4. Empirical Research

“Logistics is the management of the entire supply chain.” – Anonymous.

4.1. Introduction

In previous chapters sustainability and intermodal transport was introduced, this chapter focuses on the more practical view on how to make Sustainability and Intermodal Freight Transport a reality. It contains focus points such as study areas within South Africa, South African Policies and Legislation that will be introduced and case studies (international and national) which indicate where sustainable intermodal transport is in development or already a growing success. Figure 17 contains the focus areas as empirical introduction.

Figure 17: Empirical Introduction

Source: Own construction, 2012.
4.2. Study area

As a developing continent Africa is often faced with challenges in achieving Sustainable Development. Government institutions and development agencies are using terms such as job creation, economic growth, infrastructure development, social development and poverty improvement to attend sustainable development. It is said that sustainable development should meet the present socio-economic needs, without compromising the future of environmental development (SA, 2012).

4.2.1. Demarcation

South Africa being the economic hub of the Sub-Saharan region, it would be suitable to use it as a study area and investigate the most popular, but not yet as effective, corridors within this region. Map 3 will indicate South Africa as a whole, which will further be discussed under macro- and micro study areas.

Map 3: South Africa (National Railways and Roads)

Source: Own Construction through GIS, 2012.
4.2.1.1. Macro study area

Geographically South Africa is a country on the most southern point of the Africa continent, with a population of 48 810 427 people in 2012 and a population growth rate of -0.412%. The urban population in 2010 was 62% of total population with an urbanisation rate of 1.2% annually. The major cities are Johannesburg with 3.607 million, Cape Town with 3.353 million; Ekurhuleni (East Rand Gauteng) with 3.144 million, Durban with 2.837 million and Pretoria with 1.404 million people in 2009. (Index Mundi, 2012). As for freight transport Johannesburg accounts for 20% of the country’s exports and a further 39% passes through the city. This is the reason why Gauteng is used as a starting point for movements from South Africa (Corporate Planning Unit, 2002). Apart from the extremely favourable geographical location of South Africa, the SADC region member states should benefit from SA’s economic fortunate circumstances and development opportunities.

South Africa has changed significantly over the past few years. It is the economic heart of Africa, but not only is South Africa itself an important developing economy, but it can also be seen as the access to other African markets. The country plays an important role in supplying energy, relief aid, transport, communications and investment on the continent. The question remains why intermodal freight transport? Well the answer is simple intermodal transport has a crucial role to play in South Africa, for both passengers and freight.

South African rail has changed slowly over time in comparison to other countries. Presently South Africa has an extensive rail network, 14th longest in the world, connecting with networks in the Sub-Saharan region. The country’s rail infrastructure which connects the ports with the rest of South Africa represents almost 80% of Africa’s total rail infrastructure. The current rail infrastructure desperately needs to be upgraded as it suffers from old rolling stock. South Africa’s geographic position, relative to global routes, is a disadvantage in itself. It is therefore important that the transport system support South African products, goods and services in order to remain competitive in global markets that are not tilted in their favour already because of our geographic location (SA, 2008:3).
South African transport networks move about 900 million metric tons of cargo per annum. South African products that move in the surrounding area face a difficult challenge in terms of the inefficiencies in our ports and rail environment (SA, 2008:3).

In the context of the critical role that the freight system plays in building and maintaining the South African economy, the problem statement that this strategy responds to is (SA, 2008:4):

“The freight system in South Africa is fraught with inefficiencies at system and firm levels. There are infrastructure shortfalls and mismatches; the institutional structure of the freight sector is inappropriate, and there is a lack of integrated planning. Information gaps and asymmetries abound; the skills base is deficient, and the regulatory frameworks are incapable of resolving problems in the industry.”

The figure below illustrates the well-developed global routes around highly efficient port systems with huge base markets that South Africa’s products must compete with:

**Figure 18: Competitive Ports in Other Countries**

Source: SA, 2008:3.
This problem statement is not complete, but pronounces the key freight areas impacting negatively on the economic and social development of South Africa, if it will be left unaddressed, it will force major constraints on the country’s ability to deliver economic development and jobs in the medium to long term. The main challenges facing South African exports and imports are the inefficiencies that limit the entire transport system from port operations to rail operations (SA, 2008:4).

### 4.2.1.2. Micro study areas

The Department of Transport, SA (2008:26) stated that Gauteng continues to sustain its role as the economic hub of South Africa. South Africa has seven primary corridors, which are Walvis Bay, Cape Town, Port Elizabeth, East London, Durban, Maputo, Beitbridge and Gauteng. This indicates not only the impact of economic growth to date but also the improved trust on trade, both global and domestic, as an fundamental part of changes in the national economy.

Future forecasts from 2004 for the next ten years show that there is a range of capacity gaps from a corridor perspective. Two national corridors, Gauteng - Durban and Gauteng - Cape Town, stand out as requiring special attention. These corridors carry significantly more volumes than any of the others and are therefore critical to the national economy (SA, 2008:26).

#### 4.2.1.2.1. The Gauteng - Durban corridor

The province of KwaZulu-Natal has a very diverse industrial sector. Major industries in the province are sugar, forestry, aluminium, petro-chemicals, automotive manufacturing, steel production, coal mining, plastics and packaging, paper and board manufacturing, and a range of industries associated with import and export to the two major ports of the Southern African region, Durban and Richards Bay. The N3 runs in a north south direction and links Johannesburg with Durban (SA, 2009:6).
Transport of goods is mainly through containers, there are various terminals along this corridor, i.e. City Deep, Harrismith, Durban Container Terminal, PX Shed in Durban (out of use), PX Shed facilities in Ladysmith (unused), and the proposed Cato Ridge Container Terminal (SA, 2009:6).

The port of Durban comprises of the Durban Container Terminal, Dry Bulk Terminals, Liquid Bulk Terminals, and the Break-Bulk Terminal. The port of Richards Bay is made up of the Coal Terminal, Dry Bulk Terminal, Multi-Purpose Terminal, Bunker Terminal, Sasol Agri Terminal, and the Island View Storage. The major airports along this corridor are the OR Tambo, where nearly all of the cargo handled is international import and export cargo, and the Durban International Airport which mainly handles courier type parcel traffic (SA, 2009:6).
In **Figure 19** the N3, NATCOR and the NMPP pipeline is shown. The N3 runs in a north south direction and links Johannesburg with Durban. To monitor overloading, there are numerous weighbridges which are located in Gauteng (Alberton, Bapsfontein, Centurion, Boekenhout College, Donkerhoek, Germiston, Johannesburg CBD, Meyerton, Nigel, Springs, Sandton, Krugersdorp, Pretoria, Heidelberg, Pretoria North) and Durban (Empangeni, Greytown, Groutville, Ladysmith, Marburg, Midway, Mkondeni, Newcastle, Park Rynie, Rossburgh, Umhloti, Vryheid, Westmead, and Winkelspruit) (SA, 2009:6). The Durban-Gauteng line, known as NATCOR, is the most important general freight rail route in South Africa. The Richards Bay Coal Line connects the coal mining areas near Witbank, Mpumalanga and the Richards Bay Coast (SA, 2009:6).

The volumes of air cargo are limited as there is an efficient overnight road transport service between Durban and Johannesburg. The air cargo handled at Durban International Airport is mainly courier parcel traffic. Durban International Airport handles approximately 3.6 million travellers per annum but only approximately 6000 tons of air cargo. The air cargo is mainly courier type parcel traffic, with limited handling of larger amounts. The volumes of air cargo are also limited by the fact that there is efficient overnight road transport services between Durban and Johannesburg, which tend to attract cargo destined for international consignees due to the relative costs. (SA, 2009:7). **Figure 19** outline commodities freighted through this corridor as well as their estimated tonnages (SA, 2009:6).
Two main pipelines supply the interior (including Gauteng). These are a 300 mm line from Durban to Sasolburg (Coalbrook) and the 400mm pipeline Crude oil line. Products transported include, gas, aviation turbine fuel, crude oil, diesel, alcohol, and various grades of petrol (SA, 2009:8). Transport of liquids by pipeline is a major undertaking in South Africa with a pipeline network spanning five provinces. The presence of the pipelines in the province, constitutes a major transportation asset, as the large volumes transported would otherwise be moved by rail where possible, or by road, thereby increasing road usage and congestion (SA, 2009:8). Figures for the projected growth on the Gauteng – Durban corridor from 2003 to 2020 as follows:

![Figure 20: Freight going through these Corridors](image-url)

Source: SA, 2009:7
The following strategic issues facing this corridor are urgent and require immediate attention (SA, 2008:27):

- The required capacity for the Gauteng - Durban corridor was projected by MSA to reach 57 million tons in 2020,
- The corridor is already close to this capacity (53 million tons in 2004, 16 years sooner), and is expected to have grown by 38% by 2020. To make matters worse, less than 20% of the goods transported along this corridor can be switched to other ports, implying that 80% of the goods destined for Durban are for local consumption. This has serious implications for the sustainability of this corridor. Alternative corridor strategies are required to prevent a bottleneck in the immediate future. Additional capacity will be required on this corridor to cater for local demand irrespective of whether cargo can be switched or not,
- Furthermore, the operational capacity of rail is estimated at 20% of the installed capacity and is further challenged by a lack of, effective infrastructure, trained people and a closer alignment to customer needs. If nothing is done now, and considering the projected growth of 75 million tons in 2020, there will be a capacity bottleneck of about 21 million tons (75 million tons projected versus the current 54 million tons carried),

