

工學碩士 學位論文

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**An analysis of the Competitive Advantage
on South African Ports**

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2004年 8月

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Abstract

In the last decades we have witnessed profound changes in the maritime transport, which have modified the balance between capital and labor at seaports. Ports are now increasingly becoming capital-intensive industries, while in the past they used to be labor-intensive.

This paper looks at what competitive strategies can be implemented by South African Port Operations while they are faced with fierce competition from the neighboring Ports, Port of Maputo and Namport in Namibia. The development of bigger vessels demands major investments in the terminals to meet the ever growing competition in the Maritime industry. Port choice key determinants, port efficiency, hinterland connections and location play an important role in port choice of call by shipping lines.

Key words: Competitive advantage, Port Competitiveness, Port choice determinants.

1. INTRODUCTION

Ports are one of the key components of the logistics chain and, this is why the desire to cut costs in the sector is becoming a mainstream component of most transport policy reforms. Today Port competition is certainly one of the most challenging phenomena in the ongoing process of globalization, and ports can have a catalytic impact, but then only if they become cost-effective logistics centers in a world driven by global economics.

Globalization has been one of the buzzwords in the 1990's and continues to be a prevalent expression in the new millennium. Forces of globalization have increased competition just as trade flows have increased causing more competitors to vie for slices of economic pie. Ports remain the primary gateway of goods flowing across the oceans; hence the efficiency of ports is central to the economic growth and prosperity of the regions that extend beyond the ports themselves.

In a competitive port environment port operators and policy makers need to understand the key factors influencing port user's port choice and their decision –making process to stay ahead. It is important for port operators and policy makers to understand the key factors influencing the routing of cargoes or the factors that major port users consider important in choosing their ports of call and how their decisions are made.

Growing inter-port competition in particular has forced respective port authorities to develop competitive advantages to attract and maintain their port customers. This is relevant in the case of South African Ports as they are facing fierce competition from the SADC neighboring ports especially Namport and Port of Maputo.

The objective of this study is to examine the competitiveness of South African Ports in the changing market of containerization. The paper will also explore key determinants of port of choice and performance in a competitive environment. The scope of the work will be limited to the Port of Cape Town and Durban. Port of Maputo and Namport will be highlighted, as they are close competitors to the South African Ports.

The research design will address the situation of the port of Cape Town and Durban; compare some infrastructure developments and performance to that of Namport and Maputo and also conduct strengths, weaknesses, opportunities, threats(SOWT) analysis.

2. LITERATURE REVIEW

Ports are operating in a competitive environment. Competitiveness should be equated with productivity, it relates to measures that firms, industries, regions and governments cautiously adopt to foster, maintain and increase productivity on a sustainable basis. It depends on the continual upgrading of human resources, capital and natural resources. It relates to induced technological change and innovation. It applies to the changing organizational structure and behavior of firms, industry and government, both locally and nationally. It refers to creating and strengthening inter-and intra- industry and international linkages. (R. Shyan Khemani, Fostering Competitiveness)

Compared with other industries or service activities, ports, especially those in many developing countries, are less used to competition. In the past each port used to have its own group of clients whose activities were just within the proximity of the port area and its hinterland. There was no need to worry about the market since the cargo could not be easily transferred elsewhere nor was there any need to be concerned with the working of other ports since this was unlikely to affect one.

Today, ports find themselves suddenly in the same competitive market, hunting cargoes in the common hinterland. Competitors come from near and from far. Ports have to take competition very seriously since it can alter their situation. Prof Wilky Winkelmanns cited the final aim of port

competition as not just getting more traffic, more tonnage, etc but achieving a sustainable degree of generating added values in relation to the input and effort. Consequently, it becomes necessary to understand that the more effective port competition is, the more efficient port management is needed. The ultimate challenge is to manage by making port competitiveness more effective and port competition more efficient

Eddy Somers and Capt. André De Wilde see a port facing three categories of competition:

1. Inter-port competition
2. Within –port competition
3. Intermodal transport competition

2.1 Inter-port competition

The experience of developed countries has shown that if one or all the following factors change, inter-port competition emerges and develops very rapidly.

The competition is normally focused on costs and/or quality of service. The following are the factors, which would most probably bring inter-port competition to the port.

Inland transport system

Each port has its own market in which it enjoys a particular geographic advantage. When the inland transport system is not developed there might

be little inter-port competition. However, if the inland transport system is improved, other ports may be in a position to interfere and capture part of the market. Consequently, inland transport system improvement will bring ports into competition.

Freight forwarder/multimodal transporter operators

Today transportation organizations require a very specialized expertise. Freight forwarders and multimodal transport operators play a decisive role in today's international transport evolution, especially in the revolutionary door-to-door intermodal transportation. They are transport distribution specialists and greatly influence port activities and inter-port competition in the following ways:

- Freight forwarders and MTO's often have their own operation and information networks in the region. Through such networks port users are informed much better and quicker about every technical, commercial, operational or social difference between the ports. This was not the case when the shippers had to organize their cargo transport themselves. With a good information network, port users compare different ports constantly, making full use of every advantage and pushing ports into fierce competition.
- The use of Freight forwarders and MTO's has led to a loss of loyalty to specific ports on the part of the shippers and consignees. Shippers and consignees are now represented by a small number of freight

forwarders and MTO's. Shipper's loyalty is no longer a competitive factor.

- A switch of route from one port to another is much easier for transport specialists like freight forwarders and MTO's than for shippers and consignees, since the former are better acquainted with sea and land transporters, cargo handling and storage companies, customs offices and other units on the new transport chain. As consolidators of small consignments and representatives of shippers, they are relatively strong, which makes the modification of the transport route easier. With the help of freight forwarders and transporters, the shipping lines can now change the port of call with much less difficulty.

Transshipment

The big ocean shipping lines have taken an advantage of the flexibility and scope of organizing shipping services to regions of heavy traffic. Transport networks, assembled around transshipment ports where different trade routes interconnect, have replaced the traditional port-to-port routes. Ports are now competing for transshipment cargo, which appears to be increasing because of bigger vessels.

Political and economic barriers

Neighboring ports located in different countries may enter into competition when the political and economic barriers once preventing the

free movement of cargo are swept away. Consequently, ports can be confronted with new markets on the one hand, but also with new competitors on the other.

Within-port competition

Competition within the port can and does play an important role with respect to certain port services. Competition between the operators or providers of facilities within the same port can generally increase port efficiency and improve services. Competition in the provision of port facilities and services is determined, amongst other things, by

- The existence of certain facilities
- The existence of spare capacity
- Their location and
- The tariff charged

2.2 Intermodal transport competition

According to (Dr Jean-Paul Rodrigue and Dr Claude Comtis), Intermodalism is enabling the economies of scale within a transportation system where modes are used in a productive manner. This has been brought about in part by technology. Techniques for transferring freight from one mode to another have facilitated intermodal transfers. While handling, technology has influenced the development of intermodalism; the most important factors have been the changes in the public policy and

developments in information technology. Companies were no longer prohibited from owning across modal types, and there thus developed a strong impetus towards intermodal competition.

Customers could purchase the services to ship their products from door to door, without having to concern themselves of modal barriers. The most important feature of intermodalism is the provision of a service with one ticket (passengers) or one bill of lading (for freight). This has necessitated a revolution in organization and information control. At the heart of modern intermodalism are data handling, processing and distribution systems that are essential to ensure the safe, reliable and cost effective control of freight. Electrical Data Interchange (EDI) is an evolving technology that is helping companies and government agencies (customs documentation) cope with an increasingly complex global transport system.

Dr Eddy Somers and Capt André De Wilde, in their study of Port Marketing, a port competitor is not always another port but can be heavily influenced by competition between different modes of transport. World air cargo for example is taking more and more high valued goods away from traditional sea transport. Also land transport, both rail and road transport, can seriously affect port activities. One might think that in intermodal transport competition, ports are merely indirectly involved and that competing with other modes of transport is the business of shipping companies. It is true that shipping companies are in the front line of

competition, yet ports can be prosperous only with growing maritime transport. Faced with intermodal transport competition, ports should definitely become more active.

Dominic J Taddeo CEO, Port of Montreal alludes in the role of ports in intermodalism. The transfer of cargo among various modes of transport has become an integral part of maritime transportation industry. An efficient and modern intermodal system is crucial to any ports success. The secret to this success is to make the transfer between ship, rail and truck as invisible or seamless as possible. It appears reasonable to study intermodal transportation as a two-way improvement of an economic system.

On the other hand, it improves current operational functions of the system. On the other hand, it expands those functions. Both functions are achieved by consolidating different transportation systems into seamless transportation network that utilizes the comparative advantages of different transportation modes. Industry executives taken by surprise with the movement to intermodal transportation companies are clearly behind times. The intermodal movement is happening. Former CAB chairman Alfred E. Khan described the situation succinctly when he said, “you can’t unscramble the eggs”.

2.3 Dimensions of competition

1) Scope of competition

The vast majority of world trade is sea borne, and seaports remain the primary trade gateways of the world. The governing and the operation of seaports is therefore an important trade policy of the government, which the port represents, whether or not it is recognized as such. The activities that a port pursues, the economic development it espouses, the principles it operates by and the authority to which it answers: all these are part of a trade policy.

Trade policy is defined as any policy pursued by the federal, state or local government in order to affect the development of trade. Port competition can and does have serious trade implications. It affects the efficiency and cost of importing and exporting goods. Intensity of competition can vary from monopolization (where no competition exists) to intense, destructive competition.

Monopolization has a negative effect of hampering innovation and reducing efficiency. Excessive competition on the other hand, can lead to inefficiencies due to a misallocation of resources and a situation where superfluous infrastructure exists, especially in situations where high capital investments are necessary, such as in intermodal infrastructure. The existence of one type to another is due to factors such as geography, tax

structures, and the existence of regulatory body and concepts of political economy.

Port competition can exist in several geographic dimensions: international vs. domestic, and regional vs. local. In international dimension, ports in different countries can compete to handle the same business, because they serve similar hinterlands. A local example is that between Cape Town and Namport. In the domestic dimension, ports within the same country compete with each other for business. This can occur between ports over geographic distance for example Amsterdam and Rotterdam. Unlike European ports, each South African port has a natural hinterland with a defined market; this determines the nature and types of cargo handled at each port. The effect of various types of competition is a warning to refrain from myopic decisions regarding port policy.

The increase in globalization has made more than closest neighbor a competitor. In fact, in some cases a neighbor may turn out to be a friend. In regional competition, ports within a region that serve similar hinterlands and/or functions compete for the same cargoes and finally there is local competition, a primary domestic phenomenon that occurs when ports that are close together compete with each other for the same business.

2) The tools of competition

The demands for port comes from shippers and carriers, who choose which ports they will use based on a number of criteria such as cargo compatibility, access to hinterland, costs, security. Labor productivity, customs, equipment availability and the presence of foreign trade zones. The two most important changes affecting the ports are the increasing temporal and spatial demands of the expanding intermodal freight transportation market, and the increasing number of complexity of environmental regulations that pertain to ports. Therefore, the two key areas of competition will be the ability of ports to attract business by seamlessly handling intermodal freight movements and meeting environmental regulations in a cost efficient and non-burdensome manner. In order to be competitive in today's environment, a port that wishes to be a logistics hub must offer these services, and offer them at a price low enough to retain demand for those services. Because port services are capital intensive, it is easy to assume that large economies of scale must be necessary to operate competitively, and that only only hub ports enjoy these economies of scale.

It should be noted that competition between ports is far from perfect in an economic sense. There are barriers to entry, such as the intense capital requirements, and there are some ports that enjoy monopolistic situations, and therefore face little competition. These factors limit the speed and effectiveness of competitive forces, producing, in effect inelastic supply, at

least in the short term. Over the long term, this supply becomes more elastic as ports can eventually adjust their ability to compete.

3) The effects of competition

Competition can be more intense between ports that already have made the necessary capital investments in shore side facilities and that serve similar trades and have overlapping hinterlands. However, no two ports are identical and each port offers its own unique mix of services and assets. This means that competition between ports occurs not on the basis of price alone, but on the basis of a port's complete offerings.

A carrier may not choose to switch its business from one port to another on the basis of price alone, for instance, if one port offers better hinterland access or a better operating environment. The competition between domestic ports may also raise issues of who is benefiting and paying from this competition. Since ports are a link although a major one in the transport chain, producers and consumers of services or products shipped through these ports enjoy the real benefits of port efficiency because of low cost trade. More often than not, these producers and consumers live far away from the port and even in other countries. Increasing port's competitiveness by public support (i.e. with taxes) means that local people pay it for, but others enjoy the benefits of port's competitiveness. The locals may enjoy the job and economic benefit of the port, but those benefits must be carefully weighed against their direct and indirect costs to the local region, as well as the opportunity cost of spending that support elsewhere. On the

national level, competition between domestic ports is of little value, and if it occurs at the cost of financial operating soundness, it is destructive. A national port strategy plan may be a useful tool for limiting or eliminating destructive competition between domestic ports. Although some of these issues also apply to competition between ports of different countries, international port competition also gives rise to unique issues. For instance, although it may not be important to a certain country if a shipping line switches from one port to another within the country, but it may become important if the shipping lines goes to another country.

If a port loses business to ports from other countries because of lack of adhering to customer requirements, then that port needs to take action to enhance those requirements. The region that is affected by the growth of a port in a nearby country may in fact need to create or build a competitive advantage by which it may survive. This is evident to South African ports where Namport and Maputo are being developed, and they both have road linkages to the Gauteng region, which is the economic engine of South Africa.

2.4 Building competitive advantage

1) Key dimensions

A competitive advantage exists when a firm is able to deliver the same benefits as competitors but at a lower cost (cost advantage), or deliver

benefits that exceed those of competing products or services (differentiation). (Michael E. Porter)

Competitive advantage could arise from some demonstrably superior offering or it could be achieved simply through the competitive weakness of other organizations. However, it is not wise to rely on your competitors being incompetent for all time. Positive advantages derive from organizations specific capabilities, but customers in terms of perceived value and satisfaction consider an offering. When sustained over a long period these advantages lead to repeat business and profit.

According to Dennis Adcock, from a customer perspective there are three key dimensions of competitive advantage.

The product/service itself: judged by its quality and by how acceptable it seems to be with regards to the needs and wants of a customer. In addition to the quality aspects this could include better service, continuous service improvement or more service innovation.

The perceived value: The value derives from the benefits expected less the cost. This cost will include such issues as the relative price of an offering but it will be modified by the perceived cost of obtaining and cost of ownership. The way components of value are assessed and compared could vary from one customer to another. However, it is often possible to

delight customers by exceeding their expectations. The problem with this is that those purchasers will have much higher expectations in the future.

The convenience of obtaining a product/service: in terms of its availability and the support that is offered to increase accessibility

There is a fourth issue that follows from the availability, which is the degree of influence that a supplier might achieve over a customer to restrict choice to one or a limited number of alternative offerings. The creation of a near monopoly situation by manipulating the market could lead to a situation where customers have little choice in the matter (Kotler, 1986).

2) Principles of competitive advantage

Competitive Advantage grows fundamentally out of improvement, innovation and change: Innovation in strategic terms includes not only new technologies but also new methods or ways of doing things, that sometimes appear quite mundane. Innovation can be manifested in a new product design, a new production process, a new approach to marketing or a new way of training or organizing. It involves any activity in the value chain. In international markets, innovations that yield competitive advantage anticipate not only domestic but foreign needs.

Competitive Advantage the entire value system: The value system is the entire array of activities involved in a product's creation and use, encompassing the value chains of the firm, suppliers, channels and buyers. Close and ongoing interchange with suppliers and channels is integral to the

process of creating and sustaining advantage. Competitive advantage frequently comes from perceiving new ways to configure and manage the entire value system. Firms restructure or integrate their activities with suppliers, modify the strategies of channels and integrate activities with buyers. The importance of the entire value system to competitive advantage is manifested by the prevalence of clustering.

Competitive Advantage is sustained only through relentless improvement: Advantage once gained is only sustained by a continual search for different and better ways of doing things and through ongoing modifications in the firm behavior within an overall strategic context. The firm operating with a differentiation strategy, for example must find new ways to add to its differentiation or improve its effectiveness in differentiating in old ways.

Sustaining advantage demands that its sources be upgraded: More durable competitive advantages usually depend on possessing advanced human resources and internal technical capability. They demand ongoing investment in specialized skills and assets, as well as continuous change. For these reasons, differentiation strategies involving high product quality, advanced features, high levels of service and a stream of new product innovations are usually more sustainable than cost based strategies; even those resting on economies of scale are large initial capital investments.

Sustaining advantage ultimately requires a global approach to strategy: A global strategy amongst other things involves locating activities in other countries in order to capture local advantages and to facilitate local market

penetration. It also means coordinating and integrating activities on a worldwide basis in order to gain economies of scale or learning, enjoy the benefits of a consistent brand reputation and serve international buyers.

Sustainable competitive advantage will keep the firm in a competing position and stay ahead of the competition by integrated services, resources upgrading, information technology and being visible and innovative in the total supply or value creating chain. In a port competitive environment, port authorities, port operators and policy makers need to understand the key factors influencing the routing of cargo or the factors that major port users consider important in choosing their ports of call and how their decisions are made. Growing inter-port competition has forced respective port authorities to develop competitive strategies to attract and maintain their port customers. This is especially pertinent in the case of South African ports as they are facing competition from the neighboring ports, Port of Maputo and Namport in Namibia.

2.5 Key determinants of port choice

Dr Jose Tongzon, University of Singapore (2002) studied port choice determinants in a competitive environment. The following factors are assumed to have a significant impact on the choice of ports:

- Frequency of ships visits
- Port efficiency

- Adequacy of port infrastructure
- Location
- Competitive port charges
- Quick response to port user's needs and
- Port's reputation for cargo damage

Frequency of ship visits

Greater frequency of ship visits translates into more choices for cargo owners in scheduling their shipments and selecting a shipping service for the transportation of their cargo, and hence resulting in more competitive carrier costs. Further, greater frequency of ship calls allows for greater flexibility and lower transit time. Thus, the more ship visits a port has, the more attractive it is to shippers.

Port efficiency

Although frequency of ship calls is a significant factor in port choice, ports can also attract shippers due to their high levels of efficiency. Port efficiency often means speed and reliability of port services. In fast paced industries where products must be moved to the markets on time, terminal operators as vital nodes in the logistic chain must be in a position to guarantee shippers a very reliable quick service. Port efficiency can be reflected in freight rates charged by shipping companies, in the turnaround time of ships and cargo dwelling time. The longer the ship stays at the berth, the higher is the cost that a ship will have to pay.

This higher cost can be passed on to shippers in terms of higher freight charges and longer cargo dwelling time. The ability of the shipping lines to pass on the costs to shippers would depend largely on the elasticity of demand and the proportion of total costs attributable to these costs. Tongzon and Ganesalingam (1994) identified several indicators of port efficiency and categorized them into two broad groups; namely:

1. Operational measures: which deals with capital and labor productivity as well as asset utilization.
2. Customer-oriented measures: which includes direct charges, ship's waiting time, minimization of delays in inland transport and reliability.

Shippers are more concerned with indirect costs associated with delays, loss of market/market share, loss of customer confidence and opportunities foregone due to inefficient service, than with port charges. Some port users are actually willing to accept higher port costs in return for superior efficient service.

Adequate infrastructure

Infrastructure in its widest context refers not only to the number of berths, cranes, tugs and terminal area, but also to the quality of cranes, quality of effectiveness of information systems, availability of inter-modal transport such as roads and railways, the approach channel provided and the

preparedness or otherwise of the port management. If the volumes handled far exceed a port's cargo handling capacity, this will lead to congestion and inefficiency, and thus can turn off port users. Furthermore, limited access to current information about shipment arrivals due to lack of adequate information system will slow the documentation process and thus the smooth functioning of a port. Without adequate inter-modal links, shipper cannot easily move the cargo to and from the port, which could lead to congestion, delays and higher costs. Terminal operators, are no longer handling cargo, they are moving the cargo.

Location

The choice of a port is not merely a function of proximate convenience but derives considerable implications as well from the overall transit costs of cargo trafficking. For example, the distance between the port and the shipper's premises has a major impact on inland transportation costs. Tongzon cited Willingdale and Murphy (1984) and Daley and Dalenberg (1991) in their respective surveys that significant improvement in domestic transportation system appeared to have lessened the importance of close geographical proximity between ports and their customers in port choice decisions.

Port charges

There are different types of port charges, which vary between ports in terms of levels and structures depending on the nature and functions of

ports. Port charges are generally levied on the basis of port visits and/or cargoes. Examples of ship-based types include port navigation fees; berth age, berth hire, harbor dues and tonnage while cargo-based types include wharf age and demurrage. Stevedoring and terminal handling charges are levied on cargoes with different rates for different cargoes. Previous studies produced varied findings on the relative importance of port charges as a determinant of port choice, while several subsequent studies by few authors found that some port users are actually willing to accept higher costs in return for superior service.

Quick response to port user's needs

Perception of cargo safety can be more powerful and important than the actual safety. If a port has a reputation that the handling of cargo is unsafe or theft of cargo is high, this could drive away potential clients and discourage existing clients. Thus, marketing and promotional efforts by port authorities to highlight the ports positive characteristics and accomplishments could improve the port reputation. A record of achievement gives assurance in terms of quality and reliability. The latter is eminent for influencing carrier's choice of port, as it is often the relative perception of customers that supersedes the actual port performance. Understanding the key decision factors in port choice is crucial in staying ahead in this increasingly competitive port environment.

Tongzon has analyzed these factors and the results confirmed that port choice is determined by three most important factors: Efficiency, frequency

of ship visits and adequacy of port infrastructure. Among these three factors port efficiency is found to have the most significant impact on port choice decisions and performance. Port Authorities should give priority to efficiency enhancement; secondly, direct port charges are not as important as any of the three factors identified. Thirdly, not all determinants of port choice are within the port's control. Location is not a matter of choice, however, this is not as important as the other two such as port efficiency and infrastructure. A port with allocation disadvantage can capitalize on improving its efficiency and infrastructure.

3. CASE STUDIES

3.1 Research methodology

This section will address the reason why the topic was chosen, collection of data and how the data is analyzed to answer the objective of the study.

The vision of Transnet, the transport and logistics service company in South Africa is being the “undisputed world champion in transport and logistics solutions”. It therefore came to my mind to study and measure the competitiveness of our ports in the changing market environment. Ports are playing a vital role in the transport chain, or in the movement of goods. Because of bigger vessels, ports are the nodes that need to adjust to these new developments, it is important to understand the port’s competitive strategies to stay ahead of competition.

The data was collected through telephone calls, websites, e-mails and telephonically interviews with marketing and planning managers in the Port of Cape Town and Port of Durban. With Port of Maputo and Namport, I relied on the information from their websites because I did not get responses from the e-mails I sent to the Marketing Directors. The case of Cape Town and Durban will be discussed in the research topic, comparing some activities with those of Namport and Port of Maputo and make a deduction out of the information gathered. The study will end by

conducting a SWOT analysis and outlining critical influences, which may impact on the overall competitiveness of the two ports.

South Africa has seven commercial ports, which are managed by National Ports Authority of South Africa (NPA). NPA is driving the development of the government's national port policy and to develop and manage the country's port infrastructure. South African Port Operations (SAPO) is the national terminal operator of all the container terminals, break bulk, bulk and car terminals. The three container terminals in South Africa are equipped with the operations system, Cosmos to ensure efficiency and better stack utilization, followed by Corebis, a computerized billing system as another way of improving service in the terminals. SAPO and NPA fall under Transnet, the transport operator company in South Africa. Government port policy outlines the guiding principles on its cooperative and participative stance on port management.

The Department of transport will develop and maintain the national commercial ports policy, port regulatory framework, port legislative framework and appointing a national Ports Forum to advise the Minister of Transport. It will also establish an enforcement of norms and standards covering safety and port security. It is the government's responsibility to focus on policy and on substantive regulation, recognizing the need to provide South African importers and exporters with more efficient and higher quality port services.

The government will reduce its involvement in terminal operations by allowing for a more competitive environment to ensure that standards are constantly being raised. In this process, contracts linked to a lease and concession agreements will constitute the two main instruments with which to give the private sector operators a larger role in port operations. The government has started negotiations with labor for the concession of DCT, which is an effort to promote competition in South African ports.

The Department of Public Enterprises will oversee the implementation of the policy and the concession process.

Unlike most European ports, each South African port has a natural hinterland with a defined market and this determines, to a large extent, the nature and types of cargo handled at each port. This study will only be limited to the Port of Cape Town and the Port of Durban, with special focus on container terminals, measuring their competitive strategies to stay ahead of the competition against the neighboring ports, Port of Maputo and Namport in Namibia.

While addressing the two ports cases, the following topics will be discussed:

1. South Africa vs. Competitors
2. Plans to leapfrog Competitors
3. Global Competitive Environment

The classic macroeconomic theory suggests that productive infrastructure; including transport assets is one of several key preconditions for national economic growth. Transport is seen as an engine of growth and a guarantor of national integration, both internal and with the external global economy. Ports must act as interfaces between maritime and inland modes of transport. Therefore, in order to have an efficient maritime transport system, seaports must be guaranteed to work efficiently. The basic objective of a seaport is to provide a fast and safe transit of goods through its facilities, so that generalized costs for shippers such as tariffs and storage time are minimized.

3.2 Port performance

1) Port of Durban

Durban is located on the east coast of South Africa, making the container terminal a pivotal hub for the whole African region of the Indian and South Atlantic Oceans serving the trade routes linking North and South America with the Middle East, India, Asia and Australia.

The terminal also serves as the crucial interface for the distribution of cargoes between ocean carriers and the markets of South Africa, Botswana, Zimbabwe, Zambia and Zaire.

The port handles 44% of South Africa's break bulk cargo and 61% of all containerized cargo flows through the Port of Durban and currently handles 1,228,493 TEU's per annum, the largest in the Southern Hemisphere. Sixty four percent of containers are transported by road and 24% by rail; the remaining 12% is transshipment cargo. On the landside there is a direct connection with surface transport via rail sidings and also speedy connection to South Africa's trunk network. Durban Container Terminal has eight deep-sea container berths, 2128m length and 12,8m draught. The terminal also has 11650 TEU's ground slots and 528 reefer points.

Ports of Durban and Cape Town have been experiencing congestion and as a result are handling containers over capacity. Congestion created the impression that these ports are inefficient.



<Figure 3-1> Layout of Durban



<Figure 3-2> View of Durban

Congestion in South Africa is related to container traffic, which has increased dramatically since South Africa entered the global economy and began a concerted export drive. The waiting time of ships is one of the port characteristics that shipping companies value when choosing between alternative ports. Therefore, the shorter the waiting time the lower the generalized cost of port use, and the more attractive the port is to users.

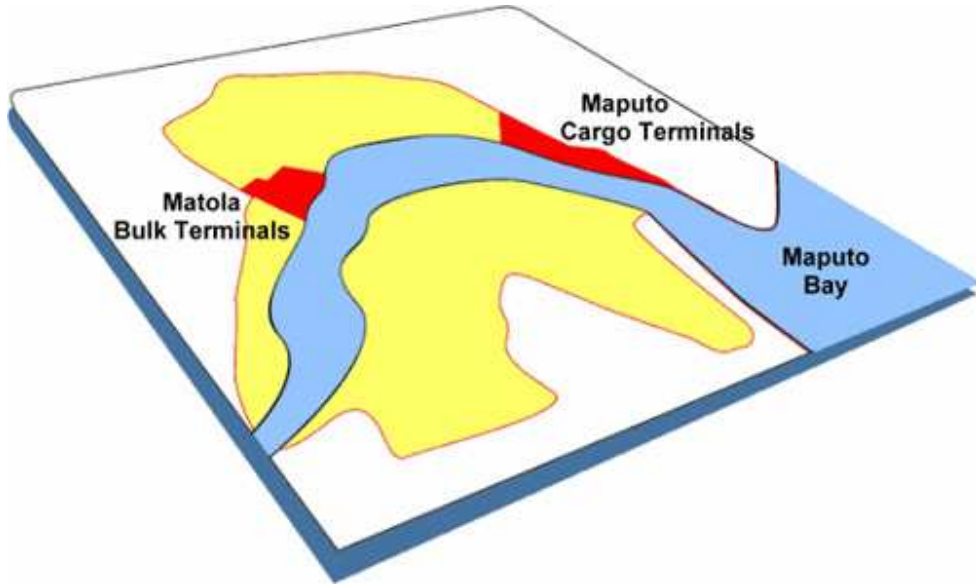
SAPO has bought 60 straddle carriers for DCT, which will increase the fleet to 83 straddle carriers. SAPO in DCT has also designed the stacks to be perpendicular to the quayside to reduce distances traveled by straddle carriers between the stacks. It is now stacking export boxes three high to create some space.

Cosmos system is behind the port efficiency in load planning, container movement and communication with the clients. Almost it's opening; DCT has been in constant expansion mode with continuing investment and infrastructure. This policy is set to continue until the limits for growth are constrained only by the available land and water areas of the port.

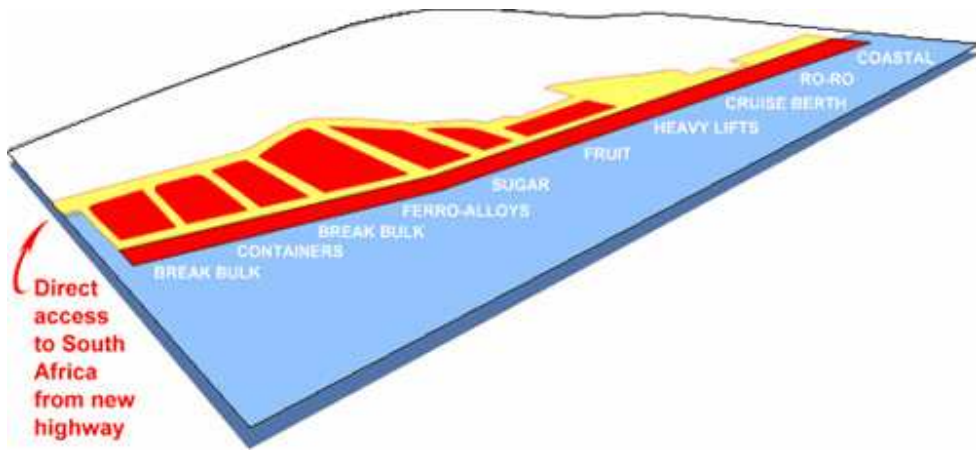
The Development project 2005, is addressing the capacity constraints of container handling in the Port of Durban with the improvement in infrastructure and replacement of equipment. Pier one, which has been converted to container handling, previously handling break bulk is expected to increase container-handling capacity. Once this terminal is equipped with proper equipment, it will be able to ease congestion from DCT.

2) Port of Maputo

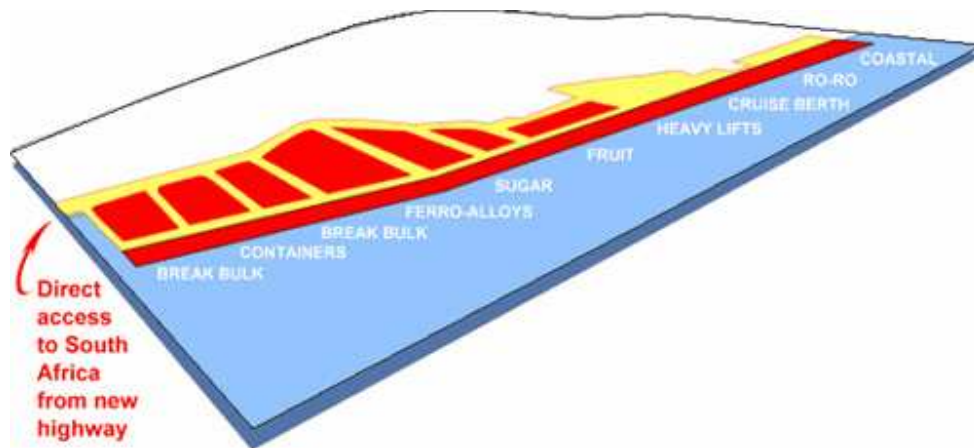
The port is seen as a major threat on the cargo from Gauteng has the potential to be one of South Africa's major ports, a role it once played with regards to exports from neighboring South Africa. The Maputo container terminal is concession to and managed by P&O Ports, Mozambique International Port Services (MIPS), which makes use of a 300m berth with the draught of 10,3m and equipped with two gantry cranes. The container terminal throughput is 39,486 TEU's per annum, 68 reefer plug points with capacity for further 48. The terminal has 100,000 TEU's capacity. Maputo has rail and road connections with Swaziland and KwaZulu Natal, Mpumalanga and Gauteng provinces to the west and Zimbabwe to the northwest. The port already is handling sugar from Swaziland and South Africa, coal and citrus also from South Africa.



<Figure 3-3> Layout of Maputo



<Figure 3-4> Layout of Maputo Cargo Terminal



<Figure 3-5> Layout of Matola Bulk Terminal



<Figure 3-6> View of Maputo and Matola Terminal

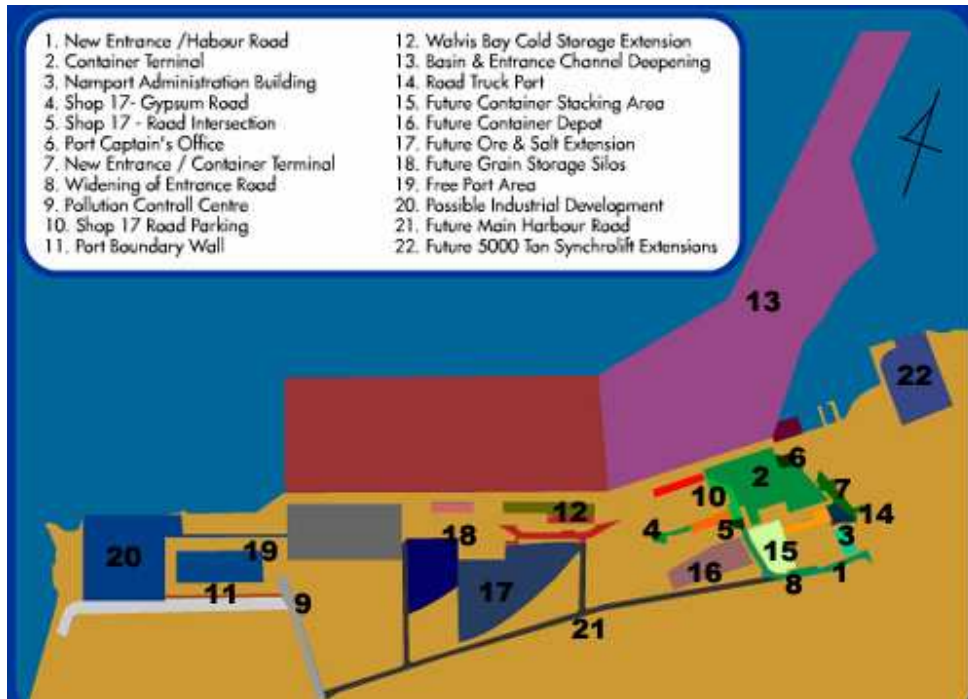
The port also has a citrus terminal alongside a 380m berth operated by Fresh Produce Terminals (Capespan). The fruit terminal poses a threat for Cape Town that could result to a loss of some exotic fruit from Mpumalanga area. South Africa and Maputo have promoted the revival of the Maputo Corridor with bilateral policies and substantial public and private sector investments designed to stimulate sustainable growth and develop in the region. The roads of Maputo are adequate.

3) Port of Walvis Bay

The port is generally a cargo port and is aggressively marketed as an alternate port of choice to South African ports further south and east. There are good road and rail connections with the rest of Namibia while Trans Kalahari Corridor links the port with Botswana and Gauteng province in South Africa. The development of Trans Kalahari will enable Namport to compete for Botswana as well as Gauteng destined high value, time sensitive cargoes. Walvis Bay is approximately two days sailing closer to Europe.

The port has already attracted a greater number of shipping lines as regular callers. These include Unicorn Lines who provide a weekly coastal service with South Africa and Maersk/Saf line that provides connections or direct sailing to Europe. The direct call by Maersk has led to the loss of transshipment reefers previously handled at Cape Town.

With the deepening and modernization, the Port of Walvis Bay competes favorably with Port of Cape Town and Durban. The port was deepened to 12.8m.



<Figure 3-7> Layout of Walvis Bay

The port is able to handle container ships up to panamax size. The Container Terminal consists of nearly 400 ground slots with 210 reefer points. Cargo is handled either by ships gear or using the mobile crane with a reach of 44 meters. Containers handled totaled 31569 TEU's with 16814 imported and 14208 exported and 547 transshipped.

A large proportion of the traffic is reefer containers, which are used mainly for exporting frozen fish. This port may also pose a threat in terms of ship repairs facilities.

4) Port of Cape Town

The massive increase in trade between South Africa and the rest of the world have necessitated strategies around expansion. Terminal infrastructure has been increased over a period of time allowing the terminal to handle a maximum throughput of 496 000 TEU's per annum. Cape Town Container Terminal have six berths, four being main berths and two for feeder vessels. The maximum depth is about 14,5m and minimum depth of 9m in coastal berths and is 1,264m long. The terminal is ideally positioned as a hub terminal at the most southern point of Africa for cargo emanating from the west of the northern hemisphere to South America and the Far East. East/West cargo has grown substantially making the Cape Town Container Terminal, the terminal of choice for transshipment cargo. It is also known as the reefer terminal because of the fruit that flows through this terminal.



<Figure 3-8> Layout of Cape Town



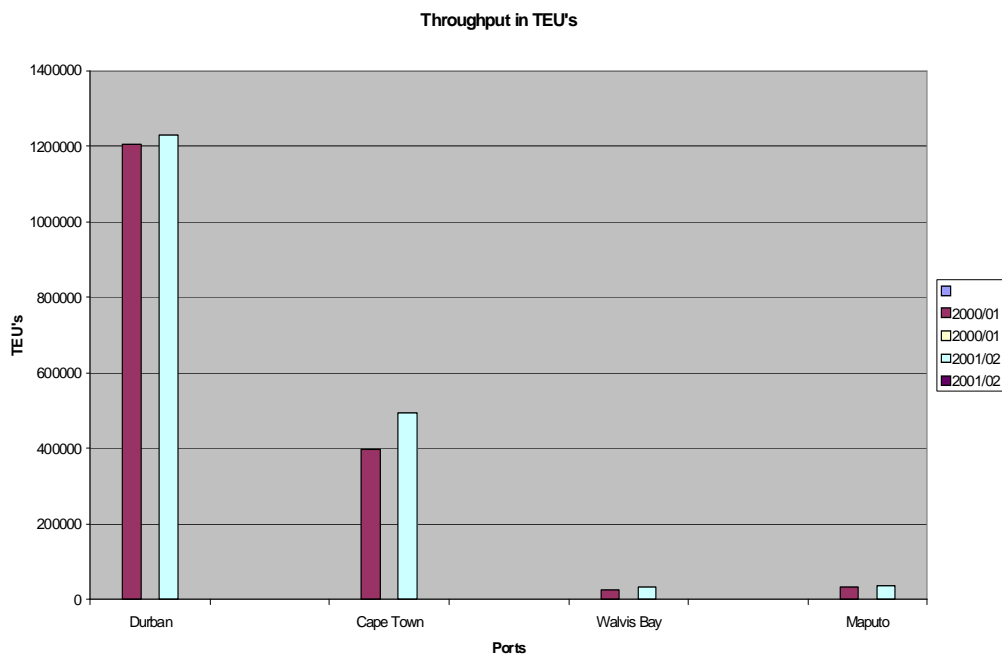
<Figure 3-9> View of Cape Town

The Cape Town Port, like Durban has been plagued by congestion on its peak season and has implemented some strategies to minimize the problem. The terminal created some space for MT containers to be stacked out of the normal stack, more reefer stacks and the procurement of Straddle Carriers stacking ¼ for reefer operation. CTCT has about 4748 ground slots for exports, 2878 for Imports and 959 for Reefers. MT Stack has 2002 ground slots and the cold shed has only 500. The Imports, Exports and MT stack's design capacity is 75% and reefers is 85%.

The capacity still remains the problem in the terminal, hence the proposed expansion of the terminal by 300m wide to create some stacking space for imports and exports. The project as proposed is divided into medium and long-term phases. The expansion of the terminal is to be finished by 2010, and the proposal of Port Industrial Park by NPA, of which the site is outside the port allows for complete integration in the port by 2020. This longer-term development of site will be determined by the outcome of the studies to be conducted. According to the above statement, the former will enable an increase in throughput in CTCT and the latter will promote the port to a full logistics center.

<Table 3-1> Comparison of Port Facilities
(Source Ports of Southern Africa)

<i>Ports</i>	<i>TEU's</i>	<i>Berth Length</i>	<i>Reefer Points</i>	<i>Depth (m)</i>	<i>IT system</i>
<i>Durban</i>	1,228,000	2,128m	528	12,8	Cosmos
<i>CTCT</i>	496,000	1,264m	959	14,5	Cosmos
<i>Maputo</i>	39,486	300m	68	10,3	
<i>Namibia</i>	31725	503 m	210	12,8	CTIS



<Figure 3-10> 6 Comparison of throughput between SADC ports

Although there is a big difference in TEU's handled between these ports, the excess capacity, equipment procurement and level of service by Walvis Bay is going to put pressure in terms of competitiveness on the two South African Ports. The ports also have big differences in number of vessel arrivals to the terminal. CTCT and DCT seem to be receiving more vessels than Namibia and Maputo.

<Table 3-2> Container Vessel arrivals at DCT, CTCT,
Namibia and Maputo- April 2001 – March 2002

<i>Vessels</i>	<i>Durban</i>		<i>Cape Town</i>		<i>Namibia</i>	<i>Maputo</i>
	<i>No</i>	<i>GRT</i>	<i>No</i>	<i>GRT</i>	<i>No</i>	<i>No</i>
<i>Cellular</i>	536	34,998,228	911	71,374,082		
<i>Non-Cellular</i>	223	14,502,672	37	1,396,027	152	192
<i>Reefers</i>	123	2,600,425	389	8,974,465	82	
<i>Total</i>	882	52,101,325	1337	81,744,574	234	192

3.3 Port tariffs

In seaport activity, there is a diversity of charges that the users of a port must pay for the services they receive and for the use of facilities. On the one hand are port tariffs or port dues, which are the charges on ships for the use of general infrastructure of a port. Another part of the total income received by port authorities stems from tariffs on all cargoes that pass through the port's facilities. These tariffs on cargo are partly by shipping

companies, and the rest is directly charged to shippers. The important part of the total bill is cargo-handling charges (loading/unloading, stevedoring, storage etc) as the table below shows: Source: Suykens (1996) adopted from Lourdes and Gustavo.

<Table 3-3> Relative weights of different port charges

Relative weights of different port charges	
Port tariffs on the use of infrastructure	Percentage of total bill
	5% -15%
Berthing services	2% -5%
Cargo- handling	70% -90%
Consignees	3% -6%

There is a general understanding among port experts on port industry that the elasticity demand for port services with respect to port tariffs is relatively small (Slack, 1985). As already indicated above, shipping companies relevant factors when choosing a port are the quality and the existence of business opportunities (demand for cargo from exporters and importers). For the shipper, the important variables would be cargo handling charges, the frequency of regular services and the existence of charter services from the port for special shipments. As South African ports are competing with Maputo and Walvis Bay, which both have good hinterland connections and similar facilities, it is possible that a slight variation in port tariffs could lead to traffic deviations, and thus render port

tariffs as a strategic variable for competition. How do port tariffs or cargo handling charges differ between these ports?

<Table 3-4> Comparisons of Terminal Handling Charges among the three container terminals, DCT and CTCT have same prices

(South African Rand = Namibian Dollar) = US\$6,7600

<i>CONTAINERS</i>	<i>Handling charges DCT & CTCT</i>	<i>Walvis Bay</i>
Landing/Shipping 20'	639,00	690,00
Landing/shipping 40'	944,00	940,00
Landing /shipping 45'	1250,00	
Reefer Containers 20'/surcharge	639,00/254,00	690,00/215,00
Reefer containers 40'/surcharge	944,50/381,00	940,00/343,00
Reefer Containers 45'/surcharge	1250,00/508,00	
IMDG Containers 20'/surcharge	639,00/254,00	690,00/414,00
IMDG Containers 40'/surcharge	944,00/381,00	940,00/564,00
IMDG Containers 45'/surcharge	1250,00/508,00	
Abnormal containers 20'	893,00	690,00/414,00
Abnormal containers 40'	1325,50	940,00/564,00
Abnormal containers 45'	1750,00	

<i>Transshipping</i>	<i>Handling charges at DCT and CTCT</i>	<i>Walvis Bay</i>
Normal Containers 20'in/outwards	639,00	912,00
Normal Containers 40'in/outwards	944,00	1,436,00
Normal Containers 45'in/outwards	1250,00	
Reefer Containers 20'in/outwards	766,00	676,00
Reefer Containers 40'in/outwards	1135,00	919,00
Reefer Containers 45'in/outwards	1504,00	
IMDG Containers 20'in/outwards	766,00	I, 459,00
IMDG Containers 40'in/outwards	1135,00	2,297,60
IMDG Containers 45'in/outwards	1504,00	
Abnormal Containers 20'	766,00	1,459,00
Abnormal Containers 40'	1135,00	2,297,60
Abnormal Containers 45'	1504,00	

Note: "Walvis Bay offers 25% discount on MT containers." (Source, SAPO and Namport Tariffs Books)

3. 4 Major factors determining terminal competitiveness

Time

The shorter time a vessel can stay in the port, the more the vessel can save. Increased productivity (discharge and loading) and quickly turnaround vessel in the port is crucial in port competition. It is, however partly influenced by geographical location of port or terminal itself. Turnaround time in port does not only mean berth time at terminal that is mostly

influenced by productivity but also the total port stay time including the vessel maneuvering time from pilot station to berth in harbor and vice versa.

Flexibility

Flexibility is an important factor in terminal competitiveness and can be divided in three aspects; flexibility in terminal operation, terminal capacity and modal split. First, fully automated terminal system is very difficult to be flexible in operation because every sequence of operation is pre-programmed by computer system, which can be difficult to change at a later stage. In a normal terminal operated by straddle carrier or RTG's, it is easy to increase productivity by simply increasing resources where they needed.

Secondly, terminal capacity is one of major determinants of terminal flexibility that may absorb handling volume at high peak. In practice 80% of theoretical utilization is an optimal operational capacity of the terminal. It has to be considered whether the terminal has enough space to extend quay length or yard space when it reaches its maximum capacity. Thirdly, flexibility in modal split is defined as the ability of a transport mode at port and terminal such as truck, rail and barge to meet varying customer demands in time, place and quantity. The terminal that has a variety of modality will have more advantage towards other terminals that has limited possibility.

Stability

Stability can be divided in three categories; social stability, labor stability and terminal stability. Social stability is the events such as civil wars, safety problems and unstable service standards and charges. Labor stability is also one of the key elements in the performance of the terminal. This can be associated with unskilled labor, strikes, damages to cargo and theft. The port user can avoid the port that is experiencing these problems. Lastly, the terminal stability means the reliability in terminal operation. It includes stability of the terminal operating system, yard equipments supply during operation and the failure rate of yard facilities.

Hinterland connections

The quality in hinterland connections is measured in terms of speed, reliability and cost. Today, terminal is not simply loading and discharging point but huge distribution platforms and value adding activities would be applied where an order- operated system is more emphasized than a stock-operated distribution system. Therefore, road, rail and waterway connection has to be maintained properly to accomplish a smooth distribution of both import and export containers.

Cost

The goal of a shipping line is to reduce costs by deploying bigger vessels and spend less time in the port or the terminal. Port costs consist of port due, pilot charges, tugboat charge and other nautical service charges. Terminal

costs consist of equipment, labor, operating and infrastructure costs. All these costs play an important role in the decision making process of whether a port will be chosen or not. Nowadays it is common for a shipping company to negotiate with the terminal as a group in order to enjoy the benefits of economies of scale through the cooperation with other shipping companies as an alliance. Generally, we can agree that if the terminal has more cost-effective structure, it has more chances to attract shipping lines.

Geographical location

Geographical position is the prime factor in a port's competitiveness. Although we cannot change the geographical position of the port, the port can hardly be expected to obtain a strong competitiveness without such good natural conditions.

3.5 Competition of South African ports

Major capital injection by private sector into developing and upgrading of infrastructure, geared to boost the ports of Maputo and Walvis Bay, is occurring at a faster speed. Road and rail networks connecting South African major industrial zone, Gauteng have been upgraded to allow fluid transportation of goods between Maputo and South Africa. Maputo and Walvis Bay have excess of land for future development of logistics and

value adding activities. Beira and Maputo free trade zones were officially approved but not yet operational.

South Africa, in these two ports, Durban and Cape Town has few strong advantages that distinguish themselves from perceived competition.

- Excellent rail and road infrastructure connecting the ports with its cargo hinterlands, Gauteng province and overboard
- Modern infrastructure and state of the art equipment
- Durban preferred by most shipping lines as premier port in South Africa
- Skilled and competent workforce

1) Plans to leapfrog the competitors

In order to neutralize the impact of Maputo, there are set achievable target to improve the performance of the terminal. The package of targets contains

- Increase of vessel productivity to 36 moves per ship-working hour.
- Reduction of vessel delays to an average of below 16 hours, which is the delay tolerance by shipping lines
- Reduction of road turnaround time to an average of 20 minutes per truck from entry point to exit point
- Value adding activities such as warehousing and packing and unpacking of cargo
- Full implementation of EDI connectivity with major stakeholders (shipping lines, customs & excise).

There are value-adding activities around the two South African ports in the form of container depots that provide stuffing and destuffing and container repairs. These facilities are privately owned, however, SAPO wants to remain a true logistics provider, albeit having signed a joint venture agreement with one of the cold storage and dry cargo warehouse providers in the port of Durban.

Ports no longer operate in an insulated environment. They face the same competitive forces that companies do in other industries. There is rivalry among existing competitors, continuing threat of new entrants, for example the development of the Port of Ngqurha in the Eastern Cape, 20km away from Port of Port Elizabeth and the possible concession of DCT. There is also potential for global substitutes, presence of powerful customers and suppliers. Dealing with these forces is a continuing challenge for the terminal operators. It requires that the terminal operators be aware of port users requirements, know their constraints in the global market and have a strategy for making the port a partner in business development.

2) Global competitive environment

In the last decades, we have witnessed profound changes in the maritime transport, which have modified the balance between capital and labor at the seaports. Ports are now increasingly becoming capital-intensive industries while in the past they used to be labor intensive. This has generated an excess of employees in the most ports around the world. The development

of containerized transport is another factor that has significantly modified ports operations. Containers have allowed large cost reductions in cargo handling, but they have also imposed new needs on ports in terms of equipment (gantry cranes, specialized terminals improved pavements, etc). On the other hand economies of scale obtained by the transport of large quantities of containers and bulk have led to the building of increasingly larger specialized ships that require substantial port investments in new infrastructure and equipment.

All these technical changes have generated a competitive environment in the seaport industry, especially between those large ports with the facilities to serve regular deep-sea traffic from liners. Modern ports no longer have a monopolistic position in the transport of goods to the hinterlands. The development of integrated transport chains have reduced the transport costs to such an extent that it is now often preferable for a shipper to use a distant port instead of a closer one, provided that the former has better hinterland connections and facilities than the latter.

Therefore, modern ports must be extremely competitive to be able to offer optimal combinations of time and price for those firms demanding their services.

3) SWOT analysis

Based on the SWOT analysis, both Cape Town and Durban are the major competitor in that region. In terms of infrastructure, the two ports seem to be

the most favorable for mother container ships' calling. Cape Town is in better position in terms of berth depth and approaching channel depth, reaching to 14m and 15.9m respectively. Durban also seems to be more favorable in respect of future poer development, developing new container terminal capable of 120,000 TEU.

<Table 3-5> Strengths, Weaknesses, Threats and Opportunities (SWOT)

PORTS	Durban	Maputo	Cape Town	Walvis Bay
Costs (THC)	High	Medium	High	Medium
Industry served	Gauteng, local and SADC region	Gauteng and local industry	Cape Town hinterland, Gauteng and SADC region	Gauteng, West Africa and SADC region
Facilities	7 berths–12,8m depth	1 berth-11,5m depth	4 berths –14m depth	1 berth-12,8m depth
Port Efficiency	25cntr/crane hr on cellular vessels	15 contr/crane hr, no cellular vessels calling	22 contr/crane hr on cellular vessels	15 contr/crane hr, no cellular vessels calling
Distances of Mother vessels	Far East, 6,975 miles	Far East, 7,270 miles not ready for post-panamax vessels	Europe and America, first port of call. 6,192 miles	Europe and America, port of call, 5,574 miles not ready for post-panamax vessels
Future Port Developments	New container terminal – 120,000 TEU capacity	100,000 TEU capacity, FTZ Only handling 39,486 TEU's	Expansion of storage space extra 300 m ²	120,000 TEU capacity, only handling 31,725 TEU's
Land transport	Favorabl	Improvin	Favorabl	Favorabl
Dwell times	3 day	12 day	2 day	5 day
Technology EDI	60%	Not yet	60%	Not yet
Approach channel	12,8m	11,3m	15,9m	12,8m
Distances by road from Gauteng	600km	400km	1,200km	1,800km

In terms of efficiency, Durban seems to be better than Cape Town representing 25box per crane hour compared to 22 box. Average dwell time shows a little bit difference between the two ports, representing 3 days and 2 days respectively.

The proximity to hinterland and main trunk route the two ports show little difference.

4. POLICY IMPLICATION

4.1 Inter-port competition

In the literature review and the case studies of the competing ports, Key determinants of port choice and major factors of competitiveness in terminals have been studied in detail. In this area the issues of competitiveness around South African ports will be analyzed based on empirical studies of port choice determinants and major factors on competitiveness. South African Ports are still performing under monopoly and South African ports are potentially competitors to each other. Since there is a desperate need for new investment in port infrastructure, and Government is unwilling to spend its own money on that investment, it would appear that a complete range of port services must be concession, and for a reasonably long period of time, so that there is an incentive for the successful bidder to invest in substantial infrastructure. In the discussions of the paper, ports of Durban and Cape Town are moving more cargo through their terminals than Maputo and Walvis Bay.

These ports are already operating above capacity, which means there is a need of new developments for more capacity in the terminals. Geoff Parr, chief economist for the Competition Commission in South Africa proposed to the transport portfolio committee that there should be three forms of competition in South Africa; competition between SA ports (inter-port

competition), within each port, for providing certain port services (intra-port competition) and competition relative to South African international counterparts. In addition to the possibility of competition in and between SA ports, there is the matter of the overall level of competitiveness, efficiency and productivity of SA ports in comparison with world standards. There is a general feeling amongst stakeholders that SA ports are slow and expensive, and there have been calls for increased participation of the private sector to improve efficiency.

The concession of DCT has been on the cards but is going in a slow pace because of the pressure from labor unions. The development of Port of Ngqurha, presently constructed deep-water container port next to Port Elizabeth might have a major impact to both Durban and Cape Town container terminals. The market share enjoyed by Cape Town and Durban container terminals could severely be affected. Consequently, service levels need to be improved and maintained, to retain current market share and minimize the impact of the Port of Ngqurha. Durban needs major investment on dredging to overcome draught limitations and expanding the entrance channel. It is therefore important to note that South African ports, albeit enjoying bigger market share as compared to Maputo and Walvis Bay, they are still not achieving the world standards in terms of efficiency and productivity.

Growing role of information technology

Equally important in the future is the need for ports to expand the use of information technology (IT) to support port user requirements, particularly relating to containerized traffic, although not exclusively. IT is being increasingly employed throughout the ocean transport sector and has revolutionized the way intermodal traffic is handled. IT systems electronically link port administration, terminal operators, truckers, customs, freight forwarders, ship agents and other members of the community. The technology provides port users with real time data on the status of cargo, paperwork and availability of port facilities and enables ships and terminals to be part of an integrated office infrastructure.

IT reduces time for delivering cargo, provides more accurate transfer and recording of information, reduces manpower to prepare paperwork involving port use and operation. South African ports have not yet fully utilized the IT to meet all the above advantages. They still have manual operation for trucks coming in/out of the terminal. Cosmos is the operating system, but EDI is not fully implemented and SA ports have not yet taken the advantage of the Port Community System, which links all the port stakeholders for effective communication. South African ports need to invest more on Information Technology to be able to meet the world standards. Ports unable to keep pace with information technology will be left behind in the competitive ocean transport market.

Ability to replicate port services

Port users will have strong bargaining power if the services provided by the port can be replicated elsewhere. This has been evident between CTCT and Walvis Bay, where transshipment cargo by Maersk was shifted from CTCT to Walvis Bay. Walvis Bay do offer same services as Cape Town although on a small scale but that is putting pressure on Cape Town Container Terminal because Walvis Bay have excess capacity for reefer and general cargo in the terminal. The investment in the Port by a private company is definitely going to offer better services in the Port of Walvis Bay.

Nowhere is this better illustrated than in Northern Europe, where a number of large container handling ports are available for entry and exit in the European market. Carriers can react to tariff increases, efficiency issues and labor influence by shifting or threatening to shift to other ports. Grand Alliance decided to temporarily shift from Rotterdam to Antwerp on the basis that it was experiencing delays in Rotterdam. This decision shifted 125,000 TEU's annually from Rotterdam to Antwerp until delays were corrected in Rotterdam. (The evolution of Ports in a competitive world, World Bank).

Adequate infrastructure

Infrastructure does not only refer to cranes, berths and terminal area, but quality of equipment, quality of effectiveness of information systems,

availability of intermodal transport and the approach channel provided. If the volumes handled far exceed a port's cargo handling capacity, this will lead to congestion and inefficiency and thus can turn off the port users. DCT and CTCT have been under attack by the industry because of congestion. These ports still use manual methods to process cargo, clear customs and inform forwarders and clearers of cargo manifests. The importance of IT in the terminal operations cannot be emphasized further; it does speed up the process of moving cargo.

Geographical location

Walvis Bay has the geographical advantage than South African ports, it is two days closer to Europe and this can affect the concept of Cape Town being the hub for transshipment cargo. It is indicated by some authors that geographical location may not pose a threat because shipping lines are looking for a port that has good hinterland connection and better service, and this advantages can compliment the geographical handicap of other ports, which Walvis Bay and Cape Town have both good hinterland connections.

Flexibility

For a shipping company, it is very important to keep high level of scheduled punctuality of their vessels in order to satisfy their customer requirements. The main reason for the scheduled failure for shipping line is severe weather condition during sea voyage, but this is unavoidable. The

most efficient way to recover the delayed schedule is to minimize port time by increasing terminal productivity. Flexibility will be difficult in the Walvis Bay and Maputo because they don't have enough equipment to increase productivity, and still have limited capacity of 100,000 in Maputo and 150,000 TEU's per annum in Walvis Bay.

4.2 Global competition

In previous chapter the main improvement scheme for the South African ports were set as follows:

- Increase of vessel productivity to 36 moves per ship-working hour.
- Reduction of vessel delays to an average of below 16 hours, which is the delay tolerance by shipping lines
- Reduction of road turnaround time to an average of 20 minutes per truck from entry point to exit point
- Value adding activities such as warehousing and packing and unpacking of cargo
- Full implementation of EDI connectivity with major stakeholders (shipping lines, customs & excise).

These seem to be a significant improvement compared to more modernized ports such as Port of Busan. The average productivity of quay side handling reaches to 100 moves per ship working hour in Busan. Vessel delays in the port shows nil, turnaround time for the truck is less than 10

minutes, and the rate of EDI implementation is over 90 percent. In these respects it may be said that the global competition of the South African ports is still weak. However, considering the fact that port competition is confined to a region the global competition aspect has a little meaning in this case.

4.3 Overall recommendations

This dissertation has highlighted issues about the developments in the ocean transport and terminal competitiveness. Distribution patterns are increasingly evolving into hub and spoke networks, creating winners and losers among ports that achieve hub status. Increasingly sophisticated information technology is spreading throughout the port sector as port users demand more timely information to support their logistics systems. Although South Africa has a potential in improving the services, it has a lot to do before they reach the world standard.

These few highlights are observed: South Africa has to invest more on information technology to enhance efficiency in the ports. EDI in Durban and Cape Town is operational at 60% level. Sophisticated information technology systems are a key part of an efficient port in the 21st Century, and South African Ports need to invest heavily in hardware and software to keep ahead in this fast moving discipline. Delivering a quality service requires not only the best facilities and equipment but also highly skilled,

properly trained and well-motivated workforce. This means great emphasis on training and updating of skills and put in place comprehensive training programmes. Port Efficiency is the most important port choice determinant, which is still a problem in the ports of South Africa, hence the emphasis on human resource development. If the terminals are not ready logistically, shipping lines will shift their cargoes to another ports. This means, complete logistics solution, top quality warehousing, re-packing, just in time delivery, real time information and total service packages.

5. CONCLUSIONS

Changes taking place in the port sector present difficult challenges to port administrators, terminal operators and other port service providers. But these changes also present opportunities for new ways of doing business and open the door to entry of new players throughout the range of port activities. This dissertation was about measuring the competitiveness of South African ports, which was based on empirical data. The key areas were to understand the ports operations as compared to those of competitors and what strategies can be implemented to increase productivity in the ports. The economics of container-ship operation are critically dependant on port productivity.

A typical container terminal today has a crane productivity of 25-30 moves per gross crane hour, average container dwell time of 3 days and truck turnaround time of less than 30 minutes, but future terminal requirements will be considerably more demanding. Container terminals need to keep abreast with the development of the bigger ships in order to be competitive in this maritime industry. In order to accommodate the mega container ships coming into service, new terminal will require a crane productivity of 200 moves per ship hour at berth, three days average dwell time, water depth of 15-16m and increasingly larger cranes will be required to accommodate ship with a deck of up to 28 rows across. The challenge is

for ports to relate to the needs of their competitive positions by providing low cost and efficient port services.

Shipping lines consider very important determinants when they choose ports; hinterland connections, port efficiency, adequate infrastructure, port charges, quick response to port user's needs and location. Port efficiency is found to have the most significant impact on port choice decision and performance. Further studies also indicated that time and flexibility is major factors determining terminal competitiveness, which they both fall under port efficiency. Quick ship turnaround and flexibility in terminal operation, terminal capacity and modal split in the terminal can enhance port efficiency. Understanding the key decision factors in port choice is crucial in staying ahead in this increasingly competitive port environment. The interest of government in reducing its involvement in port operations has given port users hope in increased efficiency and competitiveness in ports. Although this has not yet been in practice in South African ports, there is a great possibility of going that direction. Terminal operations in the Port of Ngqurha will be awarded to the private operator. The negotiations about the DCT concession are continuing between government and labor unions. These two developments will see the South African ports in a fierce competition once they start operating. Port of Walvis Bay and Maputo are being developed in a faster pace, and that puts the South African ports under pressure because of opportunities that these ports have.

Walvis Bay is boasting with its Geographical location, which if full developed can make it a gateway to Africa and hub for America and Europe cargoes. With this development, the ports will eventually have adequate infrastructure, good hinterland connections and enhanced port efficiency. Port tariffs will come in as a competitive advantage but South African ports and Walvis Bay are relatively on the same level in terms of terminal handling charges. Major technology changes are taking place in the ocean-shipping sector, which impacts on requirements for port infrastructure and services. Ocean transport industry is employing increasingly sophisticated information technology to manage logistics and ports, if they want to remain competitive, they must be key players in IT logistics networks.

This study has limitations that need further research on the topic. Firstly, the study relied heavily on empirical data and therefore there is a need for more research on the behavior of South African ports in terms of competition if Maputo and Walvis Bay are fully developed. Secondly, there was no first hand information from the South African port user's, logistics service providers and shippers. More research would need to be conducted to have a full understanding of their requirements. The study only explored one economic factor, which is handling costs. Further studies would address main line, port facilities and feeder costs.

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