the fact that they initiate major changes in the economic development.

In chapter 5, selected areas of the industry such as the local shipping agents, terminals, customers, existing training institutes and the transport companies are surveyed in order to determine the future training needs as a result of identified shortcomings.

Due to the shortfalls identified in the previous chapter, in the next chapter 6, the writer will propose to establish a maritime training institution which will integrate the existing training institutions in South Africa, with the aim of establishing a National Maritime Institute combining all transport related courses.

Chapter 7 is a summary of the whole study. It is in this chapter where recommendations and possible improvements are provided.

1.2 Objectives of the research

Following are the objectives of the study:

- To examine the current development and significance of container logistics in South Africa
- To identify the role and needs of industry in intermodal transport with particular reference to shippers and ports
- To examine current and projected trade patterns and evaluate trends in growth and development in transportation
- To undertake a survey of selected areas of industry to determine future training needs as a result of identified shortcomings

- To examine current approaches taken in maritime transport education with a view to determine new training requirements

- To draw conclusions and make recommendations for future maritime transport education and training in South Africa.

1.3 Research methodology

In preparing the dissertation, information from written questionnaires to appropriate organizations related to ports, local shipping agents, transport companies and academic institutes were consulted. Attached annex 1 has a sample of the questionnaire. Interviews were held with officials from the Department of Transport and Freight Forwarders on the current situation and future policies. Official government published gazettes and documents, library materials, personal interviews and observations have formed the major source of information.

1.4 Literature Search

A literature search has been undertaken to examine how international countries (e.g. the United States of America, Norway, Germany, Holland, France and the United Kingdom) and African countries (Tanzania – Dar Es-Salaam Marine Institute, South Africa – UNISA and RAU) conduct their training. Visiting experts in the field at the World Maritime University were also contacted for their professional help and expertise.

CHAPTER 2

The development and significance of container logistics in South Africa.

2.1 The revolution of containerization

Container shipping began during World War II with a military need to move troops and equipment. During World War II, American military was faced with huge transportation challenges. The transportation experts experimented with new cargo handling techniques, including the pre-packing of materials that could be directly loaded on or off trains, trucks and ships. In 1956, Malcolm Maclean, an American trucking company owner, suggested that taking a container directly from the truck and loading it on a ship could simplify the port loading process. Malcolm Maclean, through his experience in the trucking industry, was convinced of the merit of a cargo handling system that could use all three modes – road, rail and sea (Stopford, 1995).

He recommended that the size of the containers be standardized so that they could fit on any truck or train around the world. However, with these changes in cargo handling, ports were forced to restructure and modernize their cargo handling

capabilities. Subsequently, port modernization compelled the container to become the centerpiece for an international transportation chain that allowed cargo to fit in almost every container ship, train and truck around the world.

On this matter, Muller (1999, p. 25) contends that as a result of the container revolution, the container manufacturing and service industry emerged as a new sub-industry. Container construction, leasing, maintenance, and repair have become important businesses. Container ports, each with hundreds of acres for assembling thousands of containers, have grown into separate independent facilities at many maritime, rail and freight gateways. Cranes, transporters and other container handling devices are multimillion dollar, fixed investments that represent big business for heavy equipment manufacturers.

Before the revolution of containerization, goods were transported on a port-to-port basis. The carrier was involved only in the sea leg port of transport. Inland and sea transports were completely separated. The transfer of goods from one mode of transport to another was time consuming, costly and often resulted in damage. It was the shipper's responsibility to bring goods from his warehouse to the loading port. On the other side, the consignee was responsible for transferring goods from the port of discharge to the final destination. Containerization has dramatically reduced the labor-intensive handling of general cargo and provided a means for the ultimate interchange of freight among ships, trucks and trains (Helmick, 1998).

Customs clearance and inspection were carried out in the port area. So, time lost in the port was considerable. There were difficulties in separation of responsibilities between segments of transport modes. Separate contracts were necessary for the transportation to the port, customs clearance, loading on board the ship, discharge, and customs formalities in the port and delivery to the consignees. It signifies several invoices and different levels of liability. Cost structure was complex and overall cost was high. A large number of documents were necessary to perform different modes of transport.

The introduction of containerization and globalization coupled with new technologies such as modern communication, EDI, reefer containers, gantry cranes to handle the containers, etc have developed a new transport concept called intermodal transport. The reduction of trade barriers through GATT (General Agreement on Tariffs and Trade) now known as WTO (World Trade Organization) and opening of markets through regional agreements such as EU (European Union), NAFTA (North American Free Trade Agreement), ASEAN (Association of South East Asian Nations), SAARC (South Asian Association for Regional Cooperation), etc, have boosted international trade (Bahadur, 1997).

There is no trade without transport. The increase in trade has boosted the volume of transport. Improvement of communications thanks to satellites has brought about the concept of global transport network. Now transport is considered as an integrated part of the industry. Transport is one of the factors for competitiveness of the industry. It has brought a lot of opportunities in the freight market. The right product can be delivered at the right time at the right place to satisfy the customer.

2.2 Impact

The container revolution created more competition for the maritime industry. The overwhelming efficiency of containership operation forced many shipping lines to convert to this more efficient system, move on to other trade routes, or perish, despite the helping hand of government regulation and subsidies, and conference protection. The strong force of the invisible hand of the market place was, and continues to be a major factor in the container revolution.

The use of containers to transport general cargo aboard ocean going vessels produced a fundamental improvement in shipping operations that spawned numerous other innovations. Not only did it cause realignment and regrouping of carriers on major routes, it permitted carriers with containership efficiencies to invade new routes. The container revolution generated competitive vessel design and caused shipowners, especially in the early years to become creative in converting tankers and freighters

into containerships. Later, a more sophisticated idea was to increase ship capacity anywhere from 25% to 60% (Muller, 1999).

Containerization lead to innovative ocean vessel operations like containerization in connection with Ro/Ro and lighter aboard ship operations. The spectacular development of roll-on/roll-off services, and particularly the rapid growth of containerization, further decreased the amount of physical efforts needed for loading and unloading ships, trains and trucks in the harbours. It has pushed the labour necessary to the packing and unpacking of the containers outside the ports and as far as possible to the manufacturers plant or the forwarders premises (Van Den Burg, 1975). By making intermodal transfer easier, containerization also made a broader array of new intermodal routing and pricing options available to shippers. For example, an inland US shipper transporting goods to an inland European destination was given literally thousands of new routing and pricing options. In turn, the competitive struggle among carriers for business intensified to the benefit of shippers.

In the 1970s and early 1980s, containerization operations as well as transport operations in other modes were subject to three major influences as mentioned by Muller (1999).

- Increase in the price of fuel:

During the 1970s, fuel price increase made it necessary to hike shipping rates in successive steps commensurate with each fuel price jump. Increased fuel prices also were supported in part by charging shippers a fuel surcharge based on a per ton cargo rate that fluctuated with oil pricing. In response, containership operators devised fuel-saving methods and efficiency such as reducing ship speed modifying existing vessel to be more fuel efficient per ton of cargo carried, and specifying these characteristics in new ships being built. Modern containerships are propelled by diesel instead of steam turbines, and contoured to operate more efficiently at speed of 20 to 25 knots, instead of 30 to 33 knots as in the past. In addition, newly constructed

ships, designed for more efficient use of shipboard space, carry many more containers than earlier vessels. With improved engines and more efficient stowage, containerships are cutting fuel cost per container by more than half.

- Changes in world trade patterns:

The business slowdown in ocean freight transportation between 1978 and the mid 1980s affected almost all routes, but in different ways. For example, the Far East gained strength while the North Atlantic grew less in annual volume handled, market shares and rate level. Fluctuations in general world economies combined with growing worldwide overcapacity of vessels and containers caused extreme financial difficulties for many operators.

- Logistic Management;

The globalization of the business, with its international sourcing of labour, components, and capital, has produced exponentially greater complexity in logistics and transportation management. However, the concept of containerization has grown from the simple, traditional view of moving containerized cargo between two points to today's view that encompasses the understanding, managing, and controlling the overall economies, and physical flow of cargo in a seamless and total move. This includes related costs and issues of inland and ocean movements as well as manufacturers inventory, production, and demand costs. Logistic management, according to Helmick (1998), has provided innovative conceptual frameworks and operational techniques for managing the flow of goods and information.

Containerization has substantially increased the productivity of labour by comparison with the conventional cargo-handling methods. Skilled labour at higher rates of pay has to be employed and containerization also involves much greater capital cost. The decrease of the part played by labour in the handling of general cargo in the ports will be tremendous. The introduction of palletized freight and its streamlined shipping, according to Van Den Burg (1975), has increased productivity in the ships,

on the quays and in the sheds by some 40%. The average 1 ton per man-hour has grown to 5 tons of cargo unloaded and in many cases even more. The economies of this unit load system in handling ships, enabling a much more efficient use of the fleet, were observed when a Fred Oslen vessel, as an example, loaded 965 tons of unitized cargo in 10 hours with an 18 to 22 man longshore gang, instead of the usual 200 tons.

2.3 Significance of container revolution

The container revolution has brought significant development to the transport providers, service providers, banks and insurance companies and amongst the others to the governments.

a) Firstly the transport user can expect economic and financial benefit mainly from the greater care that has to be taken by an Intermodal transporter. It requires professional experts, such as in the following:

- Reduce transit time, increase time reliability, and increase security of cargo, particularly at interface points.
- Reduce transport cost from negotiated rates on quantity cargo, and other associated costs, resulting from the use of modern transport related technologies: containers, EDI, computerized cargo tracking system, etc,
- Pre agreed price for the door-to-door transport operation
- Closer commercial relationship with service providers
- Greater awareness and understanding of transport related issues regarding their trade (incoterms, cargo security, packing, insurance, banking, etc),

b) Service provider: Service providers and particularly in terms of intermodal transport operators could gain immediate benefit from:

- Boosting trade opportunities as international transport operators as different segmented transport will become intermodal transport.
- Increase their local market shares and opening new markets overseas, thereby increasing their profits
- Increasing their financial liquidity through the collection of prepaid freight on containerized door-to-door transport contracts, providing them with key financial leverage and with the possibility of sub-contracting shipping, railway and truck space at competitive rates while controlling sub-contractors payment schedules, usually after services have been rendered.
- commercial incentives to adapt to transport related technologies such as containerization and EDI, and
- the need to reconsider their market strategies and, for example, concentrate their activities in "niche" operations to serve specific commodities on specific routes.

c) Banks and insurance companies: Other local services providers such as banks and insurance companies, will also increase their business opportunities as a consequence of increased trade transactions.

d) Governments: governments can also benefit from the development of intermodal transport, because intermodal transport development has an opportunity to change and update the transportation system. It offers a chance to streamline and update trade and transport related procedures and regulations. It also stimulates trade, promotes new activities for the country's transport sector and saves, possibly earns, hard currency.

2.4 Problems

The development of containerization not only has its significant impact but also has brought problems into the freight industry. The use of containers has actually increased the risk of goods being stolen when they are in supply chains from the point of production to the point of final distribution. Theft is alarming in the container business. Although a container may be a steel barrier against thieves, the current intermodal transport techniques are opening up new opportunities for criminals.

It is more difficult to detect theft than when goods were transported conventionally. For instance, when goods were shipped conventionally, each piece or package dispatched from a shipper was counted onto the trucker's vehicle by the driver, and was counted off again when the truck arrived at the loading port. Pieces were again counted when they were loaded into the hold of the loading vessel, and were tallied off at the destination port, as well as being checked again by customs officers, and on to the road truck or rail wagon delivering the consignment to its final destination. So there were numerous checks at all stages of a shipment, and it could be easily established where any loss had taken place. But the conventional process of loading and unloading according to Malcolm Maclean, is a waste of time and money (Stopford, 1995).

In contrast, this checking does not happen with door-to-door or terminal-to-terminal transportation. A container is only a transport unit, and the contents of a container may be untouched by human hand, and may go unchecked from the time the container leaves the shipper until it arrives at the consignee's warehouse. Customs examinations are minimized, and clearances are increasingly being effected electronically. If the contents of a container are fully or partly removed when the container is in transit the loss may not be noticed until it is delivered to the consignee, by which time it may be too late to trace the thieves and recover the load.

Compounding the problem is that a container being transported as part of the supply chain will always be handled by more than one road haulier, and possibly by one or more barges or rail-based intermodal freight operators as well. It will also be carried by at least one deep-sea ocean carrier, may be hubbed or transhipped before or after the deep-sea movement, and will move through at least two container terminals. The difficulty of pinpointing responsibilities for the loss through theft is all too apparent.

In addition to the problem, containers are expensive to purchase, rent and repair and are costly in terms of idle storage and empty backhaul. In some cases, multiple numbers of containers must be transported together to realize economies of scale. And containers are not always suitable to the product or compatible with the vehicle.

Containerization in particular according to Van Den Burg (1975), raises problems of structural adjustment for firms engaged in transport, stevedoring and packaging production which are not big enough to bear the loss of certain outlets without difficulty. The introduction of containers involves more extensive use of computers in certain sectors of the freight transport industry. The retraining of the workforce that this implies cannot be handled entirely within the industry itself.

However, different problems have been encountered in South Africa, since the revolution of containerization. To be more specific, the port of Durban, as an example is the busiest port in Southern Africa and is also the most conveniently situated port for the industrialized Durban / Pinetown and Johannesburg areas and overborder countries. Durban has abundant shipping opportunities, both in terms of frequency and destinations served. It is especially effective as a hub port for cargo to and from the Far East, serving both South Africa and East African countries. More details will be discussed in the next chapter 3, under the sub-topic: ports.

CHAPTER 3

The role and needs of shipping industry in intermodal transport with particular reference to shippers and ports.

3.1 Definition of concept: Intermodal transport

According to the United Nations Conference on Trade and Development (UNCTAD, 1995), Intermodal Transport is defined as the transport of goods by several modes of transport from one point or port of origin via one or more interface points to a final port where one of the carriers organizes the whole transport.

Furthermore, Multimodal transport is defined as:

> *"...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".* (UNCTAD. 1995, p. 11).

Other scholars such as Muller (1999, p. 1), defines intermodal transport as:

> *"…. being or involving transportation by more than one form of carrier during a single journey".*

The difference between the two concepts, Intermodal and Multimodal is that, Intermodal is used predominantly in the American society whereas Multimodal is commonly used in the British society. In summary, Multimodal transport denotes that the carrier that organizes the transport takes the responsibility for the entire transport, he issues a Multimodal transport document. In contrast, Intermodal transport implies that goods are being transported by several modes of transport from one point or port via one or more interface points to the final port or point where one of the carriers organizes the whole transport. This depends largely on how well responsibility for the entire transport is shared. Different types of transport documents are issued.

3.2 The role of Intermodalism

Intermodalism is a process which is becoming more and more an integrated part of the freight business. It is becoming an integral part of the logistics management. It requires all components of the intermodal freight transportation process to be reliable, offers connectivity with the other modes, and should have flexibility.

It is very imperative for an intermodal transport operator to have a wide knowledge of different transport possibilities. He should be knowledgeable in container transport techniques, as the container is the most suitable for safe door – to- door transport.

It is, of course, not every operator of the intermodal transport who will be in favour of the intermodal approach. Intermodal transport can be advantageous to some people and can cause difficulties to others.

In support of the above statement, it can be mentioned that the intermodal transport can cause major expenses. In the current financial climate, this can be unacceptable

to a commercial organization. Intermodal transport may demand heavy capital investment in infrastructure such as roads, bridges, and railways, ports and airports, which could divert funds from other, possibly more urgent priorities. The changeover to door-to-door methods may call for rearrangements that could break well-established links and also cause loss of trade.