### Table 15: Projected Growth for Durban – Gauteng Corridor

<table>
<thead>
<tr>
<th>Projected growth 2003 to 2020 38%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003 corridor stats:</td>
</tr>
<tr>
<td>Road</td>
</tr>
<tr>
<td>82%</td>
</tr>
<tr>
<td>Domestic</td>
</tr>
<tr>
<td>84%</td>
</tr>
<tr>
<td>Dominant commodities</td>
</tr>
<tr>
<td>-Stone Quarrying</td>
</tr>
<tr>
<td>-Limestone</td>
</tr>
<tr>
<td>-Processed Foods</td>
</tr>
<tr>
<td>-Fuel &amp; Petroleum Products</td>
</tr>
</tbody>
</table>

• Rail delays, predominantly at the marshalling yards leading to the port of Durban and City Deep, impact negatively on rail’s competitiveness,
• Different electric currents require four locomotive changes, which increases operating cost and transit times,
• Asset age reduces efficiency:
  o of ports, particularly the container terminal,
  o of rail, particularly of rolling stock and at City Deep;
• Ship delays and waiting times have obvious adverse impacts on logistics costs and reliability,
• The forecast port capacity will be unable to deal with 2020 volumes,
• Traffic is not evenly balanced – two-thirds full on the down run and one-third full on the back haul, although there may be variations between commodities.

4.2.1.2.2. The Gauteng - Cape Town corridor

The Atlantis Corridor has experienced rapid ‘greenfield’ development over the last decade, primarily taking the form of conventional suburban residential. Large scale retail and office development has occurred in the Century City complex adjacent to the N1 freeway, with more locally-oriented commercial development. Developable land in the Corridor within the designated urban edge could accommodate much of the anticipated growth of metropolitan Cape Town at relatively little direct environmental cost, provided that suitable density levels are achieved. The transport system serving the Corridor area is particularly problematic (Wilkinson & Marks, 2007).
Container cargo is transported by road and rail between the relevant ports and Gauteng. Due to severe bottlenecks in the road infrastructure at City Deep Terminal, an initiative was taken with the assistance of Blue IQ which assisted in relieving the congestion (SA, 2009:8).

A wide range of general cargo is transported from Port Elizabeth, one of the busiest container terminals in South Africa, by rail and road either to terminals or direct to industrial customers. The number of containers transported by rail to and from Gauteng is approximately 120,000 per annum (SA, 2009:8).
The port of Cape Town is situated on one of the world’s busiest international trade routes and will always retain strategic and economic importance for that reason alone. Cape Town, caters for general cargo on a common user basis, and handles an ever-increasing number of containers. The multi-purpose terminal in Duncan Dock handles fruit, steel, paper, maize, wheat, rice, timber, coal, scrap and other general cargo - as well as passenger cruise ships. Duncan Dock also has a dedicated cold storage for fish products. The port has good rail and road connections through the main corridors to other centres inland (SA, 2009:9).

The Port of Saldanha Bay, South Africa’s largest natural port with the deepest water is 60 maritime miles northwest of Cape Town. The port developed into a modern harbour only recently, in order to facilitate the export of iron ore from the Northern Cape. This required the construction of a railway to the mines at Sishen in the Northern Cape and the construction of a deepwater jetty in Saldanha Bay. In addition the Saldanha Steel Mill near the port has also been commissioned for the export of steel. There are no intermodal facilities (SA, 2009:9).

Mossel Bay is situated halfway between Cape Town and Port Elizabeth and is the smallest of the commercial harbours’ along the South African coast. It is an active fishing harbour with developing oil industry, which begun with Mossgas in the late 1980’s. The port sees little other commercial activity and there hasn’t been any real growth in the ensuing years. The harbour of Mossel Bay caters mainly for fishing and service craft for the local oil industry and handles little other commercial cargo, and therefore has little in the way of sophisticated infrastructure. However, the fishing industry provides an important economic boost to the Southern Cape and the Local community. There is no container handling and no intermodal facilities are available (SA, 2009:9).

The state airport network regarding this corridor consists of two international airports, namely OR Tambo in Johannesburg and Cape Town International. There are also two regional airports, namely Bloemfontein and Kimberley. Air cargo is transferred and transported in break bulk consignments by road in both open and closed (sometimes
refrigerated) vehicles of different sizes. The goods are unloaded at loading docks and then processed through storage, customs, packing, documentation, and then reloaded into aircraft by the cargo handling organizations at the OR Tambo Airport. Import cargo follows the same procedure in reverse. There is no direct transfer from road to aircraft due to the security considerations and the legal requirement for customs control over the goods in transit (SA, 2009:10).

The N1 runs as a tolled motorway from Johannesburg southwards at Kroonstad in the Free State province, crosses Northern Cape and ends in Cape Town. As there is inconsistent and incomplete freight data for the corridor, it is proposed to use figures for the projected growth on the Gauteng – Cape Town corridor from 2003 to 2020 as follows (SA, 2009:10):

**Table 16: Projected Growth for Cape-Town – Gauteng Corridor**

<table>
<thead>
<tr>
<th>Projected growth 2003 to 2020 %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2003 corridor stats:</strong></td>
</tr>
<tr>
<td>Road</td>
</tr>
<tr>
<td>85%</td>
</tr>
<tr>
<td>Domestic</td>
</tr>
<tr>
<td>90%</td>
</tr>
<tr>
<td>Dominant commodities</td>
</tr>
<tr>
<td>-Processed Food</td>
</tr>
<tr>
<td>-Coal</td>
</tr>
<tr>
<td>-Chemicals</td>
</tr>
<tr>
<td>-Beverages</td>
</tr>
<tr>
<td>-Fruit Products</td>
</tr>
</tbody>
</table>


The following strategic issues facing this corridor are not as urgent as those facing the Gauteng - Durban corridor (SA, 2008:27):
• Of the 19 million tons of freight transported on this corridor, less than 3 million tons is switchable to another port, which implies that high volumes of goods are transported for local consumption,
• Unlike in Durban where immediate port expansion is required, some expansions in the port of Cape Town will be required between now and 2020. The port of Cape Town has the potential to evolve into a specialist port with the emphasis on fruit export,
• Very low utilisation of rail capacity,
• Road corridor capacity is constrained in places by single lanes,
• The opportunity to use rail as line haul and integrating road freight as a feeder service is being limited by poor rail reliability,
• Locomotive changes impact adversely on reliability, transit time and the operating cost of rail.

The corridor is more directionally balanced than most other corridors. However, rail’s performance gap will have to be closed to avoid the road corridor from filling up completely. Rail is the cheapest infrastructure solution to providing alternate corridor capacity by road. A significant portion of commodities could be containerised by 2020, thereby lending itself to intermodal solutions (SA, 2008:27).

4.2.2. Current Transport Analysis

4.2.2.1. Modal Description

South Africa moved 693 millions of tons of freight domestically in 2003, 74% by road and 26% by rail. In 2006 the following figure indicates the distribution of freight, even though Figure 22 shows a relatively constant movement of freight, an increase in the market for freight was captured by road, hence the growth of the road sector (Havenga & Pienaar, 2012). Airfreight is projected to grow at 6% per annum in 2003. The seaports handle 161 million tons per annum and have seen the fastest growth in container volume of 7.25% per annum since 2000 (SA, 2008:12).
The following table identifies the different modes and indicates the infrastructure and the operations that support each mode of transport.

**Table 17: Modal Descriptions (Infrastructure and their Operation)**

<table>
<thead>
<tr>
<th>Mode</th>
<th>Infrastructure:</th>
<th>Operation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rail</td>
<td>The rail network carries about 180 million tons of cargo annually for both the local and export market. The physical network can be divided into three main categories, namely the primary network and the secondary network (the light and the low-density networks).</td>
<td>Although rail in South Africa has retained its market share of bulk products, some of the world’s best performing railways have achieved their greatest growth in volumes in container traffic over the past 10 years. This is not the case in Spoornet, which has lost much of this and other higher value commodities to the road freight sector.</td>
</tr>
<tr>
<td>Road</td>
<td>According to the Road Infrastructure Framework for South Africa, about 6 700 km of the road network falls under the jurisdiction of SANRAL, while about 56 000 km are surfaced provincial roads.</td>
<td>South African road freight operators move about 647 million tons of freight per annum. It is estimated that in tonnage terms 29% is moved by operators for reward, whilst the</td>
</tr>
<tr>
<td><strong>The unpaved (gravel) provincial road network</strong> is approximately 301 000 km in length while urban roads comprise another 168 000 km. Unproclaim gravel and earth rural roads are about 221 000 km, including access roads. The busiest freight corridor, Gauteng - Durban, carries 29 million tons of cargo per annum, which is 80% of the total cargo that is moved by road and rail in this corridor.</td>
<td>remaining approximately 69% is moved in-house. Approximately 70 to 80% of freight in South Africa is moved by road because it is more flexible than rail transport.</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td><strong>Air</strong></td>
<td>The state airport network consists of the three key international airports, namely Johannesburg International (JIA), Cape Town International (CIA) and Durban International (DIA) and seven regional airports, namely Bloemfontein, East London, George, Kimberley, Pilanesburg, Port Elizabeth and Upington. South Africa has 500 000 aircraft flights and over 21 million passengers are transported per annum. There are numerous airports that are of a regional or localised importance that have not been the subject of this analysis due to the low levels of internal cargo traffic outside of the major destination pairs.</td>
<td>Approximately 522 000 tons of cargo are moved by airfreight each year. This is done by scheduled passenger services as well as by scheduled and unscheduled airfreighter services.</td>
</tr>
</tbody>
</table>
| **Pipeline** | The size of the entire network is about 3900 km and majority of the network is on the eastern side of the country because the majority of crude oil exports and refined products come from the Port of Durban, which is on the eastern seaboard. Of the 3900 kilometres of network, Petronet is responsible for 3300km and about 590km is privately owned by Caltex because the line moves | Pipelines within Petronet move: 16 billion litres of refined products, and  - Petrols and Diesel 10.3bn litres;  - Avtur 0.8bn litres;  - Crude oil 4.9bn litres by Petronet and 5 billion litres by Calref line;  
About 334 million cubic metres of Gas (11,5 million Giga Joules) |
from Saldanha to the Calref refinery in Milnerton. This Calref line moves crude oil only. The industry moves about 21 billion litres of fuel per year. Of that, Petronet moves about 16 billion litres and the Calref line moves about 5 billion litres as a dedicated line. The network moves a diverse number of products across its expanse.

