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A STUDY OF SHOPRITE'S IMPORTED NON-FOODS SUPPLY

CHAIN



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Bachelors of Industrial Engineering at Stellenbosch University.

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ECSA Exit level outcomes references

The following table includes references to sections in this report where ECSA exit level outcomes are addressed.

Exit level outcome	Section(s)	Engineering tools used
1. Problem solving	6.2.2	Supply chain problem identification
2. Application of engineering & scientific knowledge	5.2 ; 5.3 ; 6.2.2 ; Appendix F ; 5.1	Engineering economics principles, quality management, supply chain management
4. Investigations, experiments and data analysis	Appendix D ; 6.2	Data and trend analysis
5. Engineering methods, skills & tools, incl. IT	5.2 ; 6.2.2 ; Appendix D ; Appendix C	Bottleneck analysis, root cause analysis, supply chain modeling, supply chain classification
6. Professional & Technical communication	Appendices A, B, report itself	Interviews and other technical communication, written communication
9. Independent learning ability	Chapter 4 ; Appendix A ; Appendix B ; 6.1 ; 6.2.1	Literature Study and the application of relevant tools
10. Engineering professionalism	6.2 ; Chapter 7	Decision-making



Synopsis

The Shoprite retail group, based in South Africa, imports over 90% of their non-food goods. Two routes for transporting imports to Johannesburg were studied, specifically, (1) cross-docking the goods through distribution centres in Cape Town and, (2) direct shipments of entire containers via the port of Durban.

A literature study comprised of research on supply chain management, logistics and the purchasing supply chain function was conducted. The literature study described various supply chain techniques, such as centralised distribution, and summarised ways of measuring and improving supply chains.

An analysis based on the company's strategies and financial and other data was used to determine the best route. The cross-docking route via Cape Town was chosen as it is aligned with the current company strategies and aids the visual management system used. There is no significant cost saving when using the Cape Town route, eliminating the choice to base the routing decision solely on financial implications.

A detailed analysis of Shoprite's process of importing revealed several problems. The high demurrage cost was studied further and it was shown that a lack of control of the timing of the release of goods from the supplier causes container storage costs to rise. The suggestion of implementing a freight forwarder to monitor the consolidation and timely shipment of goods was made. The promotion of communication between the buyers, suppliers, replenishers and distribution centre management was further identified as a major stumbling block for improved efficiency. If rectified, it would enable the supply chain to be flexible and allow management of the supply chain as a whole, instead of management of individual parts.

An important classification was that of the distribution centres as the bottleneck in the supply chain. The supply chain can be improved by managing the flow of imported goods according to the capacity of the distribution centres.

The project achieved its aims of identifying a route that should be used to import non-food goods from the East and of assessing the supply chain to provide improvement strategies.



Opsomming

Die Shoprite kleinhandel-groep, wat in Suid-Afrika gebaseer is, voer meer as 90% van hulle nie-voedsel-goedere in. Die twee roetes wat gebruik word om die goedere in Suid-Afrika na Johannesburg te versprei is bestudeer. Die roetes is, (1) die verwerking van die goedere deur die kruisdok prosedure via verspreidingsentrums in Kaapstad gevolg deur die vervoer van die goedere na Johannesburg toe, en (2) direkte vervoer van hele verskepinge via die hawe in Durban.

'n Literatuur studie oor voorsieningskettingbestuur, logistiek en die verkryging van goedere was onderneem. Die literatuurstudie beskryf verskillende voorsieningsketting tegnieke, soos gesentraliseerde verspreiding, maniere om voorsieningskettings te meet en hoe om dit te verbeter.

'n Analise wat gebaseer is op die maatskappy se strategieë, finansiële en ander inligting, is gebruik om die beste roete te bepaal. Die verwerking roete via Kaapstad is gekies omdat dit saamstem met die maatskappy se strategieë en die visuele bestuurstelsel wat gebruik word ondersteun. Daar is geen beduidende kostebesparing met die gebruik van die Kaapstad-roete nie en veroorsaak dat die keuse rondom die roete nie hoofsaaklik op finansiële implikasies gebaseer kan word nie.

'n Gedetailleerde ontleding van Shoprite se invoerproses is gedoen om enige probleme aan die lig te bring. Die hoë stoorkoste van onverwerkte goedere is verder bestudeer en dit het getoon dat 'n gebrek aan beheer van die vrylating van die goedere van die verskaffer veroorsaak dat stoorkoste styg. Die voorstel is gemaak om 'n ekspediteur aan te stel wat die goedere kan konsolideer en tydige verskeping moet verseker. Die bevordering van kommunikasie tussen die kopers, verskaffers en verspreiding sentrum bestuur is as 'n struikelblok teen die bevordering van bekwaamheid. As die probleem opgelos word sal dit die voorsieningsketting in staat stel om buigsaam te wees. Dit sou ook toelaat dat die bestuur van die voorsieningsketting dit as 'n geheel, in plaas van individuele dele, kan bestuur.

Die verspreidingsentrums is as die bottelnek van die voorsieningsketting geklassifiseer. Die voorsieningsketting kan verbeter word deur om die vloei van ingevoerde goedere volgens die kapasiteit van die verspreiding sentrums te bestuur.



Die doelwitte van die identifisering van 'n roete wat gebruik moet word om 'n nie-voedsel-goedere in te voer uit die Ooste en die beoordeling van die voorsieningsketting om verbetering strategieë bekend te maak, is bereik.



Acknowledgements

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Terms of reference

The project is a study of the Shoprite Group's imported goods supply chain, focusing on the non-food imports from the East. The aim was to study, model and analyze the supply chain with the focus question being:

“Is it advantageous to send imported goods to Johannesburg by routing the goods through

(a) Cape Town using cross-docking procedures, or

(b) Durban sending the entire container to Johannesburg ?”

In this project the theory of supply chain management, logistics and purchasing formed the basis to model the supply chain and identify possible opportunities for improvement.



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Glossary

DC	Distribution Centre
Bill-of-lading	A receipt given by the carrier to the shipper acknowledging receipt of the goods being shipped and specifying the terms of delivery
Branch	Retail store that is auxiliary to a larger store owned and operated by the same person, persons, or company
Carbon emissions	Release of Carbon (C) into the atmosphere
Consolidate	To combine into a single unit
CRO	Centrally raised order
Customs duty	Taxes collected by states upon imports to their territory
Cycle time	In a retail environment, the time needed for a customer order to be received, processed, filled, shipped and delivered.
Demurrage	A charge required as compensation for the delay of a ship or freight car or other cargo beyond its scheduled time of departure
Distribution centre	A short-term storage centre used to facilitate the processing of orders and shipment of goods to customers.
Expedite	To accelerate delivery of goods
Freight	The transport of goods by truck, train, ship, or aircraft
Goods	Merchandise
Intermodal transport	The use of more than one mode of transport for a journey
JIT	Just-In-Time
Non-foods	Goods not meant for the physical consumption of human beings
PO	Purchase order
Port	A harbour
Safety Stock	Extra units of inventory carried as protection against possible stock outs
Tariff	Fee
Turnaround time	The time it takes between the arrival of a vessel or truck and its departure



1. Introduction

This chapter contains background information as to the content of the project undertaken. It provides the problem identification, aims, objectives as well as limits and exclusions. It is followed by a description of the methodology applied and ends with an overview of the Shoprite Group. The Shoprite Group of Companies is explored with respect to its background and composition, with a short focus on internal transportation services available. The contents of this section are excerpts out of the vacation work report by Du Toit [28] in 2010.

1.1 Problem Identification and Aims

The Shoprite Group, based in South Africa, has identified the need to reassess their importing strategy, specifically the import of non-food goods from the East. Approximately 90% of Shoprite's non-foods goods are imported, with 95% of these imports coming from the East.

Currently most imported non-foods goods are being sent to Cape Town, even though the stock was destined for branches in Johannesburg. The need for this project originated out of members of the Shoprite National Team wanting to know if it is, indeed, more economical and logical to send goods via Durban ports and distribution centres to Johannesburg. This prompted the need for a complete assessment of the import supply chain.

The main aim of this project was to determine the best routing for imported stock destined for Johannesburg. The two supply chain routes to be studied are the cross-docking of goods via Cape Town and direct shipments via Durban, as shown in Figure 1.

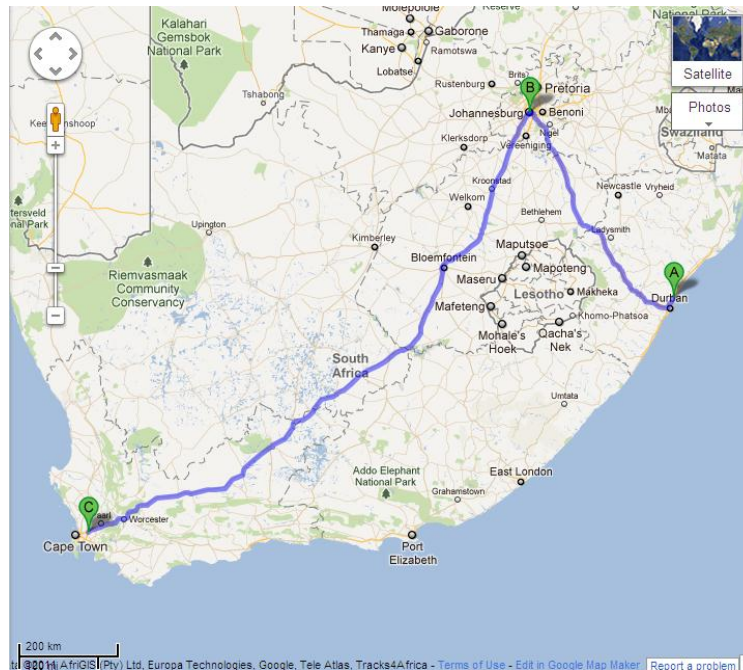


Figure 1: Map of the routes studied

Source: Google Maps [40]

The secondary aim was to perform a study of the current import supply chain and assess its performance. Problems needed to be identified and an improved importing strategy developed. Shoprite makes use of a centralised distribution system and the entire supply chain was to be explored to determine the best strategy for importing goods.

1.2 Objectives

Based on the aims mentioned above a number of objectives have been identified. These objectives are listed below in the order that they were addressed in the report:

- To model the current import supply chain;
- To assess the current import supply chain;
- To provide insight into the performance of the current supply chain;
- To provide an evidence-based viewpoint on the imports routing decision; and
- To develop suggestions for improvements of the supply chain.



1.3 Limits and Exclusions

This project will look at a broader overview of the supply chain including all supply chain phases from the buyers to the delivery to branches. Aspects such as material handling within the distribution centres of the Shoprite Group of retail outlets will be excluded. Only distribution centres that receive or process imported goods are discussed. Shoprite Group franchises that fall within this investigation include:

- Shoprite
- Checkers
- Checkers Hyper
- Shoprite USave

Franchises that are not served by the same distribution centres as those listed above are Hungry Lion, Money Market, OK Foods, OK Grocer and House & Home. The request from the Shoprite group was to study the distribution centres that provide stock for the above list, thus these franchises are excluded from the study.

1.4 Methodology Applied

The methodology followed in this study is depicted in Figure 2. The first section consists of the literature study, which provides knowledge of the supply chain field in order to offer a basis from which the study can be conducted. It was followed by supply chain modelling which then led to an in-depth process clarification of the supply chain. Next the supply chain strategies were then explored, followed by a data analysis and supply chain analysis. The supply chain analysis included, amongst others techniques, a bottleneck analysis and root cause analysis. The information accumulated, together with the basis the literature study provided, resulted in the recommendation of a routing choice and recommendations to improve the supply chain.

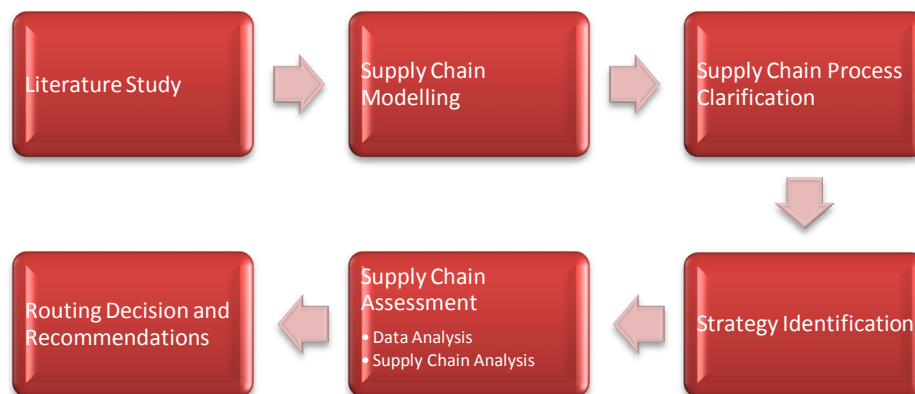


Figure 2: Methodology applied in this study



1.5 Overview of the Shoprite Group

The Shoprite Group was founded in 1979 as a small chain of supermarkets across South Africa. The aim of the retailing division of the group is to provide inexpensive products to lower income consumers and their goal is to become the retailer of choice in Africa. There are over 80 000 employees of the group internationally. The Shoprite Group, which is listed on the JSE, consists of the following companies shown in Figure 3. There are a total of 1146 stores in 17 countries that are stocked by the Shoprite Distribution Centres (DC's).

The Shoprite and Checkers franchises have two main annual promotions. The one takes place from October to December and is aimed at the Christmas holiday. The second promotion takes place from January to February and is named "Back to School" as the products promoted are education supplies. The branches move large quantities of non-foods stock during these promotions.

Shoprite utilizes several distribution methods. The suppliers deliver goods to a DC in their own trucks. Delivery to regional stores is executed by the Shoprite fleet of refrigerated and non-refrigerated trucks. The Shoprite fleet consists of over 400 trucks. The transportation system used by Shoprite to distribute goods is further described in Chapter 5.



Figure 3: Franchises of the Shoprite Group

This chapter provided a background of the project undertaken and the context in which it was approached at the Shoprite Group.



2. Supply Chain Management

This chapter focuses on exploring the aspects surrounding the concept of a supply chain. The aspects discussed are supply chain performance, techniques, global supply chains and improving a supply chain. It will specifically focus on supply chains in the retail industry in order to provide relevant information for the situation that will be addressed later in Chapter 6.

2.1 Introduction to Supply Chain Management

2.1.1 Definition of a Supply Chain

Ayers [1] defines a supply chain as:

“A supply chain consists of product life cycle processes comprising physical, information, financial, and knowledge flows whose purpose is to satisfy end-user requirements with physical products and services from multiple, linked suppliers.”

By product life cycle Ayers *et al.* are referring to manufacturing, usage and disposal of a product. Processes specifically mentioned are sourcing, designing, supporting, manufacturing, transporting and selling of physical products or services. The role players in a supply chain are modelled in Figure 4. The flow of goods is also shown.

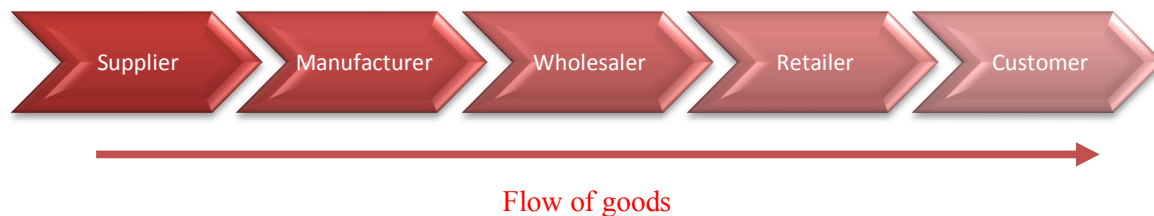


Figure 4: Model of a typical supply chain

Source: Ross [8]

2.1.2 Definition of Supply Chain Management

Ross [8] defines supply chain management as:

“..a continuously evolving management philosophy that seeks to unify the collective productive competencies and resources of the business functions found both within the enterprise and outside the firm’s allied business partners located along intersecting supply channels into a highly



competitive, customer-enriching supply system focused on developing innovative solutions and synchronising the flow of marketplace products, services, and information to create unique, individualised sources of customer value.”

Ross [8] describes supply chain management as a way to manage both internal business functions and those of associated business's to ensure coherence and stability between all functions. Since importing is part of a business' function it is an important aspect of supply chain management and international suppliers should be considered 'allied business partners'. Figure 5 illustrates the Supply Chain Operations Reference (SCOR) supply chain model. It clearly shows the internal processes starting at planning and ending at sales and the relationship between the core business and associated businesses.



Figure 5 SCOR Supply Chain Model

Source: Auraportal [52]



2.2 Measuring Supply Chain Performance

In order to improve a supply chain the performance of a current applied supply chain has to be measured and evaluated. Ross [8] states that there are six main areas to measure supply chain performance by. The author further describes various performance measurements for each area. Some of these areas and performance measurements are listed in Figure 6.

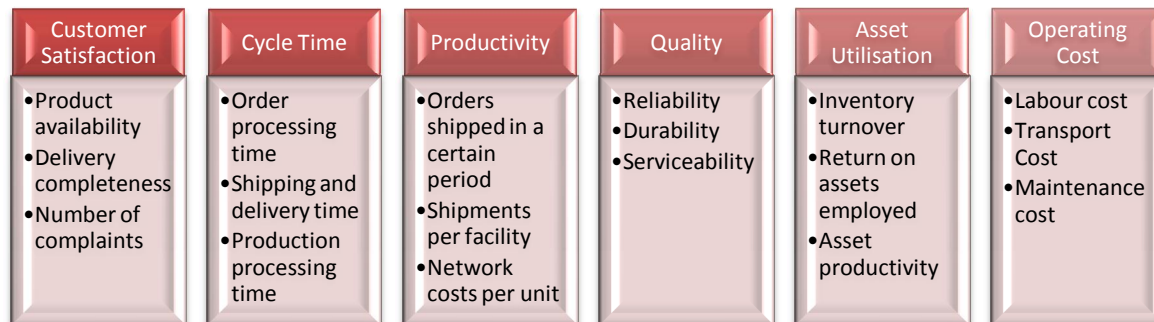


Figure 6 Areas and their relevant performance measurements

Source: Ross [8]

2.3 Techniques used in supply chains

2.3.1 Centralised Distribution

Centralized distribution is defined by Bence [11] as a distribution method where several regions are supplied by a central warehouse facility (also known as distribution centres), instead of each supplier servicing each branch individually, as shown in Figure 7 . The rationality for this concept becomes apparent considering a supermarket chain. If each supplier delivers its goods to the supermarket directly a few times a week the receiving area will be permanently congested. The centralised alternative will allow suppliers to deliver to a distribution centre, from which one truck will deliver a collected load of supplies to a specific supermarket and overcrowding of that area can be avoided. Another advantage of centralized distribution is that this strategy gives the



supermarket chain the opportunity to negotiate lower supplier prices as they are not delivering the goods to the stores directly.

Furthermore, centralised distribution also makes use of economies of scale. In a decentralised system an individual branch would order a small amount of goods from a supplier. However, with centralized distribution, Shoprite for instance, consolidates the orders from all branches into one large order and is thereby able to negotiate a good unit price due to the large quantity ordered. Walmart, classified as one of the top three global retailers, also makes use of centralised distribution. (Reardon *et al.* [17])

Other benefits of centralised distribution include the following (Bence [11]):

1. Lower inventory levels at store level
2. Increased handling efficiency
3. Precise scheduling
4. Scheduling of deliveries can be tailored to store's needs

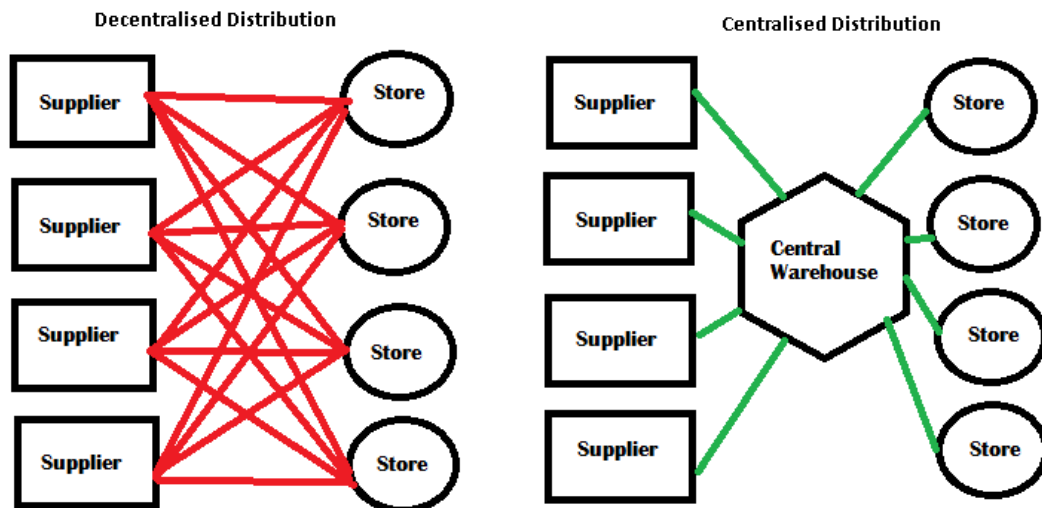


Figure 7: Decentralised and centralised distribution structures

2.3.2 Cross-docking

Apte *et al.* [10] describe cross-docking as a strategy implemented in warehouses where stock ('material') is moved directly from receiving to dispatch without being stored. Cross-docking can be applied if the entire shipment or even pallets are sent in the same arrangement as when received and the dispatch occurs shortly after receipt. Cross-docking reduces inventory stored and



reduces order cycle time (Apte *et al.* [10]). As an example Walmart cross-docks 85% of its delivered goods resulting in decreased costs (Apte *et al.* [10]).

2.4 Global Supply Chains

2.4.1 Definition

Baines [27] defines a global supply chain as:

“A 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.”

Global supply chains can therefore span many countries.

2.4.2 Benefits of Global Supply Chains

Businesses choose to implement global supply chains due to several reasons (Ross [8]), some of which are listed below:

- Potential cost reductions when transporting goods over boundaries having reduced taxes.
- Increased market to satisfy internationally.
- The likelihood of increased production volume (by catering for a global market) to pay off equipment faster.
- Avoiding government trade obstruction by trading in another country.

2.4.3 Disadvantages of Global Supply Chains

Ross [8] states that operating an international (‘global’) supply chain is a “complex affair”. Ross [8] illustrates certain drawbacks of this global system as shown below:

- International transactions take longer to complete.
 - International shipments have longer lead times.
 - Intermodal transport is usually required.
 - Government regulations in the country of origin and country of import are complex and may differ from one another, causing complications.
 - Due to longer lead times, larger inventories usually have to be held to avoid stock out.
 - Vast amounts of paperwork are normally required.
-



2.4.4 Implementing a Global Supply Chain

Ross [8] recommends a 5 element approach to implementing a global supply chain, as shown in Figure 8. The same elements can be used to assess and redesign a global supply chain. Figure 8 explains the 5 elements of designing a global supply chain and also describes the steps required for each element. The elements should be explored in the order shown in the figure.

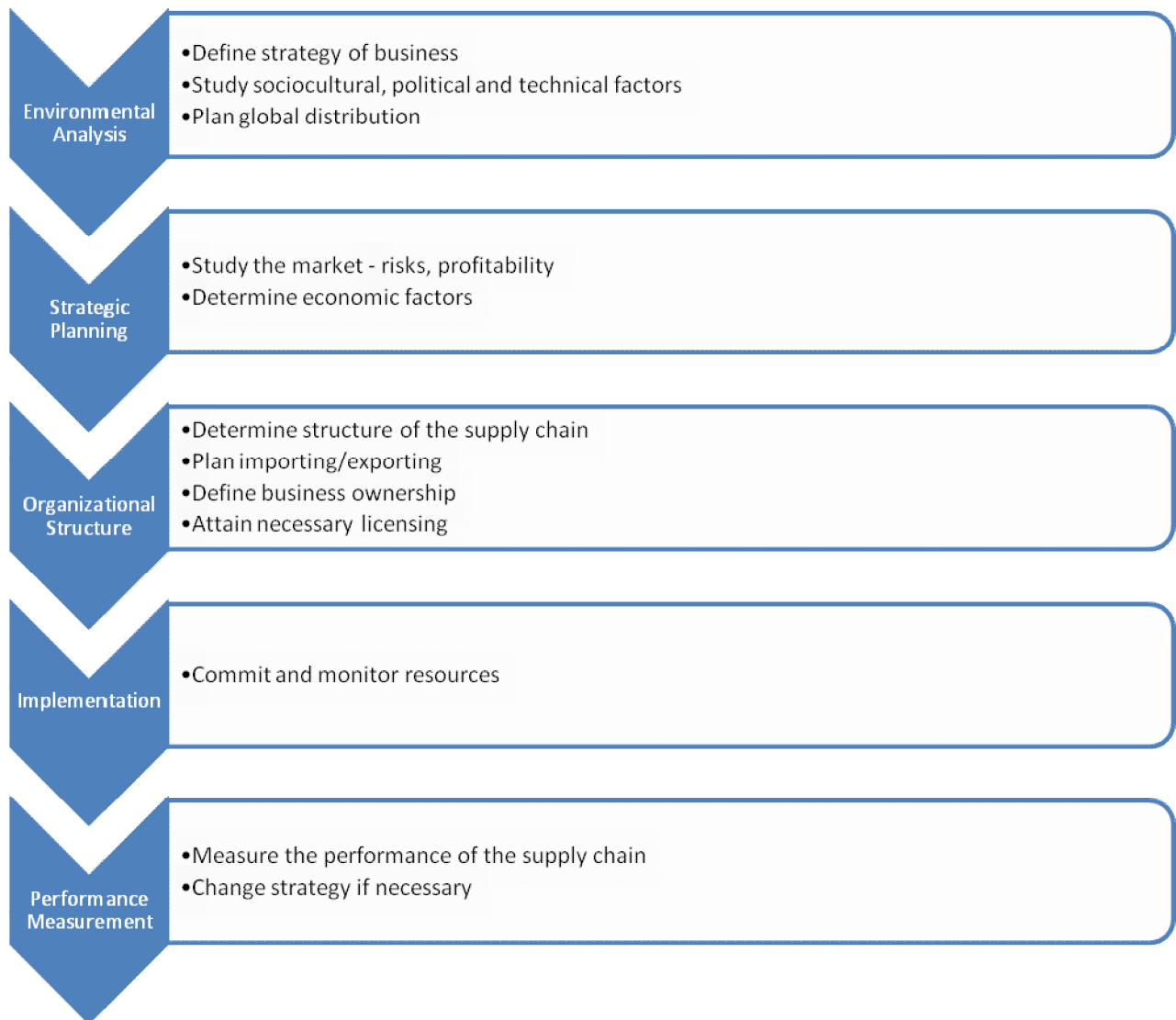


Figure 8: Global Supply Chain Strategy

Source: Ross [8]



2.5 Improving Supply Chains

The two major aims of improving a supply chain are to make the system more efficient, as well as more cost-effective. It has been described in the literature that grocery supply chains worldwide can save approximately \$30 to \$50 billion annually in their inventory costs by effective supply chain management (Ross [8]). Apte *et al.* [10] describes the AIM & DRIVE method for cost management as shown in Figure 9.