More importantly, intermodalism can increase employment in the related industries. It can bring new, more complicated jobs that command better pays and the technical innovations will help increase the standard of living of the people engaged in the new technology, thereby assisting the economy of the country as a whole.

A good example of such a change would be Honduras as illustrated in UNCTAD (1995, p. 221). It has been mentioned that in Honduras, the transportation of bananas has changed from break-bulk to truly containerized multimodal transport. The change from break-bulk to containerization resulted in a loss of some 70 stevedoring jobs in Puerto Cortes. However, a technical school operated by one of the banana companies in a very few years turned out many more mechanics than the 70 stevedores that lost their jobs. The container department of that company within a very short time employed between 70 and 75 more staff in Honduras in such fields as inspection, maintenance and repairs of containers and refrigeration equipment, container control, electrical work and management.

From the above example, we can realize that the development of the industry is, therefore, indeed unavoidable. Nevertheless, there are a number of obstacles in the way of rational and regulated future development. These hurdles are discussed below.

In South Africa, for instance, there are a number of problems associated with intermodal transport. Firstly, container terminals require large capital investment in handling equipment and this is reflected in transshipment charges. Secondly, transshipment also introduces delays as cargo is moved in and out of storage and can lead to complications in the assignment of legal and insurance responsibilities.

Only few Intermodal facilities in South Africa have successfully met the challenge of road transport. The Transnet "inland port" at City Deep in Johannesburg administered by Portnet and Spoornet handles more than 23.000 containers per month. 80% are for the local areas and 20% in transit to Zimbabwe, Malawi and Botswana. The depot and its nine satellites have been successful largely due to the range of services offered and the effective and well-priced rail connections to Durban, Port Elizabeth and Cape Town (Southern African Transport Communications Commission-SATCC. 1998, p. 51).

There are currently no regionally agreed procedures for transit traffic. Consequently, cargoes moving between South Africa and Tanzania, for example, could be liable for inspection by customs in Zimbabwe and Zambia, both on entry and exit. For instance, the study has found that on average, trucks wait at Beitbridge border with Zimbabwe up to 32 hours, which is longer than some of Europe's most notorious border crossing, like the Czech-German border. The amount of paperwork involved in cross-border shipping to other countries of the Southern African Development Community (SADC) also serves as a substantial deterrent to low cost and timely trade (South Africa, Minister of Transport & Department of Transport. 1999, May 13). Exhibit 1 below illustrates the average SADC border delays.

The factors that drive this premium are border post delays, lack of backhaul opportunities, non-standard gross vehicle mass dimensions, and miscellaneous permits and road user charges.

In Europe and elsewhere for instance, there is a transit international router (TIR) system that uses approved vehicles sealed by customs. A national guaranteeing association guarantees duties or penalties due to any irregularity. The goods are accompanied by a carnet. Provided the seals are intact, the carnet is stamped by customs in the transit country without inspection. Introduction of a TIR system would greatly facilitate transit trade in the region (SATCC, 1998).

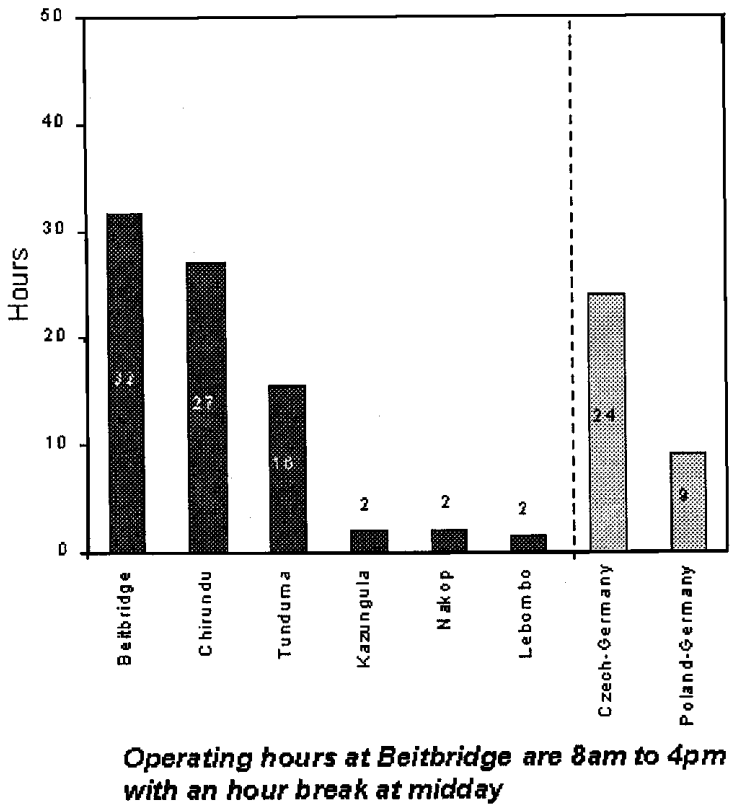

Exhibit 1, Source: South Africa, Minister of Transport & Department of Transport, 1999, May 13.

Customs documentation, cross-boarder movements such as drivers license passport, vehicle documents and consignment notes, causes major delays at the boarders. There is no standardized procedure at the time of writing, and this is illustrated in exhibit 2 below.

The aim of SADC Protocol on Transport Communications and Meteorology is to provide for simplification and harmonization of such documents. There is a need to establish transport, communications and meteorology systems that provide efficient, cost-effective and fully integrated infrastructure and operations. These will best meet the needs of customers and promote economic and social development while being environmentally and economically sustainable (Southern Africa Transport and Communications Commission Technical Unit, SATCC-TU. 1998, p. 10).

A SADC driving license is now being introduced. Standardization of the other documents should assist both the authorities and transport operators and remove any doubts about the legality of vehicle and cargoes. The UN has developed a standard classification of trade documents that could be used as a basis for regional harmonization.

An impediment of international road transport is the absence of a regional agreement on the terms of contract of carriage. Different jurisdictions are involved and disputes can be difficult to resolve.

	SA (Export)		SA CU (Import)		Zimbabwe (Import)		Zambia (Import)	
	Original	No. Copies	Original	No.Copies	Original	No. Copies	Original	No.Copies
Customs Union Permit			For Stamping		n.a.		n.a.	
Road		4		2		4		✓
F178		2						
DA550 or DA25	✓	2						
Commercial	✓	2	✓	1	✓	2	✓	
CCAI			✓	2				
Deferred Tax/Taxable			✓	3				
All Original					1 for each Consignment			
Certificate of					✓	2		
RSA Customs Stamped					✓		✓	
Zambian Invoice							✓	
IDF (Goods)							✓	
SGB (Goods)							✓	

Exhibit 2, Source: South Africa, Minister of Transport & Department of Transport. 1999, May 13.

The United Nations Convention on the contract for the international carriage of goods by road (CMR) sets out standard conditions for such contracts, particularly with respects to documentation. CMR adoption by the member states would simplify the resolution of disputes and facilitate the development of international road transport service.

Further development of intermodal traffic is hampered by the change in legal and insurance responsibilities when cargo switches from one type of mode to another. This can lead to disputes, increase risks and indirectly raise the cost of intermodal transport. The International Chamber of Commerce (ICC) has developed a set of standard terms for the assignment of responsibilities in international commerce, known as INCOTERMS. The consistent use of INCOTERMS would help the development of intermodal transport. The use of such contract terms should be voluntary, but need to be promoted by the Regional Shipping Association in cooperation with the main providers of intermodal service, such as the railway. Government should also explore the possibility of introducing the CMR convention on international road transportation contracts and the TIR system to facilitate transit traffic.

In South Africa, about 500 million tonnes of goods are transported annually. Roads currently represent 80% of all inter–urban tonnes-km transported in the region. These volumes are likely to increase considerably with the prospects for accelerated economic growth in the region and the accompanying steps towards trade liberalization.

Most of the region's traffic is generated in South Africa, which accounts for 90% of the port traffic and 87% of rail tonnage. Outside South Africa, probably the most densely trafficked route is the main road in Swaziland between Manzini and Mbabane with a traffic volume of over 8.000 Vehicle per day (vpd). Traffic levels on Lesotho's rural roads are low with only 230 km carrying more than 1.000 vpd. In Zimbabwe, traffic is highest around Harare, with the roads carrying up to 6.000 vpd.

In Zimbabwe's rural area, the traffic counts on major road range between 1.000 and 4.000 vpd. In Botswana, the main north-south road carries 50 to 200 vpd. The situation is similar in Namibia (SATCC: 1998).

3.3 The escalating needs of customers

Customer needs are forever escalating. Customers want a range of capabilities available to them from their principal providers, from basic international ocean service to door-to-door intermodal deliveries, and domestic distribution within any given market. In the International Container Review (1998, Spring/Summer) the process is simply defined as "*one-stop-shopping*". This means that, customers want all of these capabilities to be under the control of a single provider. In line with this, they would like single source accountability for the outcome, even if various collaborators have to later sort out the mess among themselves. In other words, a quick clean response and no finger pointing if things go wrong.

The providers will be required to offer access to most or all modes. The customer today is, however, less interested in specifying the mode of transport than in the past. Rather, the customer is going to ask the service provider to help analyze the service cost trade off-of the modes, and to provide the combination that will be most effective as part of an overall distribution pattern.

Customers' demand for freight transport in South Africa is currently highly concentrated on two bulks export flows. There is one general cargo export flow between Johannesburg and Durban, and a series of other midsize corridors. The flows are expected to adhere to similar patterns but at significantly higher volumes, as shown in the following figure, exhibit 3.

The majority of freight customers are geographically concentrated, requiring transport from dense industrial locations to destinations. Relatively dense corridors feed these. The main nodes in this system are Johannesburg, Durban and Cape Town. The remainder of the customers clusters into two main groups: those who locate in

smaller nodes concentrations (e.g. commercial farmers). Thus, while South Africa overcome, inasmuch as it is distant from foreign markets and its principal domestic markets are all relatively distant from each other, unlike, for example, the Netherlands or Brazil.

Current and Future freight Volumes

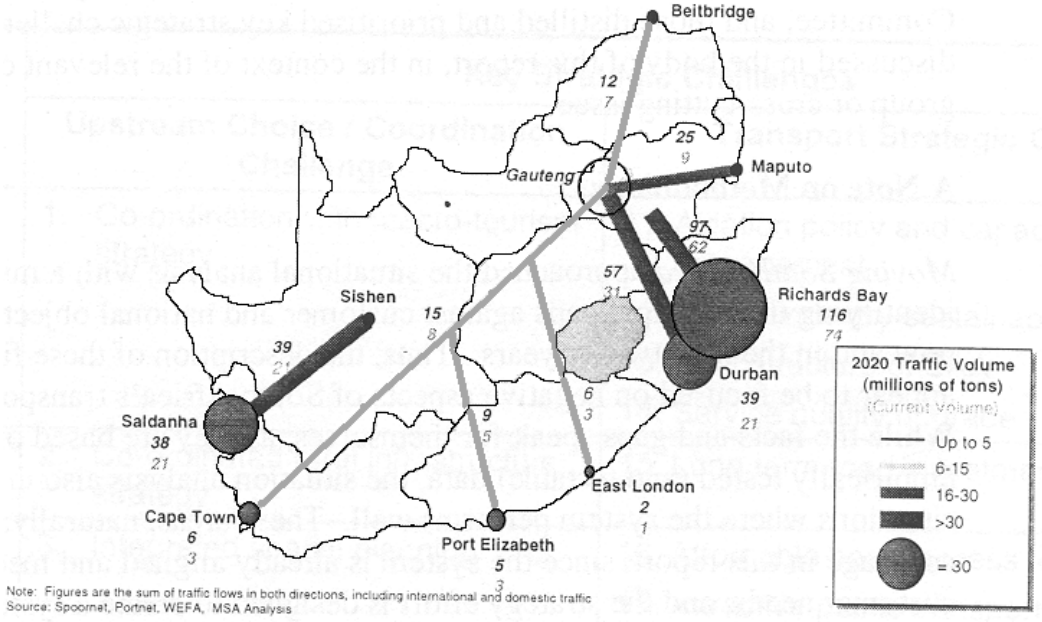

Exhibit 3, Source: South Africa, Minister of Transport & Department of Transport. 1999, May 13. Note: Figures are the sum of traffic flows on both directions, including international and domestic traffic.

In the following paragraphs, the writer will look at the escalating needs of customers, in particular with reference to shippers and ports.

3.3.1 Shippers

Shippers are looking to their business partners, including transportation and logistic providers. Shippers need to streamline their operations, cutting inventories through just-in-time deliveries, cut transit times and costs and enhance the overall efficiency

of their operations. Amongst other things, shippers are looking to carriers to help them quicken and simplify their operation and make their supply chains more efficient.

It has been realized that in some instances cargo can be handled 39 times between the production line and the retail shelf before reaching the customer. When you consider that the total supply chain from the beginning to the end represents as much as 20% of manufacturers' costs, you can begin to realize the size of the opportunity. Such inefficient supply and delivery chains will not stand up to the competition of the 21st century.

Shippers are only demanding value-added services that in a way include the following:

- Intermodal inland coordination between shipping, rail and trucks
- Consolidation services
- Warehousing
- Logistic planning expertise
- Tailored information service that will allow them to have total and continuous shipment tracking with visibility to inventory in-transit, which reduces costs and shipping times.

Customers are interested in transportation providers that could bundle whatever service they want, such as bar coding, forwarding and local distribution, and manage them from pick up to drop-off. More than anything else, customers are demanding value, and to provide that value, carriers will have to be low-cost throughout their operation.

3.3.2 Ports

Ports should improve efficiency on all factors including equipments, procedures and labour organization.

Major ports in South Africa are served by large modern container vessel and the port of Durban and Cape Town are hub ports with feeder services to and from Mozambican and Namibian ports. There is active competition and rates are low. The market is competitive and functions effectively.

Durban is largely to remain the foremost cargo handling and container hub in the region for the foreseeable future but may not be physically able to handle all the container traffic after 2007. The port has insufficient capacity and may be difficult to expand in the longer term, as the port is located in the middle of the city. Even with substantial gains in efficiency, a strategic decision will need to be made soon on the optimum use of Durban in relation to other ports. The additional traffic could go to the port of Richards Bay, which has ample land for a new container terminal, provided the road and rail infrastructure capacity could be further increased (The Tyneside. 1998, p. 84).

Portnet already has substantial investment plans for Richards Bay and Durban, and more modest expansion has been announced for Cape Town. The investment will be made mainly in increasing cargo-handling capacity. It is difficult to determine the size and timing of these investments, however, and those of private operators and the extent to which potential capacity problems will be alleviated. Capacity problems are presently being addressed through investments in new facilities, particularly for containers at Walvis Bay.

In this situation, the author has nominated Durban Container Terminal as an example due to the following reasons. Firstly, the port of Durban is strategically located on the world major east-west shipping routes and is the ideal Southern African inland

and Indian Ocean distribution hub. Secondly, it is the largest general cargo port in the region, with well-developed container and other facilities. The port is regularly served by large container vessel and has good inland connections to the rest of South Africa and much of the region. Substantial traffic is handled from Botswana, Zimbabwe and Namibia

Following is a study done on the Durban Container Terminal. The Durban container terminal as an example is located right inside the city center. The port is experiencing an insufficient land facility. The terminal cannot be enlarged and sometimes it gets too congested.