Maritime

South Africa has seven commercial ports. The ports of Durban, Cape Town and Port Elizabeth handle mostly container and higher value products, whilst the ports of Saldanha Bay and Richards Bay have a strong primary product orientation. The Mossel Bay port handles bulk liquids while the Port of East London handles containers, bulk, and cars. Coega, a new port in the Eastern Cape, is being developed to handle large vessels, and will have facilities to handle containers and bulk liquids.

South Africa exports 122 million tons and imports 39 million tons of products per annum. This difference between the tonnage of exports and imports is largely due to the bulk export of commodities such as coal and iron ore. Although there are many private sector port operators, the only discernible competition is in break bulk cargo.


The following maps will distinctly show the national railway systems and national road networks in South Africa.
Map 4: National Road Networks

Source: Own construction through GIS, 2012.
**Map 5: National Railway Systems**

Source: Own construction through GIS, 2012.

### 4.2.2.2. Nodes

#### 4.2.2.2.1. Intermodal Interfaces

Intermodal transfers and load consolidation occur at a range of locations concentrated in urban areas and usually at points of modal transfer such as ports, airports and container terminals. The intermodal interface is poor. Operational issues, poor asset quality and poor customer interfaces result in bottlenecks at the intermodal terminals. This applies particularly to the higher value container and break-bulk supply chain, but is less of a problem at bulk intermodal facilities. Delays occur due to multiple handling of containers, which is being worsened by inadequate handling equipment and the poor condition of infrastructure at the terminals. In terms of infrastructure, there is a general problem of shortage of capacity that compromises rapid cargo movement, coupled with
under investment, and a failure to arrest deterioration resulting from a lack of appropriate maintenance (SA, 2008:21).

Operational challenges include poor intermodal planning, inefficient use of intermodal facilities and lack of appropriate technology to enable seamless movement. In addition, poor productivity and system unreliability result in poor efficiency in intermodal processes. It has been found to seriously affect operations that the apparent unwillingness to share information and coordinate modal processes at intermodal facilities (SA, 2008:22).

The impediments to the intermodal concept include (SA, 2008:22):

1. Lack of adequate infrastructure to accommodate double stack rail service in terms of container handling and movements in the country because of the topography;
2. Operational inefficiencies at terminals, e.g. City Deep, for managing and tracking shipments, preclearance, scheduling of equipment usage and management of traffic flows; and
3. Institutional constraints and relationships with domestic and foreign partner organizations, with conflicting inter-governmental mandates, customs clearance and other governmental data requirements.

4.2.2.2. Border Posts

South Africa has 52 significant border posts, most of them are small and more than 60% of freight traffic is handled by the top five border posts namely Lebombo, Beitbridge, Oshoek, Nakop and Maseru Bridge. Rail transport remains the dominant mode of transport for cross-border freight movement. However, growth in cross border road freight is currently increasing faster than that of rail. Efficiency at the border posts is being compromised by a shortage of experienced staff. Although service levels vary at each of the five main border posts, which handle mostly freight, the general experience is unsatisfactory. Manual clearing takes twice as long as electronic clearing, but
unfortunately the electronic system is not yet fully functional. Facilities have not kept pace with demand at the main border posts (SA, 2008:22).

The inefficiency at border posts falls over into the freight environment creating excessive opportunity cost in relation to time and costs. The border posts are further constrained in their ability to respond to changes in traffic flow over time as a result of their poor quality resource base. The main causes of the poor quality of the resource base are lack of re-investment, lack of care of assets and a shortage of appropriate skills. This is evident in ports and rail, and also in secondary roads. There is a lack of sustained infrastructure investment at certain border posts (SA, 2008:23).

4.3. Policy and Legislation

A vision for freight transport is found in the White Paper on National Transport Policy. This vision is premised on the following mission statement (SA, 2008:32):

“To provide safe, reliable, effective, efficient and fully integrated land freight transport operations and infrastructure which best meet the needs of customers at improving levels of service at an equitable cost in a fashion which supports government strategies for economic and social development while being environmentally and economically sustainable.”

The development of South Africa depends primarily on its ability to move goods and deliver services to their destinations with speed and reliability, without failure and fear for their safety. It will also form part of Government’s measures to address the pressing social ills, including poverty and rural underdevelopment, resulting from high levels of unemployment (SA, 2008:32).
4.3.1. National Land Transport Act no. 5 of 2009

The purpose (section 2) of the National Land Transport Act (5 of 2009) is to:

- Further the process of transformation and restructuring the national land transport system initiated by the Transition Act;
- Give effect to national policy;
- Prescribe national principles, requirements, guidelines, frameworks and national norms and standards that must be applied uniformly in the provinces and other matters contemplated in section 146 (2) of the Constitution; and
- Consolidate land transport functions and locate them in the appropriate sphere of government.

The National Land Transport Act (5 of 2009) indicates Intermodal planning committees (section 15), institutional arrangements for land transport in planning authorities:

1. Every municipality that is establishing an integrated public transport network or has significant passenger rail services in its area must establish an intermodal planning committee consisting of the prescribed technical officials and prescribed representatives of rail operators, other public transport modes, users and organised business.

2. The function of an intermodal planning committee is to co-ordinate public transport between the modes in order to achieve the objects of this Act.

The National Land Transport Act (5 of 2009) indicates general principles for transport planning and its integration with land use and development planning:

“Land transport planning must be integrated with the land development and land use planning processes, and the integrated transport plans required by this Act are designed to give structure to the function of municipal planning mentioned in Part B of Schedule 4 to the Constitution, and must be accommodated in and form an essential part of integrated development plans, with due regard to legislation applicable to local government, and its integrated transport plan must form the transport component of the integrated development plan of the municipality.”
The National Land Transport Act (5 of 2009) on integrated transport plans (Section 36):

1. All planning authorities must prepare and submit to the MEC, by the date determined by the Minister, integrated transport plans for their respective areas for the five-year period commencing on the first day of the financial year determined by the MEC, and must update them in the prescribed manner and as frequently as prescribed.

2. Integrated transport plans must be in accordance with requirements and in the manner and form as the Minister may prescribe in consultation with the MECs, but the MEC may prescribe the content of integrated transport plans in addition to such requirements, and the aforementioned regulations may prescribe different matters for different types or categories of municipalities.

3. All integrated transport plans must include routes for the transporting of dangerous goods by road through their areas.

4. Each integrated transport plan must be submitted to the MEC for approval by the date determined under subsection (1), which approval must relate only to:
   - monitoring compliance with the provincial land transport framework and with this Act and other applicable legislation;
   - procedures and financial issues that affect the province;
   - seeing that the planning authority followed the correct procedures and otherwise complied with the prescribed requirements;
   - provincial policies and principles regarding transport across the boundaries of 30 planning authorities;
   - modes and aspects of transport under the control of the provincial government or provincial public entities;
   - issues of co-ordination of transport between municipalities, or other (institute) procedures and financial issues that affect the province; and
   - any other matter provided for in provincial laws.

5. The planning authority must submit its integrated transport plan to the Minister for approval of the commuter rail component of the integrated transport plan, within the

6. Every planning authority must make its integrated transport plan available to the National Public Transport Regulator and relevant Provincial Regulatory Entity and make recommendations to them relevant to applications for new operating licences, in the prescribed manner.
The National Land Transport Act (5 of 2009) on freight transport (section 37):

1. Subject to requirements prescribed by the Minister under section 36(2) (Integrated Plans above mentioned), planning authorities must develop a freight transport strategy, with due regard to national and provincial policy, covering the transporting of goods to, from and through the area by road, taking into account:
   • the movement of goods to, from, and through the area by rail or pipeline; and
   • the movement of goods to and from ports or airports.

2. The strategy contemplated in subsection (1) must identify routes for moving goods so as to promote their seamless movement and to avoid conflict with road traffic.

3. The strategy must also include a plan for the movement of dangerous substances contemplated in section 2(1) of the Hazardous Substances Act, 1973 (Act No. 15 of 1973), by road along designated routes in accordance with the general strategy or plan provided for in the relevant Provincial Land Transport Framework.