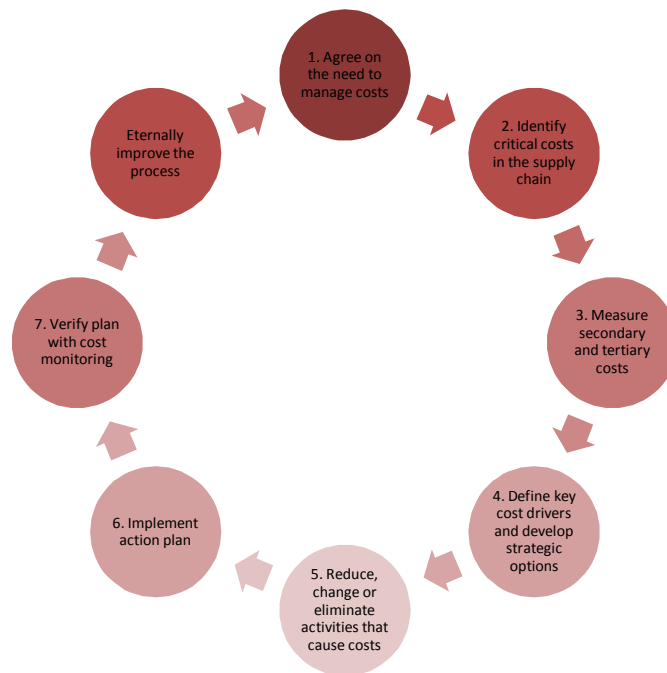


Figure 9: The AIM & DRIVE process

Source: Apte et al. [10]

Initially the need to manage costs has to be agreed upon which is necessary to ensure that there is support for cost management in the business. In the second step critical costs are identified within the supply chain while step 3 involves breaking down cost cash flows into secondary and tertiary costs. After these 3 steps the aim and drive process described by Apte *et al.* [10] continues with steps 4 - 8 involving developing strategies, reducing/changing identified costs, implementing and verifying the strategy resulting in an improved process.

Since not every single cost can be assessed and reduced as suggested in Step three of the aim and drive process, Apte *et al.* [10] point out several methods to determine which costs require further investigation:



1. Pareto analysis
 - The highest costs are deemed most important to investigate.
 - The Pareto Principle states that the smallest portion of the expenses usually account for the highest amount of cost. (Koch [6])
2. Significant competitive gap
 - If a competitor is spending far less money on a certain product or service then it warrants investigation.
3. Spend exceeds a “hurdle” amount
 - A “hurdle” (maximum) amount is set by management for each cost and any cost that exceeds its hurdle must be investigated.

Step 4 (Define the key cost drivers and develop strategic options) requires a list of cost drivers to be drawn up with strategies on the value of the cost drivers. A cost driver depicts a relationship between an activity and its associated cost. This relationship dictates that a change in the activity results in an altered associated cost. In Step 5 strategies are developed to reduce, change or eliminate causes of costs. These strategies are implemented in Step 6. It is important to monitor the effect, if any, of the changes made, as done in Step 7. The costs should be measured again and compared with historical values to clarify if any improvement has taken place. Step 8 does not require a specific action but it is important to note that the cost management process must be repeated. (Apte *et al.* [10])

As mentioned above, the second aim of improving a supply chain is to optimize its efficiency. Below some methods of improving supply chains besides focusing directly on costs are introduced (Ross [8]).

- ***Reduction of supply chain complexity***

Reduction of supply chain complexity establishes routine procedures for a supply chain. Routine procedures can include sorting of products and also the simplification of product flow. For example, changing from rail freight to road freight can be simplified to just one mode of transport. This will reduce the amount of paperwork required and also reduce handling damages and the possibility of theft, also known as pilferage.



- ***Dealing with specialisation***

When supply chains become very complex it can become necessary to assign specialised groups to coordinate certain functions such as logistics or warehousing. This improves the efficiency of a function and also helps increase the speed of product and information flow. External specialisation is also possible. Some companies prefer to outsource their logistics function to a logistics company specialised in the field. Other companies prefer to apply vertical integration. Ross [8] explains that vertical integration is done through the acquisition of companies further up in the supply chain and can decrease both cycle times and costs. Costs are reduced as there is no supplier mark-up between departments of the same company. Cycle times are also reduced because the amalgamated company can be treated and arranged as a dedicated system.

- ***Information flow***

In the literature information flow has been described as a key resource within a business (Kendell *et al.* [4]). Information flow should be accurate and also fast. This will help create a supply chain that can respond quickly and deliver what is required on time. Kilimann [5] stresses the importance of all parties in the logistics chain of a business to have the latest and most accurate information. The following example given by Kilimann [5] illustrates how information flow can benefit the logistics chain.

“...if a container ship from Asia is held up at its port of entry for longer than a specified tolerance threshold, this information goes immediately to the control system and is communicated to the company awaiting delivery. The system then automatically checks the days of supply in the central warehouse and in the retail stores themselves. If there is sufficient stock, all is well and good. However, if the delay in delivery puts availability in the stores at risk, the system sounds an alarm. It then generates a solution for speeding up the logistics process that must be manually approved by the Supply Chain Manager.” Kilimann [5]

In summation, this chapter provided a brief overview of supply chains. It described what supply chains are and some techniques that are used in supply chains. It went on to define global supply chains and then stated ways that supply chains can be improved.



3. Logistics

This chapter follows on from Chapter 2 and narrows the enquiry of supply chains to focus on the logistics aspect of supply chains. Ross [8] quotes the following definition of logistics from the Council of Logistics management:

“Logistics is the process of planning, implementing, and controlling the efficient flow and storage of raw materials, in-process inventory, finished goods, services, and related information from point of origin to point of consumption (including inbound, outbound, internal and external movements) for the purpose of conforming to customer requirements.”

For the purpose of this investigation logistics refers to the process of planning, implementing and controlling of imported goods. These goods are not raw materials, but are defined as finished goods.

Included in this chapter are descriptions of the various modes of transport, costs that a company will incur when importing, the environmental impact of logistics and aspects that need to be considered when planning logistics.

3.1 Modes of Transport

There are four main modes of transport that are used to transport goods, namely, rail, road, air and ocean.

- **Rail**

The goods are transported via rail by trains. Transnet is the operating and controlling body of transport infrastructure in South Africa. They offer freight by rail services to companies (Transnet [48]).

By 1990, 21163 km of railway lines with 933 stations (Cilliers *et al.* [12]) existed in South Africa, indicating the magnitude and range of the infrastructure available. Current literature and the people interviewed for the project (see Appendix A), however, did not have the same positive view of South Africa's rail system. The African Business Journal (African Railco [9]) quoted a supply chain consultant companies view of the current rail



service as “unreliable” and of “poor service offering”. It is the unreliability of the railway system that puts supply chain management off the most as late goods cause lost sales.

Hyde [21] mentions that companies are willing to pay more for road freight than rail freight because road freight is more reliable and faster. The cost of a faster delivery is overcome by the need to receive the goods rapidly in order to increase stock turnover in branches.

- **Road**

Road transport makes use of trucks. Trucks can carry containers or have a fixed structure that can be filled with goods. Some companies, such as Shoprite, have their own fleet of trucks and co-ordinate some of their own transport whilst others rely on road freight providers.

TradeGate [47] mentions factors that influence the choice of road as a preferred mode of transport, some of which are:

- Lower risk of goods not arriving (compared to ocean and rail transport)
- Cheaper freight rates than air freight
- Relatively little handling of goods (goods can be loaded “as-is”)
- Availability of transportation links (some areas are only accessible by road)
- Speed (compared to rail which is slow)

- **Air**

Air freight is used when the delivery lead time needs to be as short as possible (Pooler *et al.* [7]). It is a more expensive mode of transport but Pooler *et al.* [7] draw attention to the added advantages of minimized damage.

- **Ocean**

Shipping via sea is another mode of transport. Goods are placed in a holding container (e.g. container or tank) on shipping vessels. Sea freight is slow but can accommodate large load sizes (Kohn *et al.* [15]).



The costs, administration and time delay associated with moving goods from one mode of transport to another mean that movement between different modes of transport should be kept to a minimum. Every time the goods are repackaged or loaded and unloaded from transportation devices fees are charged. Hyde [21] mentions one situation when movement between modes of transport can be used to the company's benefit. At the port of Durban containers can be removed via rail or via truck. If a company selects rail to be used the container will be placed onto a railway truck to await departure. Storage is not charged while the container is on the railway truck as delay is usually due to waiting for other containers to be loaded or for the scheduled departure of the train. If the train is delayed too long the company can remove the container and transport it via road transport. This situation can be used to benefit the company in two ways, specifically:

1. The container can be "stored" on a railway truck at no cost, instead of incurring high demurrage fees at the port. The company will have to give the impression that they intend to use rail transport in order to make use of this scheme.
2. The company can make use of the cheaper rail transport but if delays are too long they can easily change to ensure delivery of the goods is still on time.

3.2 Importing Costs

According to Pooler *et al.* [7] transportation can account for 11-19% of total purchase costs. This reaffirms the need to assess transportation costs associated with importing goods. It is noteworthy that 60% of all transport costs are generated by shipping (Naudé [16]). Thus, the selection of the correct freighter and freight method is very important. Besides having to pay the supplier for the goods delivered, there are several other costs that are incurred during the importing process, some of which are described below.

- Customs duty

Customs duty is charged by the country of import to the company importing goods. It is charged as a percentage of transaction value (Pooler *et al.* [7]). Pooler defines transaction value as "the price the buyer actually pays the seller and includes packaging costs and the value of any 'Assists' that are not included in the price itself".

- Demurrages

Demurrage is paid by the importer when the goods are held at a location for longer than an allocated time period (Pooler *et al.* [7]). In South Africa, ports charge demurrages if



containers are left in the port for longer than 72 hours (Loubser [22]). The 72 hours start at the beginning of the day of when the last container was offloaded from the shipping vessel. This can be problematic if the last container is removed on a Friday afternoon and the local delivery carrier only continues to operate on the following Monday. By Monday the 72 hours have passed, the containers have not been removed and costs start to accumulate.

Another cost that can be included as a demurrage cost is container possession beyond the time frame given by the freight company. Containers need to be returned to the freight company as soon as possible. Loubser [22] stated that companies usually have 25 days from the time the container arrives at the destination port to hand over the container back to the freight company. Containers can be delivered to any port where the freight company is operating, thus companies do not have to return the container to the port where it was received from. After the 25 day time period the company in possession of the container is charged per day.

- Insurance

Insurance is paid to cover the buyer or supplier in the event of damage to the transported goods. It is important to be aware of the terms and conditions of the insurance as some contain limitations of coverage, such as in the case of war or strikes. Insurance is based on the value of goods transported plus a contingency (usually 10%). (Pooler *et al.* [7])

- Freight

Freight cost is the actual cost paid to the freight company for transporting the goods. Conventionally charges are per container; however the cost can be negotiated. Loubser [22] stated that if a company promises to send a large portion of their imports with a certain freight company, a sizeable discount can be negotiated. On the other hand, if the supplier arranges transport (see 3.4), they would need to negotiate a good freight cost.

- Containers

Containers, for this study, are considered to belong to the freight company, such as Maersk. The freight cost charged by the freight company is determined by the type of



container used. There are many different types of containers. The four types that Loubser [22] mentions are:

1. Twenty foot container

Also referred to as a twenty foot equivalent unit (TEU), this is the most common type of container used worldwide. The internal dimensions of a twenty foot container are 12.022 metres x 2.352 metres x 2.395 metres. The internal volume is thus 67.72m^3 . (Appendix F)

2. Forty foot container

The forty foot container is also known as a forty foot equivalent unit (FEU). It is equivalent to two TEU's. It is twice as long as a twenty foot container, but has the same height and width.

3. Refrigerated container

This container contains a refrigerating system and is used to transport items that need to remain cold, usually food items. The drawback of such a container is that space inside is lost due to the refrigeration unit. It is possible to use a refrigerated container with the refrigeration system off.

4. High cube container

In order to gain extra space inside a container a high cube container can be used. It is 35 cm taller than a standard twenty foot container and this extra height creates a increase in volume. The internal dimensions, as stated in Appendix F, of this size of container are 12.022 metres x 2.352 metres x 2.43 metres. Using Equation F.1 from Appendix F the volume of a high cube container is 68.71m^3 , a 1.5% volume increase compared the regular twenty foot container.

It is important to choose the correct size container for the shipment. If a shipment does not fill an entire container it can be consolidated. Further detail of consolidation is provided in the following section.



3.3 Freight Forwarders and Consolidators

West's Encyclopaedia of American Law defines a freight forwarder as:

“An individual who, as a regular business, assembles and combines small shipments into one lot and takes the responsibility for the transportation of such property from the place of receipt to the place of destination.” (Unknown [50])

The online Business Dictionary defines a consolidator as:

“A firm which groups together orders from different companies into one shipment” (American Psychological Association [39])

Based on these two definitions it becomes apparent that a freight forwarder and consolidator provide very similar services and can be viewed as the same. Freight forwarders are not transporters as they do not move the physical goods themselves. Freight forwarders act as intermediaries between the client (in this case, Shoprite) and various transportation services. The procedures of consolidating shipments, organizing transport, administering international payments, completing documentation and risk management can all fall within the job description of a freight forwarder (Kayne [42]). Consolidating shipments is an important basis of any centralised distribution system as centralisation implies that goods are brought together before transportation (Kohn *et al.* [15]).

3.4 INCOTERMS

An INCOTERM specifies the type of buyer-supplier arrangement for a specific deal. It assigns certain costs and risks to each party. Table 1 INCOTERMS only contains some of the INCOTERMS for transporting goods via ocean freight. There are similar terms for air and rail freight with according adjustments.

**Table 1 INCOTERMS**

INCOTERM	NOTES	LOCAL DELIVERY	SHIPPING DOCUMENTATION	LOADING OF SHIP	FREIGHT PAYMENT, INSURANCE, RISK DURING FREIGHT	UNLOADING OF SHIP	DUTIES	LOCAL DELIVERY
EX works	Least cost to supplier	B	B	B	B	B	B	B
FOB	“Free on board” – buyer assumes risk and cost once goods are loaded onto vessel	S	S	S	B	B	B	B
CIF	“cost insurance freight” Buyers pays for unit cost of item, insurance and freight. Used for perishable goods	S	S	S	S	S	B	B
CFR	“Cost risk freight” Risk and cost transferred when ship docks at destination.	S	S	S	S	B	B	B

B = Buyer’s Responsibility S = Supplier’s Responsibility FOB = Free on Board CIF=Cost Insurance Freight CFR= Cost Risk Freight

Source: Pooler et al. [7], Loubser [22], Radelet [31]

3.5 Environmental Impact of Logistics

The various modes of transport affect the natural environment to varying degrees. It is necessary to study the effects of logistics on the environment because of two main reasons:

1. Company policies are geared towards an ‘environmental conscience’.
2. Some governments are in the process of, or have already implemented taxation against polluting the environment with carbon emissions.

Figure 10 describes several environment damaging consequences of air, truck (‘road’), rail and water (‘sea’) freight. The extent of the damage ranges from water and soil contamination to air



pollution. The carbon emissions from transportation was shown to contribute to global warming (Endresen *et al.* [13]).

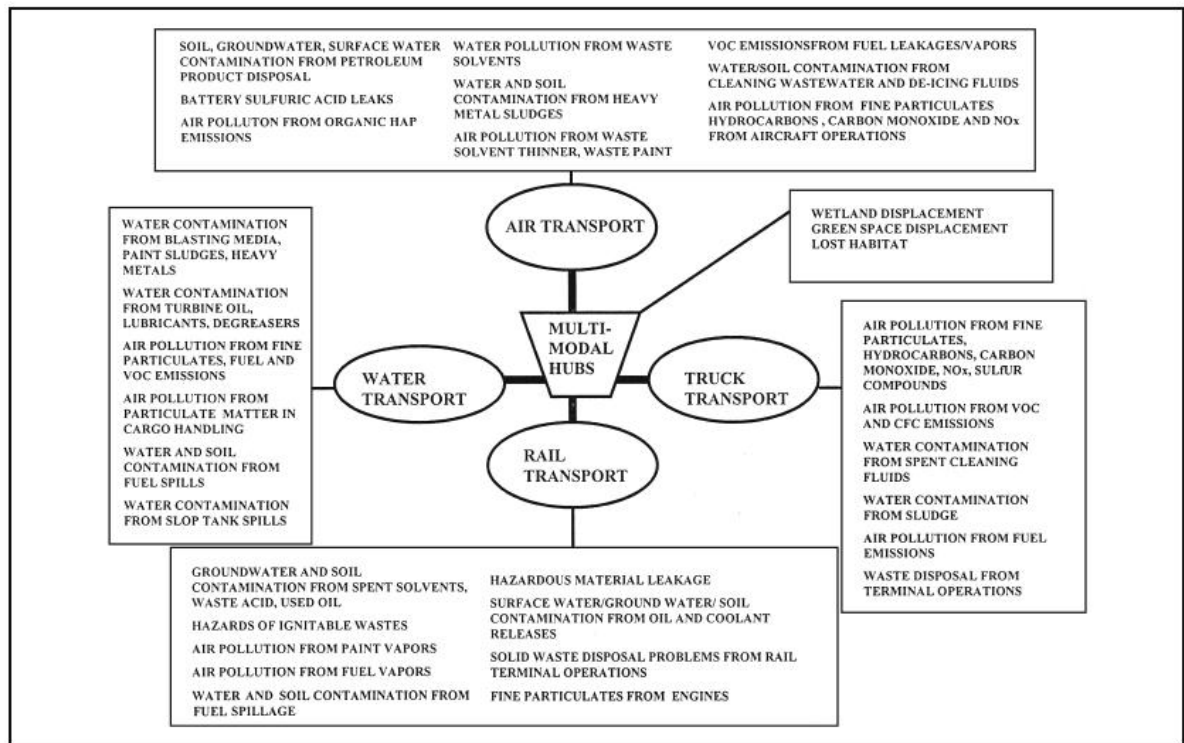


Figure 10: Environmental damages caused by transportation methods

Source: Rondinelli et al. [18]

Environmental tax can be defined as:

“The tax imposed for environmental reasons, e.g. to provide an incentive to reduce certain emissions to an optimal level or taxes on environmentally harmful products.” (US Legal, Inc [51])

Currently, South Africa is still developing an environmental tax strategy. The Taxation Laws Amendment Bill of 2009 outlines the following concepts:

1. Businesses that take part in a UN Clean Development Mechanism project have the right to certain tax benefits.
2. The creation and sale of carbon credits.
3. Income tax deductions based on approved energy efficiency savings. (Reichardt [44])



The introduction of Carbon Dioxide vehicle tax is also being considered in South Africa. People or companies purchasing vehicles that emit more than a certain level of carbon dioxide per kilometre have to pay environmental tax proportionate to the amount above the limit (Van Wyk [53]). This tax will affect supply chains, even if transport is outsourced, as the extra cost expended when purchasing vehicle assets will have to be accounted for further down in the supply chain.

In order for a company to make the best use of the tax benefits and also avoid heavy taxation it is imperative that the mode of transportation is studied and improved to reduce the impact on the environment. If transportation is outsourced then the company should ensure that the logistics partner has a similar attitude towards the environmental effects of transport.

3.6 Logistics Considerations

There are several points to consider when planning transportation of goods. Sufficient planning is required to account for delivery problems. According to Pooler *et al.* [7], the most common transport problems include:

1. Delivery promises are not made, given or are unreliable.
2. Shipments are not complete.
3. Lost shipments occur caused by delayed or lost shipping documents.
4. Delayed shipments due to incorrect or insufficient bill-of-lading information occur.
5. Overcharging occurs due to freight miscalculations.

In order to send goods internationally, certain documentation is required by the freight carrier, the exporter, the importer, government officials in the exporting country and government officials in the importing country. These documents, listed in Table 2 are required to provide information about the supplier-buyer deal, including arrangements regarding insurance, as well as documentation of permission to allow port authorities to release or except the goods.

**Table 2 Documents to complete an international buy**

PRODUCT DESCRIPTION AND IDENTIFICATION ON ALL DOCUMENTS		USED BY :				
DOCUMENT	PURPOSE	EXPORTER'S GOVERNMENT	EXPORTER	IMPORTER'S GOVERNMENT	IMPORTER	COMMON CARRIER
Bill of lading	Receipt for shipments by specified date, line or ship		Yes	Yes	Yes	Yes
Insurance Policy or certificate	Covers risks of damage or loss		Yes		Yes	Yes
Commercial Invoice	Quantity, price, currency, payment due, credit terms	Yes	Yes	Yes, to determine applicable duty	Yes	
Shipper's export declaration	Source of export statistics Identity of exporter, port method of shipment, weight and classification	Yes	Yes			Yes
Export license	Permission to export	Yes	Yes			Yes
Import Entry	Source of import statistics Same as shipper's data but adds loading port and country of origin			Import statistics	Yes	
Certificates of weight, condition, manufacture etc.	Proof product meets specified characteristics		Yes	If affects health or sanitary law	Yes	
Certificate of origin	Allows import control, and determines proper duty		Yes	Determine duty rate & import control	Yes	

Source: Pooler et al. [7]

This project focused mainly on the ports of Cape Town and Durban, both being the ports currently used by Shoprite to receive imported goods from the East. It was necessary to investigate the two ports in terms of capacity, problems faced and development in order to demonstrate how the vital the choice of port when planning the shipment of imported goods.

- **Port of Cape Town (Olivier [23], Transnet [36])**

The port of Cape Town (Figure 11) has the capacity to process 420 000 TEU per annum and operates seven days per week. In the past the main operational problems were:

- Low space utilization due to low stacking capacity of containers
- Lack of container handling equipment



- Traffic due to unscheduled truck arrival system
- Windy conditions cause crane down time

The windy conditions endure for a few months from November to March every year and make the operation of cranes dangerous. When wind speeds reach a certain level all crane activity is put on hold as a safety precaution.

Another identified problem is that the port does not allocate certain times for specific containers to be picked up by trucks and this causes congestion when many trucks arrive at once. A sophisticated information system is used to schedule the arrival of vessels as well as the offloading of containers from the vessel. The paperwork and effort required for scheduling truck pickup times and imposing fines for not adhering to the allocated time slot is the reason for not scheduling the pickup stage.

The port aims to remain below a storage level of 65% of total storage capacity and imposes fines on containers that are not picked up after four days. The four days time frame starts when the last container is lifted off the vessel. The 65% storage capacity target seems relatively low but is chosen strategically in order to maintain operational efficiency. Containers are stacked close together and on top of one another. A large quantity of containers in the port makes retrieving specific containers from the stacks a tedious and long procedure.

The container terminal has implemented a sophisticated vessel and container handling scheduling system and has already shown indications of performance improvement over the past few months. The port of Cape Town is also currently undertaking an expansion project. The container capacity of the port is being increased and the equipment upgraded to cope with an increase in containers to be handled. Since the port itself was also found to be too shallow to accommodate the vessels wanting to anchor, the expansion project included the deepening and strengthening of the basin and walls.

The proposed design would be able to process 1.2 million TEU per annum and have enough space for approximately 3000 refrigerated containers to be plugged into an electricity source. A very important reason for the increase in container handling capabilities is the installation of Rubber-Tyre Gantry cranes(RTG). RTG's are capable of



stacking five containers on top of each other, compared to the 3-high stack of the old straddle ('stack') carriers. The RTG's also have a wide straddle and can accommodate six rows of containers, thus allowing the containers to be stacked in a compact manner. Figure 12 shows engineering drawings of an RTG crane.

Once the expansion of the Cape Town port is completed, the container storage problem will be solved. It must be noted that this area is only intended to be short term storage to allow the containers to be picked up by their respective freighters. The development should be complete by 2017.



Figure 11: Aerial View of the Port of Cape Town

Source: Transnet [48]

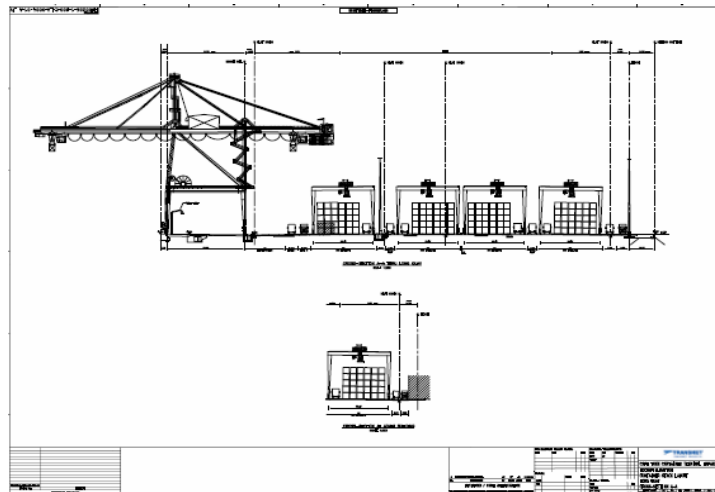


Figure 12: Engineering Drawings of RTG Carrier/Crane

Source: Transnet [48]



- **Port of Durban (Hyde [21])**

The port of Durban (shown in Figure 14) can currently process 2.47 Million TEU's per annum, almost 6 times the capacity of Cape Town's port. The port aims for a storage level of 65% of total container capacity but averages at approximately 75% in reality. In order to reduce the number of containers stored at the port, heavy storage costs are imposed after 3 days.

The container terminal consists of two piers using straddle and RTG carriers. The port, like Cape Town, does not schedule times for trucks to fetch containers. This creates traffic problems, as shown in Figure 13, which influences port efficiency negatively. The port aims for a truck turnaround time of 35 minutes but on averages truck turn takes about 40 minutes. This turnaround time refers to the time the truck spends inside the container terminal and not the entire time it spends in the harbour. Time outside the container terminal is not considered because the Durban Port is very large.

Unlike Cape Town, Durban has a truck handling procedure. Trucks arrive at the port and are directed to staging lanes based on which pier or area they will be visiting. The lanes are released periodically to stagger traffic. In theory this system would reduce traffic congestion but in reality does not function properly as truck drivers leave their trucks unattended, thereby delaying entire staged lanes.

There are extensive development plans underway at the port. The container handling capacity will be increased to 3.6 million TEU's per annum by July 2012. The development plans extend to 2050 and include the construction of a new container terminal where the old Durban International airport was located. Currently, the pier shapes are irregular which makes the installation of RTG carriers uneconomical. Once the piers of the terminal are enlarged to become more uniform in shape then more RTG carriers can be used to increase space utilization and port efficiency. Durban experiences crane downtime during the windy period of July to November which coincides with the port's busy season. It was stated by Hyde [21] that Cape Town is fortunate because their windy season does not overlap with their busy season.



Durban implemented the same vessel and offloading scheduling system as Cape Town in March 2011 and has progressed through the initial phase towards performance improvement. This system is called NAVIS.



Figure 13: Traffic Congestion at the Port of Durban



Figure 14: Container Terminal at the Port of Durban

Table 3 shows a comparison of the ports of Cape Town and Durban. The importing process involves the dispatch of goods from a port and the receipt of goods at another port. Goods cannot be imported without passing through ports. This makes the choice of which ports to use crucial.

**Table 3 Comparison of the Cape Town and Durban ports**

	Cape Town	Durban
Targeted truck turnaround time	30 minutes	35 minutes
Actual truck turnaround time	30 minutes	45 minutes
Current container handling capacity	420 000 TEU	2.47 mill TEU
Future container handling capacity	1.2 mill TEU (2017)	3.6 mill TEU (2012)
Average maintained storage level as % of capacity	65%	75%
Current equipment used	Straddle ('stack')	RTG and Straddle
Future planned equipment	RTG	RTG
Problems	Low stacking capacity Insufficient equipment Truck traffic congestion Unproductive windy months	Truck traffic congestion Unproductive windy months
"free" storage days per container	4 days	3 days

Source: Olivier [23], Hyde [21]

- ***Other African ports***

C. Kingon (see Appendix B) mentioned a number of other African ports that have adequate infrastructure to cope with the handling of imported goods from the East that arrive in Containers. The list of ports mentioned includes:

1. Dar es Salaam, Tanzania
2. Mombasa, Kenya
3. Tangier Med in Morocco
4. Egyptian ports
5. Walvis Bay, Namibia

Figure 15 shows the location of these ports. The figure also illustrates that there is a good distribution of ports over Africa that can enable importing of goods into most African countries.

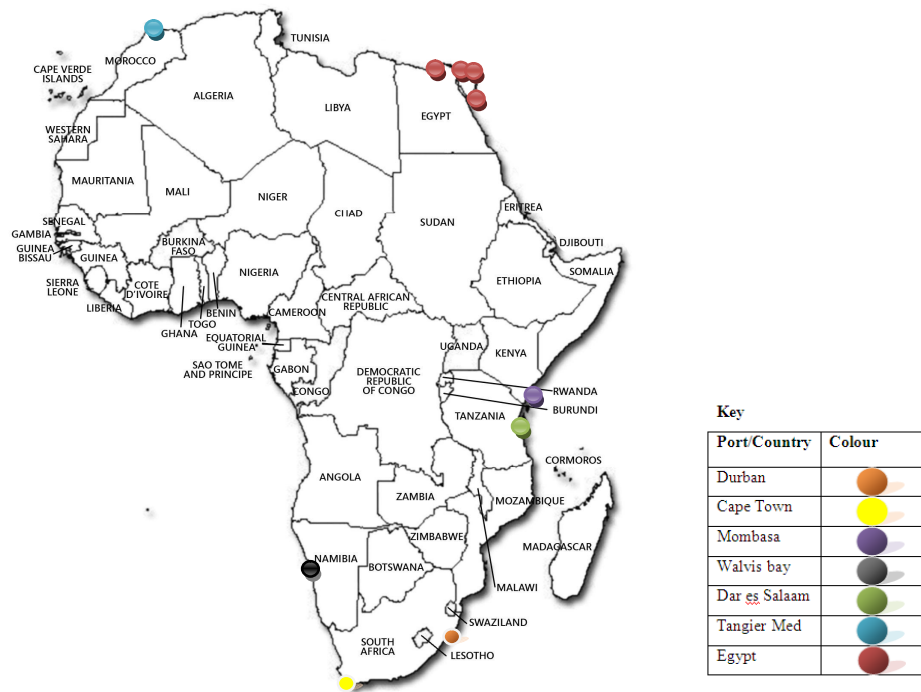


Figure 15: Location of Other African Ports

Source: Butler [40]

Taken together this chapter explored logistics as part of a supply chain. It was shown how critical logistics are within an importing supply chain. The various costs, problems and methods of logistics described above provide a good understanding of how a supply chain is affected by its logistics system. Technical logistics terms such as INCOTERMS were also introduced. The chapter was concluded with a description of two main ports in South Africa.



4. Purchasing

Chapter 4 focuses on another important part of a supply chain, purchasing. Within a supply chain all inputs into a business are being considered and therefore it is necessary to investigate the purchasing method as well as the overall affect on the supply chain.

The chapter starts with a look at the role of purchasing in the supply chain, and then delves into the topics of purchasing planning, the impact of purchasing and the actual process of purchasing. The purpose of this chapter is to highlight influences of the purchasing function on the supply chain that can be used to assess Shoprite's case.

4.1 The Role of Purchasing in a Supply Chain

Purchasing, also known as procurement, is the function of a business that controls the acquisition of goods, supplies and services to sustain a steady operation of a company (Pooler *et al.* [7]). Supply chains incorporate all aspects of the product life cycle, including the acquisition of raw materials to the finished goods from suppliers. Thus, purchasing is embedded within the supply chain of a company or business.

The purchasing department has the authority to commit the business to expenditures (Pooler *et al.* [7]). This makes purchasing a vital part in the decision making process within the context of the entire supply chain. At this point it is necessary to show how purchasing and other functions differ in emphasis, as shown in Table 4.

Table 4 Matrix of functions and their emphasis

Title Applied to Function	Emphasis Placed on
Purchasing	Buying, act of acquisition
Materials Management	Broadening scope to all aspects of material flow
Logistics Management	Support from military and academics; emphasis on physical distribution and transportation
Supply Management	Control of the supply chain
Purchasing and Supply Management	Linkage of acquisition and supply economics as complementary and global in scope

Source: Pooler et al. [7]



The scope of the purchasing function varies from business to business. Pooler *et al.* [7] mentions that the responsibilities of purchasing include:

1. Gathering of market information
2. Search for sources according to company requirements and also according to company restrictions of inventory and finances
3. Setting up of purchase orders
4. Negotiation of lowest prices from supplier
5. Handling of expedition of goods

Point 1, *Gathering of market information*, implies that the people involved in the purchasing process need to gather appropriate information on which products are required and available on the market.

Point 2, *Search for sources according to company requirements and also according to company restrictions of inventory and finances*, highlights the effect purchasing has on inventory management. Purchasing needs to adhere to the company's inventory policies, including those of minimum lot sizes and lead times (Pooler *et al.* [7]). Balancing the purchasing of items and inventory is a complicated task. On the one hand it is cheaper to buy larger quantities of goods but on the other inventory levels are elevated beyond efficiency. Ability to forecast demands accurately, accumulation of inventory to cope with seasonal demands, safety stock and space limitations all need to be considered by purchasing as they will affect the entire supply chain.

Point 3, *Setting up of purchase orders*, entails the process of asking suppliers to provide offers to supply the goods required.

Point 4, *Negotiation of lowest prices from supplier*, is the important procedure of getting the best value from the supplier that the company can afford.

The last point, 5. *Handling of expedition of goods*, involves determining the logistics surrounding the acquisition of goods prior to purchasing. In the case of imports this would include arranging local transport in the country of export, port handling, freight, port handling in country of import and local transport in country of import (Loubser [22]).



The five points illustrate the importance of managing procurement correctly in a business. The procurement of imported goods, therefore, should also be treated with careful consideration.

4.2 Purchasing Planning

Purchasing of goods needs to be planned carefully and delivery lead times need to be taken into consideration. It is essential to not run out of stock before more stock arrives. An order is typically placed once an inventory reorder point has been reached, however sometimes orders are placed in anticipation of an expected demand according to season (Pooler *et al.* [7]). The general trend of inventory level over time using a reorder point method is shown in Figure 16.

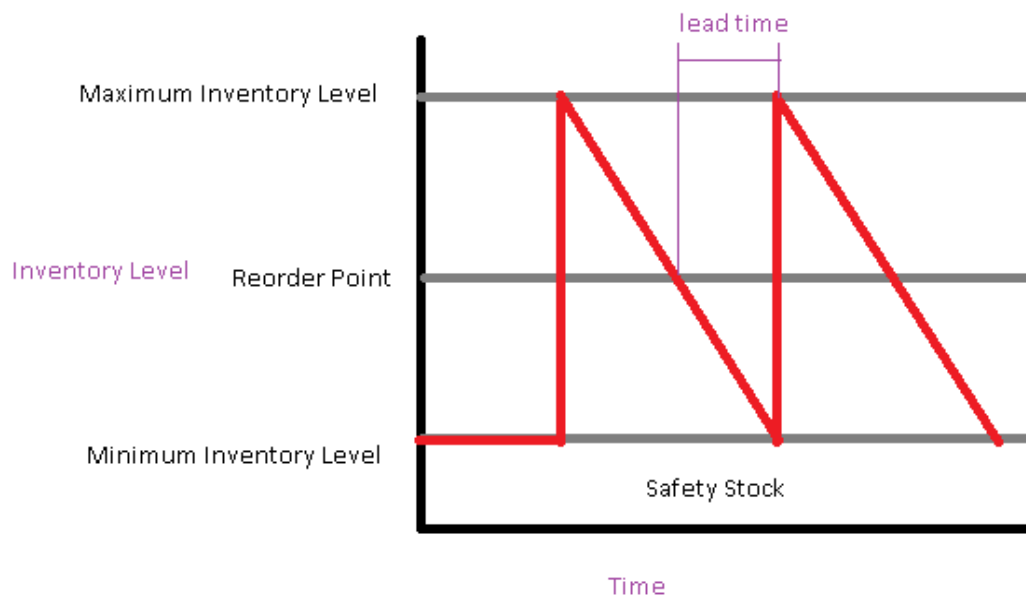


Figure 16: Sawtooth diagram on inventory receipt and usage

Source: Pooler et al. [7]

Pooler *et al.* [7] discuss two methods which are commonly used to decide on reorder points (i.e. when to purchase stock) as shown below.

4.2.1 Statistical Reorder Point (ROP)

The purchase quantity is fixed and based on historical and forecasted demand.

$$ROP = DLT + SS \quad \dots 5.1$$

DLT – Demand through lead time *SS* – safety stock



4.2.2 Time-phased Order Point (TPOP)

The purchase quantity can be fixed or can be adjusted to meet a specific demand. Time-phased Order Point is a dynamic method since current stock, lead times and forecasted requirements are used to draw up a schedule of inventory over a few time periods. The inventory in the schedule is monitored and when it becomes negative a replenishment event is triggered. The purchase planners can then work backwards through the schedule to determine, according to lead times, when an order must be produced and transported locally and internationally. The benefit of this method is that orders are scheduled according to forecasts and not historical data.

4.3 Economic Order Quantity

Not only is the timing of a purchase important, but also the quantity being purchased. The economic order quantity (EOQ) method mentioned by Pooler *et al.* [7], is well established and determines the amount of goods to be ordered. It is based on order cost, unit cost, holding cost and demand. The formulae for the number of units to order at a time can be found in Equation 5.2.

$$EOQ = \sqrt{\frac{2AS}{IC}} \quad \dots 5.2$$

EOQ – economic order quantity (units)

A – demand or usage per year

S – cost in monetary terms to procure each order

C – unit price of item

I – inventory cost per item per year

However it is noteworthy that the EOQ is just a guideline to show how many products should be ordered at a time to make best use of the available capital. If forecasts show that a different order quantity is required the EOQ should be reconsidered.

4.4 The Impact of Purchasing on Profitability

Pooler *et al.* [7] show that reduced purchase cost result in significantly higher profit leverage compared to increased sales. The reason behind this statement is best explained with an example.

**Example:**

A unit is sold for R15. The cost of purchase is R7. Assume the only cost factored into the price is cost of purchase (i.e. $\text{profit} = \text{sales price} - \text{cost of purchase}$)

Situation A: Reduce purchase cost to increase profit

If the cost of purchased goods is reduced to R6, there is an increase in profit by R1 for every unit sold.

Situation B: Sell more units to increase profit

To increase profit by increasing sales the company has to sell at least R15 worth of sales (i.e. at least one more unit).

Summary:

Cost of purchased goods – profit ratio: 1-to-1, for every Rand saved on procurement a Rand profit is generated.

Sales - profit ratio: 15-to-8, for every R15 worth of sales R8 profit is generated.

From Figure 17 it can be seen that by decreasing purchasing cost R50 profit can be accumulated by selling 5.55 units (6 units). To accumulate R50 profit by increasing sales 6.25 units (7 units) need to be sold.



Figure 17: Profit vs. Number of Goods Sold

From the above example it can be concluded that purchasing has a profound effect on cost savings within a business. For the development of a cost-effective imports distribution strategy this concept will be helpful.



4.5 Purchasing Process

The purchasing process of a supply chain encompasses goods and services. This process aids the examination of the import supply chain effectively since it can be used to model the purchase of a unit from a supplier as well as purchasing of freight and other logistics services required to distribute the unit. Figure 18 depicts the standard procurement process.



Figure 18: The procurement process

Source: Pooler et al. [7]

The information in this chapter spotlighted the role of purchasing within the supply chain. It was also explored how purchasing takes place. Based on this information the international import purchasing process of Shoprite was further studied in Chapter 5.



5. *Shoprite's Importing Procedures*

The preceding chapters provided a theoretical background of supply chains, delving deeper into logistics and purchasing. The next phase of this report focuses on documenting the procedures that Shoprite follows in order to import non-food goods from the East. A diagram of the sequence of the procedures can be found in Appendix C.

This chapter outlines each step from the placing of internal orders from the branches to the final delivery of goods to branches where the goods are then sold to customers. Various DC's of the Shoprite group are discussed and assessed in terms of their ability to process imported goods. In each step the differences between cross-docking imported goods via the Cape Town DC's to the Midrand DC and directly transporting entire containers via Durban to the Midrand DC are revealed.

Majority of the content in this chapter originates from the personal interviews with Shoprite personnel, members of a logistics company partnered with Shoprite and employees of the ports of Cape Town and Durban. The notes taken during the interviews can be found in Appendix A. Another important source of information was the knowledge the author gained as a vocational work student at the Shoprite Brackenfell DC in the years 2009 and 2010.

5.1 *Internal Roleplayers*

- **Buyers**

Shoprite has a team of buyers that focus on non-food items only. They are based at the Head Office in Brackenfell, Cape Town, which is closely situated to both, the old and the new Brackenfell distribution centres. Buyers have the responsibilities to choose which products each store will stock (based on store location and relevant target market strategy), to search and identify suppliers to use, as well as price negotiation. . Buyers also decide which exporting and importing ports will be used for a specific supplier or product. In addition the buyers determine which centrally raised ordered ('CRO', see Section 5.2) items and quantities thereof go to each store, also known as a branch.



- **Replenishment Team**

After the buyers have negotiated the price with the supplier the replenishment team will take over the process. This team determines the quantity and time of the order, based on their forecasts. The replenishment team will also determine the lead time for each order placed.

Even though Shoprite places a restriction of which DC's may keep reserve stock, all DC's have to maintain a minimum stock of 100 essential non-food items. These are basic, fastest moving products in the branches and include items such as:

- Plastic gloves
- Mugs
- Bolts

These items are all ordered through the Cape Town based buyers. Midrand and Durban each have a replenishment team that ensures that the branches have sufficient stock of these items. They will contact the Cape Town buyers when more stock is required at the DC.

- **Container control / imports control manager**

Once the container has arrived at the local port the container control/imports control manager ensures its movement to the correct place and time by corresponding with the container storage companies and DC's.

- **Branch management**

Branch management is responsible for placing orders from the DC's for products based on their stock levels.

5.2 Importing Process

The next section describes and analyses Shoprite's decisions at each crucial point in the importing process. The 'routes' mentioned below refer to the two routes currently used to distribute imported goods to branches in Johannesburg, namely, (1) by receiving the containers at the port of Cape Town and cross-docking it through a Shoprite DC in Cape Town and, (2) by receiving the containers at the port of Durban and sending the entire, unpacked, unpalletized containers of goods directly to the Midrand DC in Johannesburg. A detailed supply chain diagram can be found in Appendix C.



Figure 19 shows a flow diagram of the importing process. The flow diagram is also shown next to the step currently being discussed.



Figure 19: Importing Process



1. Placement of order (internally)



The procedure of placing internal orders is the same for all routes as the non-food buyers are situated in Cape Town.

There are two types of orders that can be placed, namely distributed branch orders and centrally raised orders. Branches place orders from the DC according to their stock levels. These orders are consolidated to form *distributed branch orders* which are then satisfied by the deliveries from the DC. The replenishment team is responsible for restocking the DC and will use their forecasting replenishment system to ensure the correct DC stock levels.

Centrally raised orders occur when stock is 'pushed' to the branches (i.e. there was no request from the branch for the items). The buyers will decide on the quantities to be pushed by considering store size, location and store classification. Store classification refers to the market strategy the store has implemented.



2. Placement of order (externally)



The replenishment team sends the supplier of the particular item a purchase order (“PO”). A purchase order entails the item description, quantity required, dispatching and receiving port, shipping line to be used and shipping window. The shipping window dictates the time span in which the goods should be shipped in order to reach Shoprite at the required time. The shipment date is crucial as early shipment can result in unwanted stock being received but no space to store it. Provision is made for local delivery in the lead time of the shipment as the local routing can vary.

The above described process of placing external orders is the same for all routes. The actual routing of the goods itself is decided at this point in the process and is made on a shipment-to-shipment basis. The buyers and logistics decision makers use cost modelling tools to test the various options available for a shipment. Every three months updated costs from shipping lines are added into the modelling system.

Although the internal and external order placement systems run fairly smoothly, some difficulties have been identified. **If the buyers or replenishers order a shipment bigger than required by the DC's (Problem #1)** the DC's cannot turn the stock fast enough and experience difficulties in operation due to lack of space. Too much stock can also result in containers being forced to remain at container storage depots, thus incurring unnecessary costs for the company. An excessively large order that is placed with a supplier could have a ripple effect further down in the supply chain. The sophisticated forecasting program used by the buyers helps determine the optimal quantity to purchase from suppliers. However, ultimately the order quantity is based on the negotiation between the buyer and supplier. Some suppliers have a minimum order quantity that must be adhered to. This minimum order quantity is the smallest amount of goods they are willing to produce in order to cover their expenses. Shoprite sometimes does not require such large quantities of these goods but is forced to purchase these amounts.



The buyers are based at the Shoprite Head Office which is very close to the Brackenfell DC. Twice a week they visit the local DC's to see how the DC's are coping with stock levels. This is a form of visual management. If the DC is perceived to be struggling with stock levels (particularly of reserve stock) the buyers will adjust their orders or redirect orders that have already been dispatched. Since a visual management system is used only Cape Town DC's can be managed this way. The buyers in Cape Town would have to rely on feedback from the Johannesburg and Durban DC's if they were to hold large quantities of stock to adjust buying procedures.

Container Selection

As the non-food goods imported are dry goods they do not need to be refrigerated. The buyers and replenishers determine what type and size of container to use for each order placed. While the size of the container is determined by the quantity of goods, the type and size of container used is determined by the price. The two types considered are refrigerated and non-refrigerated.

Freight companies need to manage their stock of containers globally to ensure that containers are always available at every port of business. South Africa is the second largest exporter of fruit in the southern hemisphere (Huang [14]) with 25% of South Africa's exported produce being received in Asia (Jooste *et al.* [30]). These goods are transported in refrigerated containers. To counter the movement of refrigerated containers to the East some freight companies offer discounted rates when Shoprite imports from the East if they use refrigerated containers that are not turned on (i.e. not refrigerated). Shoprite makes use of these discounts if possible.



3. Proforma Invoice received from supplier



Suppliers send Shoprite a proforma invoice which constitutes an offer to supply goods, irrespective of the route the goods will take. The proforma invoice will state the applicable INCOTERM for the transaction as well as the cost.

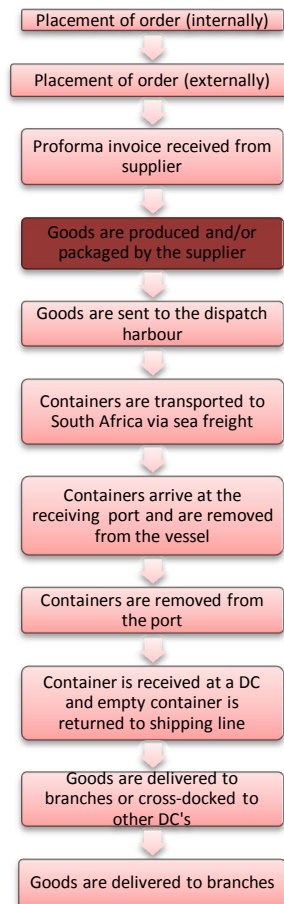
80% of Shoprite's orders have the FOB INCOTERM. FOB is used because the suppliers have better knowledge of the regulations in their own country and can organize transport more effectively. Shoprite does, however, dictate which shipping line will be used. Thus, Shoprite can negotiate good shipping rates with the shipping line and build a good relationship with them as they will be using the shipping line's services for a large quantity of shipments from all their suppliers.

A change in the INCOTERM does not affect the price of the goods to a large degree because all the costs of the entire shipment process have to be paid by Shoprite either through the unit price quoted by the supplier or through the shipping line and 3rd party logistics carriers. The INCOTERM does however affect when risk transfer takes place but for the purpose of this study risk during transportation will not be discussed.

The proforma invoice from the supplier is confirmed by the person that placed the order on behalf of Shoprite. The order is then deemed 'live'.



4. Goods are produced and/or packaged by the supplier

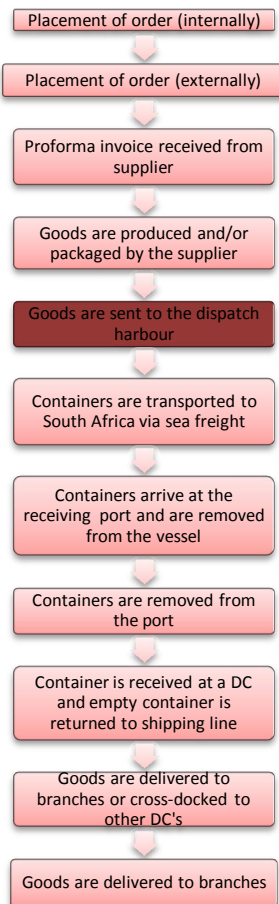


Some suppliers only start producing once the order is live. These suppliers work on the principle of “Just-In-Time” (JIT) production where goods are only produced when required and only the amount required is produced. For suppliers that do not use JIT the lead time till goods are delivered only consists of the delivery time as they have stock on hand to deliver immediately. Suppliers that use JIT have a lead time consisting of the manufacturing time and the delivery time as they have no stock on hand to deliver. This longer lead time is taken into consideration when the orders are placed.

A problem that can occur at this stage is when **suppliers delay production of an ordered item (problem #2)** in order to accumulate more orders from other customers for the same item to enable mass production of the specific item can occur.



5. Goods are sent to the dispatch harbour



The procedures involved when sending goods to the harbour apply to all routes. There are two procedures that can take place:

- **Goods are packed into containers by the supplier and sent to the harbour**

The supplier organizes the transport to the harbour and charges for the transport through the unit cost Shoprite pays. Suppliers organize for a container from the shipping line to be delivered to their premises where they then pack it with the ordered goods. The supplier should adhere to the shipping window by only sending the full container to the port at a date within the window. However, the supplier is interested in removing the stock from their premises as soon as possible for two reasons, (1) to free up space and, (2) to send the order to receive payment sooner. **As a result the shipments are being sent too early (problem #3).**

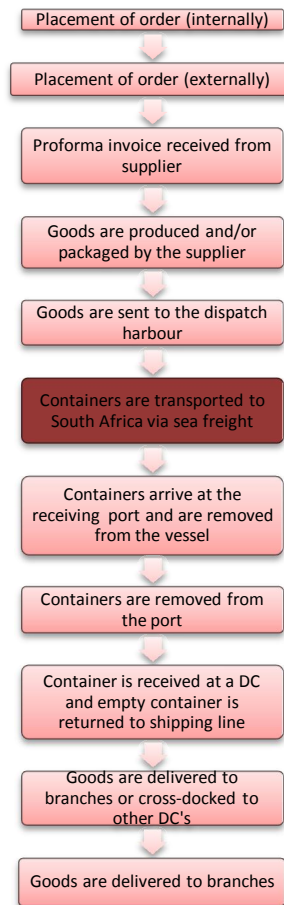
- **Goods are sent to a shipment consolidator and are packed into containers**

If the container shipped is only half full, the container price for the shipment will be reduced, but the decreased amount is not equivalent to half the fee of a full container. Ultimately, the unit price of the product increases. It is, therefore, sometimes necessary to consolidate orders from a few suppliers to fill an entire container. A container that is shipped not entirely filled is called a LCL – ‘less than a container load’.

Consolidators receive the stock from the suppliers and deliver it to the shipping line in full container loads. This consolidation cost and the cost of inland transport is all included within the FOB price. The port will move the container onto the ship and charge the shipping line for the movement. At this moment the FOB cost is set. Any further costs after this point are charged directly to Shoprite as part of the unit price.



6. Containers are transported to South Africa via sea freight



The goods are transported via sea freight to their port of destination. All the interviewees stated that in their experience the shipping cost is the same when comparing shipping from the East to Durban or the East to Cape Town. This was confirmed by the study conducted by Eliza van Zyl which is discussed in Section 6.1.

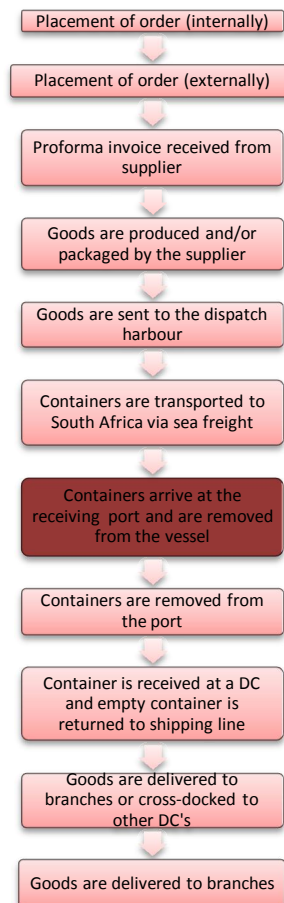
Sea freight is used as it is considerably cheaper than air freight. Air freight has been used in emergency situations in the past when a faster delivery time was required. On average the shipping time from the East to South Africa is 25-30 days. The number of days varies with the route taken and the number of stops along the route that take place. Items that are air freighted arrive within 24 hours.

An emergency situation could arise if **stock due for an important promotion (e.g. Christmas promotions) is late (Problem #4)**. In that case the high costs for airfreight is overwritten by the cost involved in receiving the stock too late and subsequently having to store the stock until the next promotion occurs. The use of air freight can be reduced by using a freight forwarder to ensure timely shipping of orders.

Importantly, 90% of the imported non-foods goods of Shoprite enter South Africa at the port in Cape Town. This is due to Shoprite's non-foods storage strategy that is explained in detail in Section 6.1.



7. Containers are received at the receiving port and are removed from the vessel



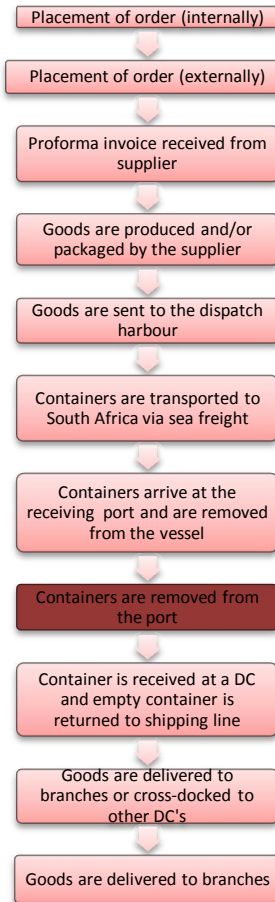
Once the vessel arrives at the receiving port the port authorities arrange the removal of the containers off the vessel. The containers are placed in stacks at the harbour, waiting to be collected and transported by trucks. Up until this point the lead time for non-food goods is 5-6 months. The 25-30 days of sea travel only forms a small portion of the 5-6 month lead time. The rest of the time is taken up by pre-travel transportation, handling, storage, paperwork delays as well as the time factored in by the buyers that place orders in advance. The lead time includes the time from when the order is placed until its arrival at the receiving port.

The shipping line is responsible for the container and the relevant costs up until the point where they deliver it to their client (i.e. Shoprite). The costs are included in the freight costs quoted by the shipping line to Shoprite. Receiving port charges such as landside charges, admin fee (paid to customs clearing agent) and cargo dues are the same for both the Cape Town and Durban ports (+-R2700.00 per 40ft container).

More than 95% of Shoprite's non-food imports come from Eastern countries. Vessels travelling from the East to South Africa usually call in Durban before Cape Town as Durban is en route. If the order is urgent and needs to be received at a port very quickly, Durban is the faster route to take. Vessels need to be cleared, offloaded and restocked with supplies before they travel from Durban to Cape Town to deliver more containers. Furthermore, **ports operating capacities and container handling efficiency (Problem #5)** need to be taken into consideration. The ports of Cape Town and Durban are discussed in Section 3.6.



8. Containers are removed from the port



The ports allocate three or four days to the shipping line for removal of the container from the port. Cape Town port allows four days while Durban port only allows three days. The time starts when the last container was removed from the vessel. As ports have a limited amount of containers that can be stored at a time, high storage costs are charged to the shipping line (and subsequently to Shoprite) if the time period is exceeded. This cost also falls under the term **‘demurrages’ (Problem #6)**. Table 5 summarizes the various container storage costs per 40 ft dry container per day, as quoted by Rodrigues [32].

Table 5 Container storage costs per storage location

	Cape Town	Durban	Johannesburg
Port storage – day 1-3	free	Free	N/A
Port storage – day 4	free	R1317 **	N/A
Port storage – day 5	R107	R2143	N/A
Port storage – day >6	R107	R3483	N/A
Shipping line storage*	R800 + R1200/day	R800 + R1200/day	N/A
SATI/SACD storage	R800 + R46/day after 10 days	N/A	R800 + R46/day after 10 days

Source: Rodrigues [32]

* Based on Maersk shipping line, Shoprite’s most frequently used sea freight partner.

** As Durban on average has more containers in storage and this can cause operating problems they start charging storage fees earlier to encourage early pick-ups.

From the port the container can be taken to three places, (1) a Shoprite DC or warehouse, (2) a 3rd party container storage depot such a SATI or SACD, or (3) the shipping line depot. Table 6 shows the party responsible for moving the containers to certain destinations, the reasons for moving a container to the destination as well as the duration and frequency of containers at the storage destination.



Table 6 Container movement options

Destination	Shoprite DC/warehouse	3 rd party container storage	Shipping line depot
Party responsible for transport	3 rd party logistics	3 rd party logistics	Shipping line
Reasons for moving the container to this destination	Goods need to be unpacked at DC for distribution to branches	DC cannot receive container – no space or goods are not needed yet	Shoprite has not had the container successfully released from the port yet
Duration of storage	N/A as goods are unpacked and processed further, not stored	Varies, SACD in JHB has an average container turnaround time of 1-2 weeks	Negligible due to infrequency of this type of storage
Frequency of storage	N/A	Very frequent	Seldom – negligible in supply chain

The final destination of all containers is a DC owned by Shoprite where the goods will be stored, followed by the distribution to several branches. Containers are moved from the shipping line depot to either a storage depot or directly to the DC.

The transport between the shipping line depot, 3rd party container storage depot and DC is performed by a 3rd party logistics company and the various basic transport configurations are shown in Figure 20. Figure 20 shows the transport configurations available to Shoprite in Durban and Cape Town. For every movement **transport costs are incurred (Problem #7)**. Storage costs are also incurred if the container is stored at any place other than at a Shoprite DC and is also included under the term, *demurrages*.

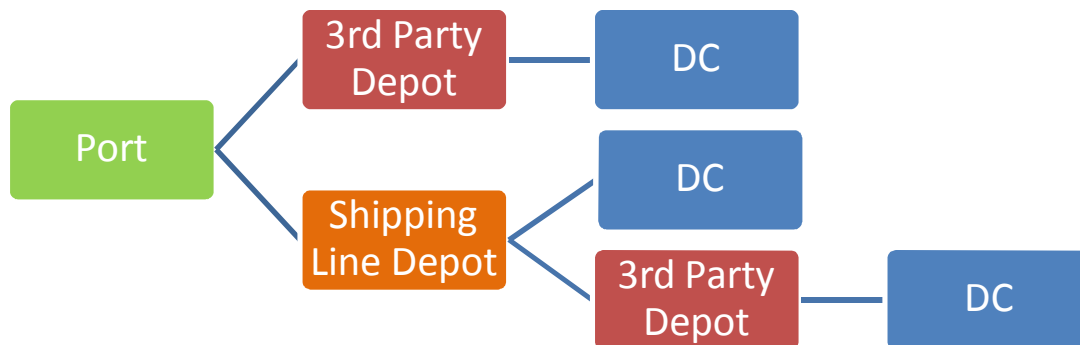


Figure 20: Transport Configurations



Decisions as to which containers are to be moved to which destinations are made on a case-to-case basis. Twice a week a meeting is held with container management staff and import staff to discuss the number of containers currently being stored in the various storage areas. There are four criteria to determine which containers should be sent to the DC's first. These criteria are:

- **Promotions:** Is the stock part of a promotion at branches? Christmas stock, for example, is very important to get into the stores before the promotion expires.
- **Back orders:** Are there backorders from branches for the stock? This is vital criteria as this stock will not remain in the DC but flow out immediately, thereby not taking up space. It also helps maintain a high level of service at the branches.
- **Flows:** Is there a planned push on the items? If stock is already allocated to stores (even without there being a branch order as in the case of pushes) it will have the same effect as back orders.
- **Aging:** How long have the containers been in storage? To reduce storage costs and product spoilage aging has to be considered. By moving any container out of storage, no matter what the criteria for moving it is, storage costs will be decreased. Since storage costs increase over time (Table 5), it is sometimes more sensible to move an aging container rather than moving a container that has just arrived but has a planned push on the items it contains. The company tries to keep aging below 25 days.

The Cape Town DC's place the highest urgency in the following descending order: promotions, back orders, flows, aging. The Durban Congella DC as well as the Johannesburg Midrand DC place the most importance on reducing storage costs and therefore value aging most.



9. Container is received at a DC and empty container is returned to shipping line



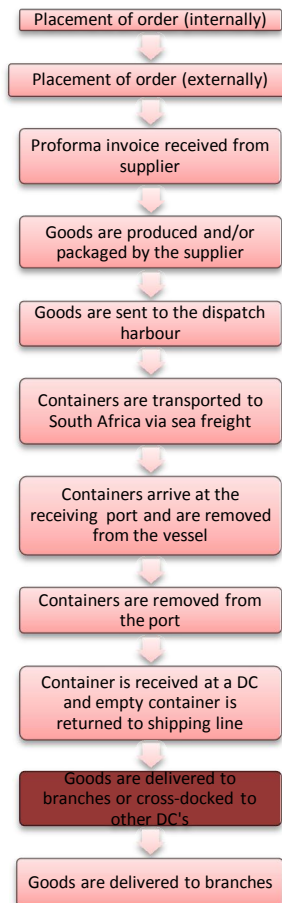
Containers are turned in after they have been emptied of the goods. Therefore, this stage takes place at the first DC the container arrives at. Most shipping lines allow clients to keep containers for four days before demurrage costs are charged. Shoprite has used their good relationships with shipping lines to negotiate a 25 day period before demurrage costs are charged.

If entire containers are sent to Johannesburg from Cape Town or Durban then the container must be turned in at a local shipping line container depot in Johannesburg. A **container turn-in fee (Problem # 8)** of R3600 per container is charged. Containers turned in at Cape Town or Durban are not charged.

The sum of all the costs up to the arrival of the goods at the first DC is referred to as the 'landed cost'. If a container is sent directly from Durban port to the Midrand DC the landed cost is very high as the transport cost to reach the first DC is high and a container turn-in fee is charged. On the other hand, if a container is sent from the port of Cape Town to Brackenfell DC the landed cost is lower as no container turn-in fee is charged and the transport cost is low.



10. Goods are delivered to branches or cross-docked to other DC's



Once the goods have been unpacked from the containers the stock is stored and distributed either to branches or to other DC's. The Shoprite DCs are classified as stockholding, flow, export, cross-docking or bulk DC's.

- Stockholding DC:** "Traditional" DC that operates based on receiving, racking and picking procedures. The picked stock can either be sent to a branch or cross-docked to another DC which will then deliver the goods to the store. Cross-docking is described in Section 2.3.2.
- Flow DC:** Operates on the flow procedure. Stock is not stored for long periods of time but is immediately allocated to stores before the stock enters the system. Once the stock arrives at the DC it is staged and the allocated stock is placed in an area designated to a specific destination. Once the order for the destination is complete the goods are delivered. The flow DC focuses on high stock turnover by having a large percentage of the stock already allocated to stores by the time it enters the DC.
- Export DC:** Export DC's operate with the same procedures described for stockholding and flow DC's except they serve branches in other African countries.
- Cross-docking DC:** A cross-docking DC receives pallets from other DC's that contain goods for a specific store. At Shoprite are picked for a certain branch and placed into a compartment. Once the picking is finished the goods are placed onto pallets and then covered in shrinkwrap to prevent shifting (Figure 21). The shrinkwrap colour corresponds to the DC it is destined for. Cross-docked pallets are sent with a 3rd party road freight company.



Figure 21: Cross-docked pallets received by Congella DC, Durban

It is noteworthy that due to the fact that Shoprite transports pallets which have already been picked and do not contain one type of product, it is not entirely correct to call the procedure cross-docking. The term transshipment would be better suited. The Shoprite team, however, uses the term cross-docking and for this project the term is used as such.

- **Bulk DC:** Bulk DC's contain reserve stock for stockholding DC's. The stock is not racked but is kept palletized. Stock is not picked and distributed to branches from bulk DC's.

Table 7 shows various Shoprite DC's in South Africa and states the DC type. It is followed by a discussion of each DC's goods handling strategy.

Table 7 Shoprite's DC's

DC Name	Location	Type
Brackenfell	Brackenfell, Cape Town	Stockholding, crossdocking
Brackenfell Flow	Brackenfell, Cape Town	Flow
Brackenfell Export	Brackenfell, Cape Town	Export
Bolt Avenue	Cape Town	Stockholding
Epping	Epping, Cape Town	Export
Midrand	Midrand, Johannesburg	Stockholding
Congella	Congella, Durban	Flow
Prospaction	Isipingo, Durban	Stockholding
Presidential	Durban	Furniture
Monteagle Durban	Durban	Foods and non-foods stockholding
Monteagle Johannesburg	Johannesburg	Foods Stockholding



- **Brackenfell**

The Brackenfell DC is a stockholding DC of 50 000 m². On site there are currently two main buildings, one for Freshmark – the fresh produce division, and one for dry goods. This DC is able to receive goods from local suppliers and containers of imported goods. Goods are stored in a racking system and then picked by branch. The picked items are sent directly to branches in rollcages, PX containers or are cross-docked to other DC's. Goods picked in a PX container are sent to an isolated store situated far away from any DC, via the National Postal Service.

The receiving bay (Figure 23) of the DC is organized according to a roving lane system where lanes are rotated providing more offloading space. Receiving lanes are chosen with several empty lanes in between. These empty lanes are used as staging areas during container offloading. Goods inside containers are not palletized making offloading a manual procedure. Containers are allocated a certain time to be offloaded. At the next scheduled arrival of a container the lanes shift and the new container is offloaded one lane further down the receiving area. This process allows a larger staging area for the unpacked goods as adjacent lanes are not used and also allows the preceding container more time to pack away the offloaded goods as the succeeding container does not need to be placed in the currently occupied lane. The roving lane procedure is demonstrated in Figure 22.

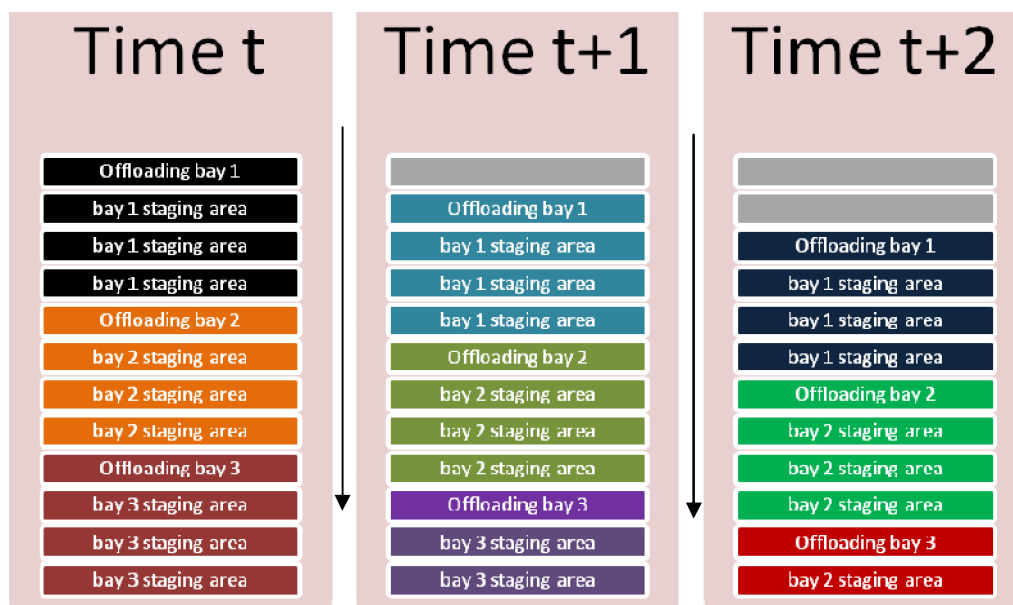


Figure 22: Diagram of staging lanes



Figure 23: Container receiving bays at Brackenfell DC



Figure 24: Dispatch bays filled with cross-docking pallets

Source: Shoprite Trainees 2010 [34]

- ***Brackenfell Flow***

The Brackenfell Flow DC is situated next to the other Brackenfell DC and started operating in July 2011. The creation of this DC was fueled by the need to relocate the old Montague Gardens flow DC and the need to expand exporting of goods from South Africa.

In the bottom-left corner of Figure 25 the staged received non-food imports are shown. The middle section of the same figure shows the compartments used to store the picked cross-docked



branch orders before palletising. The high density racking shown in the figure is used to store any remaining stock after that product line has been allocated to branches and distributed.



Figure 25: New Brackenfell DC

Source: Van Rensburg [27]

- ***Bolt Avenue , Brackenfell Export, and EppingDC***

Bolt Avenue DC consists of a refrigerated facility for foods and normal stockholding facility for some non-foods items. It is planned that this DC will be amalgamated into the new Brackenfell DC in the near future. The new Brackenfell DC has taken over some export operations to decrease the pressure on the Epping export DC. Epping DC is an export DC. It receives stock from local suppliers as well as cross-docked loads of imported stock from Brackenfell DC which is then exported to other African countries. Since the study focuses on the non-food imports destined for Johannesburg the Bolt Avenue, Brackenfell export and Epping DC will not be described in further detail.

- ***Congella***

The Congella DC in Durban processes both foods and non-foods. The foods are processed in a flow fashion and therefore require full allocation to branches upon arriving at the DC. Stock from suppliers as well as cross-docked pallets (Figure 26) from Cape Town DC's are received at the Congella DC. The basic stock handling procedure of imported non-food goods consists of unpacking the container, placing the goods in a staging area, placing the goods in racking or bulk



storage (Figure 27) and then picking products according to allocations. All goods are allocated to branches by the buyers before the goods arrive at the DC.

Congella does not cross-dock pallets from their premises. Management at Congella is also allowed to place orders for repetitive non-food items, although this type of orders only constitutes approximately one percent of total non-food imports. The quantity of non-foods stock held on the premises is kept to a minimum as the DC only services the local branches in Durban. The DC does not have the **capacity to keep reserve stock(Problem #9)** and does not have very **spacious staging areas or truck parking areas (Problem #10)**.



Figure 26 : Received cross-docked pallets



Figure 27: Bulk storage racking at Congella DC



- **Other DC's**

The Prospection DC is situated in Durban, It does not receive any imported containers from the port of Durban. It receives stock from local suppliers and cross-docked pallets from Cape Town. The Presidential DC houses furniture stock for the other companies under the Shoprite Group body. Lastly, the Monteagle distribution centres are externally sourced DC's that Shoprite has contracted in to perform parts of the stockholding and distribution tasks. These DC's will not be discussed in further detail.

Table 8 shows a comparison of the distribution centres in terms of their ability to handle the receiving and processing of imported goods in containers. Only containers that receive or distribute imported non-food goods are mentioned in Table 8.



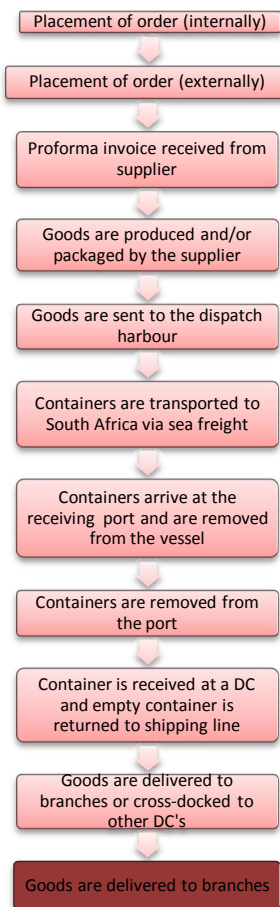
Table 8 Current procedures and capabilities of DC's with respect to imports handling

('X' indicates that the DC is capable of performing the procedure)

Current procedures performed at importing DC's						Notes
Distribution Centre	Receives containers	Receives palletized loads	Manually offloads large quantities of stock from containers	stores reserve stock	Pick and dispatch loads to cross-dock	
Brackenfell	X	X	X	X	X	
Brackenfell Flow	X	X	X	X	X	Works on flow basis but has to store some residue stock
Bolt	X	X	X	X	X	
Midrand	X	X	X			
Monteagle DBN	X	X	X	X		Outsourced DC
Congella	X	X	X			
Capabilities of importing DC's to perform procedures						Notes
Brackenfell	X	X	X	X	X	
Brackenfell Flow	X	X	X	X	X	
Bolt						Will be amalgamated into Brackenfell Flow DC
Midrand	X	X	X	X	X	Storage of goods in JHB is against company strategy. JHB DC is big enough to store non-foods.
Congella	X	X	X *			Space restrictions constrain volumes. * Small loading bays restrict manual offloading.
New DBN DC (under construction)	X	X	X	X	X	New DC will cope with space, palletizing, storing and cross-docking



11. Goods are delivered to branches



Once the goods have travelled to the final DC in the route and have been processed according to the DC's particular procedures, either stored and then picked by branch or staged and flowed, the goods are transported to the branch to be unpacked and sold to customers.

This chapter provided a step-by-step discussion of how the importing process is carried out at Shoprite. It provided information on the parties involved, their responsibilities and highlighted areas of concern. Within the discussion information on the operations of the various Shoprite DC's was brought forth. This chapter provides information required to understand the supply chain in order to be able to analyze it and provide insight.



6. Shoprite's Supply Chain Strategies and Assessment

Chapter 5 described the importing procedures implemented by Shoprite. To provide understanding of some of the procedures followed by Shoprite this chapter initially discusses supply chain strategies that form the backbone of the procedures. The company strategy of non-foods storage is described. Shoprite's use of centralized distribution is then brought to the fore as the core strategy of the business and the strategy of national pricing and the impact thereof on the importing supply chain is briefly mentioned.

The next part of this chapter is an assessment of Shoprite's importing supply chain. The assessment was conducted in two sections. The first section aimed to determine the route that should be chosen between cross-docking imports through Cape Town or directing shipments to Johannesburg via Durban. Evidence was used from a financial study performed by Shoprite as well as the author's own data analysis.

The second section looks at the entire supply chain and expands on the problems identified in Chapter 5 using the five steps of (1) Listing the problems identified in Chapter 5 with some possible solutions, (2) Performing a bottleneck analysis, (3) Identifying the stage of evolution of the supply chain, (4) Applying a quality management viewpoint and, (5) Performing a root cause analysis. Solutions were given where possible.

Interviews, author vocational work experience as well as the study conducted were used as the primary information sources for this chapter.

6.1 Discussion of Shoprite's Supply Chain Strategies

- **Strategy of centralised distribution**

The strategy that Shoprite has adopted in their supply chain is the practice of centralized distribution. The company implemented this process for several financial and practical reasons, two of which are mentioned below.

- Shoprite can negotiate a lower price from suppliers as the suppliers do not have to make frequent deliveries to many stores but only mass deliveries to one DC.
-



- The pressure on the branches to hold stock and receive stock from numerous suppliers on a regular basis is removed through the use of DC storage and DC deliveries. This enables the branch to utilize their facility to provide the most exposure of their products to the customer instead of having large storage areas.

It can be argued that the stockholding strategy of having the Cape Town non-foods hub is in line with true centralized distribution.

- **Company strategy of non-foods storage**

Shoprite made the strategic decision to allow only Cape Town DC's to store reserve stock of non-food goods. The reasoning behind this is that non-food goods on average have more value than food goods. A pallet of non-foods has an average Rand value of R12 000, compared to the average Rand value of R10 000 for a pallet of food goods. Damages and pilferage are likely to occur when goods are stored. In their view it is best to keep expensive goods in one place to reduce these damages and pilferage. The strategy emphasizes that control over the expensive goods can be achieved best when storage is centralized. Cape Town, as it is close to head office and the buying team, was therefore chosen as the hub for Shoprite non-food goods.

Even though it is against the strategy, Shoprite does send a few imported containers via the port of Durban to relieve the pressure faced by Brackenfell DC. The International Trade Department planned to experiment with this new routing by sending approximately 400 containers to Durban in 2011. Sometimes shipments are redirected in transit if the buyers notice that the Cape Town DC's cannot accommodate more stock. Congella's imports manager confirmed this change in imports routing by mentioning that in August 2011, 50 containers, originally destined to be received in Cape Town, were redirected and processed in Durban. This was an unplanned routing to Durban.

- **National pricing strategy**

Shoprite prices non-food goods on a national level. This means that the selling price of an item is the same in every branch in South Africa. The cost price of goods takes landed cost into consideration. Goods sent to Johannesburg have higher landed costs, thus



reducing the profit made due to the nationally fixed selling price. It is therefore important that the cost of transporting goods to Johannesburg are minimized to increase profit.

- **Allowances included in the planning of imports**

When planning and budgeting for imports takes place at the international trade department, certain allowances are built into the cost structure to account for various costs that are not known for sure. The two main costs accounted for are local transport and demurrages.

- **Local transport**

Local transport is an unknown variable as the exact route the goods take is not predetermined. The general route of either being cross-docked via Brackenfell or being sent directly via Durban port is known but the exact transport manoeuvres between the ports, container storage depots and DC's is not known at the time of order placement. An allowance for transport is therefore added to the costing. This allowance is based on historical data (i.e. based on similar shipments actual transport costs incurred). If the local transport was more defined and set-out the costing would be more accurate and determining the economic feasibility of certain shipments at an earlier time point.

- **Demurrages**

As mentioned in the descriptions of the various steps involved when Shoprite imports non-foods (Chapter 5), various costs fall under the term *demurrages*, namely:

- Storage fee at the port
- Storage fees at the various container storage depots

Demurrages vary tremendously from container to container, especially since Shoprite handles the storage and transport of a container individually on a container-to-container basis. Shoprite has therefore decided to add a percentage to the unit price of each product to account for demurrages when budgeting for a shipment of goods in the planning phase. The reasoning behind this is best described through an example.

Example: Two containers are imported, one containing plastic lunch boxes and one containing pots. The one containing plastic lunch boxes arrives too early at the port and has to be stored at the SATI depot for several days. The other container containing pots



has already been allocated to stores and travels to the DC directly and can be distributed without any demurrage costs being incurred.

If the demurrage cost of the plastic lunch boxes was to be included in the cost price of the lunch box then the profit margin will decrease by a large amount. The profit margin of the pots will be unaffected. To even out this situation Shoprite budgets for a percentage demurrage cost on all items, thus 'spreading' the cost over all their stock.

The R14 million that demurrages cause annually at Shoprite is an amount not to be taken lightly and more in depth studies are necessary to clarify demurrages incurred in the various routes and the other 'non-financial' costs to the company before a final routing decision can be made.

6.2 Assessment of Shoprite's Imports Supply Chain

The assessment of Shoprite's imports supply chain was based on two key steps. Firstly, it was determined whether the routing of imports should be via Cape Town (using cross-docking) or via Durban (direct shipment). For this a financial study carried out by Eliza van Zyl was studied as well as a data analysis performed by the author. Figure 28 shows the two resources used to make the shipment routing decision.

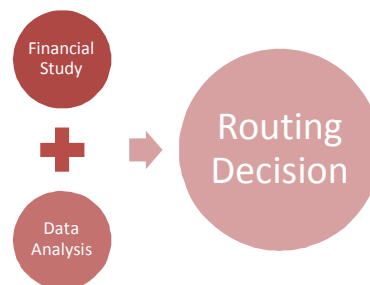


Figure 28: Decision inputs

Secondly, it was necessary to identify problems of the current supply chain and produce possible solutions. This process involved the five steps of, (1) Listing the problems identified in Chapter 6 with some possible solutions, (2) Performing a bottleneck analysis, (3) Identifying the stage of evolution of the supply chain, (4) Applying a quality management viewpoint and, (5) Performing a root cause analysis, as shown by Figure 29. Figure 29 is repeated at each step to indicate which procedure is being explained.

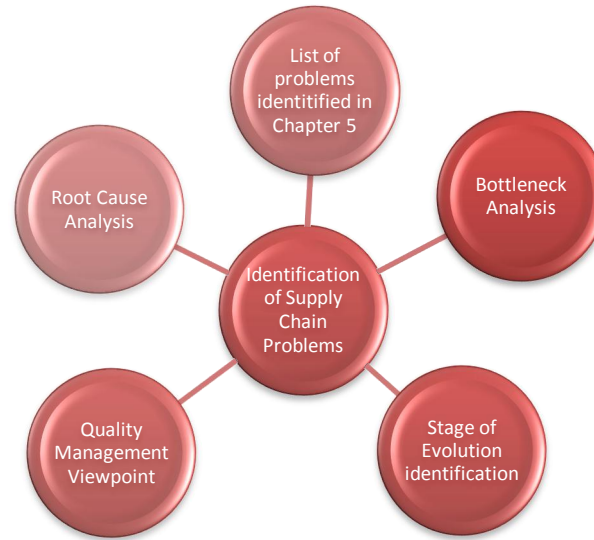


Figure 29: Steps in problem identification

6.2.1 Routing Analysis

6.2.1.1 Financial study conducted within the international trade department

Shoprite realized that the Cape Town DC's are put under pressure by handling most of the non-foods stock. This realization prompted a study in the financial division of the international trade department of Shoprite. Eliza van Zyl from the international trade department conducted the investigation and based the study on a 40 ft container of kettles that the Maersk shipping line transported from the East. The aim was to determine if it in fact is financially the more cost-effective option to send Johannesburg's or Durban's stock through the Cape Town DC's in a cross-docking fashion or if sending entire containers directly is less expensive.

The following routes were tested:

- Transport the goods to Johannesburg by cross-docking it through Brackenfell DC
- Transport the goods to Johannesburg in the container via the port of Durban
- Transport the goods to Durban by cross-docking it through Brackenfell DC
- Transport the goods to Durban in the container via the port of Durban

The first two routes mentioned in the list above are applicable with regards to this project. The costs of these two routes are shown in Table 9. It must be noted that Table 9 does not include the actual product cost from the supplier, which would be the same for all routes.

**Table 9 Expenses for the two routes**

Expenses (Rand)	Midrand	
	Via Brackenfell (cross-docking)	Via Durban (direct)
Sea freight	19,555	19,555
Landside charges	2,353	2,353
Cargo dues	4,056	4,056
UTI admin fee *	810	810
Road haulage - harbour to DC	2,040	12,671
Empty turn in	-	3,600
Cross dock cost - DC to DC	11,400	-
Total cost	40,213	43,045

* Costs up to this point relate to costs incurred till container has reached destination port.

Source: Van Zyl [38]

The study confirmed the hypothesis that all routes' costs are equal from the start of ordering from the suppliers up until the arrival of the container at the port. From this point onwards the costs vary considerably. The transport of the container costs R2 040 when it's being transported from the Cape Town port to the Brackenfell DC. In contrast, it costs R12 671 when the container is being sent via truck from Durban port to Johannesburg. The travelling distance from Durban to Johannesburg (approximately 600km) is accountable for the high cost compared to the local travelling distance from Cape Town to the Brackenfell DC (approximately 30km).

The study shows that a container turn in fee of R3600 is charged when sending the container directly from Durban to Midrand. This amount is not charged when sending the goods via cross-docking in Brackenfell. The two costs of the transport and container turn-in fee constitute the rest of the costs of the route to Johannesburg via Durban. In the case where the goods were received at the Brackenfell DC, the goods had to be processed, racked, picked and then cross-docked with the transport amounting to a further R11 400.

The conclusion taken from this report was that it is more cost effective to crossdock goods contained in a 40ft container from the Brackenfell DC to Midrand (R40 213) compared to sending the container directly from the port of Durban (R 43 045). A saving of R2831 can be achieved by using the Cape Town based route. To put this saving into perspective, consider that



approximately 100 containers worth of goods destined for Johannesburg branches is cross-docked through Brackenfell (Appendix D). This saving amounts to almost R300 000 annually. If Shoprite is transporting microwaves in a 40 ft container the saving is R3.60 per microwave, just by choosing a different transportation route. The full calculations can be found in Appendix D. However, R300 000 is not a significant amount when considering that R14 million is spent on demurrages annually.

The savings, therefore, does not alone, justify favouring the Cape Town based route. The findings of the report do coincide with the non-foods storage strategy of the company stating that non-food reserve goods should only be stored in Cape Town. However, the study only takes measurable financial factors into account. Nor did the study consider the time, workforce, and storage area and neither the administration the Brackenfell DC had to expend in order to send the goods in pallets to Midrand. The important (and immense) financial cost of demurrages is also excluded from the study performed by the International Trade Department.

6.2.1.2 Data Analysis of Imported Goods

An analysis was conducted of the number of containers of non-food imports received directly by the Brackenfell, Congella and Midrand DC's, respectively. The data used was collected from July 2010 till June 2011. It must be noted that the data is from the period prior to the start of operation of the new Brackenfell Flow DC. The flow DC has increased the number of containers processed by Cape Town, as shown later in Table 11. The complete analysis is shown in Appendix D.

Figure 30 shows the number of containers received directly to the Brackenfell, Congella (Durban) and Midrand DC's. The peaks and troughs indicate the times when the DC's are under pressure when processing large amounts of imported goods and when they are not under a lot of pressure, respectively. Table 10 relates certain events and factors mentioned in the previous chapters that can account for some of the peaks and troughs.

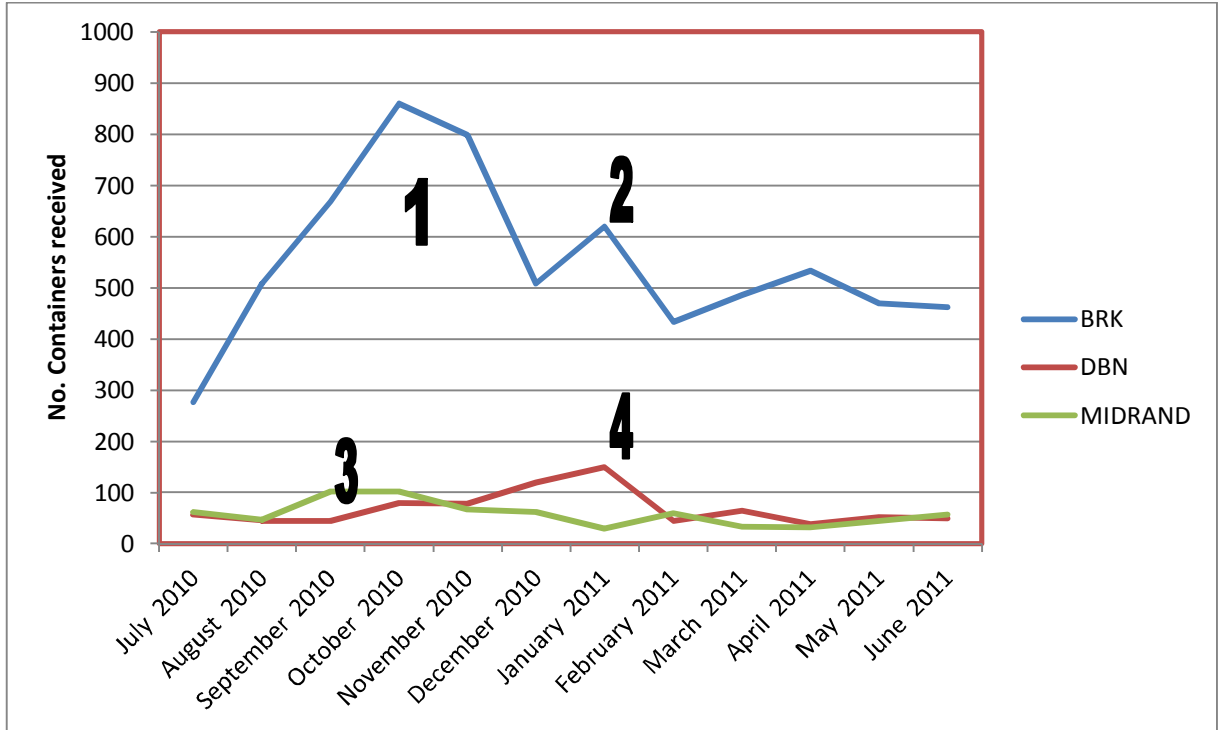


Figure 30: Containers received directly to the DC's

Shoprite Information System [33]

Table 10 Explanations of trends in Figure 30

Marker Number	DC concerned	Local increase/decrease	Reason for increase/decrease
1	Brackenfell	Increase	Preparation for Christmas/“Back-to-School” promotions
2	Brackenfell	Increase	Preparation for “Back-to-School” promotion
3	Durban - Congella	Decrease	Windy season, port cannot receive as many containers
4	Durban - Congella	Increase	Windy season has ended, importing directly can resume

Both Figure 30 and Table 10 show that the Brackenfell DC would benefit most in the months from September till November from importing load relief.

Another aspect to analyze is the extent of the pressure that cross-docking goods puts on the Cape Town DC's. If the pressure is too high, as in the opinion of the DC managers, then perhaps it is best to send some shipments directly to Johannesburg via Durban. Figure 31 shows the



percentage of Brackenfell's received imports that are cross-docked to Midrand and Durban. The full calculations can be found in Appendix D. Figure 31 indicates that 1.6% of Brackenfell's imports are cross-docked to Midrand. This small amount does not warrant a change in routing based on relieving perceived "pressure" off of the Cape Town DC's. It, in effect, contradicts the belief that the Brackenfell DC is under pressure.

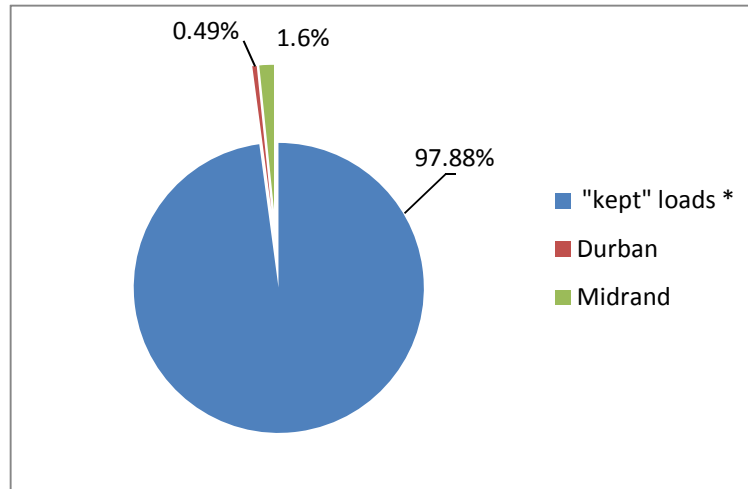


Figure 31: Percentage of Brackenfell's received imports that are cross-docked

* Kept loads refer to goods that are processed and distributed by the Brackenfell DC to branches and are not cross-docked to Midrand or Durban.

Source: see Appendix D

There are several problems with the data used that could change this analysis, including that:

- the data was collected from the prior to the start of the new Brackenfell DC's operations
- the data does not include other Cape Town DCs' cross-docked loads to Midrand, and is thus only a representation of the pressure on Brackenfell, and not Cape Town
- the data itself is analyzed under several assumptions mentioned in Appendix D

To alleviate the *perceived* pressure on the Cape Town DC's, shipments that are destined for Johannesburg are sometimes rerouted to Durban (Pillay [24]). In that case the containers will be offloaded and processed by the Durban DC's. Rerouting requires a flexible system with good communication between all parties, namely the supplier, logistics partners, shipping line, DC staff, and buying/replenishing teams.



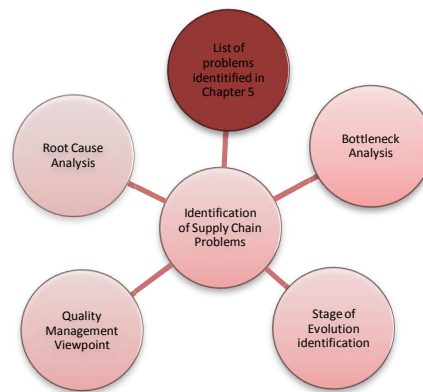
6.2.1.3 Final Routing Decision

Based on the fact that sending containers directly through Durban is more expensive and results in reserve stock storage at Midrand which is against company strategy, cross-docking goods via Brackenfell is the best route for non-foods imported goods.

However, it is important to note that a company sometimes needs to make a decision at the cost of expense to ensure timely delivery of goods, as mentioned by Hyde [21]. Therefore, if the Cape Town DC's are under stress and cannot deliver the goods to Johannesburg quickly, rerouting shipments to Durban should be allowed.

6.2.2 Supply Chain Problem Identification

6.2.2.1 List of Problems Identified in Chapter 5 with Possible Solutions



- **Buyers or replenishers order a shipment bigger than required by the DC's**

In the case where the supplier's minimum order quantity has dictated a larger shipment quantity there is very little that Shoprite can do besides find another supplier. If it is found that a buyer has purchased a larger quantity than necessary it is important to identify the reason. Ultimately it is a balancing act between operational efficiency at the DC and making use of economies of scale in the form of bulk discount. It is crucial that the visual management system of the buyers be coupled with input from DC management, as well as from higher up supply chain management. Section 4.1 mentions the functions in an organisation and what they place emphasis on. If all the functions have input into the buying process a balance between supply chain efficiency and cost can be achieved.



- **Suppliers delay production of an ordered item**

This type of delay cannot be reduced from Shoprite's side once the order has been placed. The supplier and Shoprite need to discuss their ability to supply the goods and the time frame of supply before the proforma invoice is signed off.

- **Shipments are sent too early**

Solution: Implementation of a freight forwarder

Shoprite is currently investigating the initiative of having permanent freight forwarders in countries from which they receive goods. A freight forwarder would take over the role of the shipment consolidator and will also monitor the timing of shipments. If the supplier wants to ship an order too soon the freight forwarder will stop them or will store the stock in a DC until the shipping window opens so the shipment can be released to the shipping line at the correct time.

It was mentioned in Section 3.3 that a freight forwarder and consolidator have the same roles. In Shoprite's case the consolidators used only have the responsibility to put various shipments together to form full container loads. They do not have the responsibility to ensure the correct timing of shipments. A freight forwarder would thus take over the consolidator's responsibilities and assume the responsibilities of timing shipments.

The job of a freight forwarder can be assigned to a person within Shoprite or it can be outsourced to a company specializing in the field of freight forwarding. Outsourcing has the benefits of having knowledgeable experts in the field but at the expense of Shoprite losing some control over the situation. Section 2.5 mentioned dealing with specialisation as a method of improving supply chain efficiency.

Once the position of a freight forwarder has been established it is possible for the person or company to take over the role of local transportation organizer that the supplier currently fills. The freight forwarder can then liaise with the shipping line, arrange local transport and liaise with the supplier of the goods.



It might be required that the freight forwarder is in charge of warehouse space to consolidate and store goods prior to transportation. If the freight forwarder role is fulfilled in-house then the use of a warehouse becomes a complicated procedure involving aspects such as:

- Goods storage equipment (e.g. racking)
- Material handling equipment (e.g. forklifts)
- Security
- Stock level management
- Picking procedures
- Large teams of employees for warehouse management and administration

If suppliers view the warehouse as storage area they will still be tempted to deliver orders early to receive payment. It should be stressed that the warehouse is only for short term emergency storage and a place for shipment consolidation. In addition, freight forwarders will also be helpful when dealing with late shipments as they will be in the country of origin and close to suppliers to discuss matters with them. This opens up the possibility to fine suppliers that send shipments too early or too late. The downside of such a system is that it breaks down the supplier-Shoprite relationship and can lead to cancellation of contracts.

- **Stock due for an important promotion (e.g. Christmas promotions) is late**

This is stated as a separate problem than that of 'Suppliers delay production of an ordered item' because this is a specific case relating to promotional stock and results in the extra expense of air freighting the goods in order to receive them in time for the promotion.

- **Ports operational difficulties**

The problems mentioned in Section 3.6 include wind, storage utilisation and traffic problems. The developments currently underway and planned for these ports are sufficient to deal with most of these problems. Below a solution is given to help ease traffic in a way that is both beneficial to the port and Shoprite.

***Solution: Port/Shoprite Operational Deal***

It is important to note that the ports in South Africa do not deal with the end customers. Port management liases with the shipping lines only to organize the arrival of vessels and the offloading, storage and picking up of containers. The contents of the containers are unknown by the port. The only information the port has is the container number and whether the container requires a power source for refrigeration purposes.

South Africa has large automobile manufacturing plants in the East London area. These plants receive imported parts on a regular basis. The parts are received at the Durban Port from where they are transported via road or rail to the manufacturing plant. The port receives the container numbers of the containers belonging to the automobile company from either the company itself or the shipping line responsible for the transportation of the goods. When offloading the containers from the vessel the port authority assigns a storage area for the containers which are then placed together. This allows easy and fast retrieval of the containers when the trucks arrive to collect them. In contrast, trucks collecting a Shoprite container provide the port management with the container number. The containers will be located and retrieved, but due to the random unpacking of containers from the vessel the containers may be stored far apart and under other containers that first need to be removed before the container can be retrieved.

It would be beneficial for both the port and Shoprite if a system similar to that used by the automobile manufacturing plant's is implemented. The system would require that, (1) Shoprite notifies the port authorities of their container numbers associated with containers arriving on a specific vessel, (2) The port arranges its container handling procedures to place all Shoprite containers in the same storage area. The system would benefit the port by reducing the number of container movements in order to retrieve Shoprite containers. This quick retrieval of containers would decrease their truck turnaround time and also help alleviate traffic problems within the container terminal and the rest of the port. Shoprite would benefit from such a system by gaining better control of their containers and reducing the handling time due to quick collection of containers. In addition to this, the buyers could also make use of their visual management system at the port, in order to supervise containers that are causing excessive demurrage costs at the port of Cape Town.



- **Demurrages – at the port and at other storage areas**

The R14 million annual demurrage cost warrants investigation because of its magnitude and because there is the potential to reduce this cost. Shoprite import staff mentioned that the implementation of a freight forwarder would lower storage costs of depots as early shipment can be controlled. As demurrages are incurred in several stages along the importing process, a root cause analysis would be more beneficial to determine solutions for the problem. The analysis can be found in the Section 6.2.2.5.

- **Transport costs are incurred with multiple movement of goods**

The movement of goods between storage areas is the main cause of transport costs incurred. Section 2.5 mentions that a reduction in supply chain complexity increases supply chain efficiency. Multiple movements of goods can be viewed as a complexity of the supply chain and should therefore be reduced.

Solution: Plan storage

Currently container storage areas are being viewed as “emergency” storage that is only preliminary till the DC can accept the storage. In reality, the DC's will never be able to immediately accept all of the containers arriving from the East. The interim storage of containers should therefore be included as a part of the supply chain and should thus be planned and strategized for every shipment. If the storage is planned unnecessary movements can be eradicated and the transportation costs will decrease.

- **DC problems:**

- **Capacity to keep reserve stock**
- **Spacious staging areas or truck parking areas**

Solutions: Change material handling, material storage, construction

The first problem of reserve stock capacity touches on the non-foods storage strategy of Shoprite that is discussed earlier in this report. If it is against the DC's operational strategy to keep reserve non-foods stock a solution is not possible. If, on the other hand, the DC does keep reserve non-foods stock, various material handling and material storage principles can be applied to improve the stock storage capacity of the DC. The discussion of these principles in detail is beyond the scope of this project.



In order to improve the current operation and layout DC's or improve the capacity of the supply chain as a whole, construction is necessary. The creation of the new Brackenfell Flow DC increased container handling of Cape Town DC's as a group. In the past only 15% of all containers would go directly to a DC from the port of Cape Town. Now 30% is transported directly, thus saving storage costs. Table 11 shows the number of containers received by the various DC's per week prior to the construction of the new Brackenfell DC and currently. Table 11 does not take any container storage prior to arriving at the DC's into consideration. The table shows that the construction of the new Brackenfell DC increased Cape Town's overall container processing capacity by 30% from 130 containers to 170 containers per week. Table 11 shows that an increase in the size of a DC or the creation of new DC's will increase the amount of containers that can be processed per week.

Table 11 Containers processed per week

DC	Prior to Brackenfell Flow DC	Currently
Brackenfell Stockholding DC	35	35
Montague Gardens	70	N/A Now at Brackenfell Flow DC
Blackheath	20	N/A Now at Brackenfell Flow DC
Bolt	5	5
Brackenfell Flow DC	N/A	130
TOTAL	130	170

Source: Van Niekerk [35]

A new DC in Durban is under construction near the King Shaka International Airport. The estimated completion date is September 2012. This DC will be large enough to store a small quantity of reserve stock and it will have the capacity to offload containers efficiently, palletize goods and cross-dock pallets to other DC's in the country, including Johannesburg.

There will be several benefits from using the planned Durban DC to cross-dock goods to Midrand, including:

- The container will be unpacked in Durban, eliminating the container turn-in fee.



- The Midrand DC will still receive palletized goods, enabling fast and easy putaway procedures.

The idea of cross-docking goods via Durban is against the non-foods storage strategy discussed in Section 6.1, but if the company adjusts the strategy it can be implemented.

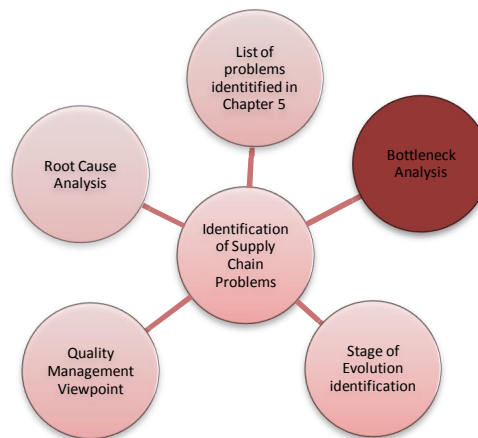
- **Container Turn-in fee**

The container turn in fee is incurred when directly shipping containers via Durban to Johannesburg. This cost can only be reduced by avoiding the transportation of containers directly to Johannesburg.

Solution: Pre-process the goods in Durban

If the container is unpacked and the goods palletized before transportation to Johannesburg the container can be turned in at the port of Durban which will eliminate the container turn-in fee. The 3rd party transporter should be responsible for this procedure. The goods will have to be delivered directly to the DC in Midrand as the palletized goods cannot be stored at the SADC depot.

6.2.2.2 Bottleneck Analysis



A bottleneck analysis helps determine the part of the supply chain that is preventing the flow of goods (Goldratt *et al.* [3]). Various problems were identified in the previous section and to determine which of the parts or processes of the supply chain should be improved first, a bottleneck analysis is necessary. Figure 32 shows the flow of goods in the Shoprite specific supply chain. The figure is based on the supply chain diagram in Appendix C.

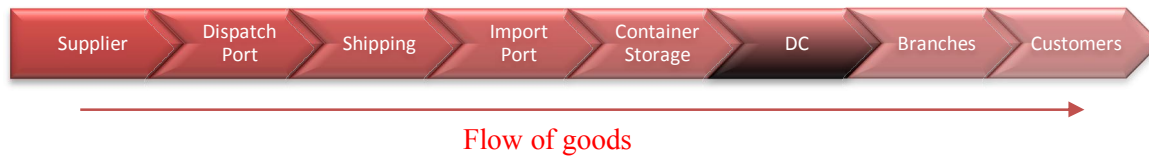


Figure 32: Flow of goods between the partners in the Shoprite supply chain

A bottleneck is defined as:

“any resource where the demand being placed on it is greater than the its capacity” (Goldratt et al. [3])

The DC's have been identified as the bottleneck in the flow of goods. The reasons for this include that:

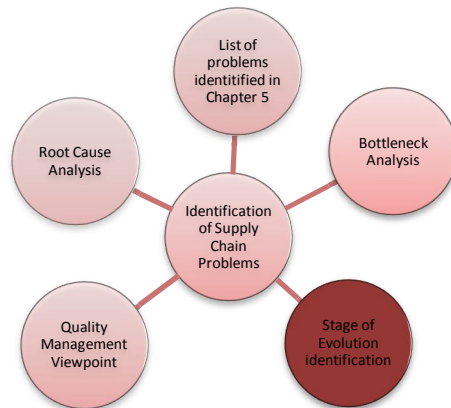
- The DC's cannot immediately process 100% of the containers arriving at the ports.
- The branches can only receive stock that has been processed by a DC. The DC's, therefore, limit the flow of goods further down the chain.

Goldratt *et al.* [3]'s five step process to eliminate bottlenecks was applied.

1. Identify the constraint
 - The DC's were identified as the bottleneck.
2. Decide how to exploit the constraint
 - The DC's must improve their operations (i.e. efficiency of imports handling procedures).
3. Subordinate all other processes to above decision
 - The buyers need to adjust their buying plans continuously (e.g. schedules, quantities, etc) according to the DC's constraints.
 - Shipping needs to be timed according to the DC's planned schedule and/or according to DC capacity, not just according to forecasted demand.
4. Elevate the constraint (make other major changes needed to break the constraint)
 - More DC's can be built.
 - More DC's can be allowed to process imports and store reserve non-foods stock.
5. Return to Step 1.
 - Bottleneck identification is a continuous process and should be performed periodically to identify new bottlenecks that arise from changes in the supply chain.



6.2.2.3 Supply Chain’s Stage of Evolution



Ayers [1] explains that a maturity matrix is a good tool to use to assess and improve a supply chain. A maturity matrix enables the user to identify which stage of evolution the supply chain is in. Each stage has known typical challenges which can be addressed. Table 12 is a reproduction of Ayer’s [1] maturity matrix.

Table 12 Stages of Evolution of Supply Chains

	Stages of Evolution			
	1. Infrastructure	2. Cost Reduction	3. Collaboration	4. Strategic Contribution
Supply chain organization	Capability building Execution of basic tasks	Root cause analysis Optimal buys	Multicompany improvement programs Financial sharing arrangements	Customer-focused organization structures along supply chain
Demand-driven supply chain	Supplier reduction Negotiations Mostly forecast driven	Quality systems Outsourcing Supplier ratings Lead time reduction	Design changes Postponement strategies Information exchange (inventories, forecasts, demand)	Segment strategies New product involvement
Supply chain systems	Basic capabilities Data timeliness and accuracy Paper based or rudimentary computer procurement system	Mature technology (ERP, forecasting tools) Forecasting and inventory practices	Web-based technology for information exchange	Increased use of customized transaction and planning tools integrated with supply chain operations
Stage challenges	People, Skills, discipline, time	Systems, support, knowledge, unwillingness to change supply chain partners	Procurement paradigms, willingness or ability to be creative	Barriers between operations, engineering and marketing Weak links in chain

Source: Ayers [1]



Shoprite's supply chain has been classified as an **early stage 3 Collaboration** supply chain. The reasons for this classification are listed below.

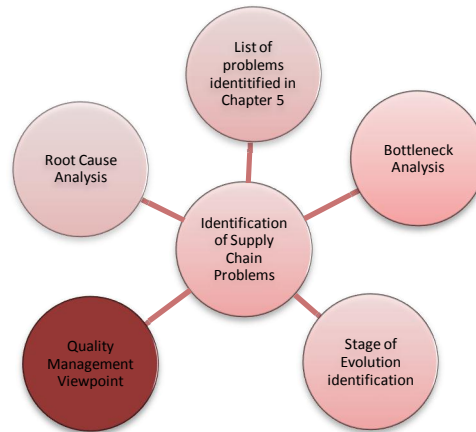
- Shoprite has developed information exchange systems for inventories and forecasting. The information systems include warehouse management, finance and scheduling systems. This places them in stage three.
- Shoprite's enterprise resource planning (ERP) system and forecasting practices place them in stage two.

The problems identified for a stage three supply chain relate to procurement paradigms (Ayers [1]). Shoprite has recently acquired the *Tradestone* information system software which will act as a communication tool between all parties involved in the logistics chain of imports. *Tradestone* will improve the undertaking of procedures in the importing process as well as improve the flexibility of the process as communication will be clear and fast, allowing for adjustments to be made continuously. The implementation of *Tradestone* will allow web-based information exchange between supply chain partners. It is example of bettering information flow which Section 2.5 mentioned as a method of supply chain efficiency improvement. As this system is not fully operational it places Shoprite in the early parts of stage three. *Tradestone* will also fulfil the need to have continuous and centralised information on the state and location of imported goods once they arrive in South Africa.

Other procurement related problems have already been identified in the bottleneck analysis as well as the list of problems and solutions generated. This confirms that the supply chain is a stage three supply chain and that one of the focuses should be to improve the supply chain from a procurement perspective.



6.2.2.4 Quality Management Viewpoint



W. Edward Deming devised 14 Quality Management principles that can be applied to any organisation. The 14 points can be used to strive towards organizational success. The first point states that there should be constancy of purpose towards product and service improvement. This is currently lacking in the Shoprite supply chain situation. The buyers, imports managers and DC management all have different goals. The buyers strive to acquire good and cheap products, the imports managers focus on moving stock around and the DC management does not want to keep stock for long. Communication and clear company goals will help rectify the situation.

The second point describes how a paradigm shift in management is necessary for any improvements to be made in quality management. This point suggests that the company strategies should be reviewed in order to see if they are still applicable and beneficial.

The third point emphasizes the need to build quality into a process instead of relying on inspection. This point is not that applicable to this report as the focus is more on logistics than manufacturing. However, it is noteworthy that suppliers adhere to this principle.

Deming's fourth point is "End the practice of awarding business on the basis of price tag alone" (Gitlow *et al.* [2]). This principle refers to choosing the correct supplier based on quality of goods and quality of service instead of just the price of the goods. The fourth principle is very applicable for the study.

Shoprite's target market dictates that their prices have to be low; therefore the cheapest suppliers are used to ensure that the profit margins are still adequate. However, the supply chain is



suffering due to bad service quality from suppliers. In this case, the bad service refers to the late or early shipment of goods and the lack of flexibility when it comes to minimum order quantities. It is recommended that the buyers are educated as to how to select buyers in terms of quality of service as well as price.

The fifth point describes how continuous improvement of products and services is necessary. This implies that the supply chain should be monitored and measured on a regular basis. More financial studies should be conducted to monitor changes and improvement. The Shoprite company has an elaborate information system that contains a large amount of raw data. This data can be used to monitor the supply chain periodically.

Point six explains the need to properly train workers. The training of the buyers and replenishers is of significant importance here. The impact of the orders placed has been described and prompts the need to train the staff to make better buying decisions. The same applies to the DC and imports staff that need to make important local logistics decisions.

The seventh point Deming mentions is that of instituting leadership. In this situation this point should be interpreted as instituting teamwork and cooperation, something that has been mentioned before as being crucial to supply chain improvement.

Point eight illustrates that fear must be driven out in order for employees to work effectively. Again, communication and cooperation between buyers, imports and DC staff will ensure that their goals are aligned and competition is eliminated. Point nine reiterates this by stating that interdepartmental barriers should be broken down.

The tenth, eleventh and twelfth point that Deming makes proclaim that numerical objectives must be done away with and should be replaced by leadership and process goals. This is the most difficult point to apply as most people understand and feel comfortable with numerical goals. In this case one can interpret the point in terms of systems management. This implies that each department should not focus on achieving its own numerical goals (e.g. stock turnover, profit margin), but should rather consider the supply chain as a system and cooperate with all departments to improve the system as a whole.

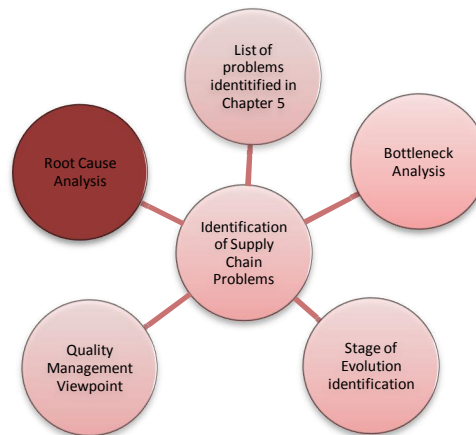


Point thirteen “Institute a vigorous program of education and self-improvement”, focuses more on the human resources aspect of a company and was ignored in this project.

The final and fourteenth point declares that action must be taken to accomplish a transformation. This is a very important realisation that no improvement in the supply chain can be made unless policies, procedures and other changes are implemented.

Deming's 14 points illustrates the need for communication, cooperation and education. It showed that these three aspects can be used to improve the supply chain by addressing some of the problems identified earlier.

6.2.2.5 Root Cause Analysis of Demurrages



As mentioned before, the substantial annual cost of demurrages warrants investigation. Section 2.5 describes the AIM & DRIVE process of cost reduction. The first four steps of the process were performed in this section.

Step 1: Agree on the need to manage costs

Managing cost is an important part of increasing supply chain performance (Section 2.2).

Step 2: Identify critical costs in the supply chain

The demurrage cost has been identified as critical.

Step 3: Measuring secondary and tertiary costs

Demurrage cost has two identifiable sources:

1. Storage at the port
2. Storage at container storage depots

**Step 4: Define key cost drivers and develop strategic options**

A root cause analysis was performed to determine the key cost drivers in the process so that strategic options could be developed as solutions. The full root cause diagram can be found in Appendix E. The low level causes of demurrages and their respective solutions are shown in Table 13.

The problem of unallocated stock is prevalent. As the flow DC's operate on an allocation basis and allocation is an important criteria used for container movement (Section 6.2), unallocated stock cause problems. The list of containers in the Shoprite system (those ordered, in transit and in storage) are frequently reviewed by buyers to update the allocations thereof. The DC's need to wait for allocations to occur before they can schedule when the container can be delivered to the DC for processing. There is a very short lead time between planning and container receipt at the DC, inhibiting long term stock planning in the DC's. A solution to this problem could be to pressurize buyers to allocate stock before the container reaches the port (or within a determined time period).

A good communication system between the buyers and the DCs should be put in place to help improve the planning procedure. As mentioned before, *Tradestone* can be used to fulfil this need.

**Table 13 Causes and solutions of demurrage cost**

Low level cause	Solution
Goods were shipped from the supplier too late	See Section 6.2.2.1
Vessel was not released from the port on time	Shoprite has no authority in this type of situation. Avoidance of the situation is best. If a port constantly releases vessels late than an alternative port must be used. If the shipping line is causing the delays then an alternative freighter must be found.
Shipping conditions caused delays	These delays are beyond the control of Shoprite.
Supplier MOQ is too high	See Section 6.2.2.1
Buyer EOQ is too high	See Section 6.2.2.1
Branch sales are too low	This problem needs to be addressed by the sales and marketing department of the company and is beyond the scope of this project.
Buyers have not allocated stock	See discussion above.
3rd party transport problems	Alternative 3 rd party transporters can be used that are more reliable, efficient and cheaper.
Customs delays and documentation problems	The implementation of a freight forwarder, as mentioned in See Section 6.2.2.1, can help ensure documentation is correct and the smooth operation of the customs clearing process from the customer's side.

The first part of this chapter concluded that it is best to cross-dock goods via Brackenfell than to send direct shipments via Durban when sending goods to Johannesburg. The reasoning behind this decision is based on the supply chain strategies and not on the minimal cost savings that are being made.

The second part of this chapter concluded that there are several barriers to supply chain efficiency in Shoprite's case. The barriers were discussed and solutions developed. The solutions include better communication and the implementation of a freight forwarder.



7. Final Conclusions and Recommendations

This chapter provides final conclusions of the project and encompasses the main findings of all the previous chapters. Furthermore, this chapter presents insight into the extent of which the aims stated in Chapter 1 were achieved. It also provides recommendations for related studies. The chapter is concluded with a reflection on the experience gained from undertaking this project.

7.1 General Concluding Remarks

- There is insufficient evidence in of excessive pressure on the Cape Town DC's to show that a change in the routing of non-foods imports is necessary.
 - The current route (via Cape Town) is not significantly less expensive, but is, however, aligned with the current company strategies and also enables the use of visual management. It is, therefore, the route to use.
 - The small difference in the cost between the two routes is mainly due to the container turn-in fee charged with the Durban route. This can be avoided through the processing of the goods in Durban before transportation to Midrand. The processing will be a minimal expense. This emphasizes the fact that the Cape Town route cannot be favoured based on cost alone as the Durban route can be made almost as cost-effective as the Cape Town route.
 - If the company wishes to change its strategy and store non-foods in other DC's the current and planned DC's and ports will be able to accommodate the change easily.
 - The current route can, however, be made more efficient through the implementation of the proposed solutions for the problems identified.
-



7.2 Summary of Problems and Solutions Identified

Figure 33 shows the problems and solutions identified in Chapter 6. The comments are placed alongside the stage in the importing process where relevant.

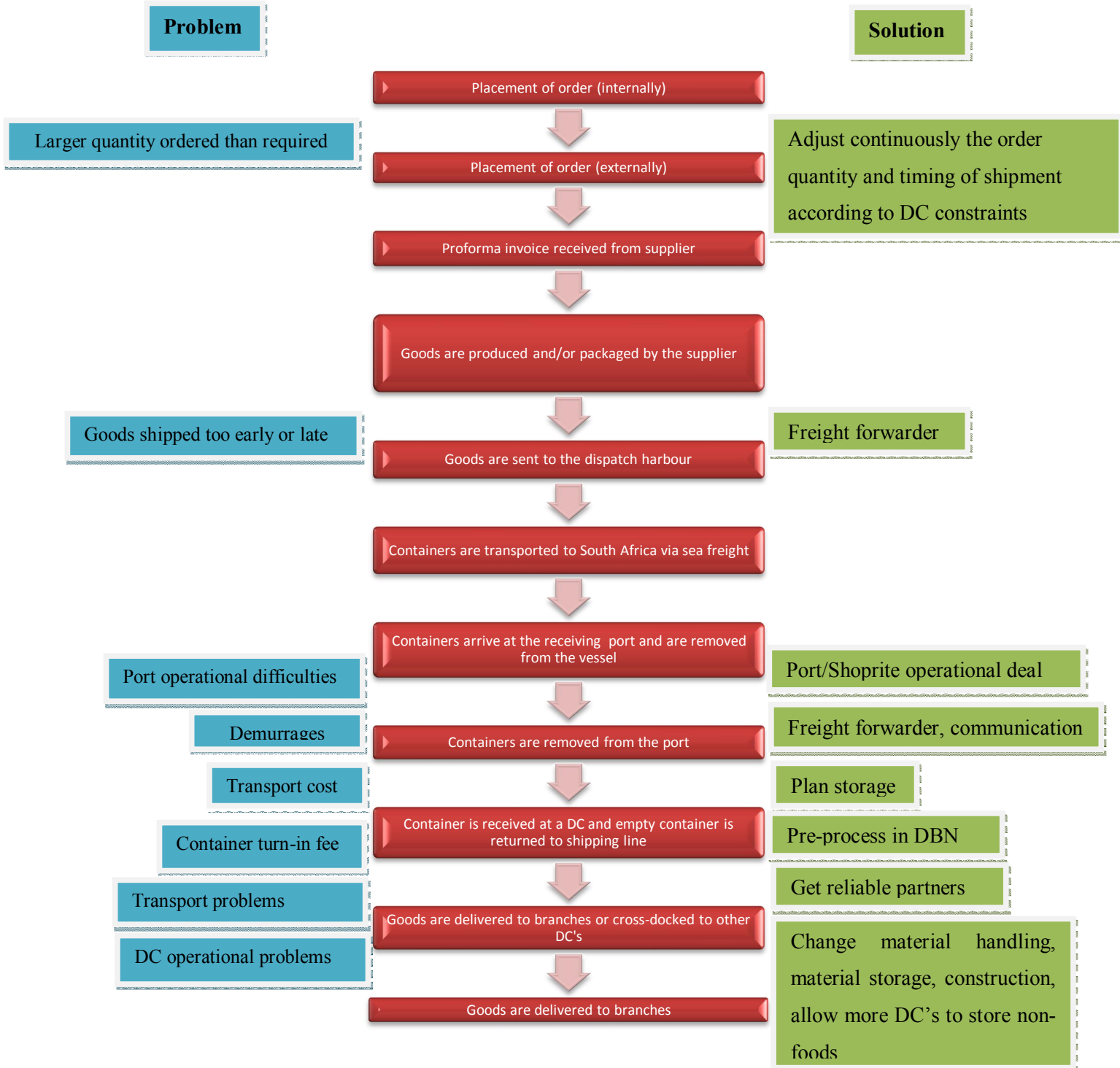


Figure 33: Summary of problems and solutions identified



Some recommendations incorporated above and in Chapter include:

- Good quality and frequent communication between the buyers, replenishers, suppliers and DC is necessary to overcome some of the supply chain's problems.
- The DC's are the bottleneck in the supply chain and all procedures should therefore be run according to the DC's capacities.
- The container storage depots should be managed proactively to reduce demurrages by including them formally into the imports planning process.
- The implementation of a freight forwarder and container storage agreement between the ports and Shoprite will improve the supply chain and, especially, reduce demurrages.

7.3 Reflection on Aims

- The aim of identifying the best route for non-food imports from the East for the Shoprite group has been achieved.
- The aim of assessing Shoprite's non-food imports supply chain and the suggestion of improvements has been achieved.

7.4 Recommendations for Related Studies

- This project focused on confirming or refuting the feasibility of Shoprites current supply chain procedures. The data analysis performed requires more quantitative information of the importing procedures to make accurate project conclusions. Newer data would also provide the basis for a more accurate analysis.
- This project focused on trying to explain why Shoprite performs procedures the way they do. It would be beneficial for future studies to compare Shoprite's imports supply chain with those of other global retailers, such as Walmart.

7.5 Experience Gained from this Project

The undertaking of this project required a vast amount and broad span of knowledge of the aspects of supply chains. Experience was gained regarding the modelling of a supply chain as well as the understanding of the complexities thereof. The approach of looking at "the bigger picture" had to be mastered whilst still being able to identify the details and impacts of components supply chains.



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Appendix A Interview Notes

1. Nico Loubser , 9 June 2011
 2. Johan Goosen, 9 June 2011
 3. Willem van Rensburg , Henk Goosen, Jacques van Niekerk, 9 June 2011
 4. Taryn Olivier, 12 July 2011
 5. Jacques van Niekerk, 17 August 2011
 6. John Hyde, 7 September 2011
 7. Deena Pillay, 8 September 2011
 8. Julian (Cargomovers), 8 September 2011
 9. Willem van Rensburg, 13 September 2011
 10. Jacques van Niekerk, 13 September 2011
-



1. Nico Loubser, 9 June 2011

9 June 2011

Interviewer Name: Nina Du Toit

Interviewee Name: Nico Loubser

Interviewee Position: Supply Line Manager: Imports, Shoprite

Abbreviations:

DC	Distribution Centre
SA	South Africa
PO	Purchase Order
FOB	Free on board
SR	Shoprite
CT	Cape Town
DBN	Durban
JHB	Johannesburg
CFR	Cost freight risk
CIF	Cost insurance freight
DDU	Deliver duty unpaid
BAF	Bunker adjustment factor
LCL	Less than container load

1. Types of buying decisions

a. DBO

- i. Distributed branch order
- ii. Branches look at stock levels and place orders from DC
- iii. Replenishment team restocks DC

b. CRO

- i. Centrally raised order
 - ii. Buyer decides a specific branch needs x amount for a time
 - iii. Stock “pushed” to branch
 - iv. Manual buying pattern only
 - v. Done for new items
 - vi. Based on store size, location, classification (high cost etc)
-



-
- c. Replenishment system
 - i. Shoprite uses E3
 - ii. Sees that DC has stock for branch orders
 - iii. Looks at history, takes out historical promotion stock, forecasts demand, plans orders based on set lead times
 - iv. Set lead times - +- 1 week for handling within SA, depends on time of year
 - v. Each port has lead time
 - vi. Sets early shipment date (2 week buffer) to latest shipment date
 - d. Manual order
 - i. Manually decide on quantities of orders
 - ii. 1 buying team for non-foods
 - iii. Used in volatile markets e.g. tuna
 - iv. No demand first
 - 2. Order is then placed in PO
 - a. PO sent to supplier
 - 3. Supplier creates Performa invoice – offer to supply with all details
 - a. INCO terms
 - i. Types
 1. FOB
 2. EXworkds
 3. CFR
 4. CIF
 5. DDU – still need to pay customs
 - ii. Some suppliers can only do 1 incoterm
 - iii. Determines who pays what and who carries risks when
 1. Supplier → Harbour → boat → harbour → DC
- Cost to SR: \$1 \$2 etc
- iv. For shoprite : 80-90% are FOB (goods only ours when pallet is on boat)
 - v. Port charges, various types
 1. Covered by supplier on FOB
 - vi. FOB: pay for unit cost, freight and BAF(linked to oil price)
 - vii. Use FOB because:
-



1. supplier knows his own country better
 2. We can choose shipping line, therefore bargain rates
 - viii. Buyers can play around with various ports and costs on a program
 1. This cost modelling systems is updated with new freight rates every 3 months because companies adjust their rates according to season so freight choice can change
 - ix. CFR – supplier responsible till it hits CT harbour, risk transfers while container is still on ship
 - x. CIF – risk only transfers when goods are here, used for perishable items like cheese – can reject goods if not correct
 - xi. Can use air freight
 1. Used if planning was poor
 2. Shorter lead times
 3. Used in “emergency” e.g. Christmas
 4. Performa invoice reviewed by buyer
 - a. Must be signed off
 - b. Then becomes a “live order”
 - c. Supplier books shipping line according to our preference (SR make deals with shipping line saying SR will tell suppliers to use them)
 - d. SR gives supplier shipping window
 - e. If supplier ships too early SR can’t stop them!
 - i. SR is in the process of investigating a freight forwarder in area. Freight forwarder will control all shipments and stop early shipments or put them in a DC till shipping can occur.
 - f. Late shipping is a disaster@
 - i. E.g. Christmas trees only sent in December will not sell and stock must be kept for another year!
 - ii. Freight forwarder will help this problem
 - g. PO will specify if destination port is CT or DBN
 - i. CT = non – foods hub
 - ii. CT – port →dc→cross docked to JHB and DBN
 5. Shipping
 - a. Containers are used to transport on ships
 - i. Belong to shipping line – e.g. maersk
-



- ii. Types:
 - 1. TEU = twenty foot equivalent unit
 - 2. Reefer container = refrigerated container (more expensive)
 - 3. High cube container – 35cm higher
 - iii. Buyer chooses size of container according to size of shipment
 - iv. Lots of reefers are sent with veg from SA to asia. Then containers come back empty. SR gets good prices if they ship from Asia in non-operating reefers.
- b. May need to fill up container to get cheaper unit cost – buy more than required actually
- i. Usually order according to MOQ – minimum order quantity which is dictated by price or by supplier
 - ii. LCL – a consolidator can be used to take control of stock and create full container
 - iii. You can ship half full but will pay for a full container and then unit price will go up.
6. Receiving of goods in importing country
- a. We won't use a full container at one shop so goods must go somewhere
 - b. 2 ports used: CT and DBN
 - i. Have 3 days to remove containers otherwise pay high demurrage cost (starts on day of last container off ship)
 - ii. The shipping line is responsible for container so they sometimes move container to a depo – costs R3500. Then they charge you +- R800 to R1200 per day →also part of demurrage costs
 - iii. Sometimes the DC is too full to accept containers
 - iv. SR has a contract with SATI storage depo (alternative to paying shipping depo)
 - 1. Location: Montague Gardens
 - 2. SR is charged incoming handling fee, outgoing handling fee and only storage fee after 10 days – R46/day
 - 3. This setup is not in JHB or DBN!
 - c. Most DC's don't have capability of storing stock
 - d. Determining where to store goods:
-



- i. Are there backorders? Then send to DC because most of it will then immediately go out.
 - ii. Is there a planned push on items? Send to Montague Gardens flow centre.
 - iii. Is it NB promotional stock? E.g. Christmas , send to DC
 - iv. Is the stock “old” – aging needs to be less than 25 days
 - v. There is a meeting twice a week to look at the status of all containers and plan what goes where.
 - vi. In order of descending importance according to CT (aging is a subheading of all sections):
 1. Promo
 2. Back order
 3. Flows
 - e. DBN dc’s do not want to keep stock, they can’t manage replenishment operations so need to operate on a fully allocated basis with stock
 - f. Current attitude :
 - i. “old school” – don’t use computers that much
 - ii. Buyers visit DC’s each week to see what is there. Manage by SIGHT.
 - iii. Buyers are situated in CT.
 - g. Freight cost: same to CT or DBN
 - h. Other costs – finance manager did study of this:
 - i. Cargo dues
 - ii. THC
 - iii. Clearing
 - iv. Local
 - v. Empty turn in
 - i. CT vs Durban
 - i. CT to JHB: longer distance but larger trucks are used (only trucks used)
 - ii. DB to JHB: pay for transport and you need to leave container in Midrand – “empty turn in” cost +- R3500
 - iii. It would elevate stress on CT DC’s if Durban took some stock
 - iv. Major issues:
-



1. Goods need to be palletised once they are removed from container
 2. This can only be done in CT at the moment
 3. This process takes a long time.
 4. JHB is used to receiving palletised loads
 5. JHB is not geared towards high volume of offloading manually (required to offload container), but can actually do it
- j. CT sends palletized loads per store
 - k. Ct can handle 200-210 containers per week
 - l. If DC's are required to replenish stores they need stock and reserve stock.
 - i. If you add another store to supply chain you need to increase reserve stock of all goods
 - ii. CT has racking which can cope with large amounts of reserve stock
 - iii. CT has Blackheath dedicated bulk storage depo
 - m. Landed cost = cost by the time goods enter a DC for the first time
 - i. This is different for CT and DBN as distribution from port to DC varies
 - ii. This means the buyers GP drops!!!! Will not motivate them to sent to Durban.
 - n. Demurrage costs
 - i. usually have 4 days to offload container before it must be returned to shipping line
 - ii. SR has bargained to have 25 days.
 - o. Midrand (JHB) has small replenishment team, they have storage depo too. They manage the 4 criteria (aging, promo, backorder etc) themselves. They believe aging is more NB than others. They are not that effective. Very small scale.
 - p. Because of all the variable of where container can move a provision is made for local delivery in lead time.
 - q. JHB – product type determines higher provisions for insurance
 - r. National team in Brackenfell determines internal logistics
 - s. CT vs DBN decision currently is a manual one
 - t. DB – JHB : 2 days
 - i. DB port → depo → depo → JHB DC
-



2. Johan Goosen, 9 June 2011

9 June 2011

Interviewer Name: Nina Du Toit

Interviewee Name: Johan Goosen

Interviewee Position: Replenishment Manager, Shoprite

1. Most food suppliers are in CT
 2. Non-foods – 90% are imported
 3. Commodity consolidation of far east – economies of scale determine orders being put together, 1 container has many products in it
 4. SR has 900 stores – serve total demand instead of each stores demand
 5. SR has started to send fast selling items directly to DBN
 6. DBN is used to branch orders and not flow orders
 7. Large portion of non-foods is small appliances +- R800 mil in 2012 planned
 8. Whole container can be sent to JHB if it is fast moving stock then DBN can be used as a port
 9. Durban DC is very small
 10. JHB DC has just been expanded to have non-foods reserve stock
 11. Decisions on logistics are made per shipment – where to send, how much
 12. Lead times
 - a. Vary a lot
 - b. Lots of seasonal fluctuations
 - c. Foods +- 3-4days
 - d. China only starts producing products once order is confirmed (JIT)
 - e. Sometimes SR has to wait for a supplier to do a large batch
 - f. +- 5-6 month import lead time
 13. Sometimes a JHB supplier sends shipment down to CT with JHB and CT destined stock then CPT will consolidate stock and send JHB shipments back to JHB.
 14. Now with bigger JHB DC they can start hosting non-foods, then local suppliers can start sending to JHB and Durban DC's
 15. CPT-JHB transport
 - a. 3rd party logistics
 - b. No empty trucks on the way back
-



-
- c. Company chosen according to route
 - d. Loose pallets sent
16. DBN –JHB
- a. Full containers sent
17. non-foods are nationally priced – transport costs not factored in differently , influences why non-foods is sent from CPT
18. SR is planning to send +-400 containers to DBN this year
19. Volumes in Africa are becoming so large that they are considering sending directly to other African ports
20. SR has just got a new tool called “Tradestone” – information system
- a. Will be used as a communication tool between suppliers, buyers, logistics people
 - b. The Dc can use this info to plan staff and layout
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3. Willem van Rensburg Henk Goosen, Jacques van Niekerk, 9 June 2011

9 June 2011

Interviewer Name: Nina Du Toit

Interviewee Name: Willem van Rensburg ; Henk Goosen, Jacques Van Niekerk

Interviewee Position: Brackenfell DC Manager ; Shoprite Employee

1. DBN dc's won't keep stock – don't have the capacity
 2. CT focuses on distributing
 3. Push items can go straight to DBN in bulk
 4. Demurrages cost = R14 million
 5. We need to plan for accommodating CT capacity
 - a. Maybe send stock to JHB if we know CT will be full
 - b. There is a dry port in JHB
 6. Project should focus on STRATEGY
 - a. How to handle fluctuations, capacity constraints
 7. Receiving DC pays for transport
 8. Each division (area of stores etc) pays % of DC's operating cost according to how much stock they receive from the DC
 9. Landing price = cost price to company
 - a. Cost prices vary from CT to JHB
 - b. Selling price is standard (for non-foods)
 10. Reasons to change the importing supply chain:
 - a. Money
 - b. Time – reduce lead time, stockouts, late promo stock
 11. To keep reserve stock:
 - a. Costs to manage
 - b. Damage costs
 - c. Inventory overload
 12. Project must focus on bigger picture
 - a. Centralised distribution
 - b. Hub and spoke model that is used by SR
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- c. Look at Walmart and Tesco cases
 - d. The whole SR distribution system is geared towards alleviating shop/branch pressure - NB, must keep this focus
 - 1. Keep supply quick
 - 2. Keep shop holding cost and inventory levels low
 - 3. Maximise “trading” area in store to maximise product exposure to customers
 - e. DC strategy
 - 1. 100 essential non-food items should always have stock in DC
 - 2. Keep pick faces for high turning stock
 - 3. Focus on DC, move boxes better and faster
 - f. There is a simulation program used for local deliveries of pallets
 - 1. Should SR use it more?
 - 2. It is used for local planning but can also be used for tracking to keep track of progress and make necessary adjustments.
 - g. SA has inefficient supply chains in general.
13. GP: division is an issue as non-foods prices are nationwide so who pays for what?
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4. Taryn Olivier, 12 July 2011

12 July 2011

Interviewer Name: Nina Du Toit

Interviewee Name: Taryn Olivier

Interviewee Position: Imports container terminal scheduler – Transnet Cape Town

1. Current Cape Town port situation:

- a. Turn around time goal is 30 minutes
- b. Port only liaises with shipping line, not final customer
- c. Ports main problems in the past:
 1. Stacking capacity very low
 2. Not enough handling equipment
 3. In the windy months the cranes can't operate, therefore containers can't be removed from port.
 4. Trucks arrive at the same time to collect containers.
 5. Containers are mixed, terminals do not know what is inside and where specific containers are.
 - a. Also don't know when the clients are coming to pick up containers.
- d. Try maintain storage level below 65% of capacity to maintain flexibility
- e. Shipping lines have 4 days to remove containers from the port – after that they are charged per day.
- f. In the past there was a project with Shoprite. The container numbers belonging to Shoprite would be communicated to the terminal. The terminal would then keep all the Shoprite containers together for easy and quick retrieval and removal. It is unknown why the project was stopped.
- g. Can currently with the equipment stack 3 high, single rows of containers.
- h. The Cape Town terminal is operating with a new information and scheduling system that has increased efficiency tremendously.
- i. BMW is Rosland has made an arrangement with shipping lines to first go to Cape Town and then travel to Durban. They can do this because of the volumes they transport with the shipping line.

1. Current developments at Cape Town port:

- a. There is a project underway to expand and improve the terminal.
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- b. Project includes basin deepening and crane upgrading.
 - c. The current RTG carriers are being replaced by cranes that can stack 5 high with 3 rows.
 - d. Construction is causing operational issues but these are temporary.
2. Cape Town vs Durban:
- a. Durban has only recently gone over to the new system in March 2011. They will experience a performance decline due to change over but then performance will increase.
 - b. Cape Town terminal mainly receives containers destined for Cape Town, Port Elizabeth and East London.
 - c. Her estimation is that it is cheaper to send containers destined for Johannesburg via Durban.
 - d. Durban is still below performance compared with Cape Town therefore ships are held up in Durban sometimes.
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5. Jacques van Niekerk, 17 August 2011

17 August 2011

Interviewer Name: Nina Du Toit

Interviewee Name: Jacques Van Niekerk

Interviewee Position: Planning Manager, Brackenfell DC

1. Information on logistics in SA:
 - a. A few years ago the road distance between Cape Town and Johannesburg was 200km.
 - b. Why is rail not used?
 - a. Dependability is bad
 - c. Why should rail be used?
 - a. Cheaper option.
 - b. Government might induce road tax to try to force rail usage.
 2. Durban situation:
 - a. Non-foods in Durban are only moved through Congella DC.
 - b. Durban has two options:
 - Unload container, pick to store order, send pallets to Johannesburg.
 - Problems: need space to pick, Durban does not have space for staging lanes.
 - Send $\frac{1}{4}$ container to Johannesburg:
 - This involves unpacking the stock destined for Durban stores and then sending the rest of the container to Johannesburg.
 - Advantages: Johannesburg has the space and handling capacity to deal with the bulk.
 3. The buyers plan gives volumes!
 4. Cape Town container handling capacity:
 - a. +- 150-200 containers per week can be handled but it depends on the time of the year.
 - b. Ie. If the DC is filled with slowmoving stock then containers can't be offloaded.
 - c. SATI depo gives a 10 day grace period before charging a storage fee per container.
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- d. Only about 1 or 2 containers per month are sent to the shipping line depo so it can be ignored in the logistics chain.

DC	In the Past	Now
Brackenfell	35	35
Montague Gardens	70	Closed – at new facility
Blackheath	20	Closed – at new facility
Bolt	5	5
New BRK	Didn't exist	130
Total	130	170

5. General comments:

- a. Shoprite does not fully do “crossdocking”, more “transhipments” between DC’s.
- b. CPT – JHB => 1450km
- c. DBN – JHB => 600km
- d. Crossdocked pallets are sent with a 3rd party fleet, not the Shoprite fleet.

6. Container movement to DC:

- a. In the past: 15% of containers would go direct to DC from port
- b. Now: 30 % of containers go direct to DC from port
- c. Choosing which containers to move:
 - Goes according to allocations. High flow goods are offloaded first.

7. New Brackenfell DC information:

- a. Houses the export and flow systems.
- b. The flow system handles most of the imported non-foods goods.
- c. Stock needs 100% allocation for flow system to work effectively.
- d. Containers must be kept at the SATI depo until flow exists.
- e. Flow system is used because most of the non-foods items are pushed to branches.

8. Process of receiving containers at DC:

- a. DC receives list of incoming containers in order of importance
- b. DC says which containers they can accommodate
- c. Containers are offloaded at flow doors – roving door system is used to have more offloading space.



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9. Disadvantages of current system:
 - a. Often incur SATI cost: reason for this is because there is no freight forwarder. Suppliers do not adhere to shipping windows and send orders when they are complete.
 10. History behind Shoprite import strategy:
 - a. Shoprite bought over OK Bazaars many years ago and incorporated it into the Shoprite group. OK Bazaars was financially unstable. It is believed that the reason OK didn't do well is because they had too much stock in too many places. Non-food items are more expensive than food items so Shoprite decided that they will have centralised storage of non-food items. This would reduce damages and the relevant costs by reducing movement of stock. Cape Town was chosen as the place where non-food goods will be distributed from. First Brackenfell DC was used and the Montague Gardens and Bolt also started being used once they acquired these additional facilities.
 11. Current Shoprite Import Strategy:
 - a. Only the new Brackenfell DC will have reserve non-food stock.
 - b. No containers are sent directly from Cape Town to JHB, all goods are unpacked then either are racked or flow through.
 12. Some notes on the data given:
 - a. No foods are sent to Johannesburg so the number of pallets given are 98% non-foods imported goods.
 - b. A few stores in JHB get direct "cross-docked" pallets from Cape Town because they have large deliveries.
 - c. There are 36 pallets in a load. Loads are given in the Excel sheets.
 - d. Rand value of each pallet varies but on average: R12 000.
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6. John Hyde, 7 September 2011

7 September 2011

Interviewer Name: Nina Du Toit

Interviewee Name: John Hyde

Interviewee Position: National Planning Manager for Deep Sea Container Terminal in Durban - Transnet

1. Other developed ports in Africa that can be considered for future imports:
 - a. Walvis Bay
 - b. Richards Bay
 - c. Problem with African countries' importing is not the ports, it is the lack of decent inland logistics services.
 2. Shipping to Durban vs Cape town:
 - a. Shipping cost is the same
 3. Durban Port information:
 - a. Busy time is July-November
 - b. Aim for 65% capacity but most of the time are at 75%.
 - c. 3 days to remove containers from port
 - d. Space is very limited.
 - e. There are two container piers, pier 1 and pier 2. They handle all imports, export and transshipments of containers.
 - f. Current capacity :
 1. Pier 1: 720 000 TEU
 2. Pier 2: 2.4 mill TEU
 - g. Future capacity – by July 2012:
 1. 3.6 Million TEU total (pier 2 will increase to 2.9 mill)
 - h. Equipment used:
 1. Straddle carriers and RTG carriers(1 row, 5 high)
 2. Once the piers are made larger and a more uniform shape then it will become more economical and logical to install more RTG carriers.
 4. Durban vs Cape Town ports comparison:
 - a. Storage costs are very high compared to Cape Town to prevent companies from not fetching their containers.
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- b. Cape Town and Durban both have windy seasons when cranes cannot operate but Durban's windy season occurs during their busy period!
 - c. Generally containers arriving from the East stop at Durban first.
 - d. Generally containers arriving from Europe stop at Cape Town first.
5. Future Developments:
- a. Several stages of container terminal expansion are underway. By 2050 there will be a large container terminal at the current site and a new one where the old airport is.
 - b. The development is in the EIA stage.
6. Discussion on rail as a possible alternative transportation method to JHB:
- a. Rail will never work for a JIT system as it is too unreliable.
 - b. Some use rail as a storage system. They allocate containers to be railed so they get put on trains so long and storage is not charged. Then they either send it via rail or change their mind and send it via road transport to save time.
 - c. Rail journey from Durban/CPT to JHB : 24-36 hours
7. General port operations:
- a. Containers for car companies are kept together and separate because they import so often.
 - b. There is no booking system for trucks picking up or delivering containers.
 - c. Implemented a new container operating system 4-5 months ago called NAVIS. Performance is now improving.
 - d. Port does not know content of containers, only if they must be refrigerated or not.
8. Some more notes:
- a. For most companies, time overrides cost. They want their goods quickly so that they can sell them. They choose the faster, more expensive methods. This is also why road is favoured over rail.
9. Truck movement in the port:
- a. Trucks arrive at the truck staging area.
 - b. Trucks are sorted according to which area in the terminal they are going to.
 - c. Lanes are released in an orderly fashion.
 - d. Sometimes truck drivers go missing or the truck breaks so the rest of the lane is delayed.
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- e. Quite a few trucks do multiple transactions – pick up and drop off containers in one trip.
 - f. Truck congestion is a major problem at Durban port.
 - g. The driving distance within the port is also very long.
 - h. Truck turn around time target is 35 minutes but in reality is about 40 minutes. This is the internal terminal TAT. But trucks can remain in the port for 5min to hours.
 - i. Cape Town does not have a staging area.
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7. Deena Pillay, 8 September 2011

8 September 2011

Interviewer Name: Nina Du Toit

Interviewee Name: Deena Pillay

Interviewee Position: Imports Manager at Congella DC in Durban

1. Congella Operations:
 - a. Cross-docking/transhipments: not really done from Congella but lots of pallets received from Cape Town.
 - b. Standard stock handling procedure: stock arrives in container, placed in staging areas, putaway then reallocated
 - c. Offloading of containers: can offload approximately 4 containers per shift, depending on commodity
 - d. Choosing of which containers to offload: Not many containers come to the DC so they don't need to prioritise much but if necessary containers are offloaded according to "age". The aim is to reduce holding and demurrage cost so containers that are offloaded at the port first need to be offloaded at the DC first.
 - e. Stock-holding strategy: Congella does not keep stock, they work on a full allocation basis so all stock that arrives at the DC must already be allocated to a store.
 - f. General operations: Congella just receives stock and allocates it to local stores.
 - g. Try not to have too much non-foods stock – only stock destined for Durban stores and even sometimes they receive the non-food stock for Durban stores as cross-docked pallets from Cape Town.
 2. DC size:
 - a. Congella : 20 000m²
 - b. Isipingo: 14 000m² (does not handle any non-food imports)
 - c. Together these two DC's serve 108 stores.
 3. Current problems at Congella:
 - a. Not enough space
 4. Buying procedure for non-foods:
 - a. Cape Town buyers place 99% of non-food orders.
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- b. Repetitive orders are sometimes placed by Congella itself.
 - c. Buyers allocate containers to arrive at Durban port and be processed by Congella.
5. Port/Congella relationship:
- a. Once the vessel arrives notification is sent to Congella.
 - b. Congella notifies 3rd party “CARGO MOVERS” to pick up container on certain date (date when container will be available for pickup).
 - c. Container is delivered to the DC (+- 7 days after vessel arrives at port)
6. Other container movement in Durban:
- a. Some full containers are sent to MGI that palletize the loads and send them on flat bed trucks to JHB. CARGO MOVERS handles the transport to MGI.
7. Cape Town vs Durban issue:
- a. 50 containers in August were redirected from Cape Town port to Durban port to relieve pressure on Cape Town.
 - b. Currently 90% of the company’s non-food imports arrives at Cape Town port.
 - c. Landed cost for Congella and Brackenfell +- the same because both have ports close to the DC. The landed cost for JHB is very high in comparison.
8. Future developments:
- a. New DC is being built in Durban. Estimated completion date – September 2012.
 - b. Once this DC is built then they will be able to cope with storing, palletizing, cross-docking non-foods to Johannesburg. Currently the DC cannot do this.
 - c. The new DC will have proper container offloading bays, unlike the current facility where containers cannot be placed directly at offloading bay.
 - d. By using this new DC to do more cross-docking to JHB it will be cheaper for the company as they will use their own fleet. It will also help maintain control over the supply chain as the goods will be transferred from Shoprite to Shoprite and not Shoprite to agent to Shoprite.
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8. Julian (Cargomovers), 8 September 2011

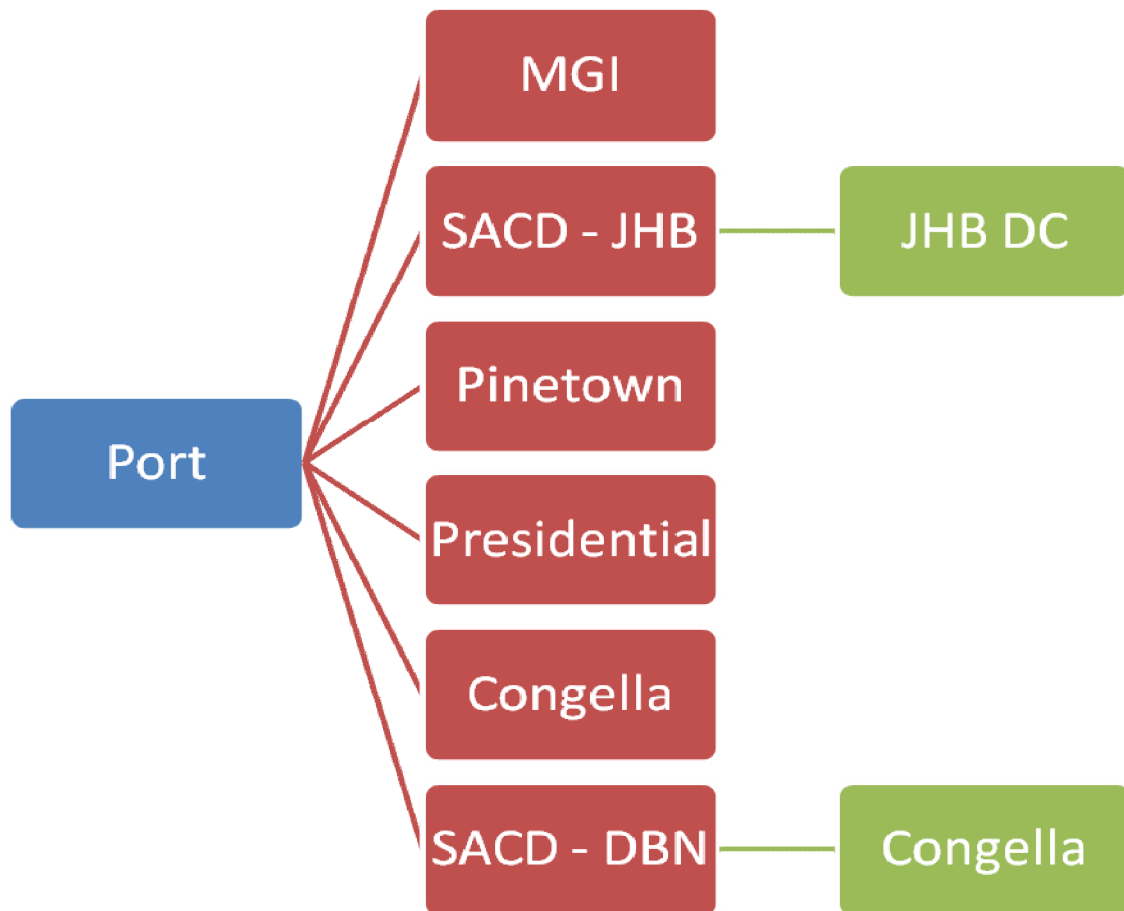
8 September 2011

Interviewer Name: Nina Du Toit

Interviewee Name: Julian

Interviewee Position: Shoprite logistics liaison at Cargo Movers (Durban)

1. General notes on the agreement between Cargo Movers and Shoprite:
 - a. Cargo Movers acts as a 3rd party logistics partner for Shoprite in Durban.
 - b. They move Shoprite's **containers** only, not pallets.
 - c. Containers are moved daily.
2. Movement of containers:
 - a. Cargo Movers is responsible for moving containers to the following places for Shoprite. They are also responsible for turning in the empty containers again.





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- b. Presidential is a warehouse for furniture goods only.
 - c. MGI is a warehouse for food goods mainly.
 - d. SACD is the South African Container Depo in JHB.
3. Containers sent to JHB:
 - a. Cargo movers takes the containers there and then when the JHB DC requests the container they deliver it to the DC.
 - b. The average turnaround time for containers in SACD is 1-2 weeks.
 - c. In the past about 50 containers per week were sent to JHB, now +- 100 are sent per week.
 4. Other transport done for Shoprite:
 - a. Sometimes Cargo Movers will transport cross-docked pallets from Durban.
 - b. Occasionally when Congella is full then containers are stored at the Durban SACD. It is cheaper to store containers here than to incur the +- R1000/container storage cost of the port.
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9. Willem van Rensburg, 13 September 2011

13 September 2011

Interviewer Name: Nina Du Toit

Interviewee Name: Willem van Rensburg

Interviewee Position: DC Manager of Brackenfell DC

PX containers:

- Postal system is phasing out their use.
- The containers are badly maintained.
- PX containers have high cube utilisation.
- With truck utilisation you save money. Perhaps if unitainers are used to cross-dock instead of pallets one can increase utilisation and not have container turn in fee.

Johannesburg vs Cape Town:

- JHB is not a non-foods cost centre
- JHB is geared for local suppliers
- 300-400 out of 7000 containers per year are sent directly to JHB
- CPT buyers cannot manage allocations from Cape Town. JHB does everyday items themselves- “draw as required”
- 100 standard items – mugs, bolts, plastic gloves, but not promo items – brought from CPT

Transport:

- Long haul section of transport is not in Shoprite hands.
- Should think of using trucks there and back again – unlike walmart ship!



10. Jacques van Niekerk, 13 September 2011

13 September 2011

Interviewer Name: Nina Du Toit

Interviewee Name: Jacques van Niekerk

Interviewee Position: Planning Manager, Brackenfell DC

Safety

- Make sure that <100 containers are on one vessel in case something happens t the vessel.

Planning

- In an ideal world the allocations of stock will be confirmed at least two weeks in advance. This would allow container management staff two weeks to plan the container movement to DC's in the following two weeks. They plan by allocating certain containers to arrive at the DC at certain times.
- The real world: allocation does not happen that far in advance. The list of containers is frequently reviewed by buyers to include new allocations. This results in a short lead time for the plan container management staff need to make. The plan thus changes frequently as more information on allocated stock becomes available.

Epping DC:

- +- 50 containers per year go to this DC (mostly bonded items – e.g. need plugs put on)
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***Appendix B Questionnaires/Other
Correspondance***

- 1. C. Kingon**
- 2. Nico Loubser**
- 3. Johan Goosen**



1. C. Kingon

Name: *C.Kingon*

Position: *Ship Master*

1. Do you work on ships that transport containers of goods?

Yes

2. Have you ever experienced hassles when offloading containers at South African ports? If so, which ports and give details please?

Not particularly. All the documentation is completed by the local agents or freight forwarders prior to the vessel arrival. I would think that the terminal operator will not allow a vessel to berth if the cargo has not been pre cleared as they would not want the ship to be delayed alongside and having a knock on effect to other ships waiting for the berth.

3. From your knowledge do you know if it costs the same to ship from the east to Durban and east to Cape Town?

For seafarers, this is not our area of expertise or influence; I am guessing again but would imagine that big clients with regular shipments would pay one sea freight price regardless of the discharge port.

Smaller, irregular or one-off clients would probably be given different prices if the cargo has to be carried further down the coast.

If the client changed their mind mid-voyage and requested a COD (change of destination) then they would be quoted any costs involved to move their container and keep it onboard for the later port, or to move other containers to get to their container if they had loaded the container for a later port to start with and now wanted it at the first port.

4. How developed are other African ports?

Dar es Salaam and Mombasa are reasonable ports with good infrastructure, Maputo and Beira as well has had a lot of development recently. They are all river ports, so are limited in the size ships they can accommodate.

Djibouti has a very new deep water terminal that runs well.

Egypt has a number of big, modern ports.



Morocco has a new, large terminal, Tangier Med, in the Straits of Gibraltar that mainly does transshipment.

West African ports are mostly well developed in recent years and many can now take panamax ships, though perhaps with a draft limitation. Dakar, Abidjan, Tema spring to mind. Slightly smaller ports are Apapa, Douala, Libreville. All of them generally work well, depending on the mood of the day.

Further south to the Congo and Angolan ports it is more a case of pot luck as to how quickly the ship will work.

As far as problems with landing cargo in these ports, I would think they are not so stringent in insisting on the cargo being pre cleared and will land the cargo into the terminal, but when cargo is not cleared for lengthy periods of time then this is what causes congestion.



2. Nico Loubser

Name: *Nico Loubser*

Position: *Supply Line Manager: Imports, Shoprite*

1. What is the difference between replenishment team and buyers team?

Replenishment team will use system based forecast to determine what stock to order to keep the DC stock levels at acceptable levels. They will also punch in the orders onto the system on behalf of the buyers. The buying team will decide which items to buy, what prices to buy them at, what quantities are required (if it is new item without a sales history), what quantities needs to go to which stores (if it is a CRO – Centrally Raised Order - item) as well as which ranges each store will carry.

2. Are containers sent to supplier to get loaded before shipping? – who does the transport?

Yes, containers are sent to the supplier. As Shoprite mostly ships FOB, it is the supplier's responsibility to get the container onto the vessel. As such, they will make the booking with the shipping lines indicating that they require a container. The supplier's nominated transporter will then collect the container and take it to the supplier's warehouse to be loaded. Afterwards, the transporter will take the container to the port. Shoprite has NO visibility on which transporters are used, and honestly, we do not care too much. As the term is FOB, we only assume risk once the container is on the vessel. So if the supplier's transport is very bad and they get into an accident, it is the supplier's risk. As such, they all tend to use good transporters.

3. Do buyers consolidate orders from several suppliers themselves or do they use 3rd party consolidator for this? If themselves, who does transport and who pays for it?

We have certain suppliers that acts as buying agents. We will place an order with them for 10 items. From this ten, 2 might be from Factory A, 5 might be from Factory B and 3 might be from Factory C. The buying agent will then arrange that these factories co-load the container. Normally they will take all the stock to the factory with the biggest part of the container. Sometimes they will take it to a central consolidation company. Whichever way they do it, the cost and planning of that process is for their account, as this is part of the



process of getting the stock onto a vessel and hence it is part of the FOB cost that they charge us for the item. From smaller suppliers that are not linked to other factories by a buying agent, the suppliers might sometimes ship LCL (Less than Container Load). In cases like this, they will deliver the cargo to Shoprite's nominated freight forwarder (Cargo Compass). If Cargo Compass has LCL shipments from several suppliers, they will build up a consolidated container for Shoprite. If they do not have enough stock for us, they will consolidate our stock with another SA importer's stock and send it to South Africa. As such, our stock might sometimes arrive in a container that also has Ackerman's stock and Pick n Pay's stock. In cases like this, the supplier will pay for the delivery cost to Cargo Compass and will also pay for the warehouse that the stock is stored in while the stock is being consolidated with other stock. These cost again are then charged out to Shoprite as part of the FOB cost.

4. Are crossdocked pallets sent with the shoprite fleet?

Please check with the Transrite team at Brackenfell DC.

5. What is blackheath depo do? container storage?

Blackheath is a warehouse that stores bulk items. No containers are stored here, as the stock is offloaded and placed into the warehouse. These stock items serve as reserve stock for Brackenfell items.

6. Where are all the other dc's in the country and what type of dc's are they (bulk, flow,etc)?

- *Brackenfell DC – DBO stock items that the stores order from. There is a 'pickface' for each item as well as reserve locations. This is thus a stockholding DC.*
 - *Brackenfell Flow DC (new part of BRK DC. This was normally done at Montagu DC) – Flow DC. Stock that has been allocated to stores is taken in here and is then placed on the loadplans for delivery to store*
 - *Bolt Ave DC – Refrigerated facility and stock holding. Frozen goods (Meat) and Chilled products (cheese etc) are stored in one part of the DC and the other part is a normal stock holding DC that holds stock for specific non foods departments. I think this DC will also be absorbed into the new Brackenfell DC shortly*
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- *Epping DC – Export DC. Local suppliers deliver stock that is destined for Africa to this DC. Brackenfell also send stock to this DC that is destined for Africa.*
 - *Midrand DC – Stock holding DC as well as crossdocking DC. Holds a lot of foods lines, but also received crossdocked non foods stock from Cape Town and then dispatches it to the various stores*
 - *Congela DC (Durban) – Processes imported containers in Durban.*
 - *Prospection DC (Durban) – Local DC for Durban*
7. Who transports containers (e.g 3rd party, shoprite fleet, shipping line, SATI fleet etc) between the following destinations:
- *From port to shoprite container storage – Shoprite has no container storage. Containers are either taken directly to DC or taken to SATI (which stores containers on our behalf)*
 - *From port to SATI depo – 3rd party. Shoprite appointed and managed by the Imports department*
 - *From port to DC (does this ever occur that containers are sent directly like this?) Yes, it does happen: – 3rd party. Shoprite appointed and managed by the Imports department*
 - *From port to shipping line depo – Shipping line. The only reason why it will go to the shipping line depot is because Shoprite has not successfully had the container released. As such, we are not allowed to transport the container.*
 - *From shipping line depo to SATI depo – This move will rarely happen, but if it happens, this will be done by our 3rd party transporter.*
 - *From shipping line depo to DC – 3rd party. Shoprite appointed and managed by the Imports department*
 - *From shipping line depo to shoprite container storage – Does not exist.*
 - *From SATI to shoprite container storage – Does not exist.*
 - *From SATI to DC – 3rd party. Shoprite appointed and managed by the Imports department*
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3. Johan Goosen

Name: *Johan Goosen*

Position: *Supply Chain Analyst and Replenishment Manager, Shoprite*

1. What is the difference between replenishment team and buyers team?

Buyer do product selection, price negotiation, store ranging and promotional deals. Replenishment deals with the execution of the buyers function, i.e. after product has been selected, price negotiated ext. the replenishment team does the actual ordering and determine how much to buy, how often, how long the lead time, determine the forecast ext. especially on repeated items.

2. Are containers sent to supplier to get loaded before shipping? – who does the transport?

Most of our import orders are shipped on a 'FOB' basis, thus the supplier is responsible for all activities until the container is loaded onto the vessel, thus the supplier will arrange container and inland transport.

3. Do buyers consolidate orders from several suppliers themselves or do they use 3rd party consolidator for this? If themselves, who does transport and who pays for it?

In most cases we use agents in China that act on behalf of Shoprite between Shoprite and the actual factory. They will consolidate the stock and sometimes they have their own small warehouses to consolidate all orders into one container. The cost of inland transport and consolidation is all in the 'FOB' price.

4. Are crossdocked pallets sent with the shoprite fleet?

Crossdock pallets normally goes from Western Cape to Midrand and Durban and for this we use 3rd party transporters.

5. What is blackheath depo do? container storage?

Blackheath is a temporary holding facility to hold the residue bulk stock until the new DC is finished. We will be moving the Blackheath stock to the new DC.



Where are all the other dc's in the country and what type of dc's are they (bulk, flow, etc)?

You need to ask Frikkie van der Merwe, he will give you a better idea but from the top of my head, all DC's are pick by store DC's except for this new FLOW DC in Brackenfell. Montague Gardens (Bolt Ave DC + Perisables), Epping (Export DC), Brackenfell (Pick by Store + Flow DC), Midrand DC, Midrand Export DC, Durban DC and Durban Export DC. We also have a DC in Angola.

7. Who transports containers (e.g 3rd party, shoprite fleet, shipping line, SATI fleet etc) between the following destinations:

- o From port to shoprite container storage *3rd party*
- o From port to SATI depo *3rd party (same as above – Shoprite does not have container storage)*
- o From port to DC (does this ever occur that containers are sent directly like this?) *YES – 3rd party transporters (SA Roadlink)*
- o From port to shipping line depot *(For Imports the supplier does the transport for export we use 3rd party)*
- o From shipping line depo to SATI depo *3rd party*
- o From shipping line depo to DC *3rd party*
- o From shipping line depo to shoprite container storage *3rd party*
- o From SATI to shoprite container storage *3rd party*
- o From SATI to DC *3rd party*

8. What is sent to Montieagle in Durban? Do they then distribute the goods themselves? Who tells them what to send where?

Not sure what Montieagle is – where did you hear about it?

9. Who tells Cargo movers in Durban what to send to SATI depot?

ITD (International Trade Department)

10. Which logistics planning software/tools do you use and what do you use it for?



JDA's E3 Trim and E3 Slim for the DC replenishment (Trim) and Store replenishment (Slim). TradeStone for Order collaboration and track & trace

11. Does a buyer or replenisher sign off the proforma invoice?

It depends on the commodity and type of item and also the value of the order.

Normally the 'once-off' and seasonal buys will get sign off by the buyer, but the everyday item we will order as required by our replenishment system. (thus the replenisher)

12. How often and on average for how long are containers kept at Shipping line storage in Cape Town and Durban?

It depends on the volume (Inbound from Vessels versus the DC capacity to off-load the containers)

Thus if you offload capacity is more than the volumes coming in from the vessels, zero containers will go into storage.

Other way round when inbound volumes are greater than DC off-load capacity, you need to store it

in depot until you can take it out.

Times wise all depend on the volumes. It can also be a strategic cost decision to rather work directly from the vessel and take the container direct to the DC, rather than taking existing containers from Storage into DC because the saving in transport cost is greater than the cost of keeping the existing containers in Storage... until a certain point of course.

13. . How many days does the vessel take to travel from the East to Durban, East to Cape Town? How long would these trips take with air freight?

Lead time from the east differ from shipping line due to the fact that they stop over at various ports between the east and Cape Town and / or Durban.

Average 25 – 30 days. For shipping

Airfreight will be the next day (very expensive of course, especially on high volume, low cost items)

14. On average how full (%) are the DC's in the quiet and then in the busy months? When are their quiet and busy months?



Quiet and busy months was always a clear distinction, but with the growth and opening of new stores the gap between these two are now so small that we don't really have a quiet period.

We also have major promotions running throughout the year, but if you have to break it up I would say Xmas is your busiest time and end of May/June the quiets.

DC % full can go a lot of ways seeing that you can run out of pick faces, but still got reserve space and vice versa.

The DC's are quite full but in a good way. We always try to optimize to the best possible way. Strategic buys can also fill your DC quickly, but in a good way (profit buy in)

On average 90 % full depends on which DC, type of commodity and time of the year.

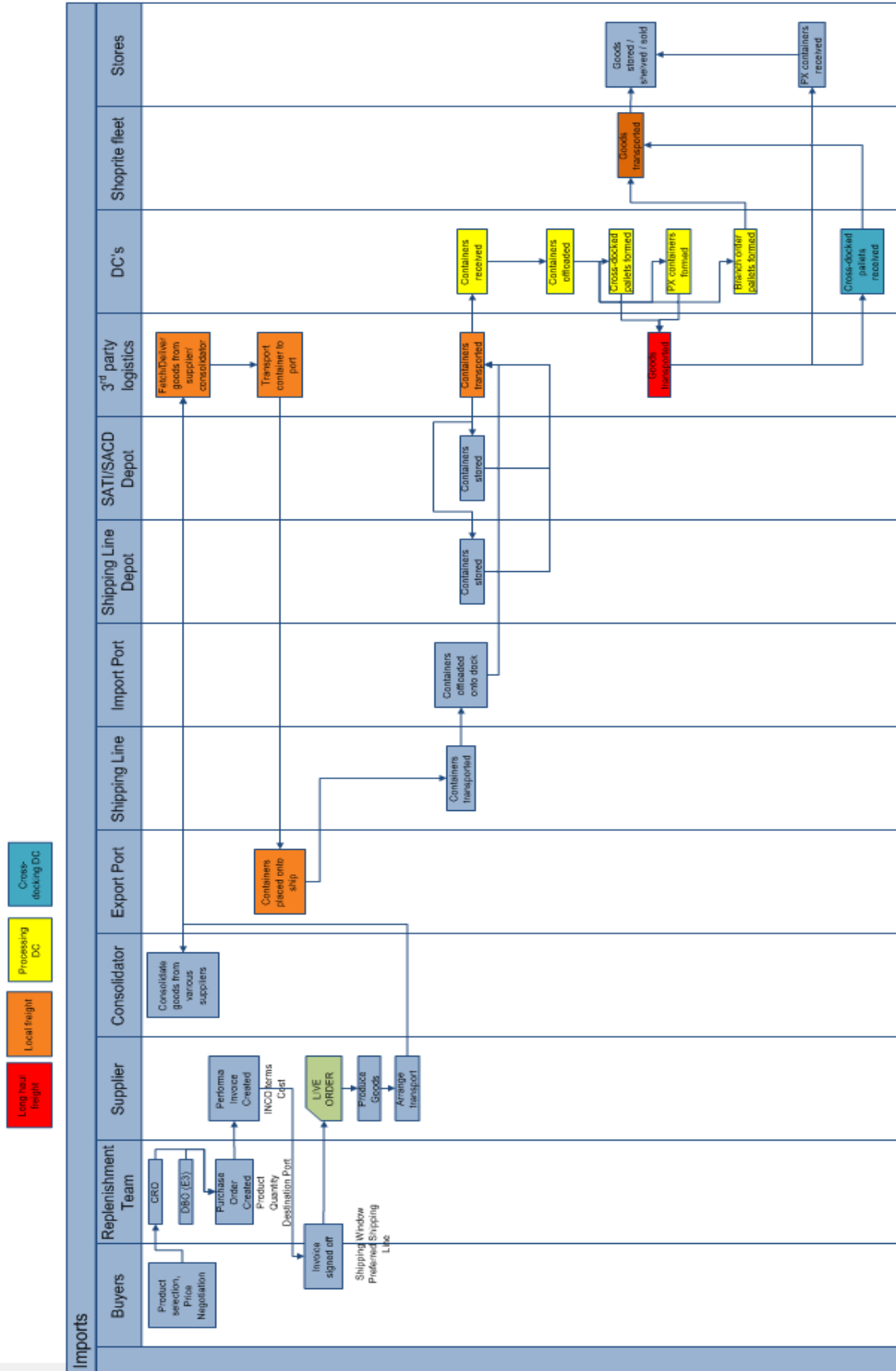
The Dc's I am referring to are: Brackenfell, Brackenfell Flow, Congella, Midrand, Epping, Bolt



Appendix C Diagram of Supply Chain



Key





Appendix D Data Analysis



The information contained in this appendix illustrates the number of loads of containers that the Brackenfell DC cross-docked to Durban DC's and Midrand over a period of 12 months as well as the number of containers that were sent directly to the various DC's. It is important to note that the data used was from the period prior to the construction of the new Brackenfell DC and is thus not an accurate depiction of the current importing data of the company.

1. Percentage of Brackenfell's received non-food imports that are cross-docked to Midrand and Durban

Brackenfell's imports receipt and cross-docked pallet dispatch details are shown below. Note that the cross-docked pallets contain more than one product type. The product size varies tremendously in the non-foods category. This affects how the pallets are arranged. Another factor of pallet arrangement is the breakable nature of goods. If a product is breakable then the pallet height is reduced.

Incoming goods in a container:

- The internal dimensions of a 40ft container are:
 - 12000 x 2330 x 2350 mm (Unknown [49])
- A received container of imported non-foods contains unpalletized stock.
- The volume of stock received in one container is:

$$Volume = height \times width \times length \quad \dots D.1$$

$$Volume = 2.350 \times 2.330 \times 12$$

$$Volume = 65.706m^3$$

Outgoing goods in a truck:

- A load is equivalent to 36 pallets placed into 1 truck (Van Niekerk [25])
- The pallets container mixed non-foods products. Due to the differences in size and packaging of goods pallet heights vary. TNT express website (TNT Holding B.V [46]) recommends that pallets are not stacked above a height of 1.8m (including the 176mm height of the pallet) for safety reasons. It is assumed that on average the pallets cross-docked are of a height of 1.8m
- Shoprite uses Chep (brandname) pallets. The dimensions of a Chep pallet are:
1200 x 1000 x 176 mm (The Stone Fruit Packaging Work Group [35])
- An average load of pallets therefore has approximately the following volume:

$$Volume = number\ of\ pallets \times pallet\ height \times pallet\ width \times pallet \quad \dots D.2$$



$$\text{Volume} = 36 \times 1.8 \times 1 \times 1.2$$

$$\text{Volume} = 77.76\text{m}^3$$

Therefore, based on the above assumptions, one received container's worth of goods is 65.706m^3 and one truck's worth of cross-docked goods is 77.76m^3 . This difference was factored into Table 14. A load of goods was classified as $77.76/65.706$ containers, 1.18 containers. The data given indicated the number of containers received by Brackenfell and the number of loads cross-docked to Midrand and Durban. By taking the difference in account the flow of goods into and out of Brackenfell could be determined directly in volume instead of terms containers and loads.

Note that because assumptions were made to determine pallet height the calculations are not accurate and can, in reality, have largely different values. The aim of this calculation was to get an indication of the percentage of imported goods that Brackenfell cross-docks in comparison with the stock they receive, and thus the assumptions are acceptable.

Table 14 Loads received and cross-docked

		Brackenfell		Cross-docked loads from Brackenfell	
		Received loads **	"kept" *loads	Durban	Midrand
July	2010	234	227	1	6
August	2010	431	423	2	6
September	2010	567	555	3	9
October	2010	729	715	3	11
November	2010	676	663	3	10
December	2010	431	420	3	8
total		3068	3003	15	50
%		~	97.88%	0.49%	1.6%

* "Kept" loads refers to stock that is not cross-docked to Midrand and Durban, but is distributed from Brackenfell in other ways.

** loads received is obtained from the number of containers received/factor of 1.18

Source: Shoprite Information System [33]

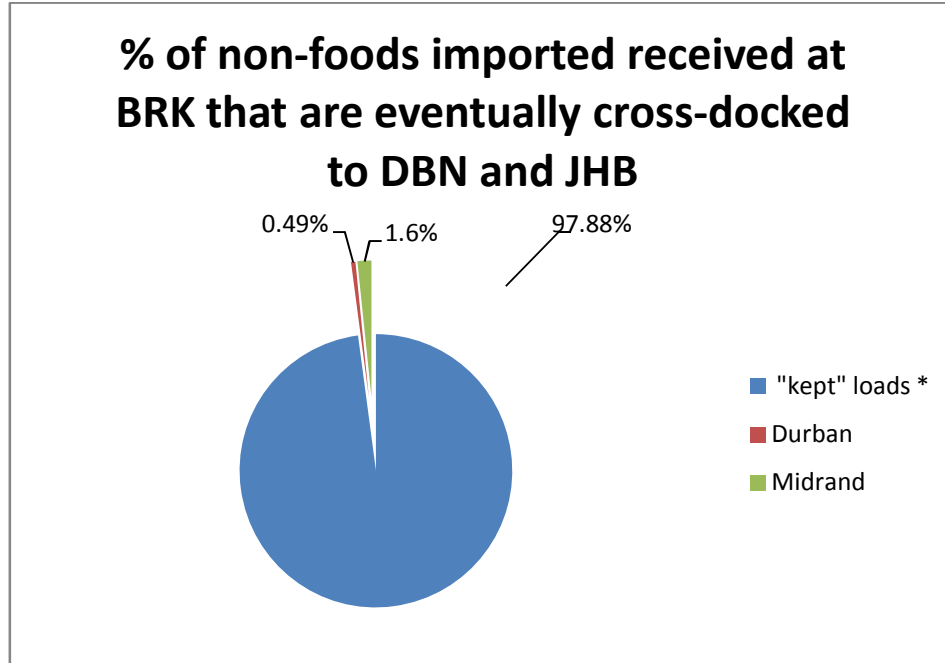


Figure 34: Percentage non-foods received and cross-docked from Brackenfell

Source: Table 14



2. Direct importing of containers trend over time

Table 15 Imported Containers Data

Containers imported directly to DC's

Brackenfell

Month	Year	Number of containers received
July	2010	276
August	2010	508
September	2010	669
October	2010	860
November	2010	798
December	2010	509
January	2011	620
February	2011	434
March	2011	486
April	2011	533
May	2011	470
June	2011	462
total		6625

mean	552
std dev	162
min	276
max	860

Durban

Month	Year	Number of containers received
July	2010	57
August	2010	45
September	2010	44
October	2010	80
November	2010	78
December	2010	120
January	2011	150
February	2011	44
March	2011	64
April	2011	38
May	2011	52
June	2011	49
total		821

mean	68
std dev	34
min	38
max	150

Midrand



Month	Year	Number of containers received
July	2010	61
August	2010	47
September	2010	102
October	2010	102
November	2010	67
December	2010	62
January	2011	30
February	2011	59
March	2011	33
April	2011	32
May	2011	44
June	2011	57
total		696

mean	58
std dev	24
min	30
max	102

Source: Shoprite Information System [33]

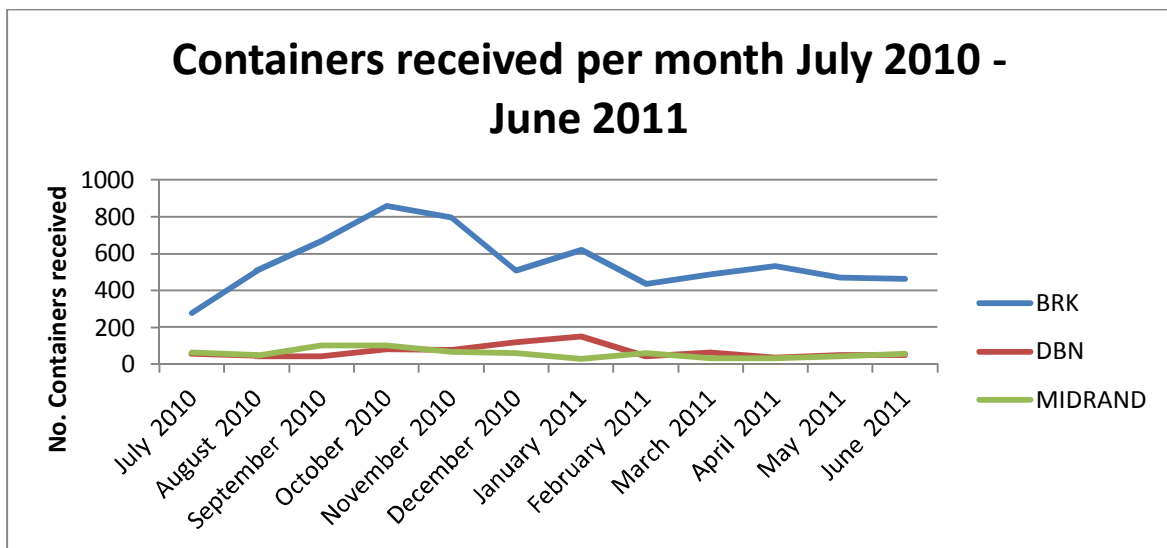
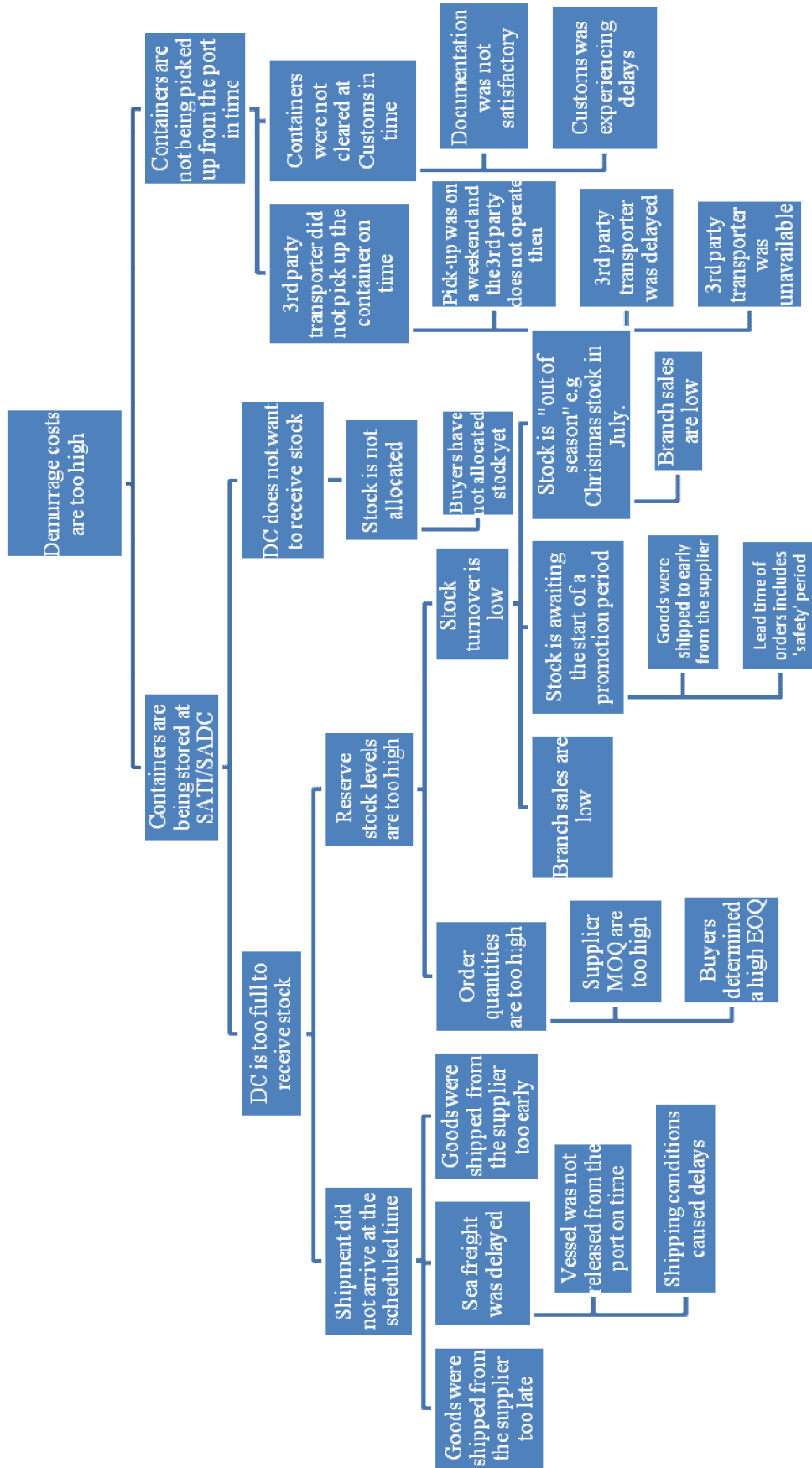


Figure 35: Containers Received per Month

Source: Table 15



Appendix E Root Cause Analysis





***Appendix F Financial Study
Calculations***



This appendix contains the calculation of savings per container when cross-docking via Brackenfell instead of shipping the entire container via Durban to Midrand.

40ft container measurements (Griffin & Company Logistics [29]):

- Length: 12.022 m
- Width: 2.352 m
- Height: 2.395 m

Standard 30L family-size microwave (Kogan Australia Pty [43]):

- Length: 0.520 m
- Width: 0.495 m
- Height: 0.335 m

The volume of the container is determined using Equation F.1.

$$Volume = length \times width \times height \quad \dots F.1$$

$$\therefore V_{container} = 12.022 \times 2.352 \times 2.395$$

$$\therefore V_{container} = 67.72m^3$$

The volume of the microwave is determined using Equation F.1 as well.

$$V_{microwave} = 0.520 \times 0.495 \times 0.335$$

$$\therefore V_{microwave} = 0.086m^3$$

To determine how many microwaves can be stored in a 40 ft container we use equation F.2. Note that this does not take into consideration the size of the packaging of the microwave. It is assumed that the difference is negligible and the above measurements are satisfactory to use for an estimation of the number of microwaves that can be placed into a 40 ft container.

$$Number\ of\ microwaves\ in\ a\ container = \frac{volume\ of\ container}{volume\ of\ microwave} \quad \dots F.2$$

$$Number\ of\ microwaves\ in\ a\ container = \frac{67.72}{0.086}$$

$$Number\ of\ microwaves\ in\ a\ container = 787.441 \approx 787\ microwaves$$

Based on these calculations we can assume that approximately 787 microwaves can be placed into a 40 ft container. The savings per container using the cross-docking route via Brackenfell is R2831.00. The savings per microwave is calculated using Equation F.3.

$$Savings\ per\ microwaves\ in\ a\ container = \frac{savings\ per\ container}{number\ of\ microwaves} \quad \dots F.3$$



$$\begin{aligned} \text{Savings per microwaves in a container} &= \frac{2831}{787} \\ &= R3.60 \end{aligned}$$

It is concluded that a saving of R3.60 is made per microwave when a 40ft container of microwaves is cross-docked through Brackenfell and then transported to Johannesburg, compared to when it is transported in a container directly from the port of Durban.