Below is the physical layout of the Durban Container Terminal at the time of writing:

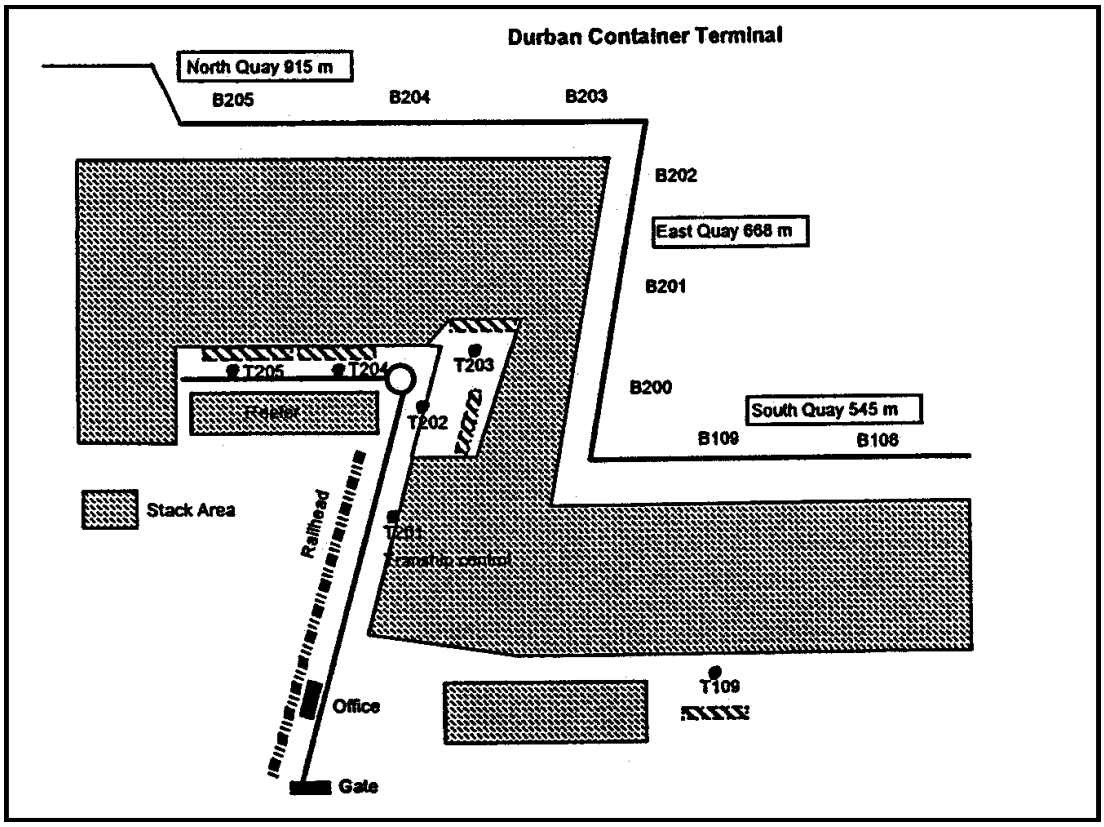

Exhibit 4: Source: The Tyneside, 1998.

Durban Container Terminal, according to Little (1999) can be regarded as the cause of considerable concern and expense to the country as a whole. Shipping lines are losing money as a result of their ships having to stay outside waiting for a berth. At least one has been diverted to Port Louis (Mauritius) where it discharged the cargo destined for South African Importers, who will now have to wait for this cargo to be brought back. Other vessels have been diverted to Cape Town in an effort to avoid the congestion in Durban. This was a situation on the 10th December 1999 in Durban.

The following graph is a summary of the situation:

Vessels currently working at the terminal during the last 24 hours

BERTH	VESSEL	EXPECTED TIME OF COMPLETION
108	P&O Nedlloyd Mwanza	10/12/99 – 12:00
109	Golden Dragon	10/12/99 - 12:00
200	MSC Elena	10/12/99 – 16:00
202	Iwato	10/12/99 – 18:00
203	MSC Spain	10/12/99 – 10:00
204A	Ligwa	10/12/99 – 23:59
204	Umfolozi	10/12/99 – 10:00
205	City of Cape Town	10/12/99 – 18:00

VESSELS OUTSIDE

VESSEL	ARRIVED	EXPECTED BERTHING
Heng Yu (Delayed at Agent's request	04/12/99 – 08:05	11/12/99 – 18:00
MSC Claudia	10/12/99 – 03:50	10/12/99 – 18:00

Whilst this has caused major congestion and delays. To solve the problem, Spoornet reduced the Cape Town / Johannesburg fare to equal that of Durban / Johannesburg, the overtime ban has reduced much of the possible benefit. The delay in the railage of goods out of Cape Town has lead to importers requiring their cargo to be moved by road. This has added to the cost and has caused the road hauliers to take some of

their vehicles off the Durban /Johannesburg route in order to move the containers from Cape Town to Johannesburg. On Tuesday 7th December 1999 there were some 3483 containers in the Cape Town Container Terminal (1772 imports, 1545 exports and 166 reefers) representing 49% occupancy of the terminal.

Whilst the impression created in some of the recent reports suggested that the waiting time outside Durban has reduced, this is, in part, due to the fact that ships are no longer sailing to Durban at full speed in order to reduce anchorage time. The following table shows the process time of road transport vehicles through Durban container terminal.

PROCESS TIME OF ROAD TRANSPORT VEHICLES THROUGH DCT:

Date	Gate in to gate out
01/12/99	1 hour 02 min
02/12/99	1 hour
03/12/99	58 min
04/12/99	57 min
05/12/99	45 min
06/12/99	1 hour 07 min
07/12/99	59 min
08/12/99	1 hour 15 min
09/12/99	1 hour 03 min

Some importers, mindful of the congestion in the Durban Container Terminal in previous years, have made arrangements for their containers to be discharged in Port Elizabeth. Whilst some of these containers are railed to Johannesburg, others come up by road, which once again diverts some of the trucks from the Durban / Johannesburg run. On Tuesday 7th December 1999 there were 2710 TEU in the Port Elizabeth Container Terminal.

Importers in East London expecting cargo in transshipment containers from the Far East and Australia are currently experiencing a three week delay at the Durban Terminal awaiting transfer to feeder berth/vessel. With factory closure intended from 15th December 1999 onwards, special arrangements had to be made with consignees to avoid demurrage costs during such closure. Another consequence, of course, was that goods ordered for the Christmas market would arrive too late.

If we look at the situation in Durban we find that on Tuesday 7th December

- There were 11 349 containers in the terminal
- There were 7 vessels working 10 gangs
- There were 4 vessels outside with delays of up to 48 hours
- There were a further 33 vessels expected to arrive in Durban within the next 7 days
- One of the Gantry cranes was out of commission as a result of a cracked drum
- Vessels productivity measured in moves per crane working hour was approximately 14 – it was as high as 18 on some occasions in August and up to 17 on some days in September, but has hardly moved above 14 since October.
- The average processing time for road transport vehicles was 1 hour and seven minutes – this had been as low as 34 minutes on the 11th October.

- Export containers had to be loaded before import containers could be discharged so as to create enough space in the terminal to land the import containers.

- Movements from port to rail was slow - containers which arrived on the Dal Kalahari, which berthed on the 1st December had not yet been railed by the 7th. As far as rail terminal operation was concerned during the past 24 hrs, there were 14 trains outside with about 600 containers for exports and 413 containers for imports. These are some of the difficulties being experienced at the Durban Container Terminal. Apart from the considerable delays in being able to collect and deliver containers, the road hauliers are finding that they do not have the capacity to run a service from Durban to Johannesburg. Their vehicles are being urgently requested to move containers from Cape Town and Port Elizabeth to Johannesburg, both considerably longer runs. Goods moved by rail to Johannesburg arrive at City Deep to find that only one of the four gantry cranes is working. This makes it almost impossible to plan delivery of cargo and to give such consignees as are willing to stay open for delivery any sort of specific times for such deliveries. One of the results of these delays is that "losses" are on the increase.

  Importers are being forced to bring in products by air at considerably greater cost in order to meet contractual commitments. One importer was obliged to airfreight a 5 ton load in order to prevent a shut down which would have cost approximately R2 million per day. However, Portnet have suggested that importers should remain open to receive cargo after normal working hours. This has been often extremely difficult, as it is impossible to fix delivery times and would mean that some would have to stay open all night, either keeping staff on duty or hiring additional security in order to ensure its safety. This is often impossible in crime –ridden areas (Little, 1999).

If containers and other facilities were to be developed elsewhere, the serious contender would be Richards Bay, which is approximately 600 km from Gauteng

(Johannesburg). This would have significant implications for the future shipping and inland transport service. The regional ports are facing similar problems to the railways.

Private sector involvement is required if those problems are to be solved. Many port authorities are already in the process of changing over from parastatal bodies to more commercialized and privatized operations with the goal of improving performance and efficiency. The process of leasing specialist terminals to private sector operators has started, most notably in Maputo where operational improvements have enabled the port to attract a significant amount of new traffic. However, all the major ports are publicly owned, and many have operational and financial problems. Furthermore, port authorities are often unresponsive to user needs. Their performance needs to be improved and their organization and management requires restructuring (Southern African Transport and Communication Technical Unit, 1998).

CHAPTER 4

Forces of change, growth and development in transport.

4.1 Changes in Trade Patterns

Growth and development in transport has initiated major changes in economic development. There is a gap that exists between the customers and providers due to the enormous growth as mentioned earlier on. In order to create a balance between customers and providers, the process of intermodal transportation system demands significant attention. Today the entire process of intermodal transport requires coordination, continuity, flexibility and above all, reliability. The entire process challenges management to become more efficient, comprehensive and customer orientated. Management must always be innovative in rethinking and reorganizing the supply chain.

The use of information technology has geared a faster pace in development. This has brought a revolution in as far as intermodal transport is concerned. It has influenced the direction and rate of change in which the intermodal transportation industry moves. For instance, between 1978 and the mid–1980's, ocean freight transportation

business had slowed down. Most of the routes were affected in different ways. Muller (1999, p. 36) contends that,

> *The Far East gained strength while the North Atlantic grew less in annual volume handled, market share and rate level. Fluctuations in general world economies combined with growing worldwide over-capacity of vessels and containers caused extreme financial difficulties for many operators.*

The following figure illustrates this concept of changes in trade patterns.

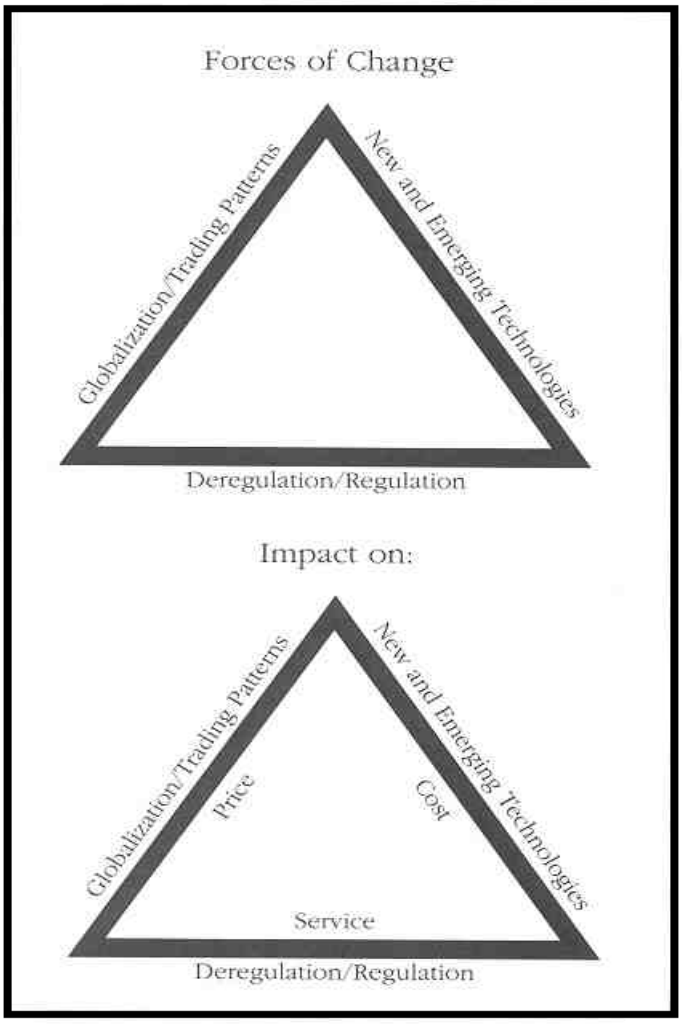

Exhibit 5. Source: Intermodal Freight Transport 1999.

First of all, globalization means that companies from one country link with companies from other countries so that they can do business together. There are commercial activities involved, which often cause a major shift in trade patterns. It is for this reason that new and emerging technologies, which include electronic data interchange, email, internet, satellite tracking and other electronic on-line services will provide intermodal providers and customers with the ability to make faster changes and informed decisions in response to new and emerging opportunities.

The author agrees with Muller (1999, p. 404) when he mentioned that:

> *"The three forces in turn affect the competitive setting by which providers develop their service with cost/profit structure. Muller further mentions that, for as long as the sides of the triangle remain relatively equal, the industry will function effectively"*.

Intermodal transport is capital intensive and often requires less labor than the traditional freight handling methods. For example, there are restrictions on the physical dimensions of the cargo that can be transported. These restrictions used to limit containerized cargoes to those of high value and lower density. But nowadays containers are being used, for instance, for transporting bananas, coffee, and cocoa beans, which until recently moved almost exclusively in refrigerated or break - bulk vessels.

4.1.1 Existing Infrastructure

South Africa serves as a gateway to Africa. The cross border countries such as Mozambique, Malawi, Zambia, Zimbabwe, Botswana, Namibia, Swaziland and Lesotho, together with South Africa, form the South African Development Community (SADC). The objective of SADC is to harmonize customs and standardize the processes for the efficient flow of goods (compared with EU for example). The fact is that Durban container port is mainly used as a HUB port, but it is not up to the standard to facilitate intermodalism in South Africa and to other

overboard countries. As a result of that, the flows on intermodal operations face a wide range of challenges, including inadequate modal infrastructure and intermodal networks, constrained terminal capacity, and door to door services quality problems. These challenges affect industry costs, service quality and overall performance by interfering with the smooth flow of goods and information over the multimodal network.

Other operational challenges facing intermodal movements are inadequate clearance and access links for rail and highway bridges, tunnels and overpasses and weight and length restrictions on many highway systems and local streets. The problem, which has been identified, is that some hauliers are overloading their vehicles in order to improve their cost structure. While the hauliers have realized a cost advantage, they create an additional cost in road maintenance and repairs. According to the Minister of Transport and the Department of Transport in their document: moving South Africa (1999, May 13, p. 82) they mention that:

> "*Truck overloading is one of the principal sources of road damage in the country, the 30-40% of trucks that are overloaded cause 60% of the damage to the road network*".

The problem at stake is that the gross vehicle mass (GVM) is not standardized for South African transport as compared with overboarder transports. The gross combination mass for the vehicle and cargo is 56 tonnes. In other countries they have a lower or higher load factor. As a result of that they might be illegal in other countries. For instance, in Namibia the gross combination mass (GCM) is 35 tonnes and it can be less in other countries.

There is a large issue within the South African road transport system pertaining to the mis-alignment of risk. In general, the risk caused by South African road operators is not priced into their operating costs. According to the Department of Transport (1998), users pay into the Road Accident Fund (RAF), through the fuel tax, regardless of their safety records. In fact, some funding for the RAF originates from

users who never drive on the road, like farmers or maritime operators. Private insurance is not yet universal and is not always priced to an operator's risk. As a result, the risk-adjusted cost of operating on the roads is rarely fully borne by the operator, and the cost is pushed somewhere else into the society, external to the transport system (Southern Africa Transport Communications Commission, 1998).

Rail double stack operations, which implies the placement of one container on top of another, are among the most affected because of the lack of clearance heights. Missing modal links or connectors between modal lanes and ports, airports, trucks and rail terminals also cause poor performance both in terms of time and vehicle involved by increasing transit times, congestion on heavily traveled highways, air pollution and wasted fuel.

Other countries have poor infrastructure. They have no rail, ports, tide roads, etc. That makes it impossible on a regional scale to implement intermodalism. This problem is not only encountered in Africa. Elsewhere in the world, regulatory bodies and poor road infrastructure are still challenging the introduction of longer, wide trailers. Muller (1999, p. 394) says:

> *"In countries like Japan, where small and tight local streets prohibit use of larger vehicles, the prognosis for their greater acceptance remains problematic. In countries where roads are primitive, the wear and tear on larger truck units also affect their acceptance".*

At terminals, barriers exist, which affect capacity levels of services, gates and intermodal interchanges. On a system wide basis, equipment shortages due to poor utilization and "who owns what" have affected service quality for the customer, often at peak traffic times. In addition, lack of a standardized communication system between shippers, carriers, facilitators and governments can slow movements of information, which is the key to making the whole system work at its maximum potential.

4.1.2 New Participants

Intermodal movement demands close coordination and cooperation among participants. A participant in the intermodal transport requires a higher degree of skill and broader knowledge of the transport and logistics management process. Amongst other things, a participant must have a diverse approach in integrating the cargo transport logistic chain. Following is an example of the cargo transportation logistic chain with diverse constituencies.

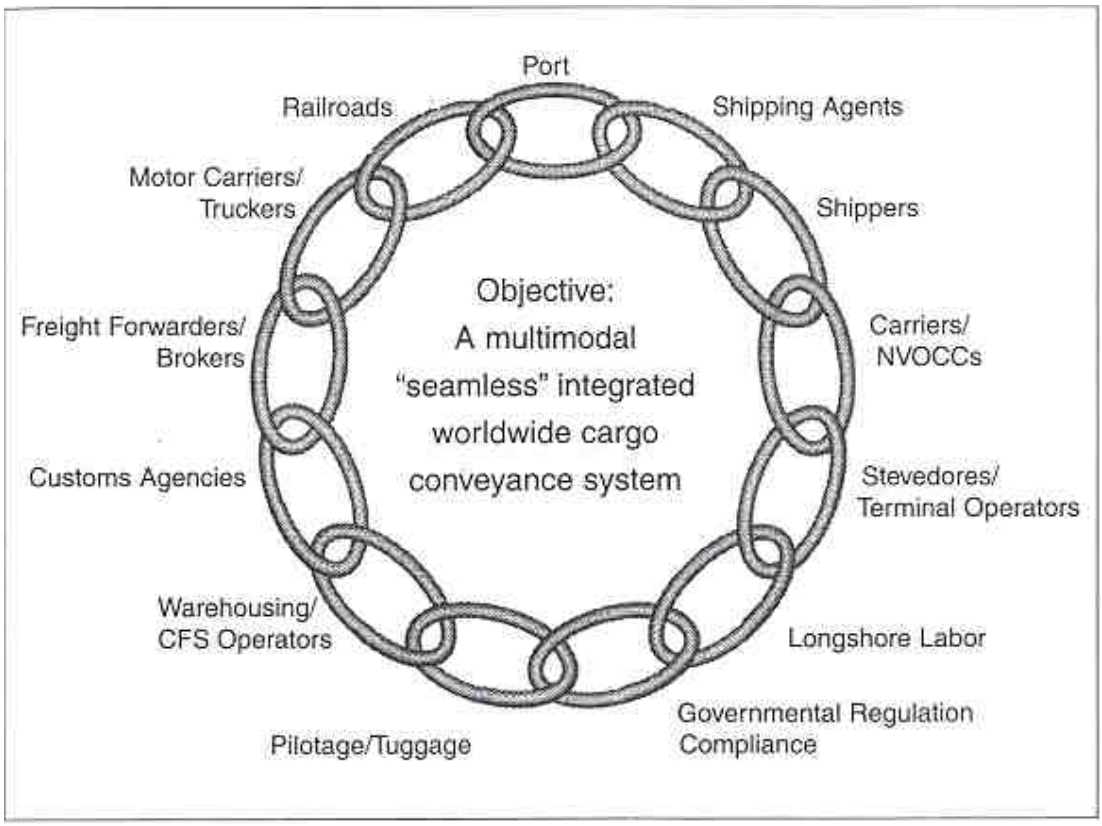

Exhibit 6: An example of the many diverse constituencies in the cargo transportation logistic chain. Source: Intermodal Freight Transport, 1999.

Exhibit 6 above says it all. Customers and suppliers must work together in defining the strategic direction when dealing with certain markets. Suppliers and customers of

intermodal services need to know how to use and integrate fast and accurate communication and information systems.

The Institute of Shipping Economics and Logistics (ISL, 1991), made mention of the fact that to be an active participant in the transport industry, the process requires continuous training and upgrading of skills, especially as more functions are becoming more specialized and technical. New participants need to have a high level of skills and training at the markets location. The investment period for both equipment and human resources has become shorter due to rapid changes in technologies, trading patterns and new business opportunities and evolving commercial and policy regulatory environments.

The way in which carriers and shippers relate to each other also has reached a revolutionary point yielding many innovative business opportunities. Initially, carriers and shippers were often at odds with each other. Each viewed its operations from its own perspective and with little regard to the needs of others involved in the transportation process.

Today, and certainly in the years to come, carriers' and shippers' relationships change almost daily. Carriers, regardless of principal mode or type of services are beginning to see themselves as partners in an integrated supply chain with the customers in achieving the shippers' logistical needs to improve productivity and open new markets. This form of cooperation has affected the relationship between carriers, where one partner will perform the activities it does best leaving the other transportation and intermodal activities to carriers that excel in those complementary activities. Carriers are now an integral part of the logistics chain or even geared to improve market opportunities for customers (Alderton, 1999).

4.1.3 Pressure of traditions and customs

The growing use of intermodalism has caused the development of new business opportunities and dislocation of traditional commercial activities. As a result of that,

intermodalism has left a remarkable mark on those who manage and operate transportation companies and affiliated services, including governments. Intermodal technologies coupled with fast changes in trading patterns and governmental policy and regulations have caused many traditional jobs to be replaced by those requiring multiple skills and higher abilities. The traditional transportation operations have drastically changed.

However, this is an eloquent fact. It means that the potential of containerization promises more and this will impact on the high costs of labour involved in shipping. It is as a result of these enormous changes that conventional movements of general cargo will continuously be reduced in quantity and in quality. Roll-on/roll-off services will technically and economically be able to take over major parts of the remaining transport needs.

The transition has not been easy for the workforce. It has created a gap between those that have made the transition and those that are not able or willing to change. The gap continues to widen. The situation will continue, placing a premium on keeping current with the latest developments in intermodal transportation.

The establishment of efficient IT (information technology) services will help transport users to be more competitive. They can expect new distribution outlets. Transport users have to maintain their competitiveness, taking advantages, among other things, of joint ventures with local and foreign partners (Atkins and Boyle, 1983). Transport providers will increasingly try to differentiate their services in an effort to gain a competitive market advantage. By offering a greater choice of value added services for potential transport users, they may be able to grasp larger market shares and increases their profits. Governments can take a step forward to develop infrastructure. They should help encourage the organizations to increased attention to the future needs to develop infrastructure so that the transport economy can become more effective.

More importantly, the government should also provide regulatory measures to harmonize transport liability regimes and insurance practices. And lastly, they should provide an appropriate legal framework for the establishment and development of a private sector of local intermodal transport systems.

4.2 New and emerging concepts and technologies.

According to Muller (1999), the new and emerging intermodal transport technologies fall into two broad categories: equipments, and information and communication services. He mentions that these technologies must provide the customer higher levels of service at lower costs. He further contends that, the equipment category can be further broken into three general categories: vehicles, containers and terminals.

- Vehicles:

In Muller's explanation, the vehicles include air, ocean, rail, and highway conveyances, which will become faster, more economical to operate, and will exhibit greater flexibility to meet changing market demands in their operating environment to remain competitive.

It is, true and the writer tends to agree with Muller. Customers have different needs and those need to be catered for. For instance, some customers will continue to find a sea-air service appropriate to their special needs. These needs may include fast shipments to meet changes in the market demand for certain products. During peak times, there is a need for an alternative transport system in some parts of the world where surface transportation to inland points is not reliable (e.g. Russia, Africa, and South America), and the need to fill empty air containers on unbalanced trade routes.

Intermodal rail technology has been changing rapidly, primarily with trailer-on-flat-car/container-on-flatcar (TOFC/COFC) equipment and automation. Most technological improvements, which are being adopted, involved modifications to

existing technologies (i.e., doublestack cars) careless units (i.e., roadrailers).

Exhibit 7. Container handler loading container on doublestack railcar.

Source: Intermodal Freight Transport (1999).

- Containers:

As far as containers are concerned, the challenge lies in two categories. Firstly, there is a mismatch between ISO standards and the growing but non-standardized domestic containers. Secondly, there is prolific growth of different types of containers for cargoes.

Initially, container sizes were limited to 20- and 40- foot boxes. As a result of that, the International Ocean Container Carriers Industry (IOCCI) was able to expand rapidly in its earliest days. Container cells and securing systems on board vessels and shoreside – handling equipments were designed to accommodate these units. However, today there is an increased use of 45-, 48- and 53 foot containers for ocean transportation. Carriers have had to purchase operating equipment to handle these longer units.

Larger size containers also pose a problem with their use in countries where there are local street and highway restrictions. A good example has been mentioned earlier on in sub-paragraph 4.1.1 concerning Japan. This situation could become worse when more carriers, who want to offer their customers greater economies, introduce additional units as long as 53 feet.

The standardization of containers in terms of length, height, width, and weight will continue to challenge container manufacturers and carriers. In contrast, ocean and other surface carriers can easily accommodate ISO standard containers.

Improvement in technology will continue to occur in the handling of formerly non-containerizable cargoes such as perishable foodstuffs, chemicals (liquid and solid), and hazardous products, including waste. Containerization will help address safety issues associated with certain hazardous cargoes.

Exhibit 8. Trailer handler loading a trailer on to a rail flatcar.

Source: Intermodal Freight Transport (1999).

- Terminals:

The critical element in assuring continuous movement of containers through the entire transportation and distribution process is the intermodal terminal. There is pressure placed on terminal operators to speed up intermodal operations within terminals. Terminal operations will become more of an integral part of the intermodal process

This is particularly relevant in cases of high-speed vessels. The terminals will be measured in terms of minutes rather than hours or days. For air transportation, nose in docking systems like those of South African Airways at the Johannesburg Air International Airport, facilitate the transfer of cargo on and off B-747 aircraft to make the operation more efficient and faster and to speed the connection to and from intermodal truck services.

Access into the terminal needs improvement. Many urban terminal facilities are located in areas that have restricted rail, highway, or water access. Highway congestion, some of which also affects rail activities, places time restrictions on intermodal movements at a cost that may make many existing terminals less competitive than their newer counterparts.

Terminal technology will continue to advance, particularly in the area of information systems. Intermodal terminals will have to grow in size and become more numerous in response to growing diversity in intermodal services. Intermodal carriers are likely to identify and develop niche markets. These markets can serve best with smaller terminal operations in urban and rural areas that meet market demands.

The following exhibit 9 is an aerial view of the port of Cape Town. The port is a full-service general cargo port. It is world renowned for it's deciduous fruit, perishable and frozen product exports. The fishing industry based at the port of Cape Town is major proportion. The port is strategically positioned and it is ideally situated to

serve as a hub for cargoes between Europe, the Americas, Africa, Asia and Oceanic.

Exhibit 9. Aerial view of the port of Cape Town. Source: The Tyneside, 1998.

4.2.1 Software / communication

For centuries, shipbrokers have helped to match cargo and ship with the appropriate market. Technological changes in information systems have allowed shippers, shipowners and cargo recipients to closely monitor the cargo throughout its journey.

Container shipping and the subsequent computer information systems have helped to produce a broader global market by redrawing old trade routes with quick, efficient vessels and direct communication links between the shipper and shipowners.

Before electronic communication, paper was the method of linking information from the shipowner and finally to the recipient of the cargo. Until recently, the main electronic communication has been the use of telex, fax and email. The explosion of information technology, satellite communication and the internet have provided opportunities for the shipowners. Communication can be made quickly and easily, in some cases bypassing the middleman, i.e. the shipbroker.

As the use of container shipping for international trade changes, according to Ford (1990), labour costs for loading and unloading cargoes at ports, as well as information technology for container tracking will redefine the need for a shipbroker.

Information technology has changed the world. Electronic commerce is exploding. Trade and financial deals worth billions of dollars are closed globally in seconds. But antiquated, cumbersome paper based procedures cause enormous waste of time and money. All too often, goods move through the transport system at a frustratingly low speed.

Information technology is enabling major changes in the production of intermodal transport services. Not only are costs reduced for the same service, but also new types of services of greater value to the customer, for example, giving time guaranteed delivery, may be offered. How to take advantage of the opportunity now becomes a major challenge to intermodal transport companies and customers alike.

The physical side of trade transactions should become as efficient as the electronic transfer of money. This may be achieved through partnerships among all parties involved to improve transport and customs operating, e.g. through the better use of IT and global networks. Although not as fast or drastic as the computer information industry, where the industry changes every 18 months, marine carriers must deal with similar changes in terms of hardware and software. To do that, and to remain competitive in an environment, which also requires more and stricter safety regulations, carriers have to identify, attract, train and maintain qualified decision-makers and technical operators who can deal with these challenges.

4.2.2 Faster, more reliable information

Intermodalism can provide faster, more flexible and reliable services. This can be done virtually from every interior supply point, which can be depot or vendor facilities to practically any point on the globe where the supplies are needed. Intermodalism has proven that it can provide those kinds of services, especially in an intense budget-cutting environment. The development of stronger working relationships can improve logistics and contingency planning. Closer communication can also increase the need to understand the full intermodal capabilities. However, those contingency plans could be made well before a crisis is fully developed. It is

very important to know at any time where your suppliers are in the intermodal transport chain.

Electronic data interchange (EDI) saves on clerical costs by avoiding re-entry of data and allows timely and error free transaction information to be passed from one computer to another. The use of EDI improves the information management and data exchange and also introduces new business strategies such as just in time manufacturing. It also allows quicker and safer processing of invoices to bring speedy payment and thus improves cash flow. EDI facilitates and speeds the control and other official interventions, for instance, customs clearance of goods. It improves customer services. It is a new way of doing business. EDI is an indispensable feature in the trade, which promotes trade both domestically and internationally (Bahadur, 1997).

The problems associated with EDI need to be considered collectively rather than in isolation from each other. It is very important nonetheless that they are not overlooked. The following problems can be distinguished in the use of EDI in intermodal transport:

- Resistance to Change:

Usually people do not like change, and therefore they must be motivated. The benefit of change should be explained to people concerned in the use of EDI. A good explanation about EDI will increase the awareness of personnel. Many people consider the computer as a threat to their jobs. The modern trade practice is changing fast and the company has to keep pace with the change, otherwise it may be out of the market.

- Lack of training:

There is a great need to promote EDI system. Conducting seminars and workshops could be seen as one of the viable ways. The government should take the responsibility and initiatives in coordinating and cooperating with private companies.

- Lack of resources:

Increasing the communication system may be the most challenging problem. The hardware is quite expensive and many countries cannot afford it. Therefore cooperation between the private and public sectors and multilateral and bilateral aid may be very vital.

- Problems related to the standardization of documents:

There are many transport documents used in international transportation. Door-to-door transport consists of several modes of transport and each will often employ a different format for the same purpose. The use of EDI requires a standard document in order to transfer the message. Electronic bills of lading, multimodal transport documents and waybills may be the solution to adopt a mutually accepted standard. But the legal development also has to follow the development of electronic trade practice.

- Confidentiality and security of the information:

Information through EDI may not be as secure and proper as a paper documents. The parties sharing electronic data should trust each other. They should agree on what data should be exchanged. Electronic keys may be used to increase the security of information.

- Lack of legal framework:

There is no widely accepted and internationally recognized convention regarding the use of EDI. The legal problems may be solved by new legislation by accepting the UNCITRAL (UN Commission on International Trade Law) model law regarding electronic data exchange. To my justification, the electronic data transfer has no legal effect. Using EDI may be considered as risky as there is an absence of internationally binding rules even though some countries have developed national laws.

- Language:

English is the language of international trade. Intermodal transport is an international activity. Different parties involved in the transportation should use English properly. Although Spanish and French languages are also used dominantly in their native countries, most of the software is developed in English. Training and improving the education system can help to solve the language barriers.

4.2.3 Faster decision making and alternatives

A new kind of decision-maker and technical operator requiring skills that did not exist before, is emerging. The rapid changes demanded by the marketplace are placing a premium on those who not only can perform but also can understand all the issues necessary to provide one or more services.

Decision-makers must periodically review all factors to determine if the decision should be changed because of new discoveries or improvements in methods or hardware as well as changing economic circumstances. These reviews, especially those based on strategic marketing factors, should take place at least every two or three years, given the rapid changes in the global markets, technology and government policies and regulations.

Different factors influence the decision. The use of containers in a particular instance is subject to change and existing circumstances may influence the result one way or the other at any given time. For example, fluctuating fuel oil prices can tip the balance against a rising trend of using one intermodal system against another. The decision whether or not to containerize is based, not on a set of fixed, cut and dried, immutable facts, but on constantly shifting circumstances.

Today there is a new emphasis on decision-makers that are professionally qualified, have a market profit – driven attitude, have skills in different languages and cultures, are comfortable with new technologies and are willing to be trained in new and emerging skills based on the organization is and industry's needs. The availability of

qualified human resources usually comes at a premium cost which the carrier might have to pay to maintain a certain level of service. In the maritime field, especially with ocean operations, the new Standards for Training, Certification and Watchkeeping (STCW) regulations have increased minimum requirements for sea going personnel in the light of increased cost of preventable accidents. This requirement was spurred on by the fact that about 80% of all ships' accidents were human related, the rest were mechanical.

The ability to focus on only one project in the maritime industry was traditional in a very tradition oriented industry that goes back thousands of years. However, in the light of globalization and a renewed focus on the customers needs, traditional managerial techniques often had to be changed, sometimes drastically, to remain competitive. Some companies had to reorder their management structure by switching the final decision-making process to the local level, placing greater emphasis and use on electronic information and communication, and becoming more flexible in the entire decision-making process. While the switch was not easy, most large companies had little choice but to do so.

CHAPTER 5

Survey of selected areas of industry and the determination of future training needs as a result of identified shortcomings.

5.1 Areas of survey

Successful intermodal operations, regardless of which part of the system they are involved with, require a comprehensive understanding of detailed planning. This will also include knowledge of engineering, finance, operations, marketing, documentation and administration. Other issues to contend with address existing and emerging government regulations and policies, faster and unpredictable needs of intermodal customers, safeguarding of the environment, public awareness and support and staffing by qualified and dedicated human resources.

In the past, transportation modal operations was very predictable and practically know how depended on the experiences of those who had been in the business for several decades. Today, predicting changes and resources to deal with those changes require a different approach involving faster and sometimes more innovative answers. What is needed, however might be a blending of the old and new (education, training, internship, etc) in such a way as to cover most of the basic

issues for a majority of intermodal participants. Education and training and internship play a significant role in trying to meet the pace of intermodal development (Lambert. 1993, pp102-108).

Greater recognition is given to institutional issues, including public awareness and educational programs. The development of public/private programs, projects and a better understanding of who the customer is and what the customer expects in terms of freight transportation and intermodal services are being recognized as necessities.

In this chapter, the author has conducted a survey to identify the existing shortcomings. The following areas were visited: the shipping companies, terminals and customers, transport companies and existing training institutes. The aim of this chapter is to integrate the already existing training institutions in South Africa. The forms of questionnaires were used and sent to different transport parastatals, freight forwarders, shipping companies, customers and terminals. Examples of the questionnaires are attached as annex 2. Below is a brief report from the survey.

5.1.1 Customers

Interviews with freight customers revealed a significant level of dissatisfaction with key aspects of the freight system. While customers expressed satisfaction in general with road freight prices and levels of service, they were significantly less satisfied with rail general freight prices and services, and were highly dissatisfied with current levels of services, especially delays, at the ports.

For the inland leg, including ports, 60% of customers felt that transit times were too long, and these customers wanted to see a 37% reduction in the overall inland transit times. Outside the ports, 73% of customers also expressed a strong preference for improved transit times on the maritime leg of the shipment. The elements of the freight system that drew the highest level of customer satisfaction were the dedicated bulk export lines for coal and iron ore. Spoornet generates the greatest part of its earnings from the transportation of bulk commodities such as coal, ore, minerals and

agricultural products. As a result, the transportation of mining-related products accounts for some 50% of freight volumes handled by Spoornet. Customers were highly satisfied with the level of service. As part of the strategy of putting the customer first, 36 service centers have been established in the regions. Each region under the control of an area manager who strives to accommodate any special and specific requirement set by a client.

One contradictory finding was that even though customers generally expressed satisfaction with road freight prices and services, South African road freight hauliers performed worse than expected on service and no better on cost when compared to international benchmarks. The following exhibit 11 compares services offered by South African hauliers with those offered by U.S counterparts within South Africa.

It is very important to note that in a global economy where the customer often has the upper hand in market development opportunities, the suppliers of the intermodal freight transportation and logistic management services must listen to what the customer wants. Customers expect consistent quality of products and services worldwide.

Road Freight Service Comparison

Selected leading South African Road Hauliers Offering Service.		
	SCHEIDER	ROADWAY
Time critical service with 100% on –time guarantee	NO	NO
24-Hours tracking and monitoring	YES	NO

Order Management	YES	NO
IT services: EDI for ordering	NO	NO
Dial-in for customer information	YES	NO
Web site	YES	NO

Exhibit 11: Scheneider and Roadway have been taken as examples of best practices. Source: Southern African Transport and Communications Commission, 1998.

5.1.2 Shipping Companies

Today shippers are demanding transportation carriers to provide a service of highest quality, low costs, and shortest delivery time. Clearly, any customer makes trade-off between price and delivery speed. If a customer needs an urgent delivery, they are willing to pay a higher price for expedited services, whether it is by air or over the road. Service quality, however, is what the shipper is least likely to be willing to trade off. This is demanded regardless of the price discount that the shipper may obtain by opting for a longer delivery cycle.

For many customers, predictability of delivery time is synonymous with service quality. A customer's decision on what mode to use is primarily driven by the need for reliability and dependability and not necessarily the cheapest rate or shortest transit time. In fact, customers are often willing to pay a price premium to ensure the predictability of arrival time. This means that the client might not need the shipment by the next day. Rather it was the reliability of the delivery time that was the key drive. With just-in-time (JIT) inventory control practices, the shipper demands for a reliable delivery schedule becomes an even more pivotal factor in determining the customer perception of the quality of intermodal services (Muller, 1999).

In tracing the pattern of trade developments during recent years and pointing to the future trends, one must bear in mind that the paramount consideration is the shipper and more especially the market. It is the market that decides whether the goods will pass and this is conditional on many factors. Some of the following points were highlighted when conducting interviews with the shipping companies.

- The overall competitiveness of the port.

This includes all the aspects of operation and commercial practice such as tariffs, clearance of cargo, distribution arrangements, hours of working, cargo-handling equipment, port development, and so on. Shipowners feel that the aspects mentioned have an influence on their choice of port.

- The port tariff structure

It is the second point of consideration as far as shippers are concerned. Some port authorities are very marketing orientated and offer negotiated discount rates to volume shippers. Hence a shipowner or shipper generating say 100 000 tons of a particular commodity through a particular berth annually may have a 5% discount on the published port tariff.

- Political Influence

There is an extent of political or statutory influences relative to port users. Regulations may exist regarding the routing of particular commodities through a particular port thereby giving no choice to the shipper. A further example arises whereby an increasing number of ports, usually by government decree, give berth preference and more favourable tariffs to the national flag. Hence a vessel of country A about to enter a port in country A will be given priority of berth over other national flags, and likewise lower port tariffs. This practice is called ‘flag discrimination’.

- Climate conditions

The port of Cape Town is affected by climatic conditions. For example sometimes the wind is blowing so strong to an extent that they are unable to load and unload containers. The process has to be stopped and this delays the vessels (Southern Africa Transport Communications Commission Technical Unit. 1998, p. 74). Not only in South Africa we are experiencing this problem. In some other parts of the world, a port may be closed owing to ice formation. Other situations include tidal variations imposing draft restrictions, and fog limiting access to and from the port without radar technology.

- The overall transit cost.

A situation exists with parity on port tariffs at two ports situated some few kilometers apart (e.g. Cape Town and Durban). The overall distance from port to the shipper's premises favours port A rather than port B. Hence port A is more likely to obtain the business unless port B is willing and able to reduce the port B tariff to a level, which will equate to or be better than the overall transit cost compared with port A. In addition, you find that shippers prefer to call one port due to traffic and delays in the other port. And more importantly, the origin and destination of the cargo tends to influence the overall transit cost as detailed above.

- The nature of the commodity and volume.

Specific cargoes are dealt with at specific ports. This requires specific cargo handling equipment and berths. Some shipowners feel that there is not much flexibility as far as the ports in South Africa are concerned. This is as a result of the go-slow that was taking place at the port of Durban during December 1999. The ships were calling the port of Durban but the service was not very efficient and not as effective as possible. Most of the cargo was delayed as they could not meet the deadlines and factories were closing due to the holiday season (Little. 1999, p. 3).

- Bunkering costs and other port charges to the shipowner

This will influence considerably which port a shipowner uses when he is examining the port options to start a new service, or reviews an existing shipping service and the ports served. A further example arises where some ports offer discounted bunker tariffs to their national flag, thereby practicing flag discrimination.

Shippers and shipowners are interested in the range of port facilities available to them. This may include agents, bunkering, victualling, stores, ship repair, tugs, forwarding agents, cargo handling equipment, customs, port access both seaward and landward and so on (Branch, 1986).

Trends in global supply chain integration have added further complexities to what a typical international shipper demands from intermodal services. There is a great demand in mass customization and integration of the intermodal service. Mass customization, which can be viewed as the major new trend in global logistics, is transforming the nature of transportation and logistics increasingly blurring the lines between manufacturing and retailing. Mass customization demands greater flexibility and value added from the carrier. The shipper is now requiring flexibility in all facets of service, pricing, schedules, delivery frequency and routing.

The shipper is also demanding value- added services. In addition to the basic point-to-point delivery of goods, the shipper wants the carrier to provide customized logistics for sorting, assembling, packing, labeling, invoicing and storage as well. The carrier's ability to integrate the goods delivery service into the customer's logistic supply chain hinges on how well it can allow the customer capability for real-time order control and cargo tracking (Muller, 1999).

The Internet now allows customers to manipulate orders and keep track of the shipment, as they need. Such empowerment lets the shipper respond to changing needs for routing, transit points, cargo diversion and equipment availability.

5.1.3 Terminal operators

Against the foregoing background of the factors influencing the shipowner's or shipper's choice of port, hereunder is a report compiled from the terminal operators. The author will examine future trends in trade especially how they are likely to affect the port industry.

South Africa's modern and extensive transport system plays a very important role in the national economy and also in the economies of several other African states. A number of countries in Southern Africa use the South African transport infrastructure to move their exports and imports. Thus intermodal terminals are to remain the critical element in assuring continuous movement of containers through the entire transportation and distribution process. Greater pressure is being placed on terminal operators, both carriers and independents, to speed up intermodal operations within terminal areas. Terminal operations will become more of an integral part of the intermodal process (Chartered Institutes of Transport in South Africa. 1997, May 5. p.1)

Rail and terminal systems will require a wholesale change of attitudes by Spoornet railway operators that are mostly owned and operated by national governments, or have been or are in the process of being privatized. Greater cooperation both in the technical and business areas needs to take place between the rail carriers. More rail orientated intermodal operations must be set up and third parties like intermodal marketing companies (IMCs) need to participate. In addition, rail operations must be open to foreign operators.

Port privatization can be seen as a major result of deregulation and the move to letting the market determine its own direction. Privatization of ports around the world sparked a wave of investment that has boosted profit and improved efficiency in the stevedoring industry. Privatization activities are largely taking place in South America (including Brazil, Argentina and Chile), Southern Asia (including India and Sri Lanka), and the Mediterranean (including Algeciras in Southern Spain, Gioia

Tauro and Taranto in Southern Italy and Malta Freeport). The opportunities at these and other ports have given rise to a new class of global stevedoring and terminal operators that also invest both inside and outside their own regions. For example, Hong Kong based Hutchinson ports have invested heavily in ports in Panama as well as in China and Hong Kong.

Many stevedores are afraid that they will be unemployed due to privatization of ports and the development of computerization. Computerization is developing in many ports. It will become a major area of technology in many ports throughout the world. Stevedores feel that they are not computer literate and that computers will replace them. For instance, one person can handle a work that was done previously by 4-5 people because the computers control and monitor containers passing through the port. Dispatch of cargo manifests, preparation of consignment lodgment details to customs for customs clearance, including assessment of the VAT and duty payable, are quickly prepared by the computer.

Dock labour is another area of concern. According to Branch (1986), the decline in the dock labour force has been virtually worldwide and this has been due to the introduction of capital-intensive methods of cargo handling. As the development of containerization and especially RO/RO services becomes even more widespread in underdeveloped countries, the reduction will become even more pronounced.

The port of Durban was built in the nineteenth century when ports tended to be built close to the hinterland on which the port relied for its market. Today, with the provision of vessels having deeper draft, wider beam and greatly increased overall length, the deep-water berths/ports tend to be situated at the mouth of the river estuary. The port of Durban is built right inside the city and now it is experiencing land problems (Southern Africa Transport Communications Commission. 1998, p. 25).

Added to the problem are the range and type of ships that are continuing to increase. Accordingly, this has a profound effect on the type and range of port facilities. Such

vessels may be a specialized vessel, or combi-carrier, classified as a multi-purpose general cargo ship. However, the current tendency is to build more multi-purpose vessels rather than the purpose-built vessel capable of conveying only one type of cargo. This will permit the vessel to switch from one trade to another, especially in periods of trade depression.

The tendency in South Africa is to rationalize the number of ports and give priority to the development of those that fit the modern needs, in particular those with the ability to raise capital and provide modern berths acceptable to the market and modern tonnage. By far the largest, best-equipped and most efficient network of ports on the African continent, South Africa's seven commercial ports have a significant role to play. They are not only conduits for the imports and exports of South Africa and neighbouring countries, but also serve as hubs for traffic emanating from and destined to East and West African coasts (Southern African Transport Communications Commission, 1998, p.16).

Although ports have been forced to invest heavily in larger terminals and bigger cranes, some of them are looking elsewhere to spend their money on inland terminals and infrastructure. They see this as part of a larger seamless link in the total logistics management system that more of their customers expect to have to remain competitive. Customers are beginning to expect that ports should be able to accommodate a container moving from overseas to Durban terminal port and to City Deep Container Terminal in 14 days. If a port cannot facilitate this, either the shipper or the carrier, or both will look for alternative ports.

Ports need to take a closer look at inland bottlenecks that affect the transfer of containers to truck and rail carriers, and the subsequent movement of the container through congested urban areas to the transcontinental rail and highway networks.

To deal with this issue, some ports have developed on-dock rail yards to expedite the transfer of containers between the vessel and intermodal trains. For many carriers, on

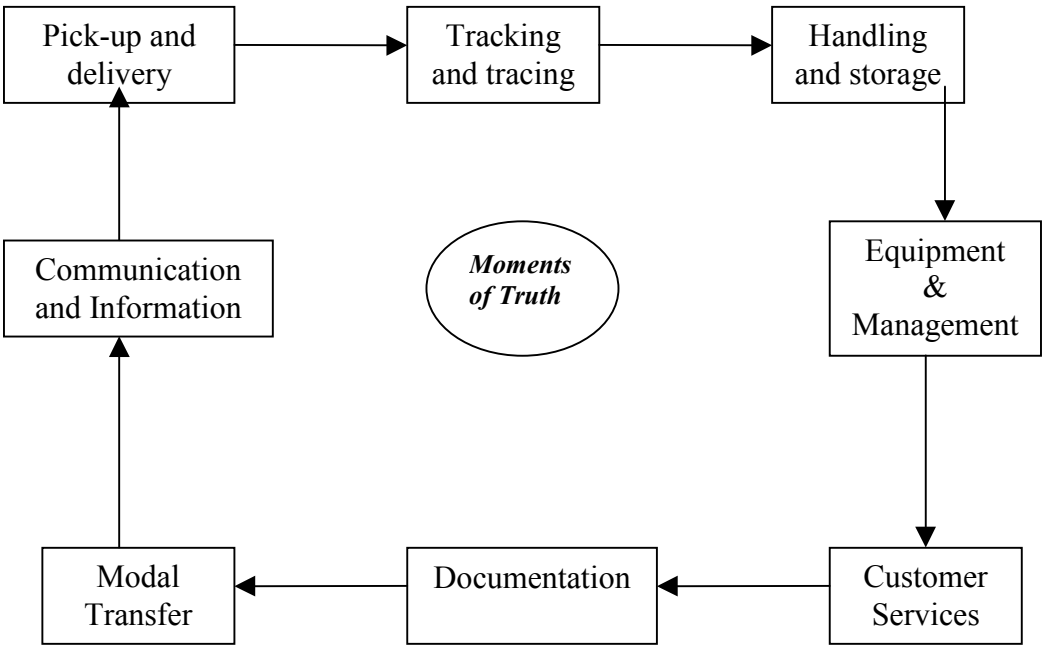

Exhibit: 10. Source: Intermodal Europe 93:The Container Conference

dock rail yards are costly but necessary tools, which allow them to control the movement of containers from origin to destination. These on dock facilities are expensive because they take up valuable waterfront land and they must be configured to accommodate trains that are as much as 8.000 to 9.000 feet long (2.4 kilometers to 2.7 kilometers long). They must also be compatible with the shape and size of the marine terminal.

5.1.4 Transport companies and drivers

Loyalty, is one but an important factor that most of the transport companies urge that their drivers should have. The question that one needs to ask him/herself is how do you guarantee that? Can loyalty be measured? Or is it earned? Is it a good ground to say that drivers, who have been with the company for more that 15 years, as an example, are loyal drivers?

From the findings and interviews conducted, the author came to realize that one of the major problems is that drivers are underpaid. In some instances, some drivers are

well paid but human beings are selfish. This arises from the fact that cargo goes missing or is even stolen. There are syndicates involved in this matter. In one particular instance in City Deep, the driver was sent to pick up cargo (e.g. unprocessed minerals) from Witbank. After pick-up, the cargo did not reach the clients premises. The driver received bribery and the cargo was given to the so-called syndicates.

Researchers have also shown recently that certain products, which have a high street marketability profile, such as sportswear, are at risk. In South Africa, it is alleged that products like this are often being sold on the streets two hours after they have been stolen (Eller, 1999, March p. 77). This is becoming a big problem to the government, customers, insurance and transport companies and some drivers are even highjacked. It also affects the global intermodal transport chain and more importantly, the economy of the country.

Thieves may also remove containers from terminals by presenting false documents, or stealing documents. However information still has to be supplied to individual drivers, and such information can be misused. It is vital that knowledge relating to cargo is restricted and that details of the location of containers, and their destinations, is kept confidential. Most crimes in ports and transport systems stem from inadequate management control of information.

Losses suffered by shippers, forwarders and ocean carriers from transport related crime are horrifyingly high, and the figures are constantly rising. As global logistics chains become more complex, the opportunities for criminals to steal high-value products are increasing. Probably nobody knows the true annual losses of forwarders and truckers from theft in international transport chains. Container related thefts are not always reported to police authorities. If it cannot be established in which country a theft has occurred, national police forces are frequently reluctant to commit scarce resources to investigate crimes that may not have been committed on their path.

Consequently, details of container-related crimes may not find their way into police statistics. Even if container thefts are reported to the police, national crime statistics may not differentiate between products stolen when they are in transit, and thefts committed in other locations. Thus Eller (1999, March p.73) says:

> "*It is difficult to extrapolate data relating specifically to container theft from the overall data which is available"*.

Seals and their correct use are highly relevant to container security. Tampering with seals is a big problem, but thieves can enter a container by removing the rivets connecting the handle to the locking bar at the handle hub, allowing the handle to be dropped. The locking bar can be rotated, and the container doors opened without removing the seal. Afterwards, the rivet is replaced and the container appears secure, and the seal intact. There are many ways to get into the container dishonestly without attacking the seals, but seals may be cut and put back together again, especially in certain countries were there are no checks.

Another trick is to insert a pen into a seal where it should join together, so that the joint is not made, but the seal appears intact. Drivers are usually the people who put seals on when collecting a load from a shipper or a terminal, and dishonest drivers can be a major problem. Lack of effective responsibility for all the links in a global supply chain is the key to the entire issue. It can be logically argued that responsibility for security is an essential element of the process. In reality, it is a gray area (South Africa, Minister of Transport, Department of Transport, March 1999).

All these people need training. They need to be part and parcel of the whole intermodal transport chain. We need to fully integrate them into the system. Will training and educating them make a difference?

We need to solve this problem. A thorough research needs to be done. Where do we start? By changing the attitudes of the drivers, educating them about the importance of cargo, how significant is their role? People can be given tools, but they themselves

need to change their attitudes. Drivers are the most important people because they have direct contact with the customers. What about transport owners, would they have a role in this syndicates system? Maybe we are overlooking the dispatch clerk because he/she has access to the documentation. They know the value and type of cargo. If there are dishonest employees who are in league with the outside criminals much information can be used as the basis for preparing seemingly genuine sets of documents to enable thieves to illicitly collect containers from terminals, and remove loads.

Theft is very alarming and growing very fast. Increasing the salaries of the truck drivers will not solve the problem but that does not justify the fact that they should be underpaid. The employers should take care of their employees. A good relationship of trust and love should be established. Moreover, there are drivers in certain parts of the world, like Europe and the United States for instance, who are well paid but are still involved in pilferage. This is becoming a universal problem. Transport companies should have a good security and an effective satellite tracking system to secure the cargo. A good investment in security will be highly recommended. That will make everyone happy. The customers will be able to receive their goods in good conditions, delivered at the right time and at the right place. The criminals need to be punished.

5.1.5 Existing training institutions

There are numerous education and training institutions, including public institutions, specialist training and training establishments in South Africa. Examples of those are UNISA (University of South Africa), RAU (Rand Afrikaans University), Wits Technikon, and UCT (University of Cape Town) to mention but a few. Several of these institutions offer courses of varying duration for participants from the region.

Restructuring the transport sector will require imposing major changes on the regional training institutions and require new strategies for human resource development. With regards to human resource development, government should

concentrate on management of change and its new responsibilities in policy making regulatory matters. The commercialized operating sector will have to be responsible for its own requirements.

There is little justification for building new training facilities. There is an influx of teacher graduates in South Africa. Teachers training colleges are closing down due to the great supply of teachers and many of them are unemployed. The industry cannot assimilate teacher graduates. Instead of the government constructing new premises for education and training existing training colleges for teachers can be converted into maritime transport colleges (which could encompasses freight and passengers). In addition to that, the government could expand the existing infrastructure by erecting modern building needed for certain types of courses (e.g. engine room, bridge room, and electronic workshop or computer room. This will save cost.

The University of South Africa (UNISA), for instance, offers a specialized degree in Transport Economics or Logistics. The B-Com degree with specialization in transport economics or logistics is designed to furnish transport economists, transport managers and logisticians with the specialized knowledge and skills needed. This will enable them to make a significant and valuable contribution to the solution of transport problems in order to meet the needs of users at the lowest possible cost and with the least negative side effects for the community (University of South Africa, 1999. pp. 1-4).

The Department of Transport Economics of the Rand Afrikaans University as agent for the Chartered Institute of Transport in Southern Africa (CITSA), also administers a transport management diploma course. CITSA is affiliated to the Chartered Institute of Transport (CIT), an international organization, which is represented in sixteen countries worldwide.

The curriculum, on which the qualifying examinations of CITSA are based, is designed to provide non-formal training for personal development and qualification

of individuals through increased knowledge and skill in the field of transportation and to foster professionalism in the transport industry in Southern Africa.

The Chartered Institute of Transport recognizes the course. It is currently being evaluated as part of the National Qualifications Framework and is expected to be assessed at a level broadly equivalent to that of a national diploma. Subject to bridging conditions, it can be used to facilitate admission to some of the bachelor's degree programmes being offered by certain technicons. In some other countries they are referred to as Polytechnics (Charter Institute of Transport in South Africa. 1997, May 5, pp. 1-4).

Courses in existing institutions may need to be adjusted to changing needs. For instance, the private sector will require short training courses to develop specific skills. Training institutions will need to be reoriented to be able to meet the new and changing demands, rapidly and effectively. The quality of management training needs to be improved in order to reduce the need for training outside the region. Training for the government will be required to support the process of restructuring.

- The United States Merchant Marine Academy (USMMA)

The secretary of transportation Rodney E. Slater, mentioned that:

> "*Our greatest challenge is to build a transportation system that is international in reach, intermodal in form, intelligent in character, and inclusive in nature" (Helmick: May-1998).*

The USMMA began educating and training deck and engine officers for American merchant vessels at King's Point, New York in 1942. In the decades that followed, the academy established a worldwide reputation for the rigor of its programs and the quality of its graduates. Operated by the U.S. Department of Transportation through the Maritime Administration (MARAD), USMMA has consistently provided highly qualified personnel to industry and the military. Graduates receive a Bachelor of

Science degree, an U.S. Coast Guard License as Third Mate or Third Assistant Engineer, and a commission in the U.S. Naval Reserve.

Commander Sir Jon Helmick (1998) contends that, it is clear that individual modes of transportation can no longer be managed effectively in isolation from the others with which they interact. The systems view is thus an essential trait of the modern logistician and transportation manager. Other important competencies include a global perspective, strong analytical and problem solving skills, information technology and information system literacy, an understanding of basic measurement and modeling issues, and a strong customer service orientation. Feedback from employers also indicates the great importance of interpersonal skills, teamwork capabilities, and communications proficiency.

In a nutshell, the key objective of the USMMA logistics and intermodal transportation program is to develop leaders for tomorrows commercial and defense transportation system and who will contribute to an intermodal transportation system that effectively ties America together (Helmick, 1998. May).

- Dar-Es Salaam Maritime Institute (Tanzania)

Marine training in Tanzania was established by the 1964 Merchant Shipping Act No 47. The aim was to provide manpower with formal marine training so that they could serve the merchant shipping industry in the world. Initially, colleges and institutions outside Tanzania largely provided the training of seafarers. It was only in 1977 after the breakdown of the East African Community, that the training of seafarers took a new turn. Support was received from the Government of the United Republic of Tanzania and also the Norwegian Agency for International Development (NORAD).

The development in technology created the need for other related maritime industries, such as shipyard and oil companies. Other on shore based industries created an alarming need for attention. That includes rail, road, electrical and so on. DMI was challenged to develop courses that would cater for these industries as well.

It is for this reason that cadets from the DMI will definitely have a wide range of options to develop their carriers as professional mariners.

CHAPTER 6

NEW TRAINING REQUIREMENTS

Central to the concept of preparing for the future is developing the human resources both labour and management, in order to make the future a reality. The process involves a sense of awareness that without identifying the resources, the success of the entire process is limited. Experience has shown that the intermodal process requires a cross-fertilization of technologies. It also requires people who have the experience and skill to make progress happen. A further look at the entire intermodal process shows it is necessary to include persons who see the same situation from different perspectives, based on experiences that are often outside the intermodal industry. It could therefore imply that intermodalism is moving from a "what is! phase to one that is more "how to" in order to manage its many activities (Muller 1999).

Intermodal freight transportation like other facets of economics, social and political activity has evolved through fundamental changes. There is no need to repeat those, except to note that changes can be expected in the future. An even greater international perspective influences the intermodal industry now and it is truly a global business.

As with other aspects of intermodalism, the method of identifying and training the industries future managers and technicians must change in order to keep pace with the overall progress of the industry. By the next decade based on what the track record clearly shows in terms of whom the industry leaders are today. There will be the need to develop and operate intermodal transportation services with fewer but better qualified persons who have more diversified skills.

To do this, requires better cooperation between industry, governments, and academia. They can better develop programs to prepare present and future decision-makers and technical operators. It will require not only better academic programs, but programs that teach and encourage practical skills. Slowly and in painful steps, this form of cooperation is already underway. At the academic level, transportation schools especially in universities and technikons have initiated degree programs in intermodalism and logistic management that responded to the needs of the maritime and transportation industry. A majority of these programs rely on the participation of private industry and government's agencies for help in developing skills by making their activities available to students on an internship basis. These programs will provide many of the industry's future leaders. They will have a wide perspective and a graps on a broad range of industry fundamentals.

The objective of the program should be to provide both an academic and practical education. By graduation, the student will be well equipped to handle challenges of the intermodal industry, with practical working experience and an enhanced understanding of the "how's and why's" of what is involved. Also both students and participating company and agency have a better opportunity to identify future personnel and employment prospects.

The same should apply to technicians who will operate the technologies and equipment that are necessary to the success of different intermodal activities. Equipment automation, advanced information and communications technology contributing to a fast seamless intermodal process requires new skills, some of which

are only now being identified by the industry. These skills will require people to be competent in technical areas that may not have a direct relationship with their primary area of expertise.

The development and maintenance of educational programs will be expensive over the short term. As intermodalism moves into its next phase of evolution, seamless transportation tied to advanced technologies and logistic management companies and government agencies have little choice, other than better educational if they want to remain capable and competitive.

6.1 Integration of Existing Educational Programs-Proposal

Central to the problem of integrated intermodal transport, education and training needs to be integrated in South Africa. Existing training institutions needs to complement each other rather than competing and duplicating courses amongst them. South Africa is one and therefore there must be uniformity and harmonization of education system. For instance, there are numerous institutions that are responsible for the training of cadets within the country. The South African Merchant Navy Academy, 'General Botha' established at Granger Bay, is integrated into the Cape Technikon, with a similar facility at the Natal Technikon. Deck and engineering students and officers complete their academic training at the Cape and Natal technikons while lower classes of certificates are offered at the Training Centre for Seamen, situated in the Duncan Dock area in Cape Town. This training institution also caters for deck, engine-room and catering department rating together with fishermen of all grades.

The South African Maritime Safety Authority (SAMSA) is responsible for setting all standards of training certification and watch-keeping on behalf of the Department of Transport, while the Maritime Education and Training Boards is in turn responsible for the accreditation of all maritime courses (South Africa, The Ministry of Transport, Department of Transport. 1999).

There are other maritime training organizations offering a wide range of courses, which have been developed within the South African Maritime Industry and Portnet and which are situated mainly in the ports of Cape Town and Durban and to a lesser degree in Port Elizabeth.

There are two other universities UNISA (University of South Africa) and RAU (Rand Afrikaans University) which offer undergraduates and port graduates related courses in the field of transportation. Details of their course are discussed hereunder and an appendix is also attached for their course structure. It is unfortunate at the time of writing the author has no curriculum for the other institutions that provide training for seafarers.

Due to economic reasons, the author proposes that the existing training institutions should be integrated to atlist one or two major institutions. This will help to have a National Maritime Institute that encompasses all the courses offered already instead of constructing a new training institute and duplicating what already exist. It will be a good idea to pull the resources that already exist. This will save the government money because we already have manpower in the already mentioned academic institutes. These axes of development will stimulate investment, upgrade existing infrastructure, enhance trade and commerce and create careers and job opportunities for thousands of people. A research department could be established focusing at transport related matters be it shore or offshore based. This will require allot of specialization in the field of work.

For a transport system that is geared for growth, we need a vision, a plan and a strategy. Transport is a key part of any serious discussion about the future. Without an efficient and effective transport system there can only be marginal economic and social development. As mentioned by the Minister of Transport, Mr. Mac Maharaj, he says, the vision is to:

> " *Provide safe, reliable, effective, efficient and fully integrated transport operations and infrastructure which will best meet the needs of freight and*

*passenger customers at improving levels of services and cost in a fashion which supports governments strategies for economic and social developments whilst being environmentally and economically sustainable"(*South Africa*,* 1998).

Transport plays a vital role in our lives and embarked upon major programs to restructure the industry and change the way it's managed. The efficiency of the industry must be improved by enhancing competition, while at the same time meeting the needs of the people of South Africa.

In order to build capacity at national and provincial levels of government, the department contracted the Department of Transport Economics at RAU (Rand Afrikaans University) to develop a postgraduate transport management course. The first students have graduated and rejoined their respective organizations. The department continues to fund postgraduate studies in transportation through its center of development at other universities.

The Rand Afrikaans University offers several courses in road transportation. The Certificate, Advanced Certificate and Diploma courses in Road Transport are offered by the Research Unit for Transport Economics and Physical Distribution Studies of the Rand Afrikaans University in collaboration with the National Department of Transport (NDOT), the Road Freight Association (RFA) and the Southern African Bus Operators Association (SABOA). The courses that are intended to be as practicable as possible covers the main functional areas of road transport undertaking.

Students are been offered the choice of specializing in either Road Freight Transport or Road Passenger Transport on their preference. Although the courses are specialized, certain subjects are common to both Freight and Passenger students, whilst others will focus on either Freight or Passenger Transport (Rand Afrikaans University, RAU 1999).

There is no minimum educational standard for entry to the course but ability to read and write in English and or Afrikaans is essential. The examination takes the format of six sessions of three hours each, covering all subjects. Multiple choice and short definition type questions are combined with a number of questions requiring critical type questions combined with problem solving and information processing skills. The successful completion of the Certificate course is pre-requisite for enrolment on the Advanced Certificate. The Advanced Certificate is a prerequisite for enrolment on the Diploma.

Appendix 3 comprises of the structure for the full three years course offered at RAU.

Furthermore RAU has extended its program by offering a Post-Graduate Diploma in Transport Management in collaboration with the National Department of Transport. The course is targeted at graduates working for the national, provincial and local/metropolitan governments as well as those working in the transport field, or who intend joining transport as a profession.

The course has a theoretical and practical component. The theoretical component consists of the lecture program of several months while the practical component involves the placing of the students with various transport organizations. The theoretical component commences with an intensive exposure to micro- and macroeconomics, in order to prepare students for the modules which follow. Depending on student preference with respect to specialization, the students will be placed for a period not exceeding six weeks, at organizations involved in transport or transport infrastructure. For instance, a student interested in Freight transport will be placed on a guided study program at freight companies to gain practical experience in order to see their theory put into practice. This will assist the student greatly in understanding and concerns of the sector, thereby contributing to better decision making.

The last stage of the course will consist of the placement period. After students have spend six weeks with the relevant transport organization for practical training, a

particular student will be placed depending on the student's area of specialization and choice subject. For each choice, there may be more than one placement organization as there are various organizational aspects to be covered. The practical experience will, for example encompass organizational structures and missions, operational activities, marketing, financing, pricing, infrastructure, etc. While on placement with each organization, the student will follow a structured study program and will be allocated a mentor who will ensure that maximum benefit is obtained. During placements, students will also complete reports to facilitate their understanding of the subject covered and to provide a manner in which both the Department of Transport Economics and their employers can monitor their progress.

The University of South Africa (UNISA) also offers variety of courses in transportation. To mention a few, it offers a specialized degree in Transport Economics or Logistics.

The BCom degree with specialization in Transport Economics or Logistician is designed to furnish transport economists, transport managers and logisticians with the specialized knowledge and skills. These is needed to make a significant and valuable contribution to the solution of transport problems in order to meet the needs of users at the lowest possible cost and with the least negative side effect for the community.

- The B-Com with specialization in Transport Economics:

A three-year degree, which comprises of 32 modules with duration of six months each has allot of career opportunities. On the first level, the student will acquire a basic knowledge of Business Management, Economics and Accounting, which serves as a basis for studies in Transport Economics. A qualification in this specialized field is suitable for a career in road, rail and sea transport, both in the public and private sector. Transport managers, logisticians and transport economists are employed by the state enterprise (e.g. Spoornet and South African Airways), as well as by private mining, agriculture, manufacturing and commercial groups.

Various large companies operate their own fleet and need transport experts. National, provincial and local transport authorities employ experts in the area of passenger and goods transport or appoint consultants. Employment opportunities also exist in related areas, such as freight forwarding.

Specialization in Transport Economics or Logistics starts on the second level and continues on third level where a wide variety of transport and logistics related modules form part of the studies. Related subjects such as Cost Accounting and Quantitative Techniques supplement these. You can also structure your degree to include other related subjects that interest you such as Accounting, Business Management or Economics.

The compulsory Transport Economics modules can be combined with the remaining modules from Transport Economics or Logistics or with modules from any of the other major subjects in the faculty of Economics and Management Science, namely Accounting, Auditing, Business Management, computer Science, Economics, Industrial Psychology, Quantitative Management, Statistics and Information system. Any of these subjects can also serve as a second major for the specialized degree if the required number and combination of modules are completed as part of your studies (University of South Africa, 1999).

- B-Com with specialized Logistics.

The degree is also offered on a minimum of three years and comprised of 32 modules. This specialized degree equip students with the basic principles and practical skills of logistics that will empower them to ensure the availability of products and services in the right quantities where and when they are needed at the lowest total costs.

6.2 Personnel

The transport sector is one of the major employers. There are recognized shortages of qualified professional and artisans, and management skills are particularly in short

supply. In the public sector, shortages of qualified personnel are often directly attributable to low salaries. In contrast, there is a general excess of unskilled staff. Substantial changes in attitudes and awareness will be required in the public service. The enterprise sector will also require new skill in management, financial control, planning and human resources, particularly were states companies commercialized.

There are substantial gaps in the current transportation system. These gaps have come into sharp focus as a result of the disjunction between historical under investment in the skills- base of the majority of South African citizens and the new capacity demands implicit in a radically re-focused set of national priorities. New transport goals are integral component of this re-focusing, giving rise to new set of skills requirements.

The public education system will have to be improved in order to achieve any successful long-term economic transformation. The problem of redundant staff is another key issue, donor assistance in designing and funding programs for retraining, placement and compensation is often a pre-requisite for successful restructuring. The education and training institution will need to become more adaptable in order to response rapidly to changing needs.

The training of personnel and upgrading of their skills to prepare for emerging transportation and logistic management concepts is absolutely essential for maintaining short and long range activities. Courses should be developed to assist transportation professional with top management potential in developing their skills and knowledge base.

Other skill levels receive introductory and upgrade training in their particular fields of specialization. With focus on improving technical and managerial skills to maximize efficiency and maintain needed resources. Personnel should be kept abreast of the fast changes taking place in the private and public sector as far as transportation is concerned.

The major shortfalls in manpower are civil engineers and technicians. This is significant problem for road authorities in all members' states because of the low level of salaries in the public sector. Furthermore, universities and technical colleges are not producing graduates with the managerial, engineering and technical know-how and skills needed.

Various problems will need to be addressed during the restructuring process. Ministries are likely to be converted into small agencies, and road works contracted out to the private sector. This could lead to considerable retrenchment of the workforce and thus other employment will need to be found.

The staff retained by road agencies will need to adopt a different approach towards the public and to acquire planning and communication skills for the purpose. Redundant staff will need to take up new roles as entrepreneurs by the small-scale enterprises. Increasingly, road construction and maintenance will be contracted out to small entrepreneurs who will need requisite skills to become competitive.

The initial step of the human resources strategy is to determine the additional skills required enabling redundant workers to establish themselves as entrepreneurs or to employ in contracting work. Subsequently, it will be necessary to provide training programs to acquire the skills required as quickly as possible.

6.3 Governments and Private Companies

A large amount of information and abundant practical assistance in the field of intermodal and international trade is avoidable from a wide variety of local, state and national governments as well as local private industry agencies.

At the local and state level, there are many export assistance agencies, some of which are no further away than the local telephone directory. They offer expert assistance in identifying and dealing with foreign contracts and new business opportunities. Much of their expertise is developed from the practical experience of those who staff and direct these offices.

At the national level, there are several agencies, including the Department of Transport, Dept of Commerce and Small Business Administrations that are especially helpful.

The Small business administration promotes small business participants in international trade through loan guarantees and counseling assistance. The guaranty loan program for example, provides financial assistance to exporters by guaranteeing commercial bank loans to finance labor, material, and services needed to manufacture or wholesales products, and to help develop foreign markets (Southern African Transport Communications Commission, 1998).

Governments will have to manage the process of restructuring, and reformed system. The technical skills required for transition, particularly in designing new legal and regulatory frameworks are currently entrusted to specialist. Training of government personnel should be directed towards managing the transition and the long-term needs of administering the new institutions.

In the future, government will concentrate on policy making in the changed environment where influenced is exercised indirectly through the regulatory and legal framework, taxes and subsidies. This will require a different style of policy analysis and will require the recruitment and further training of economists, financial analysts and lawyers. The new regulatory agencies will require economic, legal and financial specialists to carry out their market management functions. They will also require specialist technical staff appropriate to the sector to deal with matters, such as frequency allocation in telecommunications and safety and environmental control in the maritime sector. The commercial enterprise will have to train and also recruit senior managers and staff in financial control, which is generally weak in many state enterprises.

Restructuring will require the regions training institutions to change their approach. Unlike the old state – owned organizations, commercialized and privatized enterprises are likely to be unwilling to release staff for long periods of training and

thus shorter more specialized courses will be required. There is a general need to improve the quality of management training. The government sector will require training to support the transition to a less interventionist, more policy oriented approach in the short term. There will be a continuing need for training in the regulatory and legal fields.

Many states enterprises have a large number of excess staff. As a commercial or private company cannot carry the burden of unproductive staff, many people are likely to lose their jobs in the restructuring process. Handling redundancies is often a major issue in any restructuring exercise and failure to deal with it properly can cause the whole process to fail.

Compensation is a major element of any redundancy package and should take account of pension, health care and other benefits as well as loss of income. It may also be necessary to design programs to re-train staff and assist them in obtaining jobs, possibly in other private companies in the same sector. The cost of redundancy packages can be considerable. It may prove necessary to seek donor assistance to fund them as part of the restructuring program.

CHAPTER 7

CONCLUSION

To conclude, it is worthwhile mentioning that to understand the future of intermodalism, it might be a good idea to check the rearview mirror. Less than a decade after containerization began to develop, manned space was front-page news, and computers were big, expensive and finicky and colour television was a luxury. Freight transportation was relatively slow, often unreliable and heavily regulated. Logistic was a term reserved for the military.

Today as we look around, we can say that intermodalism when compared to the evolutionary process of the individual modes is a teenager, struggling to find its place among its peers in the world of technologies, business and social status.

In the future, intermodalism will surely be a major player in national and global commerce. By then the pace of change will have increased even more and the actual shape of the business and business logistics will be hard to imagine. Technologies that allow vehicles to move faster, smarter and more efficiently will provide customers with the goods they need to remain competitive and hopefully improved the quality of life. At the same time, the industry will have to contend with global

congestion, pollution of the environment, and a host of other challenges still waiting in the wings.

The author has learned that intermodalism can be considered as a problem, challenge, or tool depending on one's perspective. It is a problem if one considers the difficulties of transferring goods between vehicles operating in different mediums, such as between ocean going vessels and railcars. Not only are the vehicles shaped differently with different systems and equipment for loading and unloading, but also the goods are subjected to various stresses from the unique movement conditions in each mode. In turn, there are problems with different conditions.

The challenge of intermodalism is to keep the goods moving by reducing delays when a transfer is made from one mode of transport to another. If the movements of goods is stalled for any length of time during transport or at modal inter change points, it is warehousing, not intermodality. The objective of an intermodal movement is to maintain continuous flow throughout the entire transportation and transfer process.

Intermodalism is a tool of inestimable value. It has given shippers greater choices of routing, especially in times when markets change quickly. Illia (1987, p.96) on his work, he concluded that the new era in transportation is the era of lower costs and greater choices. It is for the reason that the author support this view because intermodalism has lowered the costs by enabling shippers to select carrier combinations and vehicles that offer the most efficient and perhaps less expensive service. It has forced carriers especially in a deregulated environment to lower cost through rates and improved services in order to remain competitive.

This is nothing new. We have turned to realize that the concept of intermodality existed even before recorded history. Early civilization based along waterways probably used logs to float goods across rivers. Where the land-water boundary causes a change in the means and methods of locomotion an intermodal exchange must take place if goods are to move across the boundary.

Today the land-water boundary remains the scene of great intermodal activity, constantly requiring intermodal improvement. At the same time, land based intermodality such as truck-to-rail and truck-to-air is gaining importance, although at different rates of growth.

The use of containers compatible with two or more modes is achieved largely through standardization of equipment. To make the flow of containers move more efficiently also requires sophisticated communications. While containers have greatly improved the intermodal transfer of general cargo, containerization and intermodality are not synonymous terms. Many intermodal movements, such as bulk, occur without the benefit of containers, although that could also change in the near future.

Moreover, it is vital to mention that unitization by containerization is here to stay. Containerization will give rise to a greater degree of mechanization and automation, and diminish more and more the human contribution. It is dangerous to nourish the illusion that “dirty” or “hard” jobs will continue to exist and that these qualifications are restricted to some work in the past. Economies to be achieved together with regularity, speed and security will be accompanied by labour forces and new demands. The pressure will come from both sides.

It should also be realized that, concerning the current market demand, only skilled operators would be required. Higher demands will be made on those who have to execute managerial decisions, and the highest on those who have to formulate these requirements. Experts’ knowledge will be needed for improved organization, administration and management. Specialization will allow for working with budgets by which the role of managing directors can be simplified. The fact that less trained workers are available will inevitably reduce the number of men employed. The crew of a 138,000 dwt, tanker as an example kept on 32 + 4 extras on call by unions activity will for that reason tend to arrive at the 15 men really necessary. Time favours economies at every level.

Fewer ports, all fully equipped, will serve the traffic of unitized general cargo. Fewer terminals, airports included will be used. As a result of the development of containers, as Little (1999) predicted that only a few ports could remain in business. This may not sound convincing though the United Kingdom-Australia trade can be quoted in support of this view. However, it will certainly become an expensive mistake to retain most of the existing ports. Human choices to be made in a constantly shrinking world with increasingly interwoven interests will be guided by economic data as others are obscure and unreliable.

Existing and new harbours will be situated in up to now unknown infrastructure allowing for speed in transit which implies much more than speed quayside handling. Of prime importance will be the existence of an efficient communications system and adequate rail and road facilities with inland waterways where available. Ports will adapt to the needs of the areas, which they have to serve. A nearby industrial hinterland or concentration is no longer essential. Distance industrial areas outside today's cities will be a prerequisite.

7.1 RECOMMENDATIONS

- The development of a well-integrated intermodal transport system will require government action on two fronts. Firstly, the public policy framework should ensure that taxes and subsidies do not favour one mode at the expense of the other, that each mode operates as effectively as possible, and that the legal and regulatory framework facilitates intermodal and international transport. Secondly, planning of infrastructure projects should take account of their impact on the modes and should ensure that appropriate facilities for modal interchange are provided.

- At the same time, greater recognition should be devoted to institutional issues, including public awareness and educational programs, development of public/private programs and projects and a better understanding of who the

customer is and what the customer expects in terms of freight transportation and intermodal service.

- Education and training at all levels is an important tool in the efficiency of the system. Training must be promoted among the potential users of the system.

- South Africa, as an example should be able to expand training and educational programs as integral parts of the industry it will eventually serve. It should have programs that require students to spend 2 to 12 months as an apprentice with one or more companies or governments agencies. These apprenticeship programs should place students in different locations, including operations, marketing and sales, and administration. Other programs should require students over the course of their academic experience to spend one or two days a week with a participating company or agency, and the rest of the week in the classroom.

- A better sense and appreciation of the total systems approach in freight transportation, especially intermodalism, is emerging. To cope with these new realities, planners have to develop long range goals capable of better managing the risks involved with intermodal freight transport system. To remain competitive, planners must accurately gauge the conditions in the market place and cultivate the political and social will to realize their goals.

- Intermodalism greatest challenge is awareness and making its capabilities and benefits better known. Longtime transportation practices reinforces by worldwide regional traditions, customs, limitations of financial and educational resources, continue to widen the gab between those that use intermodalism to its fullest potential and those that remain tied to less productive transportation systems. To make the change and correct the imbalance, a concerted effort must be made to increase the awareness of what intermodalism is and what it has to offer. This knowledge is the means to link the transportation chain efficiently. Market forces increasingly highlight the advantages of intermodalism, while competitiveness increasingly depends on intermodalism.

- This sense of awareness requires a higher understanding and knowledge of all the components of the intermodal process. The process is based on how to best use new and emerging technologies including both the “hardware” and “software”. The way these technologies meet customer needs in the market place determines how changing government policies and regulations can enhance or hinder intermodal movements. Although there is no simple answer to these challenges, one thing is clear: failure to keep up with these changes makes it more difficult to remain competitive.

- More advanced handling equipment need to be installed to improve communication system although there is a huge capital investment involved. New generation vessel carrying more containers and travelling at higher speeds requires many improvements to safeguard their expensive existence.

- For the Freight Forwarders, it should be recommended that a similar situation which has occurred in Durban Container Terminal should it happen again else where:

- Keep anxious and often cantankerous on clients advised of the latest position,

- Make alternative arrangements where possible,

- Find road hauliers who are available - one of them is already booked to the extent that he has four container loads for every vehicle,

- Keep track of the cargo movement

- Try to make arrangements for after hour delivery – when containers are delayed either in the Durban Container Terminal or at City Deep

- Keep in touch with Portnet and Spoornet Management in order to keep abreast of developments. To all of this one can add the misfortune of a customs stop or the

container having to go through the scanner, which I am reliably advised adds a further six days delay to the process.

Together we can make it. With the advent of information technology, it has made containers tracking more efficient and effective and the use of telecommunications, computers, and the Internet are available.

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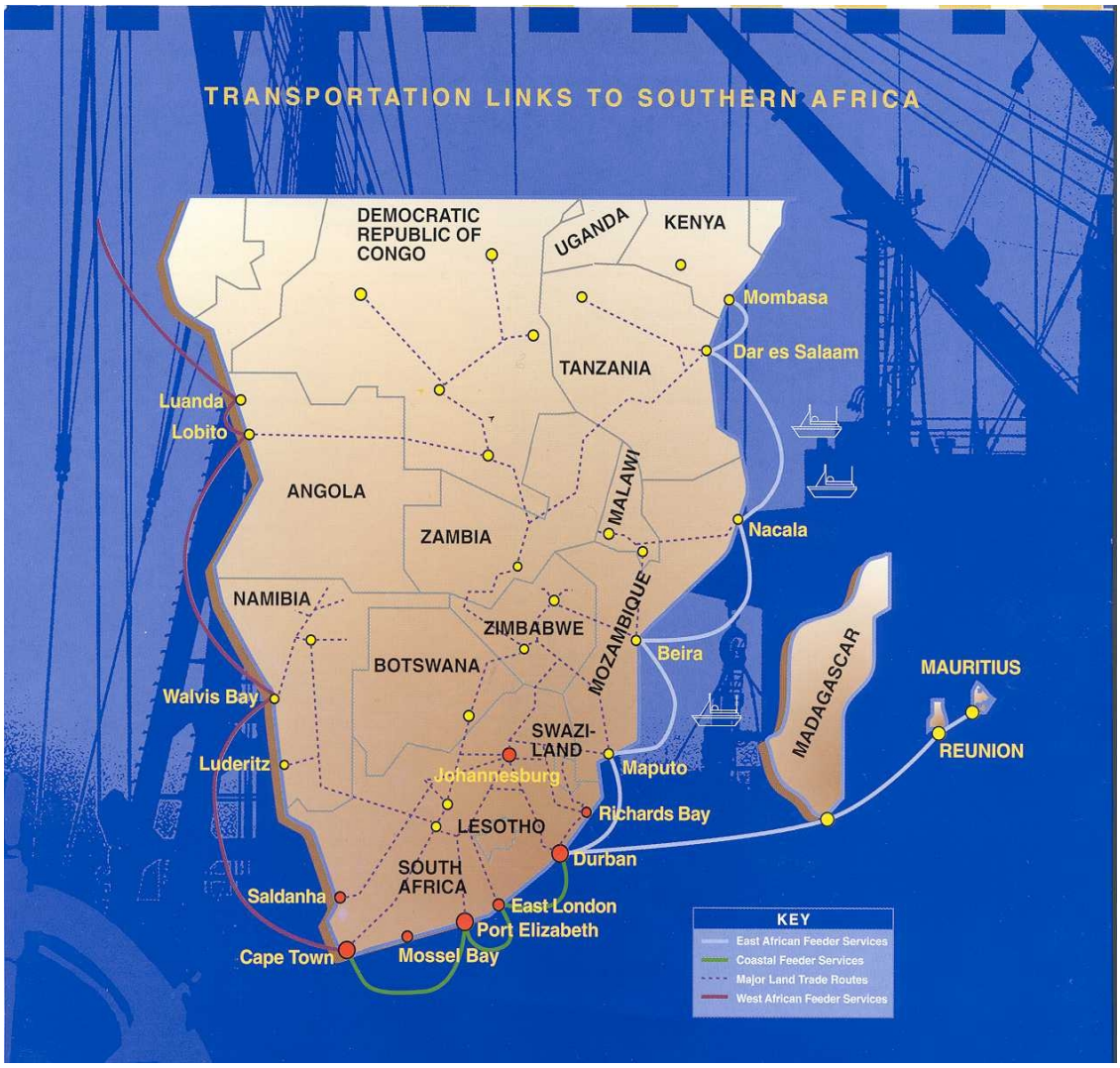
APPENDIX 1



Portnet is South Africa's port authority, controlling and managing seven ports on the southern African coast. These ports are, Richards Bay, Durban, East London, Port Elizabeth, Mossel Bay, Cape Town and Saldana**.**

This puts Portnet in the unique position of being able to offer efficient service to port users throughout southern Africa. Unlike most European ports, each South African port has a natural hinterland with a define market. This determines, to a large extent, the nature and types of cargo handled at each port, which in turn dictates the type of facilities each port provides. Each port operates and develops its own specialized service.

APPENDIX 2

QUESTIONNAIRE FORM

For

ROAD HAULIERS

There are 20 items in this questionnaire. They are statements to be considered in the context of the road hauliers. The information received from this survey will be used to improve the quality of drivers and to develop the standard of training.

Think about how well the statement describe the drivers.

Please indicate your answers by circling one of the following statements:

SD - Strongly agree with the statement

D - Disagree with the statement

N - Neither agrees nor disagrees with the statement or not sure

A - Agree with the statement

SA - Strongly agree with the statement

If you change your mind about a response, cross out the old answer and circle the new choice

Please note the following:

To ensure confidentiality and to encourage your honest participation and free thoughtful thinking, it is not required for you to identify yourself. This questionnaire will be destroyed after the survey.

If you want to know about the outcome of this survey, please tick the appropriate box below

Yes	no

EVALUATION FORM FOR ROAD HAULIERS

1. The drivers are helpful and cooperative.	SD	D	N	A	SA
2. The drivers are updated with the current road transport legislation.	SD	D	N	A	SA
3. The drivers are able to cope with constant pressure on the job.	SD	D	N	A	SA
4. I am happy with the drivers.	SD	D	N	A	SA
5. There is much to be learned from the drivers.	SD	D	N	A	SA
6. The drivers involved in theft need to be expelled.	SD	D	N	A	SA
7. The drivers are pleasant and friendly to the staff.	SD	D	N	A	SA
8. The drivers know how to treat the customers.	SD	D	N	A	SA
9. Drivers involved in theft need to be punished.	SD	D	N	A	SA
10.1 feel I could rely on the drivers.	SD	D	N	A -	SA

11. There are many ignorant, inefficient, badly behave drivers.	SD	D	N	A	SA
12. The drivers can meet the deadlines.	SD	D	N	A	SA
13. Strict discipline is needed to control the drivers.	SD	D	N	A	SA
14.We need to train drivers about satellite tracking.	SD	D	N	A	SA
1 S.The drivers participate in decision-making concerning administrative policies and procedures.	SD	D	N	A	SA
16. The drivers show little interest in what is happening in the company.	SD	D	N	A	SA
17. The drivers are not followed; they still get the work done.	SD	D	N	A	SA
18. The drivers are not dependent to senior members of the staff to perform their duties.	SD	D	N	A	SA
19.The drivers know who the customer is.	SD	D	N	A	SA
20.The drivers can prioritize delivery of cargo under stressful conditions and emergencies.	SD	D	N	A	SA

21. If you wish to make further comments about improving the standard of drivers, please write your comments below:

QUETIONNAIRE FORM
FOR
TERMINAL OPERATORS

There are 12 items in this questionnaire. The present questionnaire is been designed to get the feedback from the terminal operators and management. The information received from this survey will be used to improve the quality of port operators and develop the standard of training.

To ensure confidentiality, you need not identify yourself, but please answer each question honestly and thoughtful.

Read careful each question and make a circle on the alternative which best match your opinion or thought. You have to choose one of the following keys:

U - Unsatisfactory

N - Needs improvements

G - Good

E - Excellent

If you change your mind about a response, cross out the old answer and circle the new choice.

If you want to know about the outcome of this survey, please tick appropriate box below.

Yes	No

EVALUATION FO FOR TERMINAL OPERATORS.

1. Port privatization will create unemployment.	U	N	G	E
2. Information technology is a threat.	U	N	G	E
3. Terminal operators need computer training.	U	N	G	E
4. Port privatization boost profits and improves efficiency.	U	N	G	E
6. The stevedores participate in decision-making regarding administration policies and procedures.	U	N	G	E
6. Port operators are able to cope with constant pressure on the job.	U	N	G	E
7. Strikes are effective tool to be used when sending message to port management.	U	N	G	E
8. The stevedores are dependent to senior members of the staff to perform their duties.	U	N	G	E
9. The stevedores are not followed and still get the job done.	U	N	G	E
10. There are oppoAtunities for personal development	U	N	G	E
11. The stevedores are able to work under stressful conditions.	U	N	G	E
12. Education and training will help reduce crises between the staff and employees.	U	N	G	E

QUESTIONNAIRE FORM

FOR

CUSTOMERS

There are 15 items in this questionnaire. The questionnaire is been designed to get the feedback from customers. To ensure confidentiality, you need not identify yourself, but please answer each question honestly and thoughtfully.

Read carefully each question and make a circle on the alternative, which best match your opinion or thought. You have to choose one of the following keys:

U - Unsatisfactorily

N - Needs improving

G - Good

E - Excellent

If you change your mind about a response, cross out the old answer and circle the new choice.

EVALUATION FORM FOR CUSTOMERS

1. The rail freight price is	U	N	G	E
2. The operation of ports as a consortium is	U	N	G	E
3. The port general service is	U	N	G	E
4. The road general service is	U	N	G	E
5. South African ports are effective.	U	N	G	E
6. A vessel of country to enter its own port is given priority of berth over national flag	U	N	G	E
7. The transit time outside the port is	U	N	G	E
8. Shippers are receiving value-added service	U	N	G	E
9. The road freight price is	U	N	G	E
10. Transport carriers are providing a service of highest quality.	U	N	G	E
11. Customers are willing to pay higher prices for urgent delivery	U	N	G	E
12. The transit time at the port is	U	N	G	E
13. A vessel of country to enter its own port is given lower port tariffs over other national flags	U	N	G	E
14. The rail general service is	U	N	G	E
15. The current level of service at the port is	U	N	G	E

16. If you need to make further comments, please write them below:

APPENDIX 3

A three year course offered by The Department of Transport Economics at Rand Afrikaans University

First year:

CERIFICATE IN ROAND TRANSPORT

COMMON SUBJECTS

101	Legislation (i)
102	Industrial relations management (i)
103	Business & transport economics
104	Health, safety & security
105	Human resource management

SPECIALIZED SUBJECTS

FREIGHT	PASSENGER
106 Cost & tendering	116 Costing & tendering
107 Road freight operation management	117 Road pass. Operation management

108 Technical management	118 Routing & scheduling
109 Maintenance management	119 Maintenance management
110 Marketing management	120 Marketing management

Second year:

ADVANCED CERTIFICATE IN ROAD TRANSPORT

COMMON SUBJECTS

201	Legislation (ii)
202	Industrial relations management (ii)
203	General management
204	Contractual arrangements & negotiations
205	Financial management (i)
206	Motor accident legislation

SPECIALIZED SUBJECTS

FREIGHT	PASSENGERS
207 Costing and tendering in freight transport	217 Costing & tendering in passenger transport (i)
208 Vehicle specification	218 Routing & scheduling

209 Logistics management	219 Human resource management

Third year:

DIPLOMA IN ROAD TRANSPORT

COMMON SUBJECTS

301	Transport policy and regulations
302	Industrial relations management (ii)
303	Strategic management
304	Contractual arrangements & negotiations (ii)
305	Financial management (ii)

SPECIALIZED SUBJECTS

FREIGHT	PASSENGER
306 Specialized freight transport	316 Costing & tendering in passenger transport (ii)