4. A person must not transport dangerous substances in the area of a planning authority except on a route so designated and indicated in an integrated transport plan, where such a route has been determined and published.

5. Any person who contravenes or fails to comply with subsection (4) is guilty of an offence.

6. By virtue of the deregulation of the road freight industry effected by the Transport Deregulation Act, 1988 (Act No. 80 of 1988), planning authorities must collaborate with the MEC and registering authorities contemplated in the National Road Traffic Act, to promote effective regulation of freight operations by means of the operator card system provided for in Chapter VI of the National Road Traffic Act, to prevent damage to the road system and to achieve the other objects of this Act.
4.3.2. Sustainability Policies

Sustainability strategy is based on a few policies two namely Department of Transport: National Freight Logistics Strategy and White Paper on Spatial Planning and Land-Use Management.

4.3.2.1. Department of Transport: National Freight Logistics Strategy

The measures taken to develop South Africa and raise the standards of living of our people should not compromise the future sustainability of our environment and natural resources. The movement of goods and services, particularly by road, is already a problem because of exhaust emissions, congestion and other environmentally unfriendly results of economic practices (SA, 2008:32).

The development of a strategic framework for land freight transport depends on three key areas, namely economic, social and environmental objectives which is the factors of sustainable development. These objectives seek to balance current market, social and environmental dynamics, and so demand that Government address the seamless movement of goods and services across the breadth of this country and cross border (SA, 2008:32).

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**Table 18: National Freight Logistics Strategy on Sustainability**

<table>
<thead>
<tr>
<th>Key Areas:</th>
<th>Objectives:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Government policies:</strong></td>
<td><strong>Underpinned by certain principles:</strong></td>
</tr>
</tbody>
</table>
| **Economic** | • Re-evaluation of the role of freight transport in economic development;  
• Lower transport costs;  
• Efficient transport systems;  
• Infrastructure development;  
• Promotion of BEE;  
• Safety of goods in transit;  
• Development of strategic transportation corridors;  
• Promotion of intermodalism;  
• Reduction of control overloading;  
• Promotion of Small Medium and Micro Enterprises (SMMEs);  
• Removal of infrastructural bottlenecks; and  
• Trade facilitation and co-ordination. | • Freight drives the economy;  
• Freight is the engine for economic growth; and  
• Freight must be accessible to international markets. |
| **Social** | • Meeting basic needs;  
• Alleviating poverty;  
• Creating jobs;  
• Developing human resources; and  
• Improving access of rural producers. | • Social development;  
• Sustainable economic growth and development; and  
• Equitable access. |
| **Environmental** | • Reduce congestion;  
• Reduce infrastructure damage;  
• Reduce exhaust emissions; and  
• Reduce external items like accident costs. | |

The implementation of these principles, with measures such as trade facilitation and co-ordination, should create an environment conducive to the movement of goods and services in the country (SA, 2008:33).

Classic macro-economic theory suggests that a productive infrastructure, including transport assets, is one of the key preconditions for national economic growth. The theory holds that by investing in assets like bridges, roads, ports or even telephone lines, a nation can stimulate development by reducing transport and communications costs, thus facilitating further trade and wealth creation (SA, 2008:33).

This macro-economic theory, applied to the South African and indeed the African context, highlights the fact that freight logistics can be an engine of growth and a guarantee of continental integration, both internally and within the global economy. As a result, freight logistics is not only an industry in itself but also supports other key microeconomic growth sectors and the development of individual industries within these sectors (SA, 2008:33).

In South Africa, the freight logistics industry has developed rapidly since the deregulation of the transport industry and the introduction of progressive macro-economic and micro-economic reforms beginning in 1994. These reforms have helped the freight logistics industry in South Africa develop in response to global trends in international trade logistics (SA, 2008:33).

The industry employs many people globally and accounts for a substantial number of jobs in South Africa. Globally and in South Africa the industry aims to promote supply-chain and export competitiveness (SA, 2008:33).
4.3.2.2. White Paper on Spatial Planning and Land-Use Management

According to the White Paper (SA, 2001) the following statements reflect the basic relationship of humankind with land: Social, economic and environmental. It is no exaggeration to say that the economic, social and environmental future of South Africa depends on the wise use of land resources.

According to the white paper (SA, 2001), the human association with land springs from the enduring nature of land. It is the basis of food, shelter and livelihood. An important vision is to realize that humanity must decide how negotiable the organizing principles of the linkages between society and the landscape are. The ways in which human society adapts to the constraints given by the natural system, how people act in the landscape to the environmental while satisfying human needs and demands are negotiable.

"The broad objective is to facilitate allocation of land to the uses that provide the greatest sustainable benefits and to promote the transition to a sustainable and integrated management of land resources" (SA, 2001).

![Figure 23: White Paper on Sustainability](Source: Own construction, 2012.)
Integrated planning for sustainable management of land resources should thus ensure (SA, 2001):

- That development and developmental programmes are holistic and comprehensive so that all factors in relation to land resources and environmental conservation are addressed and included. In considering competing needs for land, and in selecting the "best" use for a given area of land, all possible land-use options must be considered.
- That all activities and inputs are integrated and coordinated with each other, combining the inputs of all disciplines and groups.
- That all actions are based on a clear understanding of the natural and legitimate objectives and needs of individual land users to obtain maximum consensus.
- That institutional structures are put in place to develop, debate and carry out proposals.

Principles and norms collectively form a vision for land use and planning in the country. The principles and norms are to promote the normative based spatial planning, land use management and land development system first introduced by the Development Facilitation Act. The objective of the principles and norms is to influence directly the substantive outcomes of planning decisions, whether they relate to spatial development frameworks or decisions on land use change or development applications (SA, 2001).

The overall aim of the principles and norms is to achieve planning outcomes that (SA, 2001):

- Restructure spatially inefficient settlements;
- Promote the sustainable use of the land resources in the country; channel resources to areas of greatest need and development potential, thereby redressing the inequitable historical treatment of marginalized areas;
- Take into account the fiscal, institutional and administrative capacities of role players, the needs of communities and the environment;
- Stimulate economic development opportunities in rural and urban areas; and
- Support an equitable protection of rights to and in land.
In addition they promote:

- Accountable spatial planning, land use management and land development decision-making by organs of state;
- Cooperative governance and wider information sharing in plan-making and implementation; and
- Maximum openness and transparency in decision making.

**Table 19: White Paper Principles**

<table>
<thead>
<tr>
<th>Principles:</th>
<th>Requirements:</th>
<th>The spatial planning, land use management and land development norms based on this principle are:</th>
</tr>
</thead>
</table>
| Sustainability | The sustainable management and use of the resources making up the natural and built environment. | • Land may only be used or developed in accordance with law;  
• The primary interest in making decisions affecting land development and land use is that of national, provincial or local interest as recorded in approved policy;  
• Land development and planning processes must integrate disaster prevention, management or mitigation measures;  
• Land use planning and development should protect existing natural, environmental and cultural resources;  
• Land which is currently in agricultural use shall only be reallocated to other uses where real need exists and prime agricultural land should remain in production. |
| Equality | That everyone affected by spatial planning, land use management and land development actions or decisions must enjoy equal protection and benefits, and no unfair | • Public involvement in land use planning and development processes must be inclusive of all persons and groups with an interest in the matter being decided;  
• Land use regulators and planning authorities must ensure that benefits and opportunities flowing from land development are received by previously disadvantaged communities |
| discrimination should be allowed. | and areas;  
|                                  | The appropriateness of land use must be determined on the basis of its impact on society as a whole rather than only the applicant or immediate neighbours. |
| Efficiency | The desired result of land use must be produced with the minimum expenditure of resources. | Land use planning and development should promote the development of compact human settlements, combating low intensity urban sprawl;  
The areas in which people live and work should be close to each other; and  
Plans of contiguous municipalities and regions should relate positively to each other. |
| Integration | The separate and diverse elements involved in development planning and land use should be combined and coordinated into a more complete or harmonious whole. | Land use planning and development decisions should take account of and relate to the sectorial policies of other spheres and departments of government.  
Land use and development should promote efficient, functional and integrated settlements;  
Land use and development should be determined by the availability of appropriate services and infrastructure, including transportation infrastructure;  
Land use and development should promote racial integration;  
Land use and development should promote mixed use development. |
| Fair and good governance | Spatial planning, land use management and land development must be democratic, legitimate and participatory. | Affected parties have a right to access information pertinent to land use and development plans that are being considered by land use regulators;  
Capacities of affected communities should be enhanced to enable them to comprehend and participate meaningfully in development and planning processes affecting them; |
• Decisions must be made in the public domain, with written reasons available to any interested party on request and no planning decisions taken behind closed doors;
• The names and contact details of officials with whom the public should communicate in relation to spatial planning, land use management and land development matters must be publicised;
• Land use and development decisions must be taken within statutorily specified time frames;
• Accessible participatory structures should be created to allow interested and affected parties to express their concerns or support for any land use or land development decision at sufficiently early stage in the decision-making process.


According to the White Paper (SA, 2001) land-use management has two main underlying rationales. The first is the widely felt resistance to the idea of uncontrolled land development and the second is the commonly expressed wish by particular sectors in society to promote various types of desirable land development. The resistance to uncontrolled development is motivated by a number of concerns, the precise mix of which is determined by the particular social, economic and political contexts of different times and places. Essentially however these concerns are included in Table 20.

The strategy sets out Government’s intention of making freight transport central to the economic development of the country. As mentioned above, freight transport in particular, and freight logistics in general, is becoming increasingly important in the movement of goods and services in the country. Trying to put the need for freight logistics in context, Government has to look at the critical transport modes and factors
that would make possible the seamless movement of goods and services in the supply chain (SA, 2008:35).

### Table 20: Rationales of Land-Use Management

<table>
<thead>
<tr>
<th>Rationales:</th>
<th>Concern:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance to the idea of uncontrolled land</td>
<td>Uncontrolled development of land can have adverse effects on natural habitats, cultural landscapes and air and water quality.</td>
</tr>
<tr>
<td>Health and safety</td>
<td>Uncontrolled development can lead to overcrowding and unsafe building construction. Certain land uses can also be detrimental to the health and safety of neighbours.</td>
</tr>
<tr>
<td>Social control</td>
<td>The control of land uses and building types has long been a means of exerting social control, particularly through the exclusion of certain types of person, household or economic activity from certain areas through the application of particular development controls limiting, for instance, plot sizes, plot coverage and home industries.</td>
</tr>
<tr>
<td>Efficiency of infrastructure provision and traffic management</td>
<td>Increasingly it has become clear that the where the granting of development permissions is not coupled with the provision of adequate infrastructure and traffic management the consequences can be severe. Similarly, where infrastructure is provided, generally at high financial cost, without taking into account likely and relevant land-use and settlement patterns the opportunity costs to society are very high.</td>
</tr>
<tr>
<td>Determination of property values for purposes of rating</td>
<td>The market value of land is the basis on which property valuation is determined and the extent and nature of the development permitted on the land is a key factor in that determination.</td>
</tr>
</tbody>
</table>
### 4.3.3. Department of Transport: National Freight Logistics Strategy

The Department of Transport’s strategy on freight logistics is based on two main documents, namely, the White Paper on National Transport Policy and the Moving South Africa Strategy (MSA). These two documents set out the role of freight movement in improving and advancing economic development. Although some elements of these documents have become less relevant over time, their fundamental thrust remains critical to the development of a freight system that supports the economic development of South Africa (SA, 2008:35).
4.3.3.1. White Paper on National Transport Policy

In the white paper on national transport policy (SA, 1996) the Minister of transport stated that he committed himself to a process of reviewing national transport policy to ensure that this policy meets the needs of all our people, within the constraints of our resources and within the changed environment in South Africa.

Transport plays a significant role in the social and economic development of any country, and the Government has recognised transport as one of its five main priority areas for socio-economic development. Public policy cannot be static but must be dynamic in nature. It must at all times be perceptive to the environment within which it operates. Policy therefore needs to be reconsidered and if necessary revised on a continuing basis (SA, 1996).

The white paper (SA, 1996) states that the broad goal of transport is the smooth and efficient interaction that allows society and the economy to assume their preferred form. The vision for South African transport is of systems which will (SA, 1996):

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

In order to progress towards this vision, the broad goals of the National Government's transport policy are (SA, 1996):

- To support the goals of the Reconstruction and Development Programme for meeting basic needs, growing the economy, developing human resources, and democratising decision making
- To enable customers requiring transport for people or goods to access the transport systems in ways which best satisfy their chosen criteria.
• To improve the safety, security, reliability, quality, and speed of transporting goods and people
• To improve South Africa's competitiveness and that of its transport infrastructure and operations through greater effectiveness and efficiency to better meet the needs of different customer groups, both locally and globally
• To invest in infrastructure or transport systems in ways which satisfy social, economic, or strategic investment criteria.
• To achieve the above objectives in a manner which are economically and environmentally sustainable, and minimises negative side effects.

Strategies for implementing these goals will be discussed in following statements. Two key thrusts to achieve these goals, namely the promotion of integration and intermodalism, however, deserve mention at this stage (SA, 1996).

Assurance of modal, spatial, institutional and planning integration is critical to transportation policy. Depending on the decision to be made, the appropriate government departments, private sector, and consumers will be integrated in the decision-making process through appropriate form. The transport sector will participate with other sectors in broader policy-making and decisions which affect the demand for transport. The roles and responsibilities of the key stakeholders and service providers will be clearly agreed. This will enable government regulation to be kept to a minimum, while the private sector will be able to build and operate within a competitive environment, be socially and environmentally responsible and self-regulating, and will be world-class transporters and transport service providers (SA, 1996).

Intermodal co-ordination, co-operation and sharing of information will be encouraged in both infrastructure provision and operations to optimise customer service, reduce duplication, reduce destructive competition, minimise total costs, and maximise social and economic return on investment. While there are preferred roles for the various transport modes, often in a hierarchical framework, and there are benefits to be gained by the use of the most appropriate mode, or of multiple modes with effective interchanges between them, it is not the intention of government to dictate such mode
choices. In promoting intermodalism the Government intends to level playing fields and eliminate constraints or disincentives resulting in inefficiencies, including the use of inappropriate modes. A key driver of reducing costs of transport is capacity utilisation. As such, a goal of infrastructure and modal planning will be to optimise capacity utilisation and to achieve a level of integration between modes. Government will not however force the use of particular modes simply to utilise existing spare capacity, and customer service criteria (cost, timeliness, reliability, security etc.) will be the determining factor in mode choice. In principle, intermodalism will be fostered by incentives, and not regulation (SA, 1996).

A goal of the transport system is to create a fully integrated transport and information system which permits seamless, efficient, and transparent passenger and freight logistics in South Africa, regionally, and globally. South Africa’s export focus will be supported by developing the seamless integration of goods transport into regional and global transport patterns (SA, 1996).

A strong, focused, professional Department of Transport will play a leading role in co-ordinating transport policy, and developing and implementing strategies. This it will do in close co-operation with other government departments, other levels of government, and other stakeholders. There will be closer co-operation between transport and land-use planning. Appropriate service delivery mechanisms for the provision of infrastructure and operations will as far as possible be carried out through the use of agencies outside of government (SA, 1996).

The policy of government in accordance with these objectives and principles are grouped into six areas (SA, 1996). Because this study is based on intermodal freight transport, the transport infrastructure and the land freight transport areas will be discussed. In each of these areas, the mission and strategic objectives for the function are set out, the key issues are highlighted, and policies for addressing these issues are stated (SA, 1996).
Table 21: Transport and Freight Areas Visions, Missions and Objectives

<table>
<thead>
<tr>
<th>Areas:</th>
<th>Vision:</th>
<th>Mission:</th>
<th>Strategic objectives:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport Infrastructure</td>
<td>As part of the overall long-term vision for the South African transport system, transport infrastructure will:</td>
<td>&quot;To provide an integrated, well-managed, viable and sustainable transport infrastructure meeting national and regional goals into the 21st century, in order to establish a coherent base to promote accessibility and the safe, reliable, effective and efficient movement of people, goods and services&quot;</td>
<td>-Establish sound intermodal co-ordinating structures,</td>
</tr>
<tr>
<td></td>
<td>-Be in place for South Africa to be a hub of transport within the SADC region</td>
<td></td>
<td>-Maintain and develop the transportation infrastructure system, and prioritise its development in terms of sustainable economic and development needs,</td>
</tr>
<tr>
<td></td>
<td>-Be promoting sustainable economic development by removing constraints on latent demand in development corridors at local, provincial, national and regional level and be providing the catalyst for private investment,</td>
<td></td>
<td>-Foster a sound financial base for transportation infrastructure,</td>
</tr>
<tr>
<td></td>
<td>-Be structured to encourage public passenger transport and to discourage excessive private passenger transport in urban areas,</td>
<td></td>
<td>-Aid the promotion of a strong, diverse, efficient and competitive transportation industry within the limits of sustainable transport infrastructure,</td>
</tr>
<tr>
<td></td>
<td>-Allow for seamless intermodalism,</td>
<td></td>
<td>-Promote environmental protection and resource conservation,</td>
</tr>
<tr>
<td></td>
<td>-Be financed through a combination of user charges and private/public sector investments,</td>
<td></td>
<td>-Enhance the competitiveness of South African industry and the quality of life of its citizens by providing protection of consumers, safety and security, and meeting accessibility, reliability and mobility needs by providing transport infrastructure to serve the purpose,</td>
</tr>
</tbody>
</table>
| Land Freight Transport | “To provide safe, reliable, effective, efficient and fully integrated land freight transport operations and infrastructure which best meets the needs of customers at improving levels of service at an equitable cost in a fashion which supports government strategies for economic and social development while being environmentally and economically sustainable”. | -Develop a comprehensive land freight transport information system  
-Promote the provision of seamless intermodal services  
-Optimise current capacity and maintain and develop the land freight transportation system  
-Prioritise issues in terms of sustainable economic and development needs  
-Find a practical and reasonable solution that leads to an equitable distribution of |
| Infrastructure capital, management, operating and maintenance costs | -Promote a strong, diverse, efficient and competitive transport industry within the limits of sustainable transport infrastructure |
| -Promote environmental protection and resource conservation, with specific reference to all aspects of transporting hazardous substances and goods |
| -Enhance the quality of freight transport services by providing transport customers with a safe, secure, reliable and cost-competitive system |
| -Advance human resource development and expand participation in the freight industry through the creation and growth of entrepreneurial opportunities, training and skills development |
| -Optimise road transport law enforcement |

Source: Own construction from white paper SA, 1996.
The seamless movement of freight across all modes is a challenge with which South Africa is forced to struggle in its efforts to increase exports and be competitive in the global market. The core of this challenge that is facing South Africa and the region is the need for infrastructural investments that will make effortless the movement of goods and services in the country and the region. The movement of goods and services in the supply chain involves costs. These costs are but one of the many elements in the chain that determine whether or not our local export companies are competitive in the international market environment (SA, 2008:35).

As these definitions imply, the role of freight logistics in a country’s economy is both central and complex. This role can be set out in more detail (SA, 2008:36):

- Globally, freight logistics is regarded as fundamental in promoting national and regional economic development. The contribution of freight logistics to commodity and product-trading is internationally acknowledged as one of the reasons for the economic prosperity, sustainable development and competitiveness of more developed countries,
- From a regional economic perspective, freight logistics has been recognised as a means of achieving the integration of regional economies, via the harmonisation of transport systems,
- Freight logistics has contributed to the economic growth of regions, as part of regional growth and development plans and international trade agreements,
- Various commodities, goods and services are traded as cargo and freight out of South Africa for export to the SADC region, the rest of Africa and other continents of the world, and imported into South Africa from these and other regions. In order to ensure the supply chain competitiveness of these commodities, products and services, highly reliable, speedy and flexible freight logistics operations and freight transport services are required.

4.3.4. National Transport Master Plan (NATMAP) 2050

The vision and mission of the National Transport Master Plan 2050 of South Africa is adopted from White Paper on National Transport Policy, 1996 (SA, 2010:19):
“Meeting the needs of freight and passenger customers by 2050, particularly in terms of promoting freight and passenger transport that is accessible, affordable, safe, of high quality, reliable, consistently being upgraded, innovative, flexible, and that strives to be and is economically and environmentally sustainable.”

Based on the above principles, freight and passenger transport will therefore support and enable general overarching government policies and strategies, particularly those strategies that relate to promoting and developing growth, redistribution, employment creation and social integration, both in South Africa and within regional context (SA, 2010:19).

Therefore NATMAP 2050 (Phase 4) highlights three levels of action (SA, 2010:20):

- Focus the scope of the transport system through concentrating and consolidating assets and investment on strategic national, urban and rural transport networks (high volume and nodes); thereby creating a Strategic Transport Network that will form the backbone of the transport system, underpinned by supporting networks.
- Deploy transport modes especially on strategic and supporting transport networks in order to capture the best economies of scale where possible, and to meet customer needs.
- Create an empowering and enabling environment where customers are empowered and where transport providers are enabled to improve efficiency, productivity and competitiveness.

The project goal of NATMAP 2050 includes the following (SA, 2010):

“...to develop a dynamic, long term, sustainable land use / Multi-modal transportation systems framework for the development of network infrastructure facilities, interchange terminal facilities and service delivery.”
Table 22: Freight transport NATMAP 2050 benchmarks and standards

1. Appropriate Freight Modes

- In an attempt to rectify the unbalanced 89%-11% modal split between road and rail freight, important policy directives and principles to be adopted for the future relate to:
  - Continued freedom of modal choice to users of freight services.
  - Justifiable reasons for technical or economic regulatory measures include the protection of the road network, safety, congested corridors and the promotion of specific modes for the longer term collective benefit and protection of the economy.
  - The general characteristics of freight commodities (value, volume and weight, perishables); as well as consumer requirements (time, speed, reliability, packaging and general product condition etc.) are the most important indicators to determine appropriate modes.
- Road will remain the dominant mode and will always be the default mode. Over time the position will change as the rail mode becomes more competitive. The reasons for this change relate to the increasing cost of accessing the road network, the cost of fuel, global shortages of crude oil, the greenhouse effect and other environmental reasons.
- Rail freight transportation will systematically recover from historic market losses and regain the market share on commodities that would under normal circumstances prefer the rail mode:
  - Rail freight efficiency levels will enhance and become competitive at least for long distance traffic and will compete with air and road on speed services; supported by modal transfer facilities located outside congested urban areas with good road access.
  - Air freight transportation will continue with high growth and gain in total market share due to higher efficiencies of aircraft design and airport capacities; dominating most high value, long distance, lower weight and volume commodities, at least for trip distances in excess of 600kms; but expect higher competition from rail for all long distance services where new high speed “seamless” rail corridors are developed. At the same time it would gain market share from current long distance road freight.
- Marine traffic will retain its current typical international high mass, low value freight market); and is expected to increase its volumes as international trade is expanded, but could be faced with systematic reduction in bulk iron ore and coal exports and also general freight to regional destinations as other African harbours and traffic corridors are developed; but increases in industrial and agricultural finished products exports.
- Pipelines will continue to operate at capacity and will increase volumes equivalent to the speed at which new pipelines are constructed. A saturation point is governed by local fuel/gas consumption.

2. Road Freight Transport

- The potential of road freight traffic that may be transferrable to rail is estimated at about 150 bn ton-km. The 2015 target is 20% or 30 bn ton-km and there-after an annual average market shift equivalent to 2% per annum until 2050 (3 bn ton-km)
- Given a number of commodities with limited potential to redirect road traffic to rail, the traffic with the best potential targeted redirection from road to rail include bulk, high mass and low value commodities on any distance carried by either public or private hauler or by contract; traffic on medium to long distance freight routes; less time and storage cost sensitive commodities; corridors where current rail lines exist; and any containerized load with the exception of short – medium distance trips.
- High priority freight traffic to be subjected to new regulatory measures include:
  - Any bulk movement of iron ore, coal and other unrefined bulk mining commodity;
- Bulk movements of agricultural products less sensitive to be perishable or damage.
- Any liquid or gas product not transported by pipeline and dangerous goods.
- Any future economic activity generating new freight traffic of bulk nature would be subjected to statutory planning and provision of infrastructure at own cost by the developers.
- Road transportation will be subjected to severe increased pricing measures and new mechanisms for the use and access of public roads and designated areas.
- Continuous expansions on the current road network will be restricted and the future focus is to improve the road network’s quality (condition, standards, and efficiencies) and the application of demand management mechanisms. At the same time adding capacity to the rail network.

3. Rail Freight Transport

- A 2050 “package” strategy for freight rail is envisaged, that includes a new Rail Infrastructure Development Agency; ring fencing Transnet business activities that could qualify for restructuring; and “Optimized Road-Rail Modal Split Strategy”; identified rail infrastructure development projects;
- The Rail Infrastructure Development Agency target date for establishment is 2010 to become fully operational during 2011; with new rail infrastructure development as the main object and focus of this agency; and also technical and economic regulatory responsibilities.
- First priority infrastructure development programs include new standard gauge rail infrastructure parallel to each national corridor (N routes); capable of accommodating both passenger and freight traffic; with design criteria that focus on competitive transit periods by means of more “seamless” medium/high speed operations.
- New logistic arrangements are envisaged for quicker redistribution of rail freight, including logistics zones; containerization; and integrated hubs and terminals.
- New rail system will also link with all national airports to capture air-to-rail freight traffic.
- On a selective basis, short term containerized freight, mainly general household goods, are envisaged along new passenger rail corridors, serving retail outlets within the station nodes.

4. Airports and Aviation

- Long term average growth rates between 5% and 10% are possible, which will put pressure on capital development programmes.
- High speed rail systems will have an effect on aviation especially for travel distance less than 600 kms. The impact of terminal times could become a more important competitive factor.
- The status of the current Code D international airports (Gauteng - ORTIA, Cape Town and Durban) is unlikely to change much; with the exception of a second International airport in Gauteng, with Cape Town to follow and Port Elizabeth IA that could become a future Code D international airport.
- Other RSA airports with international status linking by air in one way or another on an international basis are likely to increase its international activities; whilst tourism orientated airports that could expect increased traffic include Kruger Mpumalanga Airport, George Airport (Garden Route), Pilanesberg in North West Province and Polokwane.
- In terms of airport support services, integrated systems and linkages:
  - Between 2010 and 2015 all the international and regional airports will be linked with formal scheduled BRT systems;
  - By 2015 all three Code D international Airports will be linked with medium speed local or regional rail systems.
  - By 2020 all other airports to link with long distance rail systems.
  - General mixed commodities common to air services will continue and increase,
but containerized air freight is expected to penetrate and increase this market systematically.

5. Harbours and Pipelines

- It is unlikely that the number of RSA harbours that serve as international trade ports will increase in the foreseeable future; with the exception of new port facilities for energy supply.
- The focus is on capacity enhancements of existing ports and activity specialization together with a regional port grouping strategy. To optimize available capacities.
- Break-bulk: Richards Bay, Durban and Saldanha are responsible for 90% of the volume, 9.5 million tonnes currently. In 25 years’ time the volume will increase to 22.8 m tonnes and Ngqura will add to the existing capacities responsible for 17% and Richards Bay 60% of the volume.
- Dry Bulk exports will increase from 117.6m to 232.4m tons in 25 years, exported currently from Richards Bay and Saldanha Bay (90% of total), to remain the future export harbours.
- Liquid Bulk of 20.8m tons currently will increase to 41.4m tons (Durban and Saldanha responsible for 73%); and in future more evenly spread amongst all ports.
- Containerization: Durban, Cape Town & Port Elizabeth are currently the three main container ports with a volume of 3.8m teu (2008/09), increasing to 20m TEU in 25 years adding Ngqura.
- Vehicles: Durban, East London & Port Elizabeth are the main ports for vehicles and will retain this role. 2008/09 volume of 0.552m vehicles will increase to 1.54m vehicles in 25 years.
- Future pipeline developments concentrate on a new multi-product pipelines between the main ports where pipeline commodities are received to the various inland markets from where refined product pipelines will be used to distribute the refined products to respective deports situated in various offset market areas.
- Durban is currently the only port from where major pipeline traffic is dispatched, with Ngqura in the Eastern Cape as second envisaged port within the Transnet capital program; whilst Mossel Bay in the Western Cape will specialize on pipelines for gas.

6. Intermodal Transfer Facilities

- The focus of NATMAP 2050 national logistic arrangements is on quicker redistribution of freight, particularly between road and rail, including logistics zones optimally positioned outside congested areas, with quick access to the road network and in reach of delivery areas.
- Secondly and integrated open public network of facilities accessible for transfers by any operator that wishes to use these facilities. It includes a refinement and restructuring of the containerization technologies and continued handling techniques and equipment.
- A more integrated approach is envisaged for hubs and terminals whereby the Transnet plans and general road freight industry use joint facilities at strategic positions. These positions will partly be dominated by rail network characteristics for obvious reasons, but access to- and use of these facilities will become open to all transport operators.
- Transnet strategies for logistics hubs and terminals are geared to maximize the footprint of existing terminals before developing new super terminals.
- Within Gauteng mega intermodal terminals are geared to attract container and automotive traffic; whilst a new ring rail system surrounding the Gauteng metropolitan areas will be supported by mega logistics hubs at Pyramid in the north, Sentrarand in the east and Vaalcon in the south. No such facility is envisaged for the western regions of the province.
- In KwaZulu-Natal two new mega facilities are envisaged at the current Durban international airport; at the new King Shaka International Airport; as well as a redeveloped facility at Cato Ridge for inland stack, to complement the current Durban
harbour terminal facilities.

- In the Western Cape, a mega facility is envisaged at Kraaifontein to support two large existing facilities at Belcon (expanded for container handling) and the port terminal.
- The extensive network of private logistics networks and facilities have potential to expand in the form of public services with the development of internet trading that require a public facility network. There is further potential to interact with the mega and large transfer facilities of Transnet and the possibility that joint developments may evolve with separate sections for public and private use.
- Multi-purpose facilities will develop at strategic locations as part of government regional development plans, to promote specific corridor linkage points between provinces and sub-regions at positions on the periphery of large metropolitan and urban areas.


Each of the following maps indicates individually the core rail freight network, the expansion to rail freight lines and the hubs and terminals for rail to road and marine transfers:

**Map 6: The Core Rail Freight Network**

Source: NATMAP (SA, 2011).
Map 7: Expansions to Rail Freight lines.

Source: NATMAP (SA, 2011).

Map 8: Hubs and Terminals for Rail to Road and Marine Transfers.

Source: NATMAP (SA, 2011).
The above maps give a clear identification on where the rail lines are and where there is a need for improvement. The following figures will indicate the total cost per transport sector (for each province) which is needed for improving the infrastructure.

**Figure 24: Total Cost per Transport Sector: Gauteng.**

Source: NATMAP (SA, 2011).

**Figure 25: Total Cost per Transport Sector: KwaZulu-Natal.**

Source: NATMAP (SA, 2011).
Figure 26: Total Cost per Transport Sector: Western Cape.

Source: NATMAP (SA, 2011)

4.3.5. Integrated Gauteng Transport Master Plan 2025

This Strategy serves as the case study of this study (Annexure A), by that the study will be including certain aspects to help the development of this master plan for 2025. In 1970 the Transvaal Provincial Administration embarked on the development of a strategic road network for Gauteng Province. The aim was to facilitate approval of land-use applications, steer future land-use development, safeguard the strategic road network reserves and develop a 1975, 1985, 2000, 2015 and 2025 strategic road network (SA, 2011). The development of the Master Plan for 2025 is still in progress, thus will this study be a guiding tool to promote Sustainable and Intermodal Transport Solutions in the 25 year plan.

The vision of the 25 year Integrated Transport Master Plan of Gauteng (IGTMP25) is (SA, 2011):

“To develop a long term Integrated Transport Master Plan that will underpin Gauteng as the economic powerhouse of Southern Africa, stimulate sustainable long term economic growth, skills development and job creation. The basic aim is to transform society in order to create a better life for all the people of Gauteng.”
The mission for the IGTMP25 is (SA, 2011):

“To enable the Department of Roads and Transport to regulate, plan and develop an efficient and well integrated transport system that serves the public interest by enhancing mobility and delivering safe, secure and environmentally responsible road based public- and private transport and air and rail services.”

This IGTMP25 will enable the Gauteng Department of Roads and Transport, in collaboration with other spheres of government, to regulate, plan & develop an efficient & integrated transport system that serves the public interest by enhancing mobility and delivering safe, secure & environmentally responsible road-based public & private transport and air & rail services. The IGTMP25 should embody the principles of an efficient, competitive & responsive economic infrastructure network that prioritises public transport. The IGTMP25 should assist government at all levels to deliver a world class, sustainable transport system that supports Gauteng’s economic, social, cultural, environmental & developmental goals. The Committee must provide technical guidance to & co-ordinate the research for the ITMP25; determine short, medium & long term targets & deliverables for the project: reporting requirements & time frames for the completion of the IGTMP25 (SA, 2011).

Figure 27: Integrated Transport master Plan 2025

Source: SA, 2011.
In this master plan the following will be drawn to attention:

1. Current reality
2. Points of departure
3. Legislative and Policy Framework
4. Develop a vision for transport for the Gauteng City Region
5. Existing Planning and available data for the Province
6. New data that will be required
7. Governance structures and Planning institutions
8. Use of technology
9. Key focus areas
10. Focus on the road network
11. Optimisation of the current network
12. Maintenance of the existing infrastructure
13. Land-use
14. Public Transport Regulatory framework
15. Mode specific
16. Possible Funding Solutions
17. Communication and marketing Plan
18. Public participation process
19. Recommendations
20. Final brief for Integrated Transport master Plan
21. Composition and requirements of pre-qualified
22. Request for Proposal
23. Tender process and RFP evaluation
24. Time lines and phases of this study

Unfortunately the 25 year long term implementation plan will only be completed in 2013. The 5 year short term implementation plan was completed in January 2012. Some of the Presentations for Local authorities are already completed but there are a many that still needs attention. All the above-mentioned areas will be fully discussed in Chapter 6, by including the information gathered throughout the study.
4.4. Case studies

4.4.1. International Case Studies

The European Union is currently supporting the concept of intermodal transport through a variety of programs, the most important of which is Marco Polo. The Marco Polo program was incorporated in the Commission White Paper European transport policy for 2010: Time to decide from September 2001. Its purpose is to reduce road congestion and improve the environmental performance of the whole transport system by shifting freight from road transport to short sea, rail and inland waterway transport (Tenekecioglu, 2004:63). Marco Polo is meant to target transportation with the European Community, which is still mostly accomplished through road transportation (Tenekecioglu, 2004:64). The EU is committed to intermodal transportation and increasing the use of short sea shipping, rail and inland waterways, to create a sustainable transportation system (Tenekecioglu, 2004:67). The following study cases are successful intermodal logistic systems:

4.4.1.1. Best Practices in Europe

4.4.1.1.1. DHL-Freight:

DHL Freight (from 2003) operates in Italy since 1908 with the historical name of Danzas. DHL Freight is introduced as one of the greater provider international of services legacies to the transport. DHL Freight is characterised as Business Unit dedicated to the development of the intermodal transport (national and international) (EIA, 2010).

The DHL Freight specialization is evident in 4 business divisions (EIA, 2010):

1. Services for groupage and shipments to partial cargo in Europe
2. Regular Services to partial or complete cargo for national and international transports
3. Customs Services
4. Value Added Services
A 45’ box container is the best load unit for North Europe, UK, Ireland and Nordics. This box container is closer to the customer needs in terms of efficiency, security and flexibility (EIA, 2010).

DHL Freight is the owners of beyond 360 international trucks and 12 warehouses in Italy with 6 international gateways. General Cargo is the type of goods that they handle. The nature of this project is that it starts at the customer (Bari hinterland) to London hinterland. The commercial agreement is based on the following steps (EIA, 2010):

1. Pick-up (customer site) and road trunking up to the rail terminal (Hinterland to Bari by Road)
2. Handling and transfer to rail unit.
3. Bari to Zeebrugge (1600km) by rail
4. Transfer to Ro-Ro
5. Zeebrugge to Tilbury (290km) by ship
6. Unloading to UK
7. Tilbury to London (100km) by road
8. Return of the empties to the port and possible re-launching to different destination.

The customer (company in South Italy) needs a complete cargo service in order to deliver goods to England. The main difficulty using the traditional transport modality (road) is related to the following issues (EIA, 2010):

- Road operators usually do not offer domestic and international transport together
- The main direction of domestic traffic is North-South: It’s difficult to find lines coming back to Northern Italy
- On the contrary, Italy-UK traffic flow is mainly South-North.

On this context the solution is that the intermodal approach uses the same load unit managing different shipments and minimizing the empty transport. In this way, through the intermodal transport, it’s possible (EIA, 2010):
• To use the cargo unit both for domestic and international lanes
• To avoid that driver is on board
• To cover the loss of balance optimizing time and resources.

By looking at the economic aspects, the intermodal solution offer a better level of service in terms of security (thefts and accidents) in comparison with the road transport. In this specific case, the choice of intermodal rather than road transport produced an economic benefit to DHL Freight’s customer, since DHL was able to offer a rate for Bari to UK intermodal relation 14% lower than all-road solution (EIA, 2010).

The main drivers that made the intermodal solution cheaper than all-road were (EIA, 2010):

• The opportunity to reposition the empty loading units to another terminal if the flow is unbalanced
• The cost of the rail traction, more convenient than road transport for distances over 900km.

DHL Freight in terms of environmental aspects is engaged in different ‘green development’ projects. For this reason DHL offers innovative and ecological logistic service, reducing the undesired and negative consequences on the environment. This is the reason why DHL Freight is used to develop and push the rail transport: DHL put his own know how to support the intermodal transport development, improving the service level on a European scale (EIA, 2010).

The advantages of the intermodal solutions and lessons learnt are (EIA, 2010):

• Door-to-door transport via efficient ports
• Reliability and punctuality
• Environmentally friendly
4.4.1.1.2. Metrans

Metrans was established in 1991 by a Czech capital. The original idea, which was to provide terminal services for other intermodal train operators, has been changed in favour of full service for transport of containers to/from maritime ports to the Czech Republic, Slovakia and Hungary (EIA, 2010).

Metrans is the biggest intermodal operator in the Czech Republic and one of the biggest in the Europe. It operates its own network of inland terminals in area of central Europe connected with its own shuttle trains. Metrans provides services for most important ocean shipping companies and other customers shipping their goods in maritime containers. The main axe is from Hamburg and Bremerhaven ports to terminals Czech Republic, Slovakia and Hungary. The type of combined transport that Metrans is operating is Rail-Road, and they handle all containerized type of goods. They are equipped with 20ft and 40ft ISO containers. The following are the travel routes as well as the distance and hours (EIA, 2010):

- Prague – Hamburg (681km) - 12hours - terminal
- Prague – Bremerhaven (759km) – 14hours - Road
- Lipa/Zlin – Hamburg (929km) – 20hours – Truck on Trailer
- Dunajska Streda – Hamburg (1051km) – 24hours - Rail
- Nyrany – Hamburg (745km)

Prague to Bremerhaven currently operates more than 100 shuttle trains in both directions. Apart from shuttle trains, rail transport is still used for serving customers with their own sidings on a single wagons basis. It is possible thanks to dense rail network in the Czech Republic whereas most of bigger industrial plants have still its own rail sidings. Rail transport is also used for moving of empty containers from Metran’s terminals to shippers in Germany and Austria (EIA, 2010).
Economic aspects include the investment cost and financial support (EIA, 2010):

- **Investment cost**: Terminals—initially there was a state subsidy for terminal handling machines and trucks. All investments in terminals and wagons are paid from Metrans own resources.
- **Financial support**: 1998-2000—investment subsidy from state programme up to 30% of purchase costs.

Main benefits for customers are (EIA, 2010):

1. High frequency of fast direct trains to/from ports
2. Low price in comparison with road transport
3. Non-stop terminal operation
4. Depots of empty containers in every terminal
5. Own offices in ports of Hamburg and Bremerhaven

Critical issues are (EIA, 2010):

1. Reliability of railway transport
2. Capacity of terminals and main rail routes
3. Capacity of main ports.

4.4.2. National Case Study

4.4.2.1. Grindrod limited

The Grindrod Group of companies has been a household name in shipping and logistics for the past one hundred years. They began in 1911 when Mr. Leon Renaud and Captain John Edward Grindrod purchased a 150-ton steamer as she lay disabled on the Durban breakwater (Grindrod, 2012a). The figure gives a short history of the first service link between Port St. John and East London.
Grindrod Intermodal’s vision is to be a dominant and profitable service provider to the containerised freight industry in Southern Africa, focusing on infrastructure, product and service development. Their mission is to be the first choice service provider to the containerised freight industry and develop sustainable partnerships with all associated stakeholders by (Grindrod, 2012b):

- Understanding their needs and expectations,
- Delivering a service package characterised by exceptional quality, integrity and innovation.

Grindrod limited is the holding company of a dynamic organisation listed on the JSE securities exchange with more than 100 years experience in South Africa’s freight movement and related industries. It is based in South Africa and is represented by subsidiaries, joint venture and associated companies in 25 countries worldwide, employing more than 5000 educated and dedicated people. They view empowerment and education as an important aspect of its corporate social responsibilities. Grindrod
specialises in moving dry bulk, liquid bulk commodities, containerised cargo and vehicles by road, rail, sea and air, providing specialised services on route (Grindrod, 2012e). Grindrod offers end-to-end commodity supply chain solutions in the global movement. In addition the group has specialised offerings along the supply chain (Grindrod, 2012d).

The Grindrod group’s vision is to create sustainable returns and long-term value for stakeholders. This can be achieved by the contribution of the four divisions that they recognise: Freight, Trading, Shipping and Finances. For this study the focus will be on the Freight division which vision is the following (Grindrod, 2012e):

“...to be a dominant and profitable freight services provider focusing on infrastructural development on the African continent.”

Their mission is to be the first choice provider of a broad range of freight logistics services by integrating the group’s strategic infrastructure, assets, and logistics and ships agency capabilities primarily in the African continent (Grindrod, 2012e).
Grindrod Intermodal provides a complete solution for containerised cargo and provides for the storage and container transportation of mineral products (Grindrod, 2012b):

- Complex warehousing & distribution solutions including cross dock and bonded warehousing.
• Full service countrywide and over border transportation of containerised cargo by road and rail,
• Comprehensive empty and full container depot services and
• Container sales and leasing

The warehousing operation offers a blue chip client base high levels of operational expertise. Nationally situated warehouses are dedicated to specific contracts or cargo types, including steel products, ferrochrome, cars, CKD components, sugar and unitized bulk cargo. Services include container packing and unpacking, cargo handling, storage and distribution, as well as customs services. Certain facilities are licensed to handle bonded cargo and also provide groupage services. In the project cargo arena, the lashing team has a reputation for ingenious solutions with specialized cargo (Grindrod, 2012b).

Grindrod Intermodal offers comprehensive warehousing services at all major operating centres (Grindrod, 2012a).

• Most of our Container Freight Stations (CFS) have bond facilities and are fully compliant with customs requirements.
• We pack and unpack most commodity types compatible with container loading including bulk minerals.
• Our facilities are equipped with weighbridges and offer OS and SOS bonded facilities.
• We have container freight stations that specialize in handling abnormal cargo and customs unpacks and repacks.
• Secure facilities with 24 hour security.
The services of the transportation division include rail-age of full and empty containers. All routes between Transnet Port Terminals and Transnet Freight Rail terminals within South Africa and other southern African destinations are covered. A local cartage service in the major cities and a long distance service cover southern Africa. The company's operating system produces all prescribed transport documentation and monitors the movement of containers between respective delivery points, and reports progress to customers (Grindrod, 2012b).

Our transport division specialises in the provision of all landside transport needs whether by rail or road (Grindrod, 2012a).

- Rail Transport
- Local Cartage
- Long Haul Road Transport
- Container Management and Reporting
The depots store & handle empty and full general purpose, refrigerated & tank containers. Significant investment in systems and equipment has been made. Skilled artisans and technicians provide pre-trip, repair & washing services. Facilities are monitored 24/7 via a sophisticated CCTV network, with control rooms linked to emergency services and private armed response companies. The Maputo Inland Container Depot, a joint venture between Grindrod and DP World, started operating on 1 June 2011 on 8 000m² of land from Maputo Port Development Company (Grindrod, 2012b).

Grindrod Intermodal operates container depots at all major operating centres in South Africa (Grindrod, 2012a).

- Primary services include:
  - Handling and storage of cleared and un-cleared full containers.
  - Handling, storage, washing and repairs of empty general purpose containers.
  - Handling, storage, preparation, pre-tripping and repairs of empty reefer containers.
• Handling and storage of full reefer containers
• ISO tank container services in Durban and Cape Town which include handling, storage, washing and repairs.
• Container conversions.
• Secure facilities with 24 hour security.

The sales and leasing division specialize in buying, selling and leasing second-hand and refrigerated containers, as well as converting second-hand marine containers into accommodation (site offices, spaza shops, etc) (Grindrod, 2012b).

Grindrod Intermodal offers a specialised container sales and rental service to both the international and domestic market (Grindrod, 2012a).

• We will source new and used shipping containers for sale and arrange short and long term container leases. We have experienced technicians who specialize in the conversion of containers for various requirements.
• Secure facilities with 24 hour security.

Figure 32: South African Grindrod Intermodal Terminals

Source: Grindrod, 2012.
The Grindrod Terminals facilities are ideally positioned across Southern Africa to offer an efficient service to importers and exporters of various commodities. Grindrod Terminals have invested in infrastructure and assets required to handle a variety of bulk commodities to ensure that a world-class service is offered to existing and prospective customers (Grindrod, 2012c).

Grindrod has long-standing relationships with the numerous mining houses, commodity traders and large industrial consumers and strives to offer a complete logistics solution to their customers including Logistics and Cargo flow management (Grindrod, 2012c):

- Storage (warehousing, open stockