ADDING VALUE THROUGH LOGISTICS: A VALUE CHAIN ANALYSIS OF STEEL PRODUCT HANDLING IN DURBAN PORT

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Dissertation submitted in fulfilment of the requirements for a
Master's degree
in
Development Studies

in the Subject of
Global Logistics Studies

at the University of KwaZulu-Natal

Supervisor: Prof Mike Morris

28 November 2008

DECLARATION

Submitted in fulfilment / partial fulfilment of the requirements for the degree of Masters in Development Studies, in the Graduate Programme in Development Studies, University of KwaZulu-Natal, Durban, South Africa.

I declare that this dissertation is my own unaided work. All citations, references and borrowed ideas have been duly acknowledged. It is being submitted for the degree of Masters in Development Studies in the Faculty of Humanities, Development and Social Science, University of KwaZulu-Natal, Durban, South Africa. None of the present work has been submitted previously for any degree or examination in any other University.

Student signature

24/02/09
Date

ABSTRACT

Trade liberalization and globalization have resulted in the free flow of goods, services, capital and people. In this regard ports play a vital role in linking supply chains, as goods flow from the point of inception through the chain up to the customer at the end.

This research was conducted to determine and evaluate the role of logistics in the value chain of steel products that pass through Durban Port. The impact of logistics - measured in terms of cost-reduction, shorter lead times and better customer service - that would contribute to the competitive advantage of businesses was evaluated. Other countries like China and India are also manufacturers of steel products, and it is therefore important for South Africa not to lose international markets due to prices and products that are not internationally competitive.

In essence, this paper unpacks the debates surrounding the high prices of steel products from South Africa, and suggests how these prices can be reduced. In this regard the investigation into steel products provided an excellent case study, as steel contributes significantly to the GDP of the country. The study analyses all logistics activities like transportation, warehousing, handling, quality control of goods and a just-in-time management approach.

Informal interviews and a case study based on Durban Port highlight the role that logistics activities play in adding value to goods that pass through Durban Port. The implications of the findings are discussed and proposals for redefining the role of logistics in an organization are offered.

KEY WORDS:

globalization
logistics
value chain
supply chain
competitive advantage

ACKNOWLEDGEMENTS

I would like to express my warmest gratitude to the following people:

My supervisor, Prof. Mike Morris for his patience and support during my study.

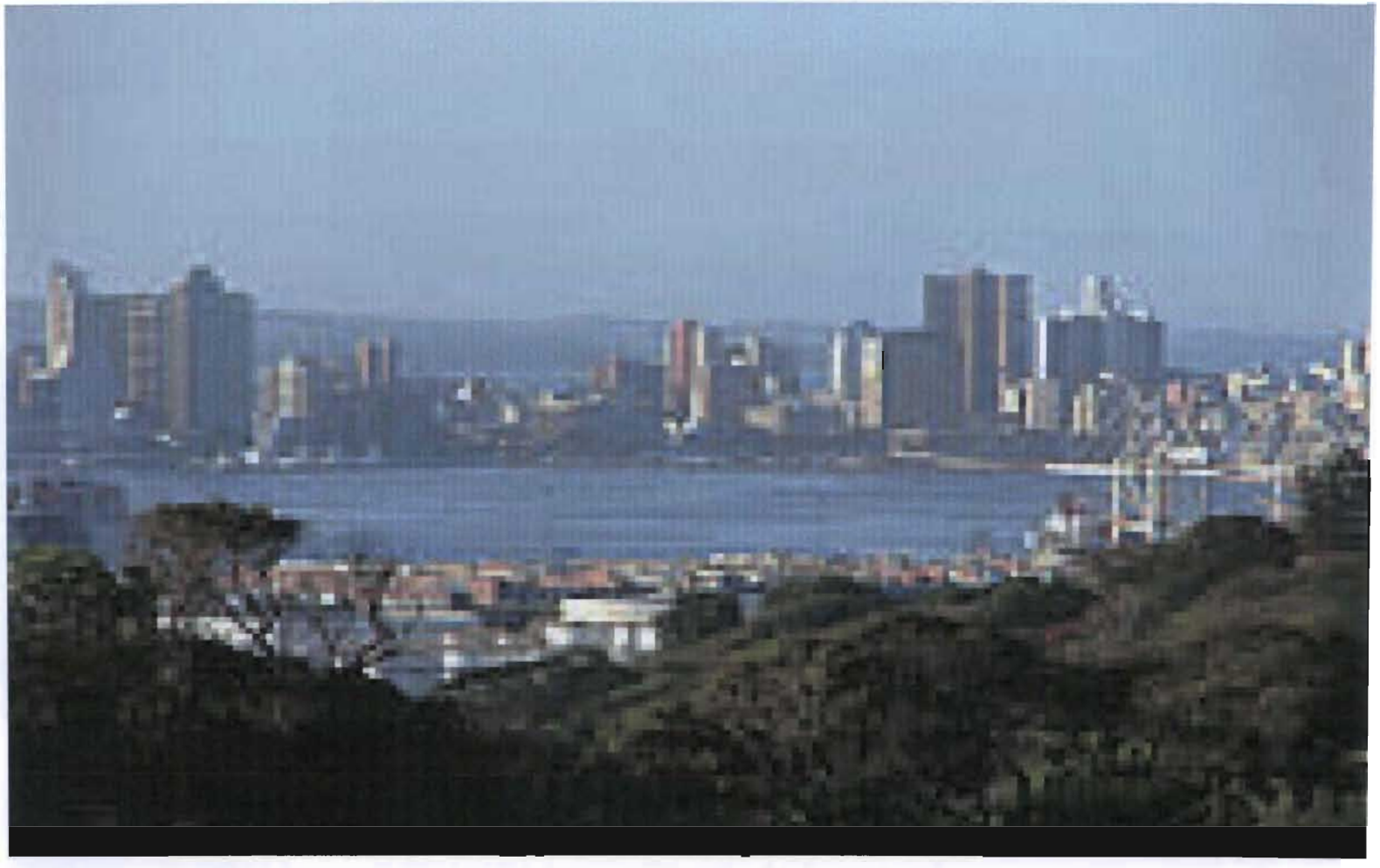
My Programme Director, Richard Ballard and former Programme Director, Richard Devey, for their endless support and encouragement.

Mangosuthu University of Technology for financing my studies and Dr Dirk Coertze from our Research Directorate for his assistance in writing a presentable document.

My husband, Mothudi Rasenyalo, who has always been a source of love, support and encouragement.

My children, Tselane, Difedile, Mapolo and Ramtsidisi, for being so tolerant while I was conducting my studies.

God, who has made everything possible for me.



Photograph 1: View over Durban Port Multi Purpose Terminal (Extracted from: www.saponet.co.za.2005)

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LIST OF ACRONYMS

ASGISA	Accelerated and Shared Growth Initiative of South Africa
CC	Cost Control
CR	Cost reduction
CSIR	Council for Scientific and Industrial Research
DoT	Department of Transport
DP	Durban Port
FMCG	Fast Moving Consumer Goods
FTA	Free trade Agreement(FTA)
ICT	Information and Communication Technology
IISI	Iron and Steel Institute
LC	Logistics Costs
LS	Logistic survey
MSA	Moving South Africa
NFLS	National Freight Logistics Strategy
NPA	National Port Authority
SA	South Africa
SACU	Sourthern Africans Customs Union
SADC	Southern African Development community
SAPO	South African Port Operations
TEUs	Twenty Foot Equivalent Units
SMME	Small, Medium and Micro Enterprises
UNACTAD	United Nations Conference on Trade and Development
3 PLS	Third Party Logistics Providers

NOTE: Citations NO DATE is the Latin abbreviation s.a. (sine anno)

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CHAPTER ONE

THE PROBLEM AND ITS SETTING

1.1 INTRODUCTION

Because of globalization, markets world wide have been opening their doors. Therefore, for countries to be competitive in this global market, they need to be effective and efficient with the production and processing of goods at reasonable costs. This objective can be achieved by ensuring that all unnecessary costs are eliminated, which in turn can be realised by focusing on an efficient logistics system that is characterized by smooth flow of freight. Robinson (2002) mentions that, for companies to improve their competitive international trade, logistics activities need to be efficient.

Botes *et al.* (2006) and a number of other authors, including the Reynders Commission (1972), Dehlen (1993), Porter (1995), Naudé (2001) and Pretorius (1997), all point out that logistics costs affect the competitive advantage of a country, in particular that of South Africa. This calls for organisations to be efficient in their logistics operations. The Council for Scientific and Industrial Research (CSIR), (2006) states that logistics issues were identified by the South African government in the Accelerated and Shared Growth Initiative of South Africa (ASGISA) as one of the possible six hurdles that may affect the country's economic growth. It is therefore imperative that organizations rely increasingly on effective supply chains, or networks, for them to compete successfully in the global market and networked economy.

Dicken (2003), as cited in Peters and Robbins (s.a.), points out that the challenges which are facing ports are the same as those which are facing economic globalization. In the National Department of Transport Draft White Paper (2001), it is pointed out that efficient ports are the catalyst for increased trade and that such ports provide a competitive advantage in international trade.

1.2 CHAPTER SUMMARY

This chapter provides the motivation for the study, the research aim and objectives, limitations of the research design, assumptions, and the problem statement.

1.3 MOTIVATION

This study investigated the value that goods incur as they pass through a port, with special emphasis on Durban Port. Transnet, one of the largest transport companies in the world, handles about 60% of all freight in South Africa. At some point this company discovered that the need to improve logistics was pressing, especially in Spoornet, Transnet's rail business unit. The literature review has shown that, as a result of their subsequent new policy, Transnet managed to save the manganese ore industry by cutting down logistics costs (LC). Naidoo (2004) describes how Spoornet was involved in transporting manganese ore, a product that is used in desulphuring and strengthening steel. About 80% of the world's manganese ore is extracted in South Africa, but the country was found to be struggling to compete in the global market due to substantial rail logistics costs. As a result, the industry

was about to close down, so all role players in the industry had to act quickly in order to save it and to keep the country's manganese production competitive. Spoornet had to reduce supply chain costs for its mining customers, so as to enable the industry to compete effectively in the global market, save jobs and sustain the country's economy.

The following is an example of fibre product handling that illustrates how the product moves down the supply chain. This example is an extract from Walters (1999) where the author illustrates how an inefficient supply chain can impact on the production and cost of a product:

EXAMPLE:

- Storage of fibre in commodity warehouses (140 days)
- Buy fibre and move to spinners (11 days)
- At spinners:
  - Store raw fibre (21 days)
  - Spin to form yarn (13 days)
  - Store yarn as finished good (11 days)
- Buy yarn and move to knitters (8 days)
- At knitters:
  - Store yarn (6 days)
  - Knit to form fabric (9 days)
  - Store work in progress as grey stock (12 days)
  - Dye standard colour and finish fabric (7 days)
  - Store fabric as finished goods (8 days)
- Buy fabric and move to Augulla Limited (7 days)
- At Augulla Limited:
  - Store fabric (12 days)
  - Cut to form components (5 days)
  - Store buffer of components (6 days)

- Sew components to form garments (14 days)
- Store garments as finished goods (18 days)

- Deliver to regional distribution centre and store (21 days)
- Deliver to local wholesalers and store (17 days)
- Deliver to retail shops and store (19 days)

When one looks at the above example, one discovers that it takes about 365 days for material to move through the supply chain. However, the main operations of spinning, knitting, dyeing, cutting and sewing take only 48 days while the rest of the time is taken up by various aspects of logistics.

This example supports the decision to conduct the study, as research into logistics in order to suggest improvements is important, mainly because the standard of logistics impacts on the performance of all the role players in the value chain at a number of levels. At the firm level high transport costs incurred by inefficient logistics would be passed on to the firm and eventually to shareholders. Guneri (2007) points out that, beside the costs incurred by goods, transportation absorbs a larger cost than any other logistics activity. Those costs will finally be absorbed by the product that a consumer wishes to purchase.

Another reason for improving logistics activities is that South Africa is far from its global markets, especially the United Kingdom (UK), the United States of America (USA), Germany and Japan, which account for 33% of the country's exports. Most of the regions that compete with South Africa, such as South East Asia, Eastern Europe, South America and Australia, are not that far from their markets (Department of Transport [DoT], 2006).

The idea that supply chains should be integrated by paying special attention to those activities that connect them in the ports was investigated and is extended in this paper. The discussion also focuses on the role that logistics play in adding value to goods. An attempt has been made to provide some solutions to Robinson (2002:252) paper that questions the specific role that ports play in the new environment which is characterized by "globalization of markets, productions, finances and distributions where corporatization and privatization of third party service providers create an exceptionally fluid and competitive situation".

The South African Business Guide (2006/2007) and DoT (2006) indicate that South Africa has experienced growth in freight traffic 14 years earlier than expected. The literature review has shown that freight traffic also contributes to high logistics costs. Therefore, for the country to support sustained economic growth, it needs to be effective and efficient in its logistics system. In order to meet the needs for improving logistics activities, the DoT developed a National Freight Logistics Strategy (NFLS). This NFLS was formulated to meet the vision as set out in the White Paper of 1996: 4:

> " Provide safe, reliable, effective, efficient and fully integrated transport operations and infrastructure which will best meet the needs of freight and passenger customers at improved levels of service and cost in a fashion which supports government strategies for economic and social development, whilst being environmentally and economically sustainable."

The aim of the NFLS was in response to the freight system's inability to fulfil the demand for cargo movement at a reasonable price, and to render quality service at acceptable levels.

In 2006 the DoT pointed out that, at the meeting of transport ministers in Addis Ababa in 2002, transport costs had been raised as the main cause that prevented African countries from being globally competitive.

As the South African government's intention has subsequently been to make freight transport central to the economic development of the country (DoT, 2006), this research attempted to provide solutions for the logistics problems faced by ports.

In this regard, the research focused on steel in break-bulk components. In eastern and southern Africa broken bulk has been a rapidly growing area of trade since 1997, especially with Europe and Asian countries (Transport World Africa [TWA], 2004). Both Durban and Richards Bay ports process steel and each port has a different strategy and specialization to access markets.

In both ports bulk (goods that are not packed) and break-bulk (packaged goods) products are processed. Parker and Van Zyl (2004) point out that Durban Port is the busiest port on the continent, as it handles about 44% of South Africa's break-bulk cargo and 61% of containerized cargo. Van Coller et *al.* (s.a.) also mention that bulk- and break-bulk cargo form important components of the port's cargo handling activities.

Figure 1 below illustrates that during the year 2004, Richards Bay port handled about 80 million tonnes of bulk cargo and about 5 million tonnes of break-bulk cargo. Durban Port handled about 33 million tonnes of bulk cargo and about 8 million tonnes of break-bulk cargo. It is evident that high tonnage of steel products flowed through Durban during the years 2005 and 2006. Table 1 below

indicates that, in 2005/2006, Richards Bay Port handled no break-bulk cargo, whereas Durban Port handled 81,568 tonnes of break-bulk cargo.

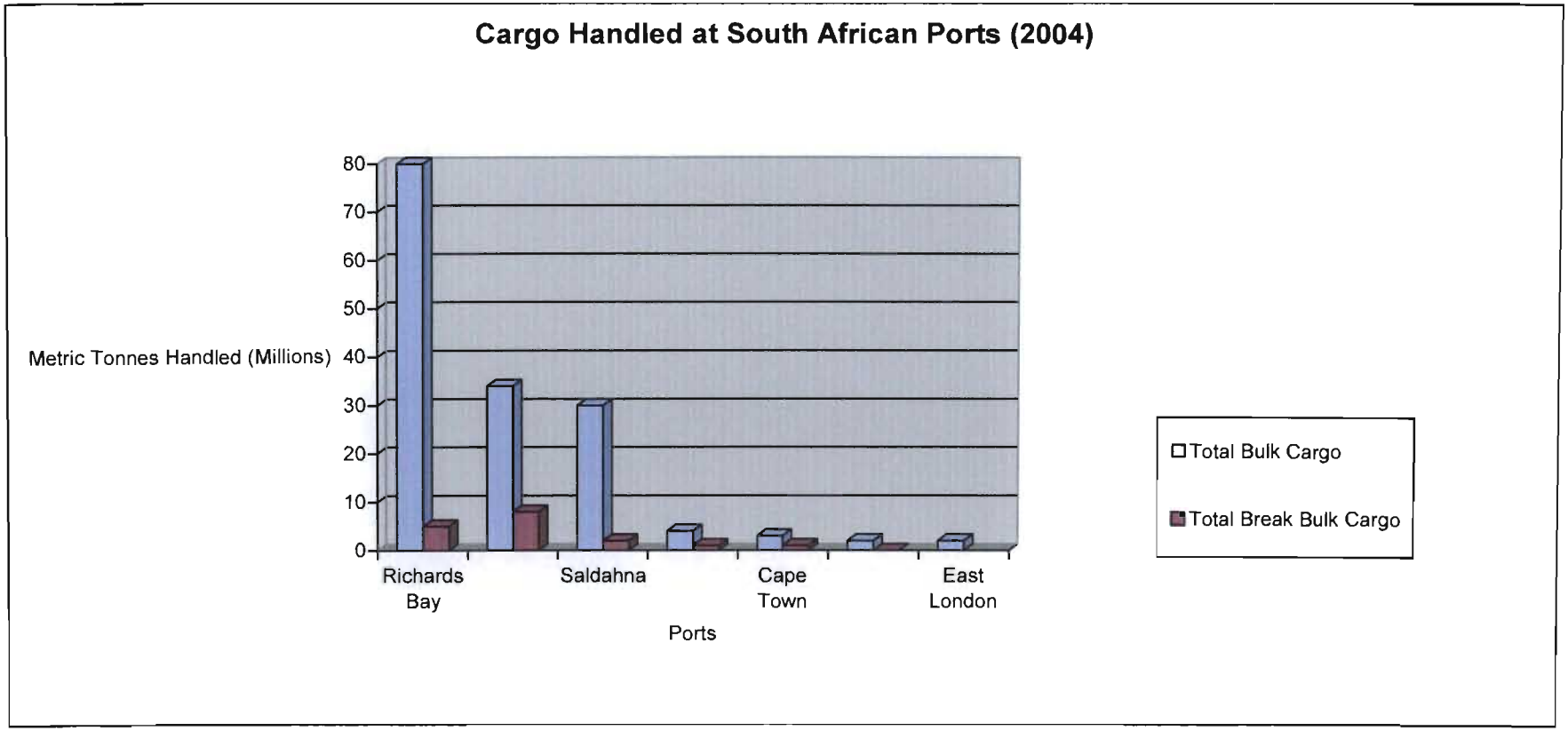


Figure 1: Cargo handled at South African ports (2004). Source: NPA statistics as cited in www.transport.gov

Table 1: Summary of cargo handled at ports of South Africa in 2006, expressed in metric tonnes. Source: NPA, 2006, April 2005 - March 2006.

PORTS	Richards Bay	Durban	East London	Port Elizabeth	Mossel Bay	Cape Town	Saldanha
TOTAL BULK HANDLED	84,875,553	34,975,264	1,354,,337	3,116,274	1,396,077	3,088,075	35,467,475
TOTAL BREAK-BULK HANDLED	-	81,568	36	331	-	60,960	-

Van Coller *et al.* (s.a.) point out that Durban Port is the largest of the Southern Africa ports in terms of the value of cargo handled per annum and the second largest in terms of cargo tonnage handled per annum. Table 2 below illustrates Durban Port as compared to other South African ports in terms of activity levels in 2006. Table 2 also illustrates that the gross tonnage of cargo handled by Durban Port was 24.4% of the total tonnage handled by all South African ports.

Table 2. Cargo handled and vessel arrivals, SA ports (Jan - Dec 2006), Source: Van Coller, s.a..

Port	Cargo Handled		Vessel Arrivals	
	('000 M. Tonnes)	%	No.	Gross Tonnage ('000)
Cape Town	4,135	*2.3*	4044	47,625
Durban	43,861	*24.4*	4566	96,660
East London	1,506	*0.8*	332	8,154
Mossel Bay	1,519	*0.8*	2548	2,887
Port Elizabeth	4,871	*2.7*	1634	27,446
Richards Bay	86,319	*48.0*	1575	57,080
Saldanha	37,773	*21.0*	492	24,206
Total	**179,984**	***100.0***	**14191**	**264,059**

Although movement of cargo is now rapidly changing from break-bulk to containers, Table 3 below indicates that, over a period of ten years, the total cargo handled as break-bulk by Durban Port decreased by 5,1%. However, there are those goods which are still being moved as break-bulk cargo. These goods arrive at the port and docks as pallets in trucks or in rail wagons. On arrival at the port they are unloaded and hoisted by net cranes off the docks into ships. This kind of movement of goods is slow, labour intensive and expensive.

Table 3: Cargo movements in Durban Port: 2005/6 compared to 1996/7.
Source: Van Coller, s.a..

Million Tonnes	Landed	Shipped	Total	% of Total
1996/7:				
Containerized	8.8	8.1	16.9	29.9 %
Break-bulk	2.8	6.0	8.8	15.6 %
Bulk	21.4	9.4	30.8	54.5 %
Total	**33.0**	**23.5**	**56.5**	**100.0 %**
%	*58.4 %*	*41.6 %*	*100.0 %*	
2005/6:				
Containerized	16.4	13.2	29.6	*41.0 %*
Break-bulk	3.7	3.9	7.6	*10.5 %*
Bulk	26.6	8.4	35.0	*48.5 %*
Total	**46.7**	**25.5**	**72.2**	***100.0 %***
%	*64.7 %*	*35.3 %*	*100.0 %*	

Table 4 below illustrates imports and exports of bulk- and break-bulk cargo through Durban Port over the past ten years. The table also illustrates the average decline of both exports and imports over the past ten years. It indicates that although average growth of import of break-bulk cargo has increased, generally the average growth of imports and exports of break-bulk cargo has decreased by 1,6% over the past 10 years.

Table 4: Break- & break-bulk cargo handled at Durban Port.

Source: Van Coller *et al.*, s.a.

Million Tonnes	1996/7	1999/0	2002/3	2005/6	Ave. Growth pa 1996/7 to 2005/6
IMPORTED					
Bulk	21.4	22.5	19.7	26.6	3.5 %
Break-bulk	2.8	1.7	2.0	3.7	4.0 %
Total	24.2	24.2	21.7	30.3	3.7 %
EXPORTED					
Bulk	9.4	9.1	7.3	8.4	-1.1 %
Break-bulk	6.0	5.1	4.1	3.9	-4.0 %
Total	15.4	14.2	11.4	12.3	-2.5 %
IMPTD + EXPTD					
Bulk	38.8	31.6	27.0	35.0	2.2 %
Break-bulk	8.8	6.8	6.1	7.6	-1.6 %
Total	47.6	38.4	33.1	42.6	1.6 %

Van Coller *et al.* (s.a) point out that steel imports form 8,5% of the total break-bulk imports. Table 3 indicates that break-bulk imports increased by 34% from 1996/7 to 2005/6, reaching 3,7 million tonnes.

There is some debate about the relative cost effectiveness of the two harbours. For example, there is some argument for processing higher volumes of steel at Richards Bay Port because of lower congestion and therefore lower cost. Because of Durban Port's location, it is more expensive to transport goods through Durban Port than through Richards Bay. For instance, it costs approximately R700 000 per day for a ship to queue in Durban Port, whereas the cost at Richards Bay Port is about R400 per day.

News, 2002). This calls for ports to improve their services by reducing lead times and improving their technology so that the velocity of supply chains will increase at low costs (Lysons, 2000; Competition News, 7th ed., March 2002).

Sithole (s.a.), citing the ferrous metal and granite products that are produced in South Africa and in China, points out that the customer in the UK will consider cost and the time that it will take for the ferrous metal or granite to be delivered when making a decision to purchase. So, for countries to be competitive enough, Sithole (s.a.) concludes that supply chains should be integrated. Robinson (2002) notes that firms are no longer competing as individual entities but that they compete within the supply chain. All role players in the supply chain, from the producer to the forwarding and clearing agents, and from port operations and the port authority to the shipping liners, need to work together so as to minimize lead times, improve quality and promote the efficiency of the supply chain (Sithole, s.a.). Hall and Robbins (2006:3 also stress the above point in their argument when they state:

> "Actors seek appropriate integration within supply chains in order to reduce overall transaction costs and to provide services more efficiently. This implies that actors, including ports, within a given supply chain should cooperate in order to out-compete other chains".

1.4 THE RESEARCH PROBLEM

Very little research has been done in South Africa on the role of logistics in adding value as products move through a port. Sheffi (1990), as cited in Evangelista *et al.* (2006), points out that the transportation of goods and the accompanying logistics are as important as the product itself.

Cooke (2004), as cited in Varila *et al.* (2007), points out that in their logistics survey (LS), cost control (CC) and cost reduction (CR) were the top concerns of their respondents. The problem that was researched and is reported in this paper was therefore the degree to which the efficiency of logistics activities at Durban Port added value to goods that flowed through the port. The study investigated the statement made by the Minister of Transport who said: "Durban Port is congested and value will be lost on a product if logistics are inefficient during the transportation, reception, storage and shipping stages" (Ndebele, 2003: no page no.). This statement is supported by Varila *et al.* (2007) who argue that cost efficiency of logistics processes is a necessity.

1.5 RESEARCH AIM AND OBJECTIVES

The aim of this study was to analyze logistics activities at Durban Port and to provide recommendations on how cost can be reduced so as to add value to goods passing through the port. Kaplinsky and Morris (2002:22) argue that: "...by focusing on all chain links in the chain (not just on production) and on all activities in each link, it helps to identify which activities are subject to increasing returns, and which are subject to declining returns".

This research focused on the operational logistics at Durban Port that affected the import and export of steel. Robinson (2002:343) defines a port as "a place that handles ships and cargos at operational efficiency, within an economic efficiency framework and within efficient administrative and policy frameworks". He cites Hans Peters of the World Bank and the deliberations in United Nations Conference on Trade and Development (UNACTAD) Columbia, who both describe shipping and port services as facilitators of trade.

The focus of the research was an extension of the idea that supply chains should be integrated by paying special attention to those activities that connect them in the ports. For this reason the study focused extensively on the role that logistics play in adding value to steel products. The study consequently aimed to provide some solutions to Robinson's 2002 paper that questions the specific role that ports play in:

> " the new environment which is characterised by globalization of markets, productions, finances and distributions where corporatization and privatization of third party service providers create an exceptionally fluid and competitive situation as far as steel is concerned".

1.6 RESEARCH METHODOLOGY

Specific research methodology is used to obtain information from a representative sample of individuals within an organisation. There are research methodologies which can be used for that purpose, namely qualitative and quantitative research. In quantitative research, the researcher is independent from that which is being researched and its statistical design, whereas in qualitative research the researcher interacts with that which is being researched. Meanings expressed through words are categorised and analysed using a conceptual framework (Creswell, 1994).

In this study qualitative research methodology was used. This research incorporated a mixture of primary and secondary source of information, to gain exposure to all debates surrounding steel products that move through Durban Port. The information applied will also form a basis for further investigation into issues around ports and the steel industry.

1.7 LIMITATIONS OF THE RESEARCH DESIGN

Much of the research focused on the logistics activities for steel handling as the product passed through Durban Port. The focus was on both the infrastructure of and the services rendered by the port. Due to limited time and financial resources, this study did not cover the entire value chain of the steel industry; nor were environmental groups or federal agencies interviewed.

Issues that lead to the impact that logistics have on the development of some government policies such as trade policy and transport policy were also not explored.

The logistics costs of Durban Port for the following sub-models: transport, warehousing, inventory, management and administration, were not calculated. Formulas which can be used to make these calculations are provided in the dissertation.

1.8 ASSUMPTIONS

It was assumed that no natural disasters or other unforeseen disturbances would disrupt the normal operation of Durban Port at the time of the investigations.

1.9 OVERVIEW OF THE STUDY REPORT

Chapter 1 provides the problem and its setting. The motivation for the study, the research problem, the research aim and objectives, as well as the research methodology that was used, are discussed.

Chapter 2 is a literature review. It covers an overview of Durban Port and the steel industry. It also covers issues related to economic policies and trade in developing countries. The chapter also covers policies informing the logistics and related activities that can be observed at Durban Port, with special reference to steel handling.

Chapter 3 provides details of the research methodology.

Chapter 4 presents the findings based on the research conducted. The results are presented under the following headings: equipment, warehousing, human resources and method of communication relating to steel handling at Durban Port.

Chapter 5 presents the relationship between the findings and the literature, as well as recommendations.

Chapter 6 presents a conclusion.

1.10 CONCLUSION

This chapter provided a detailed overview of the motivation for studying the logistics of handling steel at Durban Port. The importance of steel products in South Africa has been highlighted and it has also been illustrated how the product contributes to the Gross Domestic Product (GDP) of the country.

CHAPTER TWO

LITERATURE OVERVIEW

2.1 INTRODUCTION

The objective of this chapter is to review the relevant published material related to the topic of the study.

Terms which are used in this study are discussed. A brief discussion on Durban Port is presented. As the investigation was based on the handling of steel products, a discussion of the steel industry is also presented. Finally, the relationship between economic policy and ports is evaluated.

2.2 DEFINITIONS OF TERMS

For clarity, it is important to give an explanation of the following terms: logistics, supply chain management (SCM) and value chain. These terms are key concepts in this paper.

2.2.1 Logistics

Farrington (2006) points out that the term can be dated as early as the Napoleonic Wars. During that time the term was used to define the technique of moving and quartering armies. According to Hugo *et al.* (2004) and Ballou (2004), the term originated in military environments. It defined operations like design and development, acquisition, storage, movement, distribution, maintenance, evaluation and disposal of material.

In the 1900s the term was used to support organisation business strategy for distributing farm products (Lambert *et al.*, 1998). Ballou (2004) claims that the intention of the term increased during the Allied victory in World War II. Lambert *et al.* (1998) state that during the Persian Gulf War in 1990-1991, the term was used by US armed forces to describe their ability to efficiently and effectively distribute and store supplies and personnel.

Different authors have different views when it comes to the definition of this term. There are those who separate it from SCM, while others use the two terms interchangeably. Authors' definitions for this term can be grouped into three categories, as follows:

Under the first category there are those authors who treat logistics and supply chain management as two distinct concepts. They define logistics as the function responsible for the flow of goods within a single organization, and they define SCM as those operations responsible for moving goods from the point of origin to the consumer at the end, combining various organisations in the process.

Hugo *et al.* (2004) and Christopher (1998), as cited in Hugo (2004), state that logistics focus on activities, processes and management of flow of materials within an organization, whereas supply chain focuses on integrating elements of the supply chain that are beyond organizational borders.

In the second category there are those authors who treat the two terms as synonymous. Authors like Kaminki and Simchi-Levi (2000), as cited in Hugo *et al.* (2004), believe that there is no distinction between the two terms. Walters (2003) argues that some authors use the two terms 'logistics' and 'SCM' interchangeably. Other definitions also concur with those above. Ballou (2004) and Stock and Lambert (2001), as cited in Hugo *et al.* (2004), define logistics as "that part of the supply chain process that plans, implements and controls the efficient, effective flow and storage of goods, services and related information from the point of origin to the point of consumption in order to meet customers' requirements".

Walters (2003) describes logistics as "the **function** responsible for the flow of materials from suppliers into an organization, through operations within an organization, and then out to the customer".

Harrison (2001) argues that the term logistics refers "...to the management of supply chains, and incorporates the movement and storage of goods and their associated information flows from source to customer".

Botes *et al.* (2006) and Walters (2003) furthermore define logistics as "...that **part of the supply chain** that deals with transportation, warehousing and inventory management and administration of commodities between the origin and the destination".

The former Institute of Logistics and Distribution Management, as cited in DoT (2006), also provides a definition which is more or less related to what Botes *et al.*

(2006) have to offer. They define logistics as "... the management of the entire supply chain". This also concurs with Lysons' and Farrington's (2006) definition of logistics when they state the following: "Logistics is that part of the supply chain process that plans, implements and controls the efficient, effective flow and storage of goods, services and related information from the point of origin to the point of consumption in order to meet customers' requirements".

Figure 2 below illustrates all activities involved in logistics, from the inception stage where raw material is acquired, up to the end where the customer uses it as a finished product.

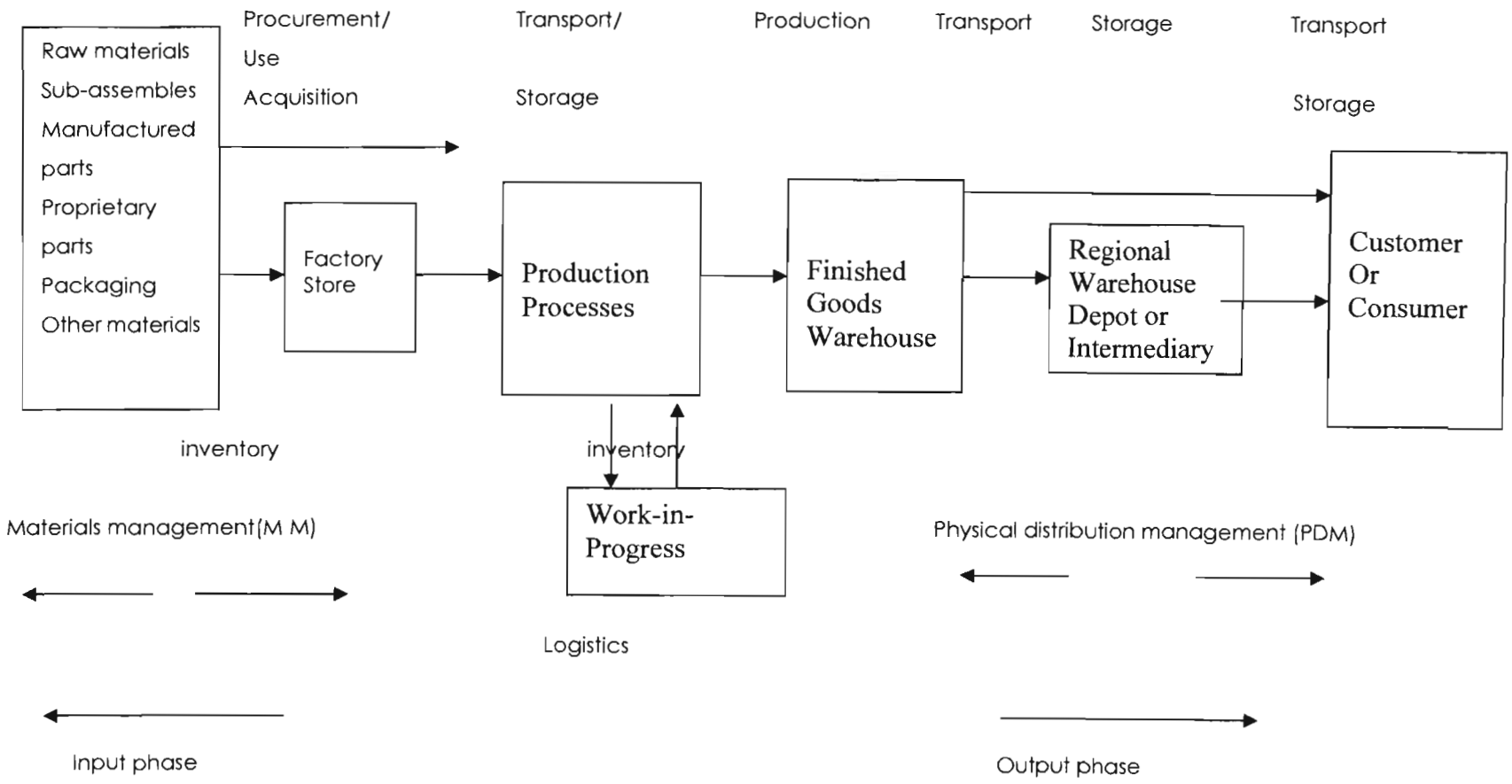


Figure 2: Scope of Logistics Management

Source: adapted from Gattomma, as cited in Lysons and Farrington (2006).

If the definitions of logistics offered above are compared, they are in line with the definition of supply chain management (SCM).

The above definitions all show that logistics form an integral part of the supply chain. In essence, the main functions are to plan, and to implement strategies to control the flow of goods, services and information so as to satisfy customers' needs. The above definitions also determine that logistics must be part of a process, which means that all activities that make it possible for the customer to acquire his goods or services in time must be involved. Harrison (2001) points out that the concept of a logistics system contains the key concepts of time and space.

Under the third category there are those authors who define SCM as an extension of logistics. Dummond (1996), as cited in Hugo (2004), claims that SCM is an extension of logistics. The definition of SCM by Hugo, Badenhorst-Weiss and Van Rooyen (2002), as cited in Hugo *et al.* (2004), confirms the view by other authors that SCM is an extension of logistics,

The term logistics in this paper is used in line with Walters's (2003) definition. He describes it as "... a function responsible for the flow of materials from suppliers into an organization, through operations within an organization, and then out to the customer ... In the case of a port, goods will flow from the producer to the port. Some operations will take place in the port, and then they will move forward to the customer".

In this investigation the term logistics was treated as a concept that included the following activities: managing the flow of steel, controlling the movement of steel, and taking responsibility for steel

cargoes by transporting, storing and handling them as they flowed through Durban Port. In this dissertation the term is used to refer to problems in relation to distribution strategy, distribution network configuration, and inventory management, warehousing management, cash–flow, sound human resources and customer relationship within Durban Port.

2.2.2 Supply Chain

Handfield and Nichols (1999), as cited in Hugo (2004), define supply chain management (SCM) as follows:

> "Supply chain encompasses all activities associated with the flow and transformation of goods from the raw material stage (extraction), through to the end user, as well as the associated information flows".

Hall and Robbins (2006) define supply chain as divided into two ideal types: the logistics chain and the value chain. According to them:

> "The logistics chain [encompasses those activities] which deal with the distribution of goods in physical space, and the value chain [encompasses those activities] which deal with inter-firm relationships in economic space ... The term supply chain encompasses both terms".

If one summarises the above definitions, one can conclude that, in a supply chain, there are both logistics activities and value activities.

When logistics activities are grouped together, they form a logistics chain; and activities that add value to goods when grouped together are called a value chain. As materials flow to the organization, they move either up or down these chains to the organization. People use different names for these chains depending on what their emphasis is. If they look at value that is added to goods as they move on the chain, they call them value chains. If their area of focus is on the supply or on the demand side, they refer to supply chain or demand chain (Walters, 2003).

Lysons and Farrington (2006) and Chistopher (1998), as cited in Hugo *et al.* (2004), define supply chain as "that network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer or customers".

2.2.3 Value Chain

As goods move through the supply chain, they keep on adding value. Hence a value chain can be defined as "a full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformations and input of various producer services), and through delivery to, finally, the consumers, and to final disposal after use" (Kaplinsky & Morris, 2002).

Wikipedia (2006) points out that a value chain is sometimes called "value chain analysis". Pearce and Robinson (1997), as cited by Coelho (1999), point out that "value chain analysis is based on the assumption that a business's basic purpose is to create value for the users of its products or services". Amit and Zott (2002) argue that a value chain framework provides an analysis of value creation at

the firm level. It decomposes the firm into its activities and then studies the economic implications of those activities. That is why value chain analysis is important in relation to Durban Port because it observes all the economic implications of activities that take place within the port, i.e. warehousing, transportation, handling and administration.

In short, a value chain can be defined as an analysis of a supply chain in terms of value that it has incurred through its value-added activities. Porter (2005) and Wikipedia(2006) point out that the concept of value chain goes beyond an individual organisation. It also applies to whole supply chains and distribution networks. Hugo *et al.* (2004) state that an integrated supply chain is sometimes called a "value integrated delivery system". They furthermore clarify that, in order to explain supply chain fully, it is important to provide clarity on some of the value concepts and to explore how the supply chain contributes to the strengthening of customer value. They refer to Michael Porter's concept of the value chain as laid out by Lyson (2000) and Porter (2005), who mention that the value-adding activities of an organization can be categorized as "primary activities" and "support activities". Both primary and support activities constitute the value chain. According to them, primary activities are those activities that generate value like inbound logistics (import), operations (production), outbound logistics (export), marketing and sales and services (maintenance). Support activities include services like administrative infrastructure management, human resource management, research and design (R&D) and procurement, as is presented in Figure 3 below. Amit and Zott (2002) define primary activities as those activities that have a direct impact on value creation, and support activities as those activities that affect value only through their impact on performance of primary activities.

Hugo *et al.* (2004) refer to support activities as value-added service, which includes support and maintenance as well as information access. Kaplinsky and Morris (2002) and Morris (2002) refer to

inbound and outbound activities as inter-linkages within the productive sector. When referred to, the term may have internal focus (inbound logistics) or external focus (outbound logistics). According to Kaplinsky and Morris (2002), Morris (2002), Porter (2005), Jacobs and Lessing (2002), Lysons (2000) and Van Weele (2000), the term inbound logistics is defined as those services which include receiving, storing, material handling, warehousing, inventory control, vehicle housing, and returns to suppliers, whereas the term outbound logistics refers to those activities which include the distribution of finished products. Thus both inbound and outbound logistics will be integral to the functioning of a port.

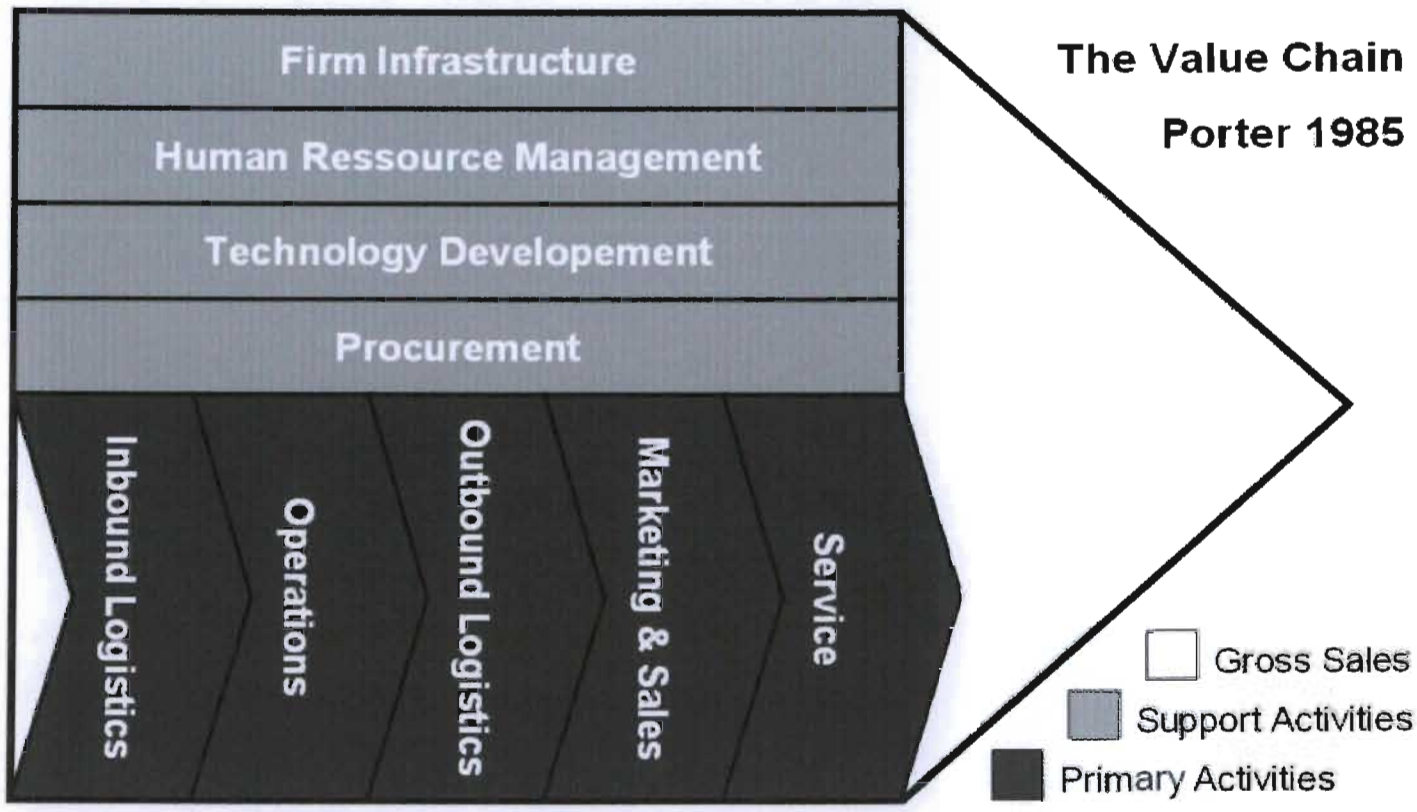


Figure 3: Value Chain Analysis: Porter (1985)

Source: Lyson (2000) and Van Weele (2000); re-drawn from Porter (1985)

For the purposes of this study, value chain analysis of steel products in Durban Port was vital because it would provide a framework for looking at the relationships between role players in the supply chain of steel products. The role players in this case were agents, producers, shipliners, transport providers, Spoornet and port staff. Value chain analysis assists in determining the value that each activity contributes to an organization (Amit & Zott, 2002).

Jacobs and Lessing (2002) point out that value could be added in an organisation by raising the value of the output or by lowering the costs of its inputs into a business. This means that the value that could be expected to accrue from ports should be generated by cutting down on unnecessary costs.

Transport and communication are the most important tools that assist in keeping value chain activities efficient (Kaplinsky & Morris, 2002; Schmitz & McCormick, 2002). Schmitz and McCormick (2002) state that, in the past, manufacturing usually happened in one place, but from the1970s up to the present enterprises have begun to rationalize and to restructure their operations. Some goods are now designed in one country, produced in another and marketed somewhere else. This means that as goods move through the supply chain, they keep on adding value at each point of the process (Schmitz & McCormick, 2002). These chains are not only taking place in one country, but they are globally integrated, e.g. in the motor and horticulture industries.

2.3 DURBAN PORT

Ports are an integral part of transport networks (Competition News, 2002). They are there for receiving ships and transferring cargo and persons to and from them. Ports play a very important role in linking up the movement of goods from land route to water routes. Each of the eight ports in South Africa has specially designed equipment to assist in the loading and unloading of exported and imported goods. The core objective of ports is to permit its country's trade to flow efficiently and to grow unhindered (Poggiolini, 2004). This paper classifies a port as an organization.

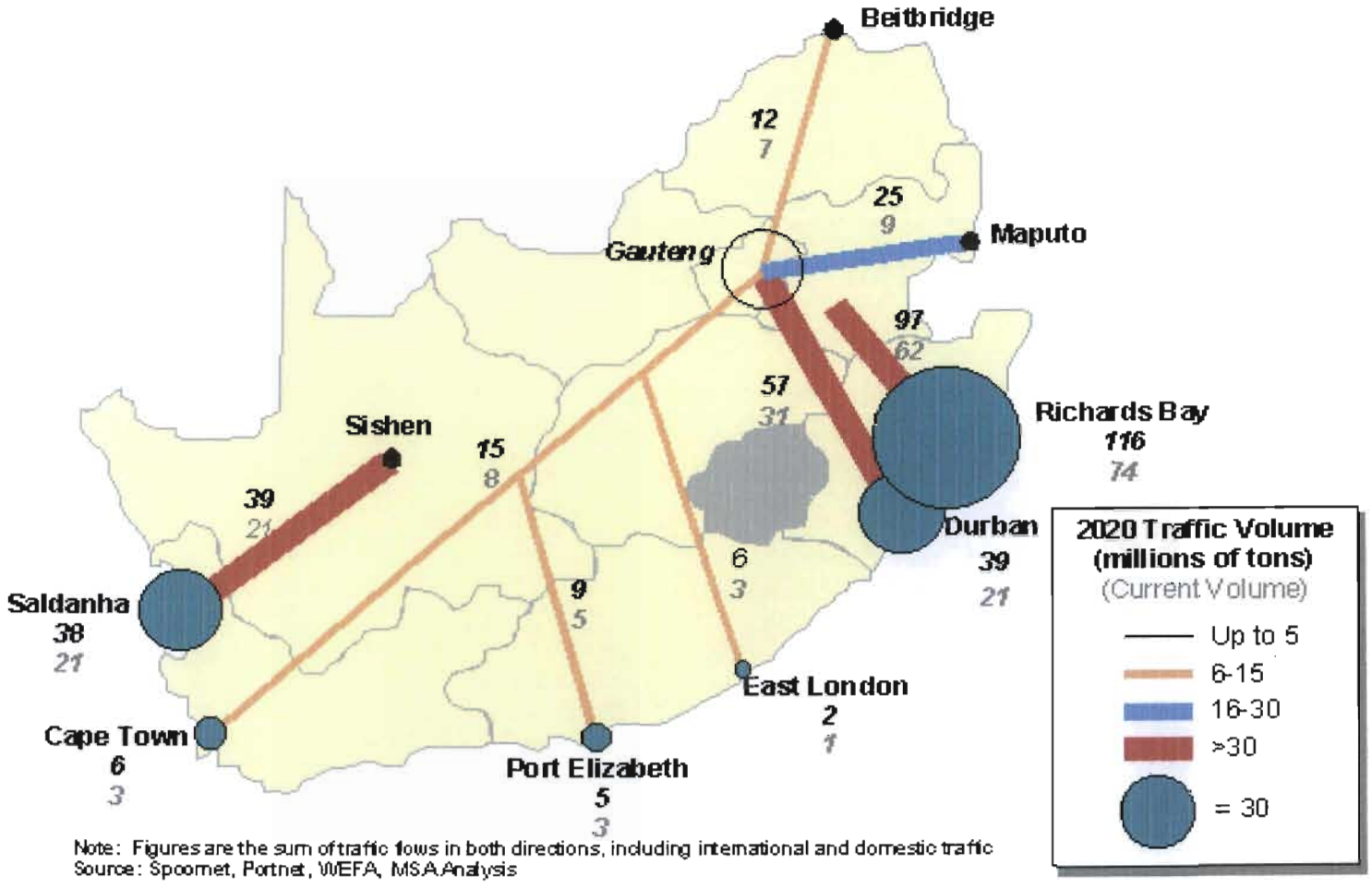
Ports are part of a country's transport infrastructure. They can be developed and maintained by both private and public sectors and they are there to serve the public interest in pursuit of socio-economic objectives (DoT, 2006).

Durban Port is a nodal point which connects a series of activities together. It is situated at the edge of the Indian Ocean. It links the world's major shipping routes, i.e. between Australia, North America, the Far East, South America and Europe. Durban Port is the largest Port in Africa in terms of value of cargo being handled. It also has the largest container terminal in the southern hemisphere (Foolchand, 2006).

Durban Port is one of the eight ports serving South Africa, as indicated in Photograph 2 below. South Africa has seven commercial ports: Durban, Cape Town, Port Elizabeth, Saldanha Bay, Richards Bay, Port of East London and Mossel Bay. They all differ in strategy and specialization to gain market share. Durban, Cape Town and Port Elizabeth mostly handle container and high value

products. Saldanha Bay and Richards Bay focus more on primary products, whereas Mossel Bay handles bulk liquid and Port of East London handles containers, bulk and cars. Coega, a new port in the Eastern Cape, is being designed to handle large vessels, containers and bulk liquids (DoT, 2006).

Moving south Africa (MSA) points out that customer demand for freight transport in South Africa is currently more concentrated on two bulk export flows, i.e. between Johannesburg and Durban, and a series of other midsized corridors, as is illustrated in Photograph 2 below. It is envisaged that future flows are also expected to follow the same pattern, but at significantly higher volumes. At the time of the study, Durban Port was handling about 21 million tonnes of cargo and it is projected that this port will be handling 39 million tonnes of goods in 2020, which will constitute an increase of about 80% in the volume of goods handled.



Photograph 2: Current (2008) and future volumes of cargo handled at SA ports

In South Africa, like in Latin America, all ports are 100% state-owned (Business Report, 2004; Barnett, 2003). This is because the government realises that ports are one key component of the logistics chain which contributes much to the final cost of many exported and imported products (Estache, Gonzalez & Trujillo, 2002).

The ports are planned, managed and controlled by the National Ports Authority (NPA), which is a division of Transnet (a state-owned company comprising a number of transport-related business units). The NPA is responsible for the development and maintenance of port infrastructure (DoT, 2006).

Arjunan (2004) points out that during 2001, Portnet was split into the National Port Authority (NPA) and the South African Port Operations (SAPO).SAPO is responsible for cargo movement operations at ports. Barnett (2003) states that the state-owned South African Port Operations (SAPO) operates 48% of cargo volumes being moved through all container terminals. Of these terminals, 77 % is break-bulk terminals and 35% is bulk terminals. Those bulk- and break-bulk terminals which are not operated by SAPO are leased to private participants (Arjunan, 2004).

Figure 4 and Table 5 below illustrate various terminals and berths in Durban Port. Figure 4 shows that Durban Port offers importers, exporters and the shipping companies a range of different terminals. Each terminal is structured in such a manner that it handles a particular form or type of cargo. Durban Port's multi-purpose terminals are privately operated (Poggiolini, 2004). Durban Port has 57 berths and over 4 000 vessels call there annually (Parker & Van Zyl, 2004).

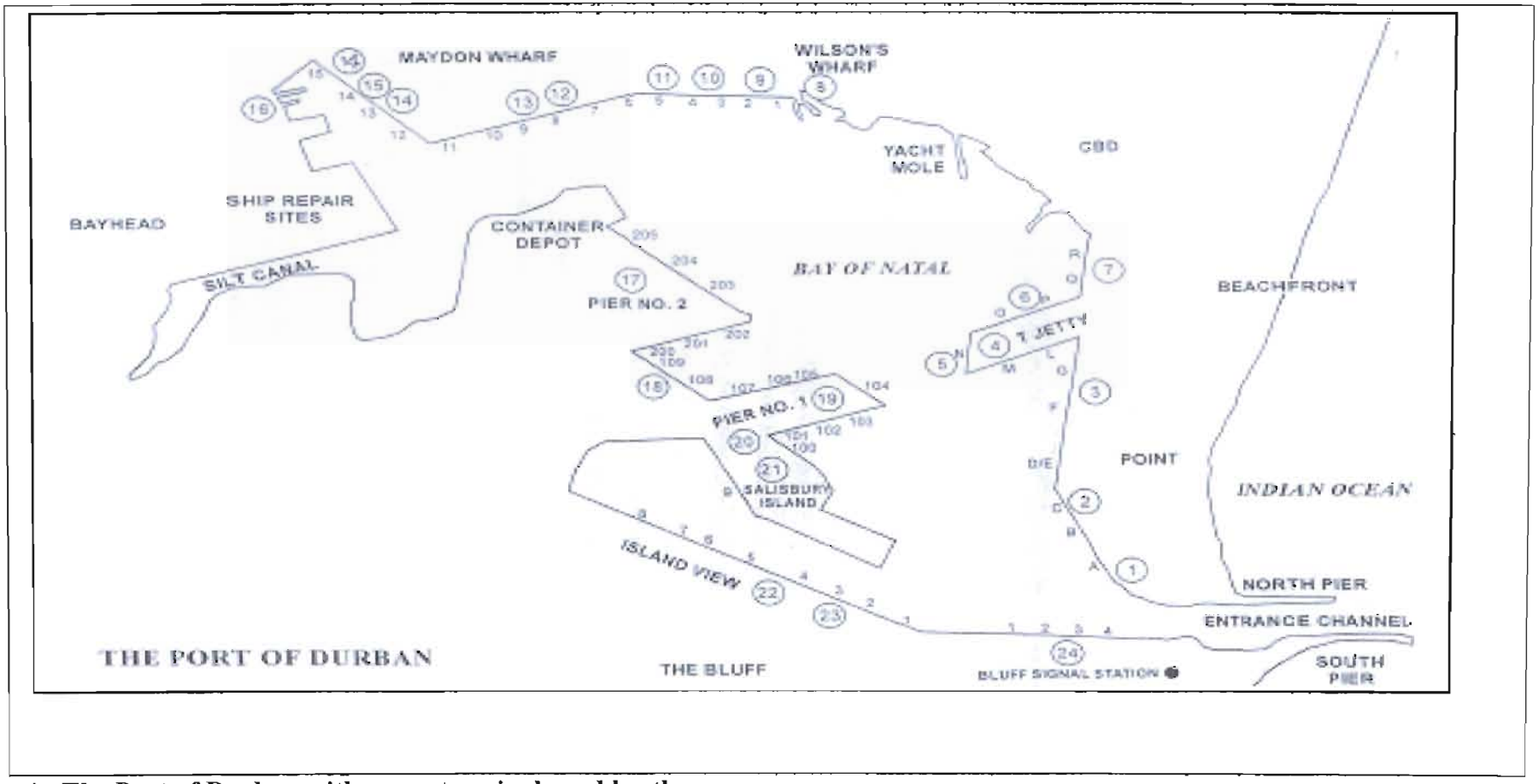


Figure 4: The Port of Durban with cargo terminals and berths
Source: Economic Devision Unit, eThekwini Municipality, extracted from: Van Coller *et al.* (s.a.).

Table 5: Terminals in Durban Port. Source: Van Coller *et al.* (s.a.)

SAPO Terminals	*Number*	*Terminal*	*Berths*
	1.	Passenger	A (proposed Point Waterfront)
	2 & 3.	Multi-Purpose (MPT)	B-G
	4.	Rice Terminal	L, M (handled by MPT)
	6.	Citrus	O, P (handled by MPT)
	7.	Vehicle	Q, R
	17.	Durban Container Terminal	200-205 Pier No.2
	18.	Coastal Terminal	108 & 109
	19.	Multi-PurposeTerminal	101-107 Pier No.1
Private Terminals:			
	Number	***Terminal***	***Berths***
	9.	Sugar Terminal*	2 (SA Sugar Association)
	10.	Unilever*	3 & 4 (Bulk Tanks operated by IVS)
	11.	Multi-Purpose Bulk*	5 (Rennies)
	12.	Pure Cane Molasses*	9 (Tate & Lyle)
	13.	Agriport Grain Terminal*	Specialist Facility
	14.	Forest Products*	13 & 15 (Bidvest & Grindrod)
	15.	Bulk Soda Ash*	14 (Brunner Mond)
	20.	Bulk Malt	100 (SA Breweries)
	22.	Bulk Liquids**	4 & 5 (IVS & van Ommeren bulk liquids)
	23.	Bulk Handling Terminal** 3	(Durban Bulk Shipping)
	24.	Coal Terminal** 1-4	(Rennies for Bulk Connections)
* and ** indicates the location of Terminal		* **Maydon Wharf**	** **Island Vie**
Other Port Facilities:			
	Number	***Facility***	***Berths***
	8.	Wilson's Wharf	Entertainment & Shopping
	—	Yacht Mole	East of Wilson's Wharf
	16.	Graving Dock	Prince Edward Graving Dock & Ship repair
	21.	Salisbury Island	SA Navy
	—	Ship Repair Sites	West Embankment of Silt Canal

This research focused only on operations in Terminals 2 and 3 where steel products are handled. Berths in those terminals are managed by Bidvest and Grindrod, as is illustrated in Figure 4 above.

This research focused on a value chain analysis of Durban Port's multi-purpose terminal unit as it appears in Table 5 above. In the Saponet overview it is pointed out that Durban Port's multi-purpose terminal is the largest general cargo handling facility in South Africa and that it is directly involved in the logistical handling of break bulk, certain other bulk and containerized cargoes. Products such as steel, ferro-alloys, granite, rice, fruit and containers are handled here. The total volumes for 2003/04 were: bulk cargo: 550,000 tonnes; break-bulk cargo: 2 million tonnes (Saponet, s.a.).

The terminal operates across twelve berths and is a combination of two separate terminals, viz. Point and Pier 1, situated on opposite sides of the port (Saponet, s.a.). SAPO is continuing to invest in these important port cogs in terms of skills and infrastructure.

At the time of the study, South African ports were being operated as monopolies, and it is expected that this operational focus will be employed for some time to come. They are regulated by the Draft Independent Port Regulator Bill of 2002 as well as the National Port Act, No. 12 of 2005.

2.4 STEEL INDUSTRY

At both the national and international levels, steel is presently in short supply, thus South Africa is both exporting and importing steel. Efficient logistics would be important in both directions. SAISI (2008) points out that the country produced 48% of the total crude steel of the continent during 2007.On the African continent, SA is the largest producer of

steel, as it produces almost 60% of Africa's total steel production (DTI, 2005; SAISI, 2008). DTI (2005) points out that from 1985 to 2003 the global trade in steel grew by 86%, which amounted to 314 million metric tonnes of steel.

The steel industry falls under the metal sector of the country's economic infrastructure. DTI (2005) points out that the metal sector manufactures basic and precious metals and produces metal products. Steel, together with iron, falls under the basic metal sector as well as under non-ferrous sub sectors. The steel sector is divided into two categories, namely carbon steel and stainless steel. Both carbon- and stainless steel are extracted from the country's raw materials. Through various processes both slab billets and flat and long products are then manufactured.

Mittal, formerly known as Iscor, is the largest primary steel producer in South Africa. In the flat product market it only competes with Highveld Steel. Mittal SA produces 84% of all flat steel in South Africa. In long product, Mittal SA competes with Highveld Steel, Scaw Metals, Cape Gate and Cisco.

As steel products move through the value chain, they pass through different stages of beneficiation. There are four stages as illustrated in Table 6 below. Stage 1 is the primary stage and stage 4 is the final stage of the production process.

Table 6. Stages of beneficiation and level achieved Source: DTI, 2005

Commodity	Stage 1 Ores/ concentrates (%)	Stage 2 Processes/ Refined Ore (%)	Stage 3 Primary Manufacturer (%)	Stage 4 Finished Manufacturer (%)
Gold	100	100	5	2
Diamonds	100	100	6	-
PGM	100	100	-	6
Iron ore to steel	100	30	30	15
Chrome to stainless steel	100	85	9	3
Coal	100	65	-	65
Aluminium	0	100	30	11
Zinc	100	100	90	60
Manganese	100	50	25	22
Titanium	100	15	4	Small
Copper	100	100	65	50
scrap	-	-	50	70

DTI (2005) presents an example which illustrates different stages of beneficiation. The department highlights the value-adding process of the automotive start at Sishen (Northern Cape) where iron ore is mined (Stage 1). At this point iron ore is upgraded from 30% to 65% iron (Stage 2). The ore is then palletized and sent to a steel mill in Vanderbijl Park (Gauteng). There it is processed into units of 300kg steel ingots (Stage 3). From this point it is sent to a near casting plant where it is transformed into a rough automotive part. These rough parts are transferred to another factory where they are

machined into finished parts (Stage 4). The finished parts are then sent to Rosslyn (Gauteng) where they are used to manufacture motorcars. The motorcars are in turn sold to auto dealers. A few years later the car has become old or was involved in an accident. The car is recycled into metal scrap which is melted and then used to produce new steel.

DTI (2005) points out that South Africa has shown a successful expansion in production at the initial stage of beneficiation. This point is demonstrated in Table 7 below. The table illustrates that that a very small proportion of most metals is beneficiated through to stage 4 here in South Africa. The major products manufactured at stage 3 and 4 are also presented in Table 7.

Table 7. Stages of beneficiation Opportunities. Source: DTI, 2005

Commodity	Stage 3 Primary Manufacturing Process	Stage 4 Finished Product
Gold	Bars, chemicals,wire	Coins, jewellery, industrial and dental products
Diamonds	Cut & polish	Jewellery, cutting tools
PGM	Bars, chemicals	Catcons, jewellery, industrial tools
Iron ore to steel	Slabs, billets, flat and long steel products	Metal products, machinery, casting tools
Chrome to stainless steel	Slabs, billets, flat and long steel products	Metal products, machinery, casting tools
Coal	Electricity, chemicals	Energy intensive products
Aluminium	Slabs, sheets, rods, extrusions, ingots	Transport vehicles; packaging, building and industrial goods, castings
Zinc	Ingots	Galvanised products, castings, batteries
Granite	Polished slabs	Tiles, measuring tables, counter tops

Manganese	EMD, alloys	Batteries, chemicals
Titanium	Pigment, metal	Pigment uses, metal products
Copper	Billet, bars, sheet, extrusions	Cable, tubing, copper alloy products
scrap	Ingot, Slab	Foundary products

Employment levels range from high in the mining industry (primary level, i.e. stages 1 & 2) to low at the refinery level (stage 3), to very high at the mass semi-manufactured and final production stage (stage 4), as depicted in Table 8 below.

Table 8. The benefits of beneficiation value-adding and employment in the carbon steel industry Source: DTI, 2005

Estimated data	Selling price per ton of steel ($)	Employment per 1000 tonnes of steel	Investment R/million per job	Stage
Iron ore	30	0.12		1
Iron	120	0.6	R2 m	2
Hot rolled steel	300	1.1	R6 m	3
Cold rolled steel	500	1.6	R8.5 m	3
	(Incremental)			
Pipe and tube	650	7	R1.5 m	3
Structural steel	1000	75	R0.1m	4
White goods	5000	100	R0.4 m	4
Mining equipment	13000	150	R0.6 m	4

2.4.1 Steel Production

Figure 5 below illustrates the production of crude steel from January 2002 to August 2008. SAISI (2008) points out that the total South African crude steel production decreased by 6,4% from 2006 to 2006. Le Roux (2008) points out that the demand for consumer goods that are made of steel (such as cars and appliances) decreased in other countries. He remarks that even manufacturing activities were reduced in 2007. Figure 6 above shows that the global production of crude steel has shown an increase since January 2002 up to August 2008.

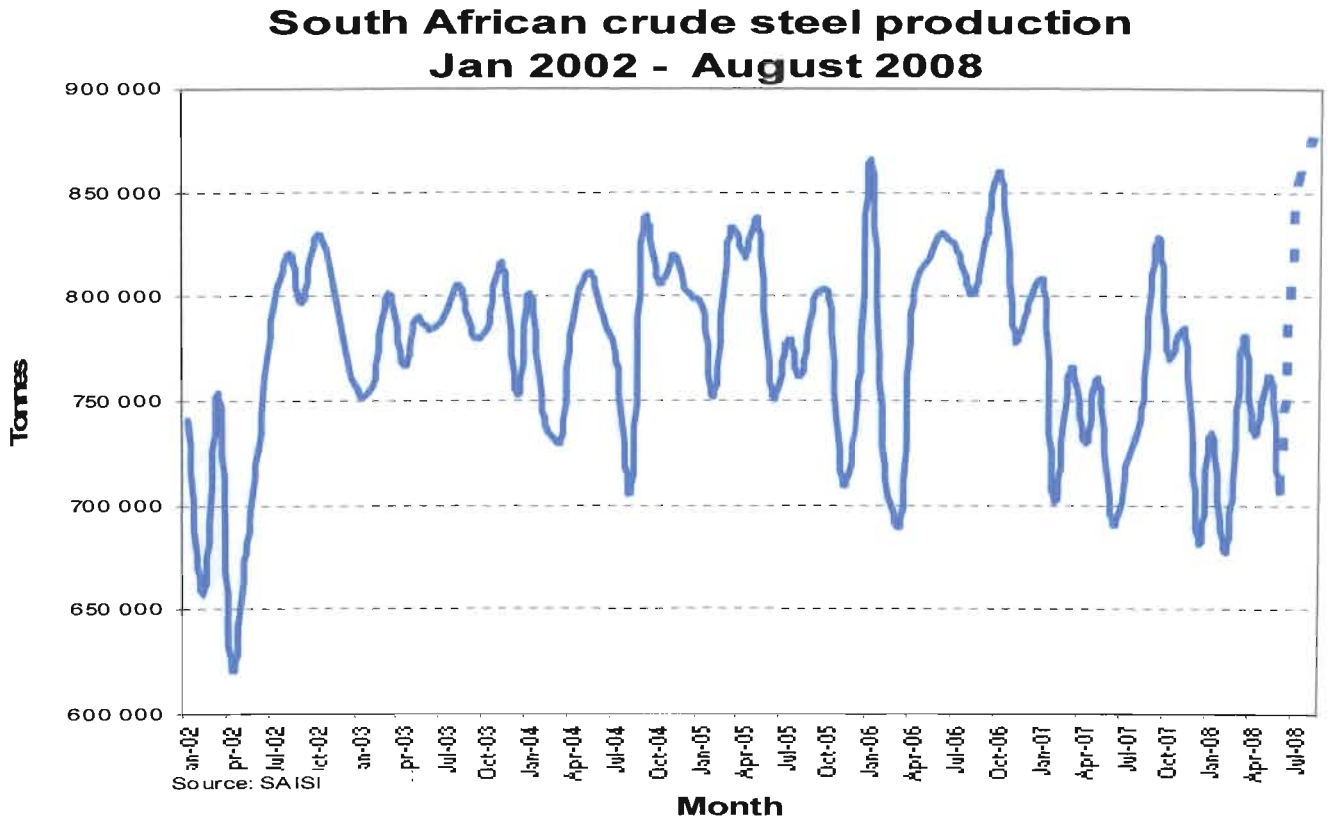


Figure. 5. South African crude steel production. January 2008 to August 2008. Source SAISI. 2008

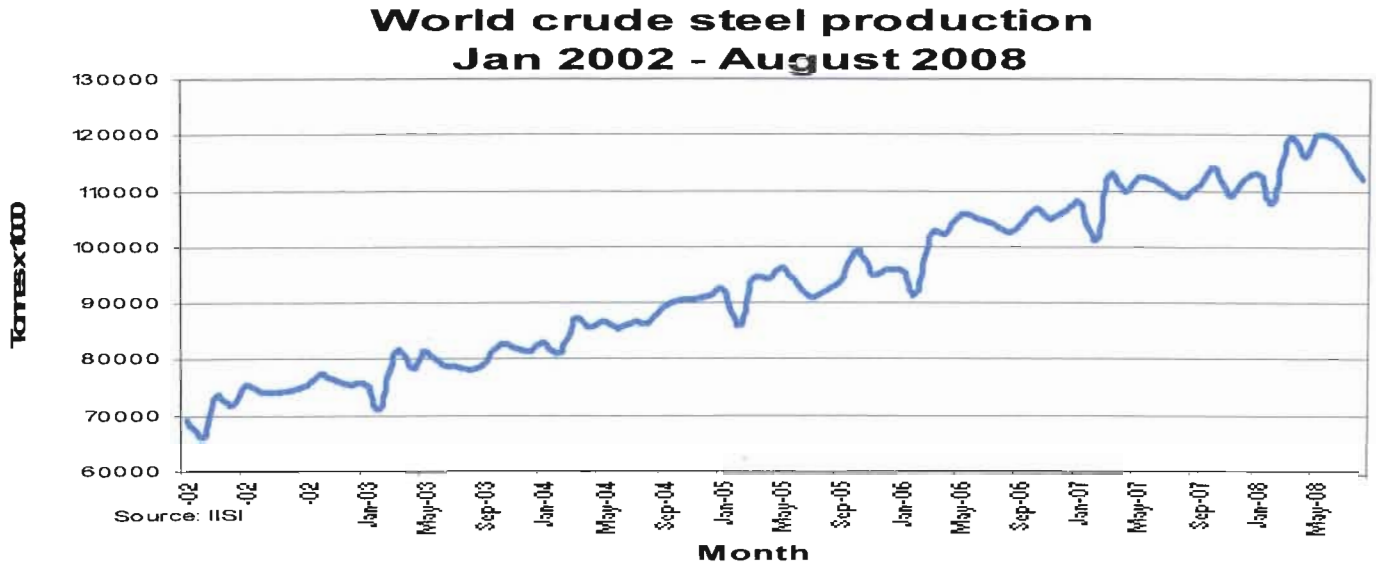


Figure 6: World crude steel production January 2002 to August 2008. Source: SAISI, 2008

2.4.2 Carbon Steel

Carbon steel is extracted and processed from iron ore. It is a combination of iron, carbon and small quantities of other elements. It is mostly used in engineering material (marine application, nuclear power and fossil fuel power plants, transportation, chemical processing, petroleum production and refining, pipelines, mining, construction, processing equipment, motor vehicles and household durables). It is produced as flat and long steel products. Flat rolled products are slabs, hot rolled plate, cold rolled coil, hot dipped galvanized coil and electro-zinc coated coil. All of these products pass through Durban Port. Other products are long wire rods, medium steel sections, reinforcing bars and merchant bars (DTI, 2005).

Carbon steel and stainless steel were the first sub-sectors which were identified by the DTI in 2005 to be given the first priority in meeting government's economic aspirations. These sub-sectors were selected because of their significant size and their high economic and low risk potential (DTI, 2005).

2.4.2.1 Global carbon steel industry

The DTI (2005) observes that there has been very slow growth in industrialized countries as far as the development of carbon steel is concerned, whereas a remarkable growth of carbon steel has been observed in developing countries, especially in China.

2.4.2.2 The South African Carbon Steel market

Primary and semi-primary carbon steel products manufactured in South Africa include billets, blooms, slabs, forgings, light- and heavy sections and bars, reinforced bars, railway track material, wire rods, seamless tubes, plates, hot and cold rolled coils and sheets, electrolytic galvanized coils and sheets, tinplates and pre-painted coils and sheets. Carbon steel deliveries by primary steel industry amounted to 7,313 million tonnes in 2007, which showed a decrease of 4,9% when compared with 2006 figures (SAISI, 2005).

Export of carbon steel in 2007 showed a decrease of 15,5% in 2007 when compared to 2006 figures. The import of carbon and alloy primary steel products during 2007 showed a decrease of 9,5% compared with 2006 figures (SAISI, 2008).

Table 9 below illustrates the consumption of carbon steel by industrial groupings. The table indicates that the overall consumption of primary carbon steel by different industrial groupings constantly increased from 2000 to 2004, except in electrical apparatus, roofing and cold forming and packaging. The biggest consumer of carbon steel is structural metal. In 2004 the biggest industrial consumer of carbon steel was building and construction, which consumed about 22% of carbon steel, followed by unallocated, cables, wire products and gates, and tubes and pipes (DTI, 2005).

Table 9: Sales of primary carbon steel to industrial groups 2000-2004.
Source: SAISI, 2005 as cited in DTI, 2005

Indusrial grouping	2000	2001	2002	2003	2004
Mining	113 380	111 911	124 995	110 500	145 813
Manufacturing	2 189 077	2 273 100	2 684 753	2 207 350	2 519 654
Packing	285 210	302 860	313 015	281 874	260 666
Structural Metal	904 366	879 894	1 069 074	781 231	982 283
Tubes & Pipes	410 068	420 387	522 588	396 253	527 610
Plate and Sheet metal works	437 605	402 683	475 010	355 571	432 319
Roofing & cold forming	56 693	56 824	71 476	29 407	22 354
Agricultural	26 704	25 354	29 415	41 509	38 558
Automotive	247 704	237 074	308 045	236 078	311 816
Electrical apparatus/white goods	51 662	51 358	56 218	54 277	49 177
Cables, wire products & gates	467 670	542 511	672 177	617 247	647 086
Fasterners	42 106	49 141	52 089	49 333	57 113
Other	163 776	184 908	184 720	145 801	172 955
Building and construction	751 046	885 206	1 033 880	864 935	966 034
Unallocated	556 792	559 747	676 817	564 701	861 605
TOTAL	3 613 295	3 829 964	4 520 445	3 747 486	4 493 106

2.4.3 Stainless steel

Stainless steel is extracted and processed from chrome. DTI (2005) points out that the name was given to a group of corrosion resistant metals that contains at least 10,5% of chromium and varying amounts of nickel, molybdenum, titanium, niobium, nitrogen and other elements. Four types of stainless steel are identified: martensitic, ferritic, austenitic and duplex stainless steel. Stainless steel can be classified into flat and long products and ingots. The main South African producers of stainless steel do not produce long products.

2.4.3.1 The global stainless steel

DTI (2005) points out that China is the dominant market for hot rolled coil, followed by South Korea, Western Europe and Taiwan. South Korea and Taiwan are leading in converting hot rolled into cold rolled coil for supply to the Asian market. Western Europe is the largest market for cold rolled coil followed by China. Europe is the largest market for long product followed by China and Japan.

Europe and Japan are the largest exporters of stainless steel, whereas China, South Korea and the USA are net importers of this product. The biggest global stainless steel consumption in 2003 was the hardware industry, which consumed approximately 18% of all stainless steel. Process industries consumed 17% of the product (when?) (DTI, 2005).

A study by DTI (2005) shows that most established manufacturers formerly using stainless steel in Western Europe have shifted to Asia and Eastern Europe to enjoy the benefits of low costs of labour and production and government incentives offered by those countries.

2.4.3.2 The South African Stainless Steel Market

SAISI (2005) points out that the range of primary stainless steel products and semi-finished products manufactured in South Africa includes slabs, plates and hot- and cold rolled coils and sheets.

Columbus Stainless is the dominant producer of stainless steel in South Africa and this company is the net exporter of stainless steel, with export increasing due to increased production and weak domestic demand. More than 80% of the products manufactured by Columbus Stainless is exported to European markets and this is favoured by the EU-South African free trade agreement where there are zero duties. Other markets are USA and various markets in East Asia (DTI, 2005). The biggest consumer of stainless steel is the distributor, followed by the automotive sector and the tube and pipe sector as illustrated in Table 10 below.

Table 10: South African Stainless Steel Demand 2003 and 2004. Source: DTI, 2005

Sector	2003	2004	Growth rate
Automotive	38 900	44 080	13,3
Tank Container	14 400	6 626	-54,0
Tubes & Pipe	15 800	9 707	-38,6
Domestic Ware	4 100	3 311	-19,3
Distributors	43 400	45 204	4,2
Foundries/Long Products	3 700	4 019	8,6
Total	120 300	112 947	-6,1

2.5 IMPORTS

China is the largest steel market in the world. In 2004 it consumed about 25% of the total world steel production. In recent years China has made massive investments in large-scale steel plants and will become less reliant on imports. The graph below indicates that the Far East is the leader in steel imports (DTI, 2005). Figure 7 below indicates that most of the steel consumed from 2006 - 2008 was coming from the Far East.

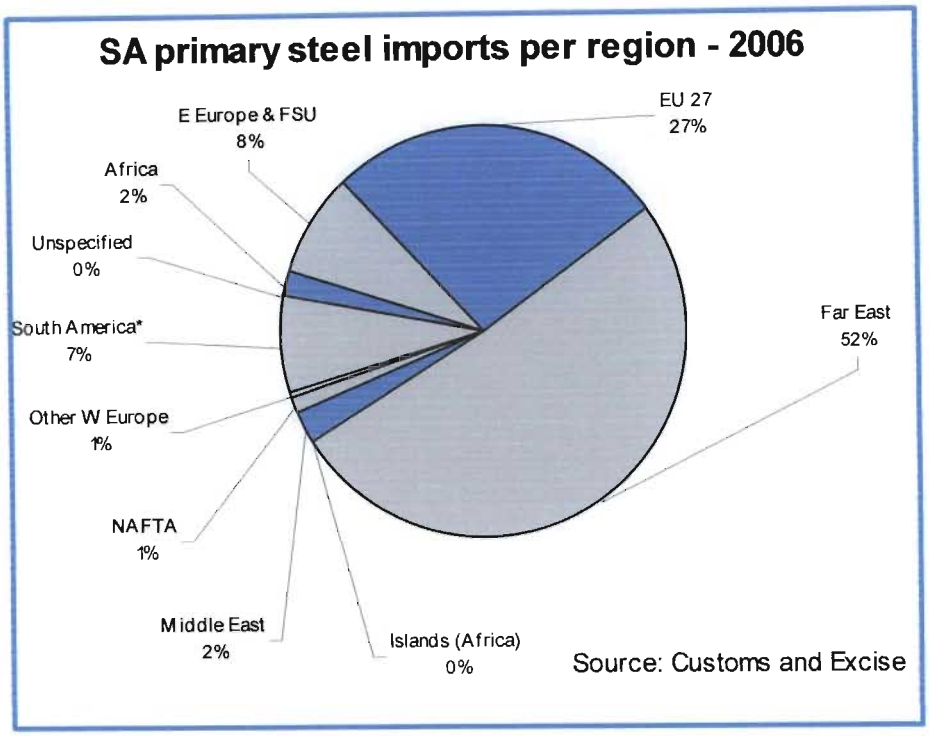


Figure 7: SA primary steel imports per region - 2006. Source: Customs and Excise as cited in SAISI, 2008

Figure 8 below indicates that the region that imported most of SA primary steel in 2007 was Far East which imported 42% and it was followed by EU with its import of 39%.Africa only imported about 1% of SA primary steel. In 2008 the import of SA primary steel increased by 11% when compared with 2007 figures and that of Far East increased by 5% as illustrated in figure 8 and figure 9 below. Imports os SA primary steel product did not show any change from 2007 and 2008 figures.

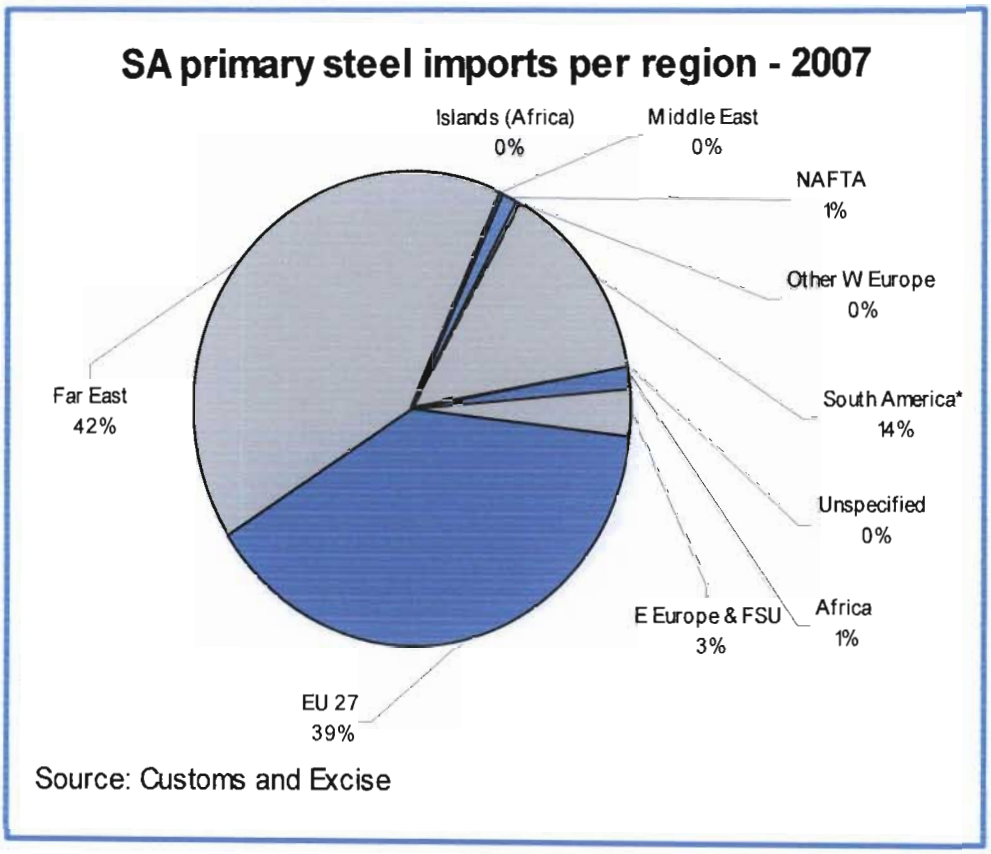


Figure 8: SA primary steel imports per region - 2007. Source: Customs and Excise as cited in SAISI, **2008**

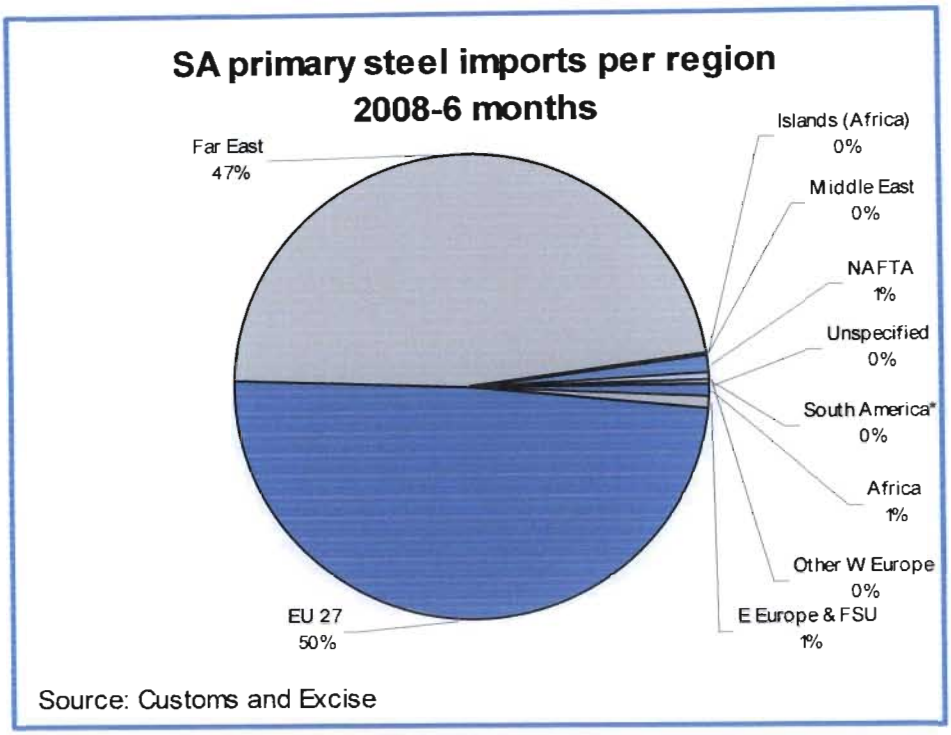


Figure 9: SA primary steel imports per region 2008 - 6 months. Source: Customs and Excise as cited in SAISI, **2008.**

2.6 PROBLEMS FACING THE STEEL INDUSTRY

The problem of overpricing steel products here in South Africa resulted in Mittal Steel being charged by two gold mining companies in 2006. Harmony Gold and Durban Roodepoort Deep Gold pointed out that it was cheaper for them to buy steel in Papua, New Guinea, than to buy it in South Africa (Anon., 2006).

Buyers in SA pay more than buyers in EU for basic metals. Table 11 underneath illustrates this:

Table 11: Mark-ups of the prices of basic metals 2003/2004. Source: DTI, 2005

	Carbon Steel	Stainless steel	Aluminium
SA net export price	100	100	100
EU price	122	120-139	107
East Asian price	101	113	104
SA buyer price	146	130	105-109

Steel companies recently lost a price fixing case through the competition policy tribunal and this is likely to result in stronger competition among steel suppliers. One of the reasons that was mentioned by those companies that were complaining about South African steel was Mittal's import parity price policy. They argued that companies were selling steel at prices that included freight charges (Hassen, 2006). Studies by Lahikainen *et al.* (2000l) and Sievanen *et a.l* (2004), as cited in Varila *et al.* (2007), found that cost accounting systems in companies had not been properly controlled, and they argued that this could only be done by accurate monitoring of logistics processes.

As Mittal is the largest steel company in South Africa, it also controls the price of steel products. DTI (2005) and Brown (2006) point out that the price of steel is regulated and it depends on the fluctuation of currency. Prices are in turn determined by international prices and exchange rates. Based on the complaints about Mittal SA's high prices, Arcelor Mittal announced that they would cut the price of long and flat steel by 10%, which translated into is R1000 per ton. This

price reduction would be followed by another 5% price cut which was introduced at the beginning of October 2008. (Le Roux, 2008).

Le Roux points out that Mittal sets its prices in comparison with those of Germany, China, Russia and the USA, and that they also take into consideration market movements and exchange volatility. The DTI (2005) points out those performances of firms could be enhanced by introducing competitive prices and better market access.

2.7 CHANGES IN ECONOMIC POLICY AND TRADE IN DEVELOPING COUNTRIES AND THE GROWING IMPORTANCE OF PORTS

A country's trade policy is influenced by the development theories of the time. After World WAR II and up to the 1960s, the development of countries was measured in terms of their modernization. During that time development theory was largely based on state intervention and states were expected to accelerate national growth. For countries to be considered developed, they had to change their traditional values, attitudes, practices, social structures and way of life to a western model (Leys, 1996). Since developing countries were not able to finance large scale industrialization because the main form of income was from export of raw materials, they were largely dependent on developed countries for manufactured goods. This means that during that era, goods moving through ports benefited industrialized countries because developing countries were paying high prices for importing manufactured goods, while industrialized countries were paying low prices for importing primary products.

After observing the deterioration of trade in developing countries, Latin American structuralists and theorists like Prebisch, Hans Singer and later the Swedish economist Gunnar Myrdal, concluded that third world countries should industrialize and produce their own manufactured goods. Although Prebish's original emphasis on import substitution (ISI) was retained, countries had to adjust their state-oriented approaches to market-dominated strategies. Some countries, including Brazil, tried to combine import substitution industrialization with export-oriented industrial development strategies because of the limited purchasing power of local markets. However, extensive protection of domestic industries during the first stage resulted in companies failing to compete in international markets and as a result industrial growth declined and most countries had balance of payment problems and public deficits (Martinussen, 1997).

During the 1980s, neo-liberal theory was introduced, where countries were encouraged to open up their markets, reduce tariffs and deregulate. According to Leys (1996), this approach originated from the United Kingdom and most European industrial countries followed suit. During 1993, upon conclusion of the 'Uruguay Round' of the General Agreement on Tariffs and Trade (GATT), global free trade was further extended to include the agricultural sector. Other reductions in the regulatory powers of most industrial countries were imposed by the European Union's single Market and Maastricht Treaties and the North American Free Trade (NAFT)

Considering this era of open markets and increasing globalization, one can conclude that ports have a more significant role to play in the global economy. However, within competitive markets, prices of final products should be reasonable, so ports should eliminate unnecessary costs by improving logistics strategies (Araujo *et al.*, 2005). Jacobs and Lessing (2002) point out that value could be added in an organisation, either by raising the value of the output, or by lowering the costs of its

inputs into a business. This suggests that ports can add value to a product by cutting down on unnecessary costs.

2.8 POLICIES INFORMING FREIGHT LOGISTICS

During the apartheid era, the trade policy for South Africa contained some elements of ISI through the protection of local industries from competition using import tariffs. During the 1980s, South Africa's industrial policy started to shift towards tariff reform and the privatization of some state-owned properties (Bezuidenhout, 2001). Because of sanctions, which were imposed on South Africa by most countries, declining terms of trade were observed in that era.

After the democratic election in 1994, South Africa began to adopt neoliberal economic policies by opening up to international markets, reducing tariffs and deregulating markets.

Ports are seen as playing a big role in relation to developmental policies. Especially during the era of globalization, the fluidity of goods and services has contributed much to the importance of ports and their efficient running in delivering goods at minimal costs.

The country's initial strategy for economic growth was the Reconstruction and Development Programme (RDP) which was transformed into the Growth, Equity and Redistribution (GEAR) programme in 1996. South Africa's re-entry into the

global economy and its stronger integration into the increasingly competitive global market, have demand that international standards be met on goods produced and services rendered. The service provided by South African ports is no exception in this context. The National Department of Transport Draft White Paper (2001:7) points out that commercial port play a crucial role in South Africa's transport system and its economic development. Furthermore, it indicates that their efficiency serves as a catalyst for increased trade and provides a comparative advantage for international trade. The paper also points out that the policy governing a port's operations "...seeks to contribute to the attainment of the objectives of both the RDP and GEAR, particularly those that relate to building the economy, promoting exports and investments and developing human resources"

A new economic strategy for South Africa, which is called the "Accelerated and Shared Growth Initiative for South Africa" (ASGISA), also indicates that ports play an important role in the economy of the country. The policy includes marketing, easy entry into SA for the expansion of existing business process outsourcing operations, skills development, simplifying administrative procedures and other investment incentives (DTI, 2007). Other policies that support the national logistics strategy framework are: the Integrated Industrial Strategy, the Micro economic Reform Strategy, Motor Industry Development Plan, Black Economic Empowerment Strategy, Agricultural Strategy, White Paper on National Transport Policy, White Paper on National Commercial Ports Policy, White Paper on National Policy on Airports and Airspace Management, Moving South Africa: The Action Agenda, Road Traffic Act, National Land Transport Transition Act, National Land Transport Strategic Framework and National Transport Policy, and Moving South Africa Strategy, which all point out the role of freight movement in improving economic growth.

2.9. CONCLUSION

Various definitions by a number of authors revealed that some believe that logistics and supply chain management are synonymous, but that others treat these terms separately. These latter authors refer to logistics as the flow of goods or services within an organization, and to supply chain management as the flow of goods or services from suppliers during the inception stage into a number of organizations for various processes and then to the consumer at the end as the final product. Therefore, based on the definitions provided by these various authors, a distinction between logistics and supply chain management has been determined.

Value chain is an analysis of supply chains in terms of value. According to Porter (2005), value chain activities can be categorized into primary activities and support activities. Primary activities are those activities that generate value, like inbound logistics, outbound logistics, marketing, sales and services. Support activities are activities like administrative responsibilities, infrastructure management, human resource management, research and design and procurement.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter offers a discussion of the research methodology that was used to obtain information from a representative sample of individuals from Durban Port on various issues discussed under section 1.3 and 1.4 in Chapter 1.

Based on Creswell's (1994) definition, the research design which was employed in this study can be defined as a case study. Denscombe (1998) points out that a case study approach spotlights on one instance; it is an in-depth study; it focuses on relationships and processes; and it also allows the researcher to use multiple sources and multiple methods. Because of the above characteristics of a case study it lends itself to a qualitative approach. The advantages of a qualitative approach in this research was that it allowed the researcher to form an understanding of the efficiency of operations in Durban Port through semi-structured interviews. As specialized managers in port operations are limited, using a qualitative approach assisted in obtaining more information on effective port operations.

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Questionnaires and semi-structured interviews were used to obtain information from key informants as they appear in Table 12 below. The research method, research design, types of data collected, data collected, reproduction of information and sampling used in the research process are discussed. The research findings were used to address the research problem.

3.2 RESEARCH METHOD

The research method employed in this study was a qualitative approach. To this end, a field study was conducted. The researcher went into the field (Durban Port) and observed the situation in its natural state so as to gather information. The major advantage of qualitative research is that findings often have greater validity and are less artificial than when other methods are employed (MANCOSA, 2000).

The researcher also designed questionnaires specifically for exporters and importers of steel products that pass through Durban Port. The purpose of those questionnaires was to obtain an understanding of operations within Durban Port. Companies in the steel industry to whom questionnaires were administered were Arcelor Mittal, Colombus and Toyota.

3.3 RESEARCH DESIGN

The methodologies for value chain studies, as specified by Porter (2005), were used to analyse the value that was added to steel that passed through Durban Port. Cresswell (1994) points out that there are several traditions which are offered by human and social sciences in a qualitative approach. Moreover, he argues that these traditions may include all phases of the research process which include method types for data collection, analysis and report writing. The tradition that was followed in this study falls under research design, which is termed a "case study". Cresswell (1994) describes a case study as a research design where a researcher explores a single entity and collects detailed information through various types of data collection procedures during a particular period of time. The advantage of

applying a case study approach in this research was that it allowed the researcher to use a variety of sources, a variety of types of data and a variety of research methods (Denscumbe, 1998).

3.4 SOURCES

Both internal and external data were collected. The internal data were generated through site observation and individual interviews with Durban Port staff members. External data sources were generated through public domain sources like documents, annual reports, newspapers, journals, reference libraries and the CSIR.

Data sources employed were primary, secondary and tertiary data. Blakie (2000) defines these three types of data as follows:

Primary data are those forms of information that are collected by the researcher. In this case it was site observation. Wegner (1993) defines it as "that type of data that is captured by the researcher at the point where it is generated". The advantage of such data is that the data are captured with a specific purpose in mind. The information gathered is directly relevant to the problem under investigation. It also offers greater control over data accuracy, but it is time consuming and expensive.

Secondary data are elements of information collected by other researchers and used in their raw form, whereas tertiary data are secondary data that have also been analysed by others. The advantages of such data are that are that they are existent,

access time is short and it is inexpensive to access the data. The disadvantages of secondary and tertiary data are that they may not be specific to the problem at hand, and they may be subject to further manipulation (Wegner, 1993). In this research secondary data was used in order to understand concepts underpinning the role of logistics in adding value to goods that pass through Durban Port.

Academics who had done some work at Durban Port were consulted and they assisted in procuring a lot of information and advising the researcher on sites to visit for further information.

It was not easy to get access to SAPO. However, I was finally granted permission by the Operations Manager of the Multi-purpose Terminal at Durban Port. The staff members whom I met were very keen to be of assistance. Finally an interview was conducted with each of two operations managers, two staff members from shipliners, one berth manager, one person from the warehouse, and one from the administration department. The main problem that I encountered during my interviews with the relevant stakeholders (like the persons from the shippers' organisation and the truck driver, as well as the SAPO staff), was that they were reluctant to disclose certain information, especially information relating to costs. I was even told that they would not disclose that information because I might one day think of opening my own business and become their competitor.

As ports constitute a significant part of the transport network, I felt that it was imperative to obtain the views of these employees, and I went to great lengths to arrange and conduct electronic interviews with one representative from Spoornet and a truck driver from the steel industry.

Two government officials (one person was from the local Economic Development Department and the other one was from the Department of Trade and Industry) were willing to provide me with lots of information.

3.5 SAMPLING

According to Wegner (1993), not every member of the population is observable or measurable because of time, costs and possible destruction. Even in this study a subset of the Durban Port population was utilised.

In this study a number of primary research techniques were applied for gathering of data, although the most extensive one was informal interviews. Fourteen key informants were interviewed as presented. in Table 6 below:

Table 12: List of Interview Respondents

RESPONDENTS	NO OF INTERVIEWEES
Academics	2
South African Ports Authority (SAPO)	2
Dept of Transport and Industry (DTI)	1
Dept of Economic Development	1
Shippers' Organisation	2
Spoornet	1
Shipliners	2
SAPO administration	1
SAPO warehouse	1
Truck Driver	1
TOTAL:	**14**

Over and above these interviews, questionnaires were also administered to ten key informants from exporters and importers of steel. Three exporters were from Arcelor Mittal; two were from Colombus; and five were from Toyota. Questionnaires had been designed in such a way they probed respondents' opinions. The responses to the questionnaires and the interviews provided adequate information to fulfil the objectives of the study and to provide recommendations on how to enhance Durban Port's operations.

3.6 COLLECTION OF DATA

Informal interviews were used to obtain primary data from respondents. These research findings were used to address the research problem. In-depth interviews and observation techniques were employed during the process of obtaining data from the relevant stakeholders. This procedure enabled me as the researcher to interact with real-life settings, allowing me to develop a more accurate understanding of the research environment.

3.6 REPRODUCTION OF INFORMATION

A descriptive framework was used in this study to analyse data. Responses from questionnaires were categorised non-numerically and data codes were used as they appear in Appendix C. The questionnaire was self administered and anonymous. Data were entered into the computer using Microsoft Excel 2003. The table was then prepared for some questions which reflected percentage responses for each category based on the Likert scale.

Information acquired from the research was analyzed using thematic analysis. All the data collected were sorted into themes. Hayes (2000) points out that themes are generated from recurring ideas or topics which are detected in the material that is analyzed. This author also indicates that themes can emerge in different contexts, or they can be raised by different people.

Due to the sensitive nature of the information provided by the key informants, they insisted that their views be kept confidential. The interview questions were designed in such a way that respondents were able to give their opinions about the logistics of different supply chains, as well as information based on the flow of goods and services frankly, without their confidentiality being compromised.

3.7 CONCLUSION

The research method that was adopted in this paper was a qualitative approach. Due to the sensitive nature of information provided by key informants, their confidentiality is maintained throughout the paper. Site observation was conducted and interviews were conducted with key informants from various positions within Durban Port, as well as with customers and government officials. Data were collected by following both primary and secondary data collection techniques. Information gathered was analysed following the thematic analysis process.

CHAPTER FOUR

RESULTS OF DATA CAPTURED

4.1 INTRODUCTION

Logistics theory is the theory geared along the aim of reducing costs. To analyse data according to this theory, value chain analysis was the key theoretical approach followed in this study. Following Porter's (2005) model of an organization, both support and primary activities, as illustrated in Figure 3 above, were investigated with regards to Durban Port, and the findings are outlined below. Sources of variations that can affect the cost of performing activities were investigated, which were methods of communication, equipment, infrastructure, and human resources.

Problems that were experienced at the port at the time of the study, as pointed out by key informants, were diverse. Some were related to Durban Port itself, whereas others were related to service providers. Questionnaires were used to obtain an understanding of constraints which are experienced in Durban Port. Questions were formulated in such a manner that they probed respondents' opinions and evaluation of the problem at hand.

The main aim of this chapter is to report on the analysis of outcomes from questionnaires and interviews. Responses that were obtained were used to provide information in relation to the objectives of the study, which in turn provided information to formulate recommendations on how to enhance the port's operations.

4.2 METHODS OF COMMUNICATION

During the interview, key informant 1 pointed out that communication channels at Durban Port were good. The interviews also revealed that the supply chain for products at Durban Port is as represented in Figure 5 below. The customer communicates with agents, and the agents then communicate with the supplier and SAPO

Interviewees pointed out that at Durban Port, SAPO is very efficient in its communication procedures, and quality control of stock occurs through its GCOS database system, as illustrated in Figure 5 below. The system links vessel agents, steel producers and SAPO. It assists SAPO with its operations and in controlling loss and damages. The system displays flow of goods from the producers till they are received by the client. Both exported and imported goods are controlled through the GCOS database system, as Figures 10 and 11 below illustrate.

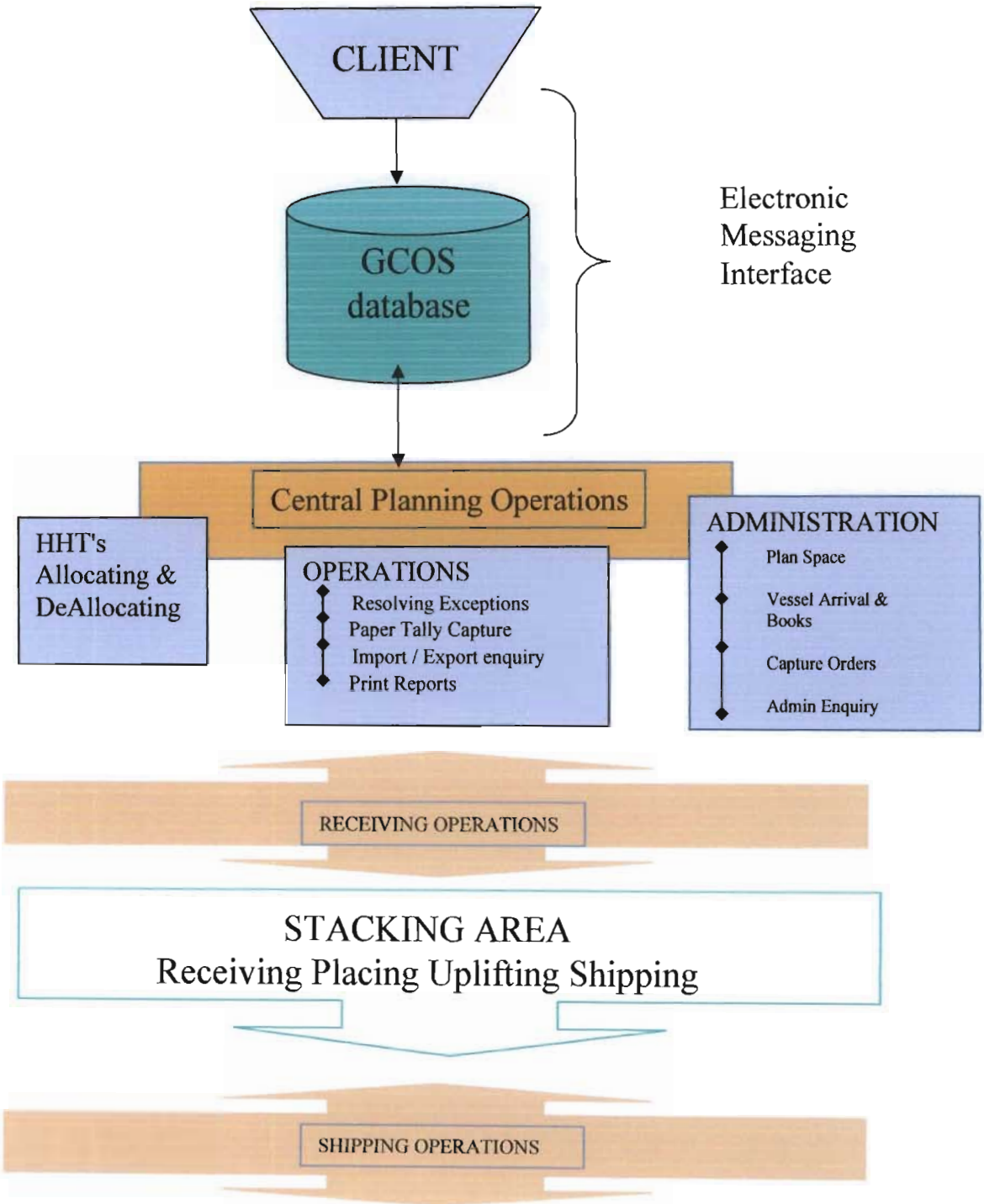

Figure 10: Communication System at SAPO

Source: Presented by key informant 1 from SAPO

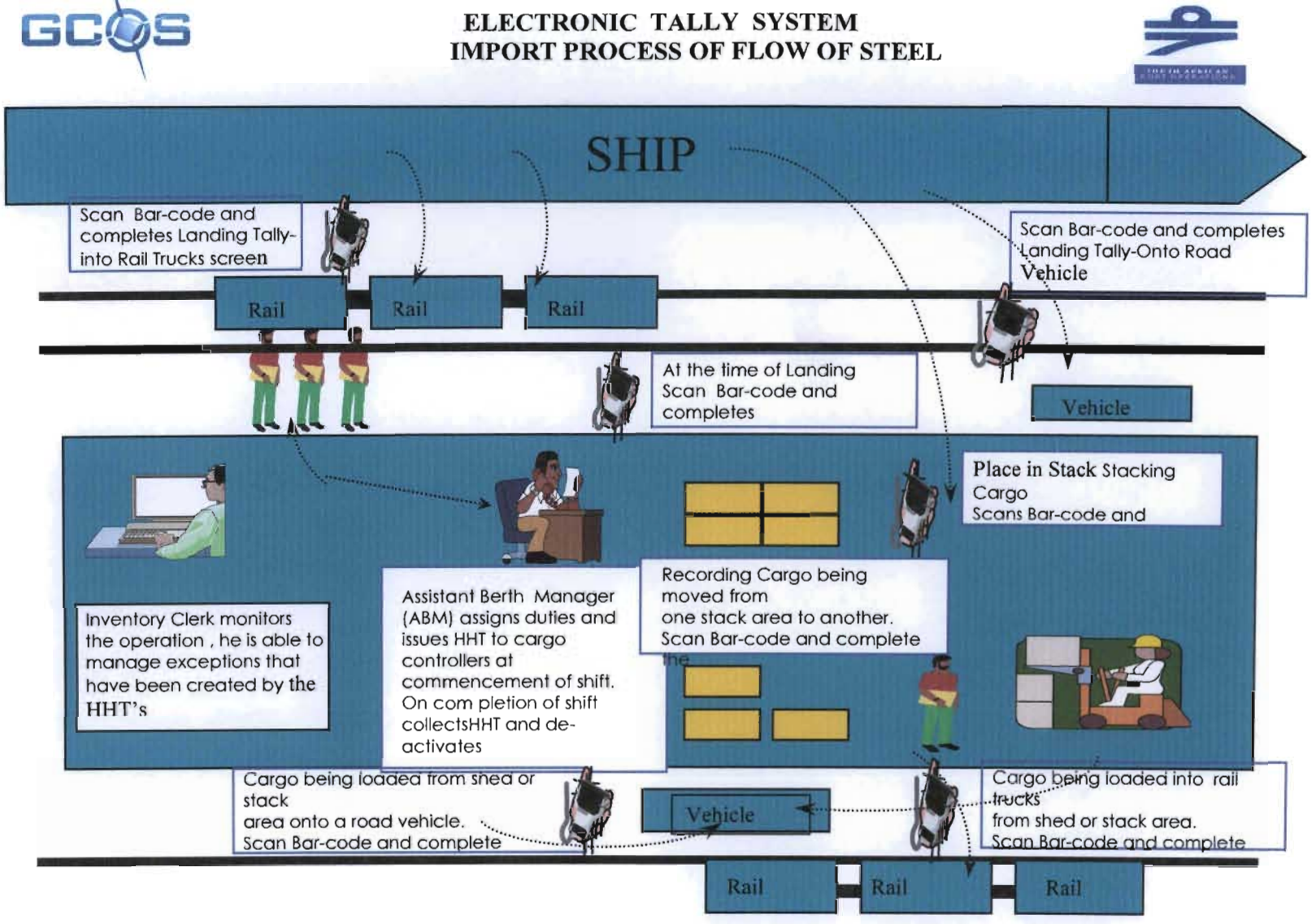

Figure 11 : Import process of flow of steel products at Durban Port. Source: Presented by key informant 1 from **SAPO**

Figure 5 above illustrates how the GCOS database system assists in controlling goods as they arrive at the port. Before goods are loaded onto rail wagons or trucks, they are scanned into a rail truck screen. During that process an Inventory Clerk monitors the operation and he is able to pick up and manage exceptions that might have been created by the scanner. The Assistant Berth Manager (ABM) assigns duties and issues a document called HHT to cargo controllers at commencement of the shift. On completion of the shift, the ABM collects the information from the scanner and de-activates it on completion. The recorded cargo is then moved from one stack area to another and is loaded from shed or stack area. When taken out from the stack area or shed, the cargo is scanned again before loaded onto road or rail trucks.

The above information was also supported by responses given by importers and exporters of steel products from the statement given to them which was: "**Communication channels at Durban port are good as compared to other Ports**". Their responses were those that appear on table 13 and figure 12 below.

Table 13: Rating the level of communication at Durban Port

Average Score	Percentages
Strongly Disagree	2%
Disagree	5%
Somewhat	60%
Agree	30%
Strongly Agree	13%

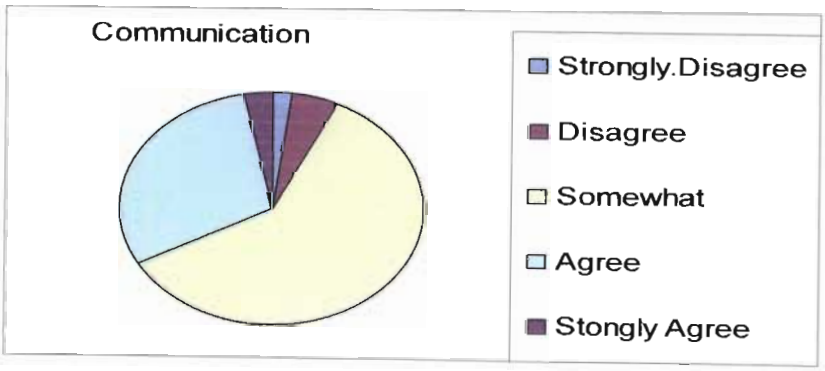

Figure 12: Rating the level of communication at Durban Port

The above responses based on the questions posed in the questionnaires suggest that communication channels at Durban Port were perceived to be satisfactory.

Although it was revealed that the communication system was generally pleasing, it was evident that respondents felt that there were some areas which still had some loopholes. Key informant 4 indicated that some of the information that agents faxed to them came with undeclared weights, or cargo might have a wrong marking, or the attached packing list might be missing. Such oversights affect the planning procedures of the port staff and, as a result, unnecessary delays are experienced.

Respondents from steel companies also pointed out that communication among Durban Port staff was not good when compared to that at Richards Bay (RP). They pointed out that staff at Richrds Bay had that sense of urgency, as they wanted job to be done in time, whereas in Durban Port some staff members did not have that sense of urgency as they did their job in a relaxed manner. They pointed out that the just-in-time management approach was only understood by those who were in management positions, and that this was not transferred to all their staff members..

4. 3. EQUIPMENT

The question involving equipment used at Durban Port was the following:

"Durban Port has enough equipment to handle steel products". The responses to this question in the questionnaire submitted to importers and exporters of steel product were as follows:

Table 14: Rating the availability of equipment at Durban Port

Average Score	Percentages
Strongly Disagree	2%
Disagree	13%
Somewhat	55%
Agree	10%
Strongly Agree	0%

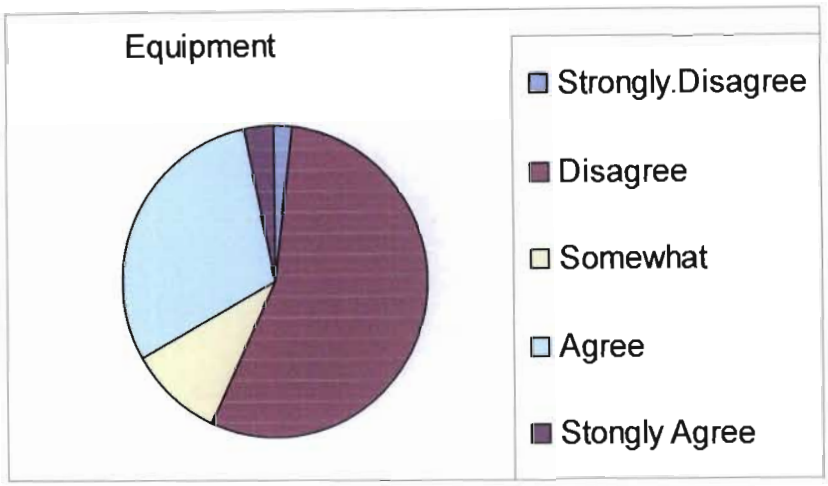

Figure 13: Rating the availability of equipment at Durban Port

Responses to the above question as illustrated in Table 14 and Figure 13 above suggest that Durban Port does not have sufficient equipment to deal with the demands. Interviews revealed that when steel products for export purposes arrived at the gate at Durban Port, they were checked and sent to sheds, where they were off-loaded. Key informants 4 and 6 felt that the port's loading and off-loading facilities were not up to world standards. As an example, one respondent cited incidents where some steel products weighing up to 5000 tonnes had to be off-loaded and transported from Durban to Johannesburg. He said that this process usually took them three to four weeks, instead of three to four days, which is the time it takes ports in developed countries to deliver similar loads. Furthermore, respondents from steel companies pointed out that Durban Port did not have the

correct equipment for handling coil, and as a result some of their coil products got damaged.

Respondents also stated that when steel arrived by train, it would be transported on wagons to the sheds. However, key informant 4 pointed out that the quantity of those wagons was insufficient to cope with the demands.

Another area of concern revealed by the respondents was that Spoornet's service was not up to world standards. They claimed that, as a result of their insufficient support, Durban Port's productivity was low. Key informant 6 pointed out that ever since 1991, Spoornet had been trying to improve their wagons, but he claimed that nothing had come off the ground as yet.

Old, outdated equipment seems to be a severe problem at Durban Port. The average age of Spoornet's locomotives is 25 years, whereas, for international best practice, it should be 16 years. Another problem experienced with outdated equipment was revealed by the DoT (2005). Cranes which are used in Durban Port have an average age of about 30 years, whereas the international norm for cranes is 20 years.

It was also revealed in the interviews that the repair of broken down machines and equipment took an inordinately long time. Moreover, based on performance tests conducted by the DoT (2005) on Durban Port using efficiency and service reliability criteria, it was discovered that South African ports could handle 17 containers (TEU) per hour, whereas the international norm is at least 35 TEUs per hour.

4.4 INFRASTRUCTURE

Interviewees pointed out those international ports are capable of catering for a large volume of steel. In this regard key informant 4 pointed out that Durban Port's infrastructure was good, but he claimed that it only needed good maintenance. This view was confirmed by the DoT (2006), who pointed out that the logistics system at Durban Port was facing poor infrastructure maintenance, infrastructure shortfalls and mismatches.

Key informant 4 and respondents from steel companies also mentioned that Durban Port was too narrow and shallow. Its width is 122m and its depth is 12.8m. He furthermore pointed out that the plan to widen it by 100m for 2007/2008 was off the ground as from 2008. In this researcher's opinion, based on the evidence of the need for more efficient services at the port, the widening and deepening of the harbour will assist the port in handling larger quantities of steel per year.

DTI (2005) points out that logistics is a cost factor in industrial development. It is argued that although the transport infrastructure is well developed, the transport sector suffers from underinvestment, uncompetitive costs and inefficient operations. Goods that are guaranteed delivery are sometimes damaged.

Problems at Spoornet not only affect them but also spill over to other companies. In 2006 Mittal steel had a problem when iron ore was poorly delivered by Spoornet. This resulted in Mittal not being able to export much of its steel product at the time (Brown, 2006). The many problems experienced by companies when moving steel products by means of the Spoornet infrastructure to Durban Port have resulted in

companies like Highveld Steel and Vandium considering the use of Maputo Port for its export businesses (Fraser, 2003).

4.5 WAREHOUSES

Warehouses are important facilities in supply chains, since this is where goods or stocks are stored on their journey through supply chains. Warehouses are expensive to run, therefore their management needs careful planning. Durban Port has warehouses, but during the research visit it was observed that they were half empty. What emerged from the interviews with Durban Port staff was that goods were kept in warehouses depending on when the client wanted them, and also on when there would be sufficient cargo for a particular vessel. Shed 4 in Durban Port is used for steel products. It was revealed during the interviews that the steel industry and the port had some arrangements with storage costs. As a result, the steel industry does not experience problems with storage costs at Durban Port. This was confirmed by responses to the statement: **"Storage costs at Durban port are reasonable as compared to other Ports".** The responses were as follows:

Table 15: Rating of storage costs at Durban Port.

Average Score	Percentages
Strongly Disagree	0%
Disagree	0%
Somewhat	10%
Agree	80%
Strongly Agree	10%

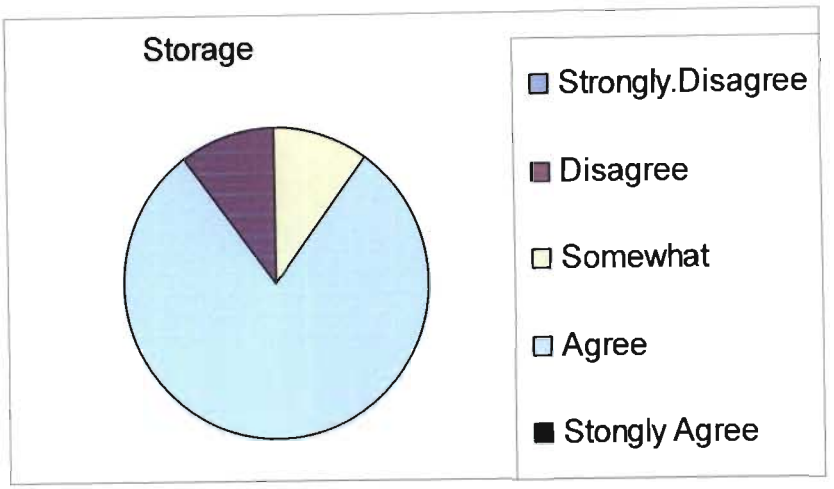

Figure 14: Rating of storage costs at Durban Port.

Scores from Table 15 and Figure 14 above suggest that storage costs for steel products at Durban Port were perceived to be reasonable.

4.6 CONGESTION

When one compares Durban Port to International ports, one finds that the port is still facing big competition. Key informants 1, 2, 6 and 7 all complained that Durban Port was too congested. They also stated that it was a long way from being comparable with international ports. At the time of the study, there were indications that the problem of congestion would be addressed by the establishment of the Dube trade port, as plans for its construction were under way at the time. Hopefully, some of the operations will be expedited to release the stress of limited resources faced by Durban Port. The establishment of the trade port will also serve as a solution to address a number of logistics challenges that are faced by the country. The project is planned around three core elements. One will be King Shaka

International airport which will include a runway, passenger terminal and associated concessions. The second element will be a trade zone which will include a cargo terminal with a centre for perishables, warehousing, light manufacturing, offices for related business services and a government support centre. The last feature will be a cyberport that will provide ICT infrastructure and value adding services (Kaiser Associates Economic Development Practice, 2004).

It was also revealed in the interviews that some berth operations currently employed at Durban Port would be moved to Richards Bay before 2010. This step should also assist in solving the problem of congestion at the port.

Although Durban Port operates 24 hours seven days a week, the problem of congestion still exists. In order for the port managers to address the problem of congestion, it is necessary to check what causes the bottleneck. DoT (2006) points out that lack of competition affects port operations. The department uses the example of the movement of cranes in the container terminals of some ports. In Dar Es Salaam, an average of 21 cranes move per hour; in Namibia the figure is about 18; and in Brazil 42. However, in Durban Port only about 13 cranes move per hour and this results in congestions being experienced at this port.

Key informant 8 pointed out that congestion affected truck drivers as they got paid per load that they moved per the hours they had worked. It was revealed that truck drivers always complained that they lost money by spending a lot of their time waiting for their turn.

Responses to the statement: "**Durban port has a plan of addressing congestion**" were as follows:

Table 16: Rating of the strategy to address congestion at Durban Port

Average Score	Percentages
Strongly Disagree	28%
Disagree	23%
Somewhat	30%
Agree	15%
Strongly Agree	10%

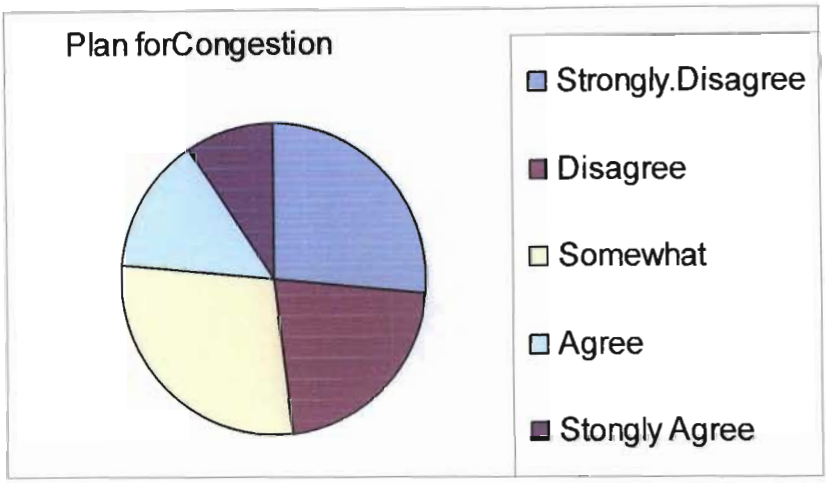

Figure 15: Rating of the strategy to address congestion at Durban Port

Scores presented in Table 16 and Figure 15 above suggests that most stakeholders were not aware of the plan to address congestion at Durban Port. However, from interviews conducted respondents revealed that there was a plan to move away from transporting goods by road, and to move to rail transport instead. Respondents pointed out that this move would minimise the risk of damaged roads which was caused by trucks. They felt that it would also be more cost effective because rail transport is cheaper than road transport. However, there was consensus that rail transport needed to improve first.

4.7 HUMAN RESOURCES

The response from key informant 3 relating to the quality of service rendered by staff at Durban Port was that it was not consistent. In his opinion, service at the port "... varies from good to shocking". The responses to the question: "Does the staff of Durban port handle goods in a professional manner", responses related to the question stated above are illustrated in Table 17 below:

Table 17: Rating of service in Durban Port

Average Score	**Percentages**
Strongly Disagree	2%
Disagree	13%
Somewhat	55%
Agree	10%
Strongly Agree	0%

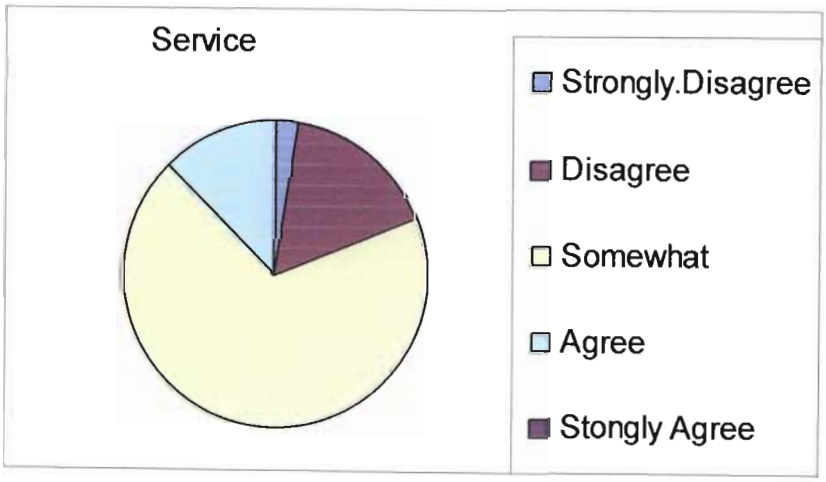

Figure 16: Rating of service in Durban Port

Table 17 and Figure 16 above illustrate that respondents felt that the service at Durban Port was not up to standard. Key informant 3 pointed out that the staff at Durban Port had no sense of urgency, and that they did not understand the consequences of their actions. He furthermore stated that another reason for their lethargic behaviour might just be that they did not have competition.

The research findings showed that Durban Port was still not responsive enough to the demands of its customers. The just-in-time demand was not addressed by the port and it may be argued that, ultimately, this will affect the sales of companies which are being serviced by them.

Key informant 4 pointed out that Durban Port needed to effect some improvement regarding human resource-related areas, such as training and development and skills development. He furthermore pointed that port staff needed to be trained even in economy-related matters because ports are the backbone of the country's economy. They are supporting many industries and those industries are providing jobs for many people. For this reason, among others, it is important that port staff get the necessary training support. Staff members need to know that their jobs are important for them, for other people and for the country as a whole. Even in 2006 DoT (2006) highlighted the fact that the logistics system at ports was facing a shortage of skilled personnel.

4.8. HANDLING

The question was posed whether the staff at Durban Port handled goods in a professional manner. Respondents from the steel industry pointed out that the only product which was not handled properly at Durban Port was steel coil. In their

opinion the sensitive nature of coil requires that it be handled with care, but they felt that this did not happen at Durban Port. As a result, they got numerous complaints from their customers about damaged coils. Table 18 and Figure 17 below illustrate the rating which was given by respondents in relation to the question "Durban **Port has enough equipment to handle steel products**".

Table 18: Rating of the standard of handling of steel products at Durban Port

Average Score	Percentages
Strongly Disagree	2%
Disagree	13%
Somewhat	55%
Agree	10%
Strongly Agree	0%

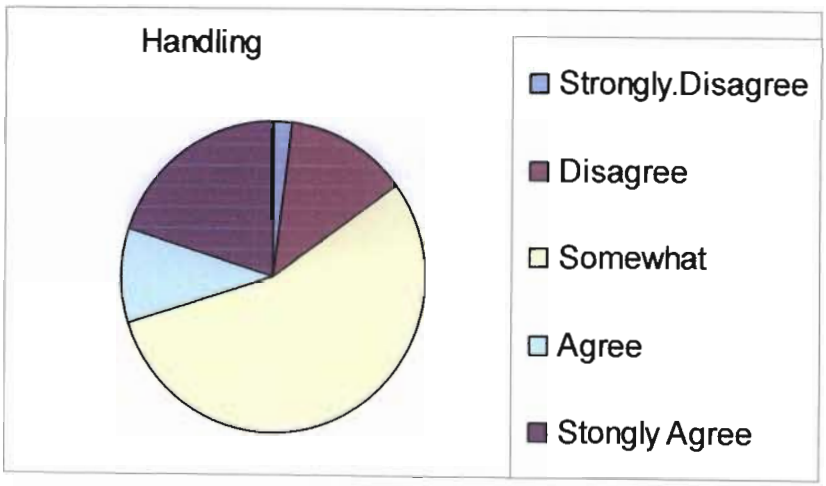

Figure 17: Rating of the standard of handling of steel products at Durban Port

4.9 SECURITY

The ratings of responses to the following question are presented in Table 19 and Figure 18 below: "Steel products that move through the port are highly secured".

Table 19: Rating of security levels regarding steel products at Durban Port.

Average Score	Percentages
Strongly Disagree	0%
Disagree	5%
Somewhat	5%
Agree	70%
Strongly Agree	20%

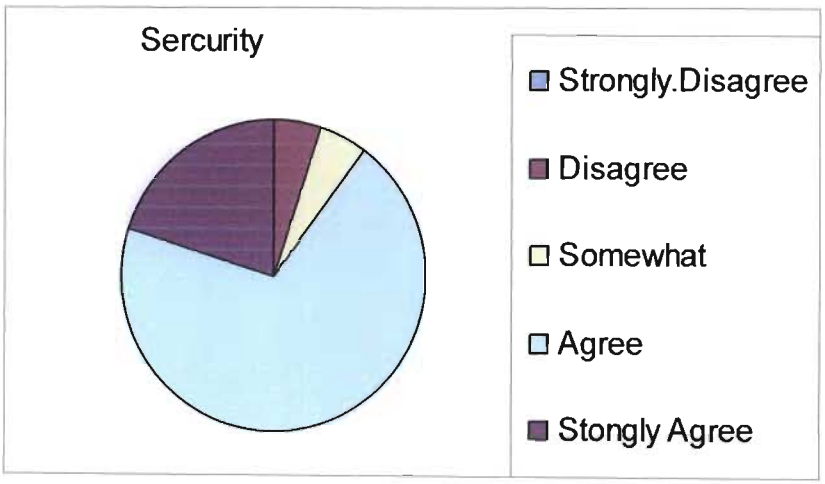

Figure 18: Rating of security levels regarding steel products at Durban Port.

Respondents from the steel industry and from Durban Port pointed out that they had never experienced problems with loss or theft of steel products at Durban Port.

4.10 GENERAL FINDINGS

One general finding from all key informants interviewed was that they felt that economic development was about improving the economy of the country. They

pointed out that the government of South Africa was placing so much emphasis on economic growth because it was perceived as the tool that would assist in addressing the problems of unemployment and in reducing poverty. All the informants agreed that Durban Port was the busiest port in the country and that, as a result, it contributed much to the economy of South Africa.

Durban Port's logistics managers should understand the logistics complexity of the port because organizations are unique and their demands are different from those of others. Nilsson (2006) points out that logistical complexity implies that logistics managers should devise new approaches and methods to enable them to address the demands of their logistics processes.

Key informants 1 and 4 also pointed out that export of steel products was decreasing at the time of the study. The reasons they stated were that the local market was demanding too much steel to prepare the country for the 2010 World Cup competition, and that the revenue of the country was being affected by the giant steel corporation, Mittal, who was exporting large quantities of steel to the USA and the European Union (EU) as well as expanding their exports to other international markets. Respondents also revealed that most break-bulk cargoes had been containerized and that, as a result, Pier Terminal 1, which had been used for break-bulk, had now been converted into a container terminal.

Generally, respondents revealed that problems with congestion also affected customer satisfaction as the just-in-time (JIT) management approach was negatively affected by it.

To summarize the discussion above, it can be argued that logistics must be given a high strategic priority, which is supported by Nilsson's (2006) finding. Varila (2007) points out that, in order for cost to be reduced in businesses, logistics processes should be smooth and mistakes cannot be tolerated.

Respondents from the steel industry pointed out that what they liked most about Durban Port was that it offered a variety of options to clients. This port boasts a large number of berths and choice is not limited. Customers can choose whether to use containers to ship their freight and they have the additional choice between bulk and break-bulk products

4.9 CONCLUSION

The findings of the study indicated that Durban Port had good communication and quality control systems through its GCOS database, and that this system enabled the port to link with agencies, service providers and customers. However, the port still experienced problems that need to be addressed.

Problems which were observed were the following:

Shortage of equipment affected the loading and off-loading processes. Problems experienced with Spoornet's wagons which are not up to world standards were also identified. Another problem that was identified was that the infrastructure at the port was not be properly maintained. It was also discovered that the port infrastructure was not capable of catering for large volumes of cargo, but the interviews revealed that this problem was being attended to.

The consequences of the problems mentioned above lead to delays, cost expansion and congestion.

CHAPTER FIVE

THE RELATIONSHIP BETWEEN THE RESEARCH FINDINGS AND THE LITERATURE, AND THE EFFECTS ON THE ECONOMY OF THE COUNTRY

5.1 INTRODUCTION

This chapter presents the relationship between the research findings and the findings of the Council for Scientific and Industrial Research (CSIR) and Moving South Africa (MSA). Factors that contribute to the competitiveness of Durban Port are discussed. It is concluded that, although cost reduction should be an important aim of port logistics, it is equally important that Durban Port should guard against trade-offs.

5.2 RELATIONSHIPS BETWEEN RESEARCH FINDINGS AND FINDINGS FROM THE LITERATURE

What follows is a discussion on the research findings, compared with findings as reported by the CSIR.

An extract from the CSIR (2006) report, as tabled under Industry Perspective and presented in Table 20 below, illustrates major supply chain inefficiencies. Although

the survey was based on the entire Fast Moving Consumer Goods (FMCG) industry, most of what was indicated as challenges in the supply chain were also observed in the supply chain for steel products in Durban Port, as was indicated in Chapter 4 above. The CSIR report categorized their findings into low transport productivity, poor service level and inefficiency in extending supply chain to the informal sector. The report also pointed out the problem of congestion in ports as it was outlined in Chapter 4 above.

Table 20: Supply chain inefficiencies based on FMCG Industry Self Analysis. (Source: The third state of logistics survey, CSIR, 2006)

Categories	Inefficiency	Priority	Cause
Low Transport Productivity	Backdoor congestion	1	Poor receiving bay infrastructure
			Poor Management/administration discipline
			Inefficiency replenishment policy/merchandising
			Off-loading: inefficiency planning and operations
			Multiple/ single consignment delivery
			Lack of vehicle scheduling and route planning
			Incorrect bar-coding by manufacturers undermining IT initiatives at backdoors causing delays.
	Reverse Logistics	2	Credit note trading terms: high costs of return items
	Inefficient vehicle utilization and inefficiency delivery	5	Inefficiency replenishment policy/merchandising
			Lack of vehicle scheduling and route planning
			Sub-optimal distribution fleet configuration
	Road Congestion	7	Limited delivery time frame (security and working hours constraints)
			Commercial development in high-density residential areas
			Lack of truck drivers' skills
Poor Service Levels(Retailers and Distributors)	Skills and compliance shortage	3	Non-compliance with SLAs by retailers and distributors
			Non-compliance with good practices
Inefficiencies of extending supply chains to informal sectors(SMME)	Sub-optimal route-to- market strategies	4	Commercial viability
			Economies of scale
	Compromised rural deliveries	8	Inefficiencies and non-compliance with SLAs by sub-contracted operators resulting from compromises required to survive.
Suboptimal resource usage	Inventory inertia product ageing	6	Skills shortage: lack of understanding of common supply chain principles
			Stock piling to mitigate against variability of supply and demand
	Duplicate distribution centres(DCs)/unutilized warehouse capacity	9	Competition and lack of trust
			Stock piling to mitigate against variability of supply and demand
Infrastructure Usage	Poor rail port Infrastructure	10	Skills shortage, suboptimal utilization of assets, inefficient processes

For the latter perspective, the survey indicated that logistics is the developmental constraint for the informal sector Small, Medium and Micro Enterprises (SMME). Supply chains need to be connected to SMMEs so that they can be linked to international markets.

5.3 COMPETITIVE ADVANTAGE

If the above issues revealed in the findings are not properly attended to, especially those which are logistics related, they may affect the competitive advantage of the country. Disenyana (2008) points out that unrealiability and high costs of transport and logistics are consistently identified as major constrain that affect international trade competitiveness of SACU members.

Van Zyl (2006) touches on the fact that the survival objective of any organization is to attain and maintain sustainable competitive advantage (SCA). Hugo *et al.* (2004) point out that logistics play an important role in creating a competitive advantage by providing outstanding customer service. These authors also highlight the fact that logistics assist an organization to differentiate within itself. According to Hitt, Ireland and Hoskisson (2003), Hofmann (2000) and Cook (2000), as cited in van Zyl (2006), SCA is defined as "the prolonged benefit of implementing some unique value-creating strategy that is not simultaneously being implemented by any current or potential competitor". It is therefore important for Durban Port to create and maintain organizational strategies that will generate value of the products that pass through it. Information technology, well-equipped human resources, reduction of logistics costs, management of cash flow, as well as skilful management of scarce resources, good customer services and government contribution are the main contributors to the competitive advantage of an organisation.

5.3.1 Information Technology

Alvarado and Kotzab (2001), as cited in Hugo *et al.* (2004), and Harris *et al.* (2004) point out that information technology-driven logistics solutions provide a competitive advantage in organizations' distribution systems. Harris *et al.* (2004) further point out that if businesses wish to be innovative and desire to enhance quality at minimal costs, they need to invest much in ICT. This strengthens the argument that it is important for Durban Port to note the problems in its communication flows and to address them, because these flows cause some delays.

Oksiutycz (2006) mentions that flexible and complex organizations should develop a rich communication system that goes beyond information exchange. Moreover, it should assist the organization in dealing with complex situations.

Based on the assumption in value chain analysis that a business's basic purpose is to create value for its users' products or services, it is a given information plays a vital role in value creation and in entering a value chain at various points (Pearce & Robinson, 1997; Stewart, 1998 as cited in Coelho, 1999; Coelho, 1999).

Evangelista *et al.* (2006) state that value-added activities are directly or indirectly dependent on information and communication technology (ICT), which is used in the Third Party Logistics Providers' (3PLs) sector. The problem with using 3PLs is that the just-in-time (JIT) approach is affected because a product may pass through many approvals before it is processed whereas on the other hand customers are demanding faster, personal service from organizations and organizations are expected to respond promptly so as to maintain their survival 3PLs. They can also

lose customers by not meeting their demands in time, and workers may lay grievances because they have to work overtime to meet JIT systems.

5.3.2. Human resources

Human Capital Management (2006/2007), Boudreau and Ramstad (2003) as cited in Fourie (2007) and Hall (2007) point out that human resources management (HR) can play a vital role in enhancing the competitive advantage of an organization. They state that, traditionally, human resources departments focused on procedural and maintenance issues. However, for organizations to enhance their competitive advantage, they need to align their HR strategy with organizational strategy.

Ulrich (1997), as cited in Fourie and Hall (2007), highlights the fact that HR needs to consider what it does, what it delivers to an organization, how it adds value and how it can measure its contribution to an organization? HR is not expected to add value to its staff only, but also to customers and shareholders (Ulrich & Brockbank, 2005, as cited in Fourie & Hall, 2007).

Ulrich (1997), as cited in Fourie and Hall (2007), states that, at the present, businesses are dealing with the challenges of globalization, value chains, profitability, organizational transformation, technology and attraction and retention of intellectual capital. Gaines-Robinson and Robinson (2005), as cited in Fourie and Hall (2007), point out that companies are operating in a more complex, competitive and challenging environment. Within such a complex and continuously changing environment, HR is supposed to play a vital role of assisting organizations to deal with these challenges.

Personnel also need to be re-trained. Skills required by port staff are stipulated by van Coller *et al.* (a.s.) as indicated in Table 21 below.

Table 21. Skills required by port staff. (Source: Van Coller *et al.*, s.a.)

Sub-sector	Key Skills
Cargo Handling & container Services	Admin Gantry Driving Driving Engineering Forklift operators Information Technology Managerial Skills Computer Literacy Systems Operation Technical Skills Welding
Cartage contractors	Advance Driving Customs & Excise Driving Finance & Admin. Auto Mechanics Warehouse Management Hazchem Driving Pro Driving Tactics Fatigue Management Storemen
Customs Clearing & Forwarding	Customs & Excise Tariffs Financial Transportation Import & Export Business Management Computer Literacy Clearing & Forwarding Shipment
Freight Services & Warehousing	Computer Literacy Geography Overseas Trading Driving Transport Links Commercial Business Administration Forklift & Machine Operation
Export & Import Services	Computer literacy Pastel 5 skills Driving Clearing & Forwarding Customs Legislation Warehousing Shipping Transport Freight
Storage & Warehousing	Administration Hyster Operation Warehouse Operation Forklift Operation Supervising Cargo Handling
Transportation Companies	Driving Supervising Forklift & Machine Operation Management Asset management Stock Management Stevedoring

DoT (2006) states that, at the present, there is no national institution for training in logistics skills. The Department argues that the logistics training that is being offered at tertiary institutions is not aligned with the local environment. It is therefore important for organizations to identify a programme of action so as to improve current logistics skills levels.

Fourie and Hall (2007) indicate that the Information Technology (IT) industry is characterized by rapid change and that it relies heavily on human skills. Re-training of personnel to improve their skills will assist them in acquiring new information.

Van Coller *et al.* (s.a.) point out that the levels of education for Durban Port staff were as follows: about 16% of the staff had tertiary qualifications, 46% had matric and 38% were unskilled. The biggest challenge for Durban Port, as for any other organization, is to be responsive in every sense of the word to market demands (Christopher, 1988, as cited in Nilsson, 2006). Ballou (2006) points out that "customer service affects customer satisfaction and ultimately company sales". But for customer service to be sufficient, staff training is a primary prerequisite.

5.3.3 Logistics Costs

When logistic costs are available, organisations are assisted in improving their operations. How logistics costs are calculated also depends on how one defines logistics. If one considers the definition by Botes *et al.* (2006) of logistics costs as "direct financial costs of performing logistics tasks that will be reflected in national accounts up to a point where final consumers purchase a commodity", it means that when they consider logistics they think of the entire supply chain. But their definition of LC can be modified even by those who treat logistics as those operations that take place within an

organization, and they can adapt their formula in calculating LC for their specific organization.

The LCM is a bottoms-up approach which assists organizations to compute aggregate detailed commodity-specific data, including the amounts for performing specific functions, e.g. transportation, storage and handling of commodities. The model is divided into four sub-models, i.e. transport, warehousing, inventory, management and administration. Formulas that the authors provide to calculate each sub-model are the following:

A port's total logistics costs (TLC) is the total sum of goods' transport costs (TTC), total handling costs of goods (THC), total inventory costs (TIC) and the total of management and administration costs (TMAC):

TLC = TTC +THC + TIC + TMAC

5.3.3.1 Importance of calculating logistics costs

Botes *et al.* (2006) state that logistics costs need to be available because they inform government departments and other parastatal units about the state of the economy of the country. They also have a direct impact on the competitive advantage of the country.

Knowledge of logistics costs also assists the government in its formulation of trade policies. Additionally, the availability of logistics costs assists policy makers in the Department of Transport since it provides them with the transport cost per commodity. Figures can also benefit producers and marketers in comparing logistics costs for their commodities with those of other commodities locally or abroad. Information can also benefit companies that provide third-party logistics in viewing costs for transportation and warehousing for different commodities.

Furthermore, if logistics costing is reliable, it will assist policy makers in their decision making. Ittmann's comment in Transport World Africa (2005), states that South Africa is still struggling with new investment requirements in rail, highway ports and other logistics infrastructure. He also argues that policy makers do not have all the necessary tools on which to base their decisions and against which to measure their performances. The reason for this, he argues, is that the logistics costs that are available here in South Africa do not benefit the country that much. The problem is that the two organizations that publish logistics costs here in South Africa - the Reserve Bank (SARB) and Statistics South Africa (Statsa) - have the following flaws which make it difficult to use these statistics for planning purposes: the SARB aggregates transport, storage and communication costs . Transport and storage costs are being based on total gross income of primary service companies, e.g. third-party providers. Furthermore, the SARB's definition of transport includes both freight and passenger transport; however, passenger transport does not form part of logistics transport. Statistics and figures exclude cargo transported by air and sea; income of companies that provide passenger-related services; and goods handling *and* storage facilities are grouped under storage (Botes *et al.*, 2006).

Transport World Africa (2005) mentions that the country's current inability to measure logistics on a regular basis affects a macro continuous understanding of the state of logistics in the country. It also makes it impossible to measure the impact of various private and public sector initiatives that are targeted to reduce the country's logistics costs.

Kaplinsky and Morris (2002) state that by observing the nature of returns throughout various links in the value chain, policy makers are assisted in formulating relevant policies and in making appropriate choices. In so doing, threatened links will be protected and links that need upgrading will be identified.

5.3.3.2 Factors that affect logistics activities

There are situations that affect logistics activities. Some are man-made and others are natural. It has become increasingly important to look at external factors that affect the business world such as the oil crisis, growing competition and increasing customer demands.

a. Natural disasters and global warming

Swart (2007) indicates that local government and corporate institutions should have a contingency plan to deal with consequences caused by natural disasters. On 9 March 2007 the KwaZulu-Natal coastline suffered from a combination of a 6-metre high tide and cut-off low (extreme wind and rain). These factors had disastrous consequences for the coastline. Because of this, Durban Port was closed from the Friday night up to the Sunday of that week. This resulted in the loss of large amounts of money and time. If port operators and shipliners had had a plan in place before the disaster, no losses would have been experienced.

b. Strikes

Eaton (1972), as cited in Bhana (1996/1997), mentions that strikes constitute a good investment for unions and a poor investment for corporations.

c. Terrorist action

The CSIR report (2006) states that not only do natural disasters and terrorist attacks affect supply chains, but they may also impact negatively on industrial growth because of the time it may take to rebuild a plant or, which is the real nightmare, to bring the facility

back on line after damage. For this reason it is important that Durban Port builds security and resilience into their supply chains (Ittman, 2007).

d. Congestion

Ittmann (2007) highlights the fact that congestion, especially on urban roads, impacts severely on freight movement which results in increasing logistics costs.

e. Inventory

Stewart (1998), as cited in Coelho (1999), states that one of information's most powerful advantages is its ability to wipe out inventory. However, in this regard the US Department of Commerce (1997), as cited in Coelho (1999), points out that the more inventory a company holds, the higher its operating costs and the lower its profits become. Just-in-time (JIT) and quick-response are inventory strategies implemented to improve return on investment for a business. These forms of reducing inventory save space and costs in the warehouse (Curl, 1997, as cited in Coelho, 1999). However, it is difficult at Durban Port to eliminate storage costs, because it is necessary to store cargo, sometimes only for a short while, before it proceeds to the next destination.

It may happen that producers become very efficient and that logistical problems rather rest with those organisations that store, handle and deliver goods before they reach the customer. Goods should not be kept for a long time at a port because storage incurs high costs. Goods should also be handled with care so as to minimize breakage and damage.

5.3.4. Customer relationships

To maintain SCA, Van Zyl (2005) indicates that an organization must develop and maintain good relationships with customers. This can be achieved through the implementation of customer relationship management (CRM) initiatives which will assist the organization in capturing intellectual capital (IC). According to the author, intellectual capital assists the organization to be more responsive to customers' needs and preferences, which are ever-changing. It will also assist the organization to customize products and services according to their various customers' profiles which, in turn, will lead to increased market share, profitability and strategic competitiveness.

5.3.5. Skills to manage scarce resources

Ports that have efficient handling systems are more competitive than those that do not, and they stand a better chance of attracting business in the market.

Skills may, on the other hand, be vested in the capacity to move goods inland from the coast. A tunnel that links Durban Port to the N2 and Durban International Airport might be the solution. This suggestion is offered in the light of the research finding that Spoornet experiences logistical problems, and it is therefore argued that transport by truck may be a solution in assisting in the faster transportation of goods. Such a tunnel will also solve the problem of heavy trucks utilizing suburban roads, which is a major problem in terms of the country's road infrastructure. The poor road system causes a high rate of accidents during traffic congestions which are truck-related.

5.3.6 Contribution by Government

Botes (2006) argues that, although lower logistics costs have been noted at the highest level in South Africa, the government still does not have a workable action plan to

address the deficiencies in the current logistics systems. This author furthermore states that the country's transport policies are focusing more on passenger transport than on freight transport, whereas most of the country's revenue is derived from goods that are marketed locally and internationally. This argument indicates that it is important for the government to invest more in freight transport, of which ports are an important component.

5.4 TRADE-OFFS

Although the ultimate goal for a value chain framework is to maximize value creation while minimizing cost, employers should guard against trade-offs when trying to meet service deliveries. Hugo *et al.* (2004) and Lysons and Farrington (2006) define trade-off as a trade situation where "an increased cost in one area is more than offset by a cost reduction in another, so that the whole system benefits". Another author points out that trade-offs should be assessed according to their impact on total systems costs and sales revenue, as , for example, it can happen that SAPO find themselves being costed more in their attempt to be efficient with their service deliveries (Nilsson, 2006).

Ballou (2006) mentions that there should be a balance between cost reduction and logistics customer service (LCS) in organizations. Harrison (2001) points out that many organizations appoint logistics directors to realize the potential benefits of strategizing the trade-offs between quality, levels of service and logistics costs. As limited only information could be traced in the literature to establish links between logistics customer service offerings and revenue generation, it may be argued that logistics managers do not give a high degree of special priority to LCS. Moreover, by not doing so, they are putting their organizations at a competitive disadvantage and at the end that can affect the revenue of the country. This means that a CR approach to logistics strategy addresses the revenue generation strategy, which is the focal point of the economic policy of the country.

Sometimes, when trying to satisfy customers, personnel can be disadvantaged. Organizations should therefore be careful when managing logistics activities with the aim of controlling cost because, as Varila (2007) indicates, CR activity can sometimes disadvantage employees. This paper would like to concur with Nilsson (2006) who argues that future research should try to provide insight into and guidance on how human factors can be considered when organizations are working towards maximising profits.

5.5 CONCLUSION

This chapter has argued that the research findings were in line with findings from Ittman (2007) as stated in the CSIR (2006) and the MSA reports. The main problem which was identified in both reports was the problem of congestion. Other problems which affect competitive advantage were also highlighted such as: information technology, human resources, logistics costs, customer relationships and government contribution. It was pointed out that these problems also affect the competitive advantage of Durban Port and that, if not addressed, they will spill over to affect the economy of the country as a whole.

Although Durban Port should try to maximise value creation at minimal costs, it should guard against trade-offs. Human factors should be considered when Durban Port is working towards maximising profits.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

The aim of this chapter is to present the conclusions based on the findings of the study, and to offer recommendations for improved services and handling of freight at Durban Port.

6.2 CONCLUSION

This study revealed six main problem areas at Durban Port, namely: communication, infrastructure, equipment, human resources, warehouses and congestions.

If Durban Port management could come up with turnaround strategies to effect improvement in the above areas, they will be able to achieve efficiency and cost reduction as well as eliminate unnecessary delays. To achieve this number of recommendations are offered.

6.3 RECOMMENDATIONS

Below is a list of recommendations that could assist Durban Port management in addressing the problems identified in the study:

6.3.1 Recommendation 1

The first recommendation is that logistics costs should be computed at Durban Port. If logistics costs are spelled out, the port will be in a position to assess itself in terms of cost efficiency. It will also be in a position to compare itself with other ports in South Africa, or with efficient ports in first world countries.

At present, Durban Port does not have systems in place to isolate logistics costs (LC) from other costs. Calculations are simply based on total value of goods and services produced at a certain point, and it is found that logistics costs (LC) are embedded there. As much as costs are embedded within the value of goods so as to enable government organizations to calculate the GDP of the country, it is important that costs are also isolated at different levels of the supply chain so as to assist organizations to assess their own efficiency. As the measure of efficiency of Durban Port in this study focused on more output at minimal cost, it may be concluded that this will enable the port to benchmark its services in relation to those of other ports at local, regional, national and international levels.

In order for Durban Port to be able to cut down on logistics costs, it will be better for them to follow the Logistics Cost Model (LCM) as formulated by Botes *et al.* (2006) and as presented in Chapter 5 above. Although the LCM has been developed to calculate logistics costs for organizations in the larger South Africa, Durban Port management can modify it, so that it can assist them in calculating specific costs of logistics which are

relevant to them. WorldNet (2007) defines cost as the total cost spent on goods or services.

The proper institution of logistics activities can lead to a reduction in the price of goods. This, in turn, will result in an increase in the demand for South African goods. Such an increased demand in goods will lead to the expansion of companies' sales, and an increase in revenue for the country. As a result, the problem of unemployment will be addressed because companies will be hiring more people. In so doing the problem of poverty in the country will be reduced.

As a result of the above recommendation, the government's social objectives, which are spelt out in the RDP and other government policies, will be met. Those objectives are: meeting basic needs, alleviating poverty, creating jobs, developing human resources and improving access of rural producers (DoT, 2006). Some of the environmental objectives will also be met such as reducing congestion and infrastructure damage.

The South African Business Guidelines (2006-2007) highlight the fact that South Africa has developed a highly competitive, world-class freight forwarding service, customs clearing, international supply chain management infrastructure, and an ability to cater for all sizes and categories of goods. Therefore, in order for Durban Port to survive, it should adhere to practices of continuous development and improvement so that it will always remain globally competitive. Should this not happen, employment opportunities, the gross domestic product (GDP) and earnings in the South African economy will be affected, which will result in job losses and increased levels of poverty?

Findings from the research indicated that the competitive element of Durban Port does not only sustain itself, but it also sustains companies around it. As a result, the revenue of the country increases. Ballou (2006) points out that revenue generation is as important as CR. This calls for all Durban Port employees to know what their responsibilities are,

and that they are not doing this for themselves, but for the benefit of the entire South African community. In short, the human factor in logistics management is crucial.

6.3.2 Recommendation 2.

The second recommendation is that Durban Port should invest in providing its business with enough and reliable equipment. The smooth flow of freight is also stressed by the DoT (2006) as this factor drives the economy and it is an engine for economic growth.

In this regard it is recommended that steel products spend as little time as possible in the warehouses, so as to eradicate delays and minimise costs. This could be achieved through providing a sufficient budget in order to make provision for state-of-the-art equipment that matches world-class standards. SAPO should also invest in more cranes and forklifts so that the problem of delays will be addressed.

Based on the interviews conducted with relevant personnel, it was concluded that the wagons used by Spoornet, as a service provider at Durban Port, are not up to standard. Since Spoornet is a public company and as such has the responsibility of driving socio-political responsibilities of the country, it is strange that its management does not see any need to improve their logistics activities at Durban Port. From the interviews it was clear that Spoornet had had a plan since 1991 to improve the equipment used at the port, but it was evident that this plan had not been implemented. These findings in the study were also verified by the South African Business Guidelines (2006-2007) in which it was pointed out that South Africa's rail transport was still inefficient, slow and out-dated.

The South African Business Guidelines (2006-2007) mention that the Department of Transport was busy drawing up programmes for shifting freight from road to rail. This constitutes a big challenge to Spoornet, because by doing so, their services would

expand. A promising aspect, as cited in the South African Business Guidelines (2006-2007), is that the CEO, Ms Maria Ramos, stated that Transnet was working on a strategy to convert rail freight services into an alternative, reliable and inexpensive service provider of freight. In the light of this it is recommended that Transnet should provide good and reliable equipment for goods to move at faster rates.

Ittman, as cited in Dlamini (2008), also supports shifting freight from road to rail, because rail transport is cheaper and this move will reduce the high logistics costs which the country is experiencing at the present moment. SA is ranked 24th out of 150 countries on the World Bank's Logistics Performance Index (Dlamini, 2008). Dlamini accepts that the increase in road freight cost is due to rising fuel costs.

Dlamini's (2008) survey indicates that within the next five years Transnet is expected to spend about R80 billion on improving SA's port and rail infranstructure, which is believed will address the problem of delays in port and congestions on roads (Dlamini, 2008).

6.3.3 Recommendation 3

At Durban Port most freight activities are done manually. Although it was revealed in the literature related to the study (DoT, 2005) that manual processing time takes twice longer than electronic handling of goods, this paper would like to suggest that, in the light of South Africa's unemployment rates, manual operations and handling of freight at Durban Port still be maintained. However, personnel should be trained very well to manage time efficiently.

It is important that personnel be re-trained. Ittmann (2007) points out that South Africa is currently in a state of intense demands because of the 2010 World Cup and a fast-

growing economy. These require sophisticated engineering and world-class project management skills.

6.3.4 Recommendation 4

An attempt was made to compute export and import logistics costs for the purposes of this study, but the process was hindered by the fact that interviewees were reluctant to disclose relevant information. This made it impossible to calculate logistics costs that could have informed the findings of the study. This problem can be addressed by government formulating a policy that will mandate business organizations to compute and release LC. At present it is not easy to compute LC, as most organizations do not disclose certain information because of fear of competition. Therefore, for LC to be computed effectively, the government needs to intervene. This will allow Durban Port to evaluate its operations in relation to time, costs and volume of cargo handled. Knowledge of the costs will greatly assist them in benchmarking their services with those of other ports.

Improvement in logistics activities will result in meeting the government's economic aspirations as laid down by the DTI (2005), i.e. "improvement in global competitiveness, enhancement of export, attraction of local and foreign investment, maintainance and creation of new employment and encouragement of broad-based black economic empowerment".

6.6.5 Recommendation 5

Ports play a very important role in the economic development of the country because they play a vital role in freight logistics. It is for this reason that ports are important for both public and private sectors. It has been indicated above to what extent ports contribute to the economy of the country, and as Durban Port specifically contributes significantly towards the GDP of South Africa, it is important for the government to

support this port, as well as all other ports serving the country. Government should assist in providing sufficient infrastructure that will assist the port to run its operations smoothly.

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APPENDIX

A. Key informants (interviewees) were grouped as follows:

a. Key informant 1: port staff from SAPO

b. Key informant 2: steel producers (Arcelor Mittal)

c. Key Informant 3: departmental officials (Department of Economic Development

d. Key informant 4: ship-liners (Bidvest & Grindrod)

e. Key informant 5: berth manager (Bidvest & Grindrod)

f. Key informant 6. rail transport provider (Spoornet)

g. Key informant 7. road transport provider

h. Key informant 8 truck drivers

B. Questions administered to Port Management Staff and general staff

Background information

1. For how long have you been in this position you are holding?
2. What is your job description?
3. Have you ever attended any workshops related to the job you are doing?
4. What is your highest level of education?
4. Which qualification/s do you have?

The port, economic development and logistics

1. What do you understand by the term "economic development"?
2. How would you define logistics?
3. Is there a link between economic development and logistics? Explain.
4. Is a port important for the economic development of this country?

Adding value

1. What do you think are the challenges facing your organization?

2. Do you have suggestions on how to address them?

Logistics *(probe for themes such as transportation, quality control, handling [including: damage and breakage], lead times, just-in-time strategies, inventory costs and how these can be improved to add value):*

1. How is steel transported? How long does it take?
2. Do you have the right equipment for handling goods?
3. Does the port have a problem with loss of steel? Why?
4. Does the port have a problem with damage of steel? Why?
5. When steel arrives for export, where do you store it? For how long do you keep the product in your warehouses?
6. How long does it normally take to disperse steel to customers?
7. How much does it cost to store a ton of steel?

Labour force

1. Do all your workers know what is expected of them?
2. Do you have programmes in place to support your workers?
3. What interventions could benefit your staff?

Government

1. Do you get any support from the Department of Transport (DoT)? If so, in what manner?
2. What incentives do you have in place for the port from thegovernment?

Quality of service

1. Do you feel you are offering the best service you can? Give reasons for you answer.
2. Is the level of service offered by your organization in line with clients'requirements?

Perceptions regarding the port

1. Why do you think customers use Durban Port?
2. Would you rate Durban Port as a world class port. Why?

C. Questions administered to Customers

1. Structured Questions

1. Strongly Disagree 2.Disagree 3. Somewhat 4Agree. 5. Stongly Agree

Please fill in spaces next to the question, by writing the correct number that is next to your answer.

I. The service of Durban Port is good ☐

Can you elaborate on your answer?

II. Durban Port have enough equipment to handle steel products ☐

Can you elaborate on your answer?

III. Does the staff of Durban port handle goods in a professional manner? ☐

Why?

IV. Steel products that move through the port highly secured goods ☐

Why?

V. Duty cost at Durban port is reasonable as compared to other Ports. ☐

Why?

VI. Storage costs at Durban port are reasonable as compared to other Ports. ☐

Why?

VII. Communication channels at Durban port are good as compared to other Ports. ☐

Why?

VIII. Durban port has a plan of addressing congestion. ☐

What is it?

IX. Unnecessary delays are not experienced at Durban Port.

2. Semi Structured Questions

I. How are you goods taken to Durban Port.

II. Are you happy about that mode of transport? Why?

III. Are you happy about Durban Port as compared to other Ports? Please support your answer.

IV. What do you like most about Durban port? Why?

V. What do you like least about Durban port? Why?

VI. Why do you think customers use Durban Port?

VII. Are you satisfied with the service you get from Durban Port? Why?

VII. If you have another alternative, would you prefer to use a port other than Durban? Why?

D. Questions administered to Government Officials

Background information

1. For how long have you been in this position you are holding?
2. What is your job description?
3. Have you ever attended any workshops related to the job you are doing?

The port, economic development and logistics

1. What do you understand by the term economic development?
2. How would you define logistics?
3. Is there a link between economic development and logistics? Explain.
4. Is a port important for the economic development of this country?

5. Do you have strategies in place to support and develop Durban Port? What are they?

Support services

1. How do you support the port functions?
2. What incentives do you provide?
3. Do you have any programmes in place to build human resources?
4. What are they and what are they expected to achieve?
5. Do you have any programmes in place to improve the ports?
6. Do you have any programmes in place to improve infrastructure? State them. How are they going to benefit the port?

E. DECLARATION

I, .**Nonduduzo Maureen Rasenyalo**. declare that:

(i)The research reported in this dissertation, except where otherwise indicated, is my original work.

(ii) This dissertation has not been submitted for any degree or examination at any other university

(iii)This dissertation does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons.

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(a) Their words have been re-written but the general information attributed to them has been referenced;

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Signed (candidate): .....

-Submitted in partial(for coursework) fulfilment of the requirements of the degree of **Masters**.. in the School of **..Developmental Studies. ,University of KwaZulu-Natal, Durban.**

- As the candidate's Supervisor I have approved this dissertation for submission

Name:

Sign:

Date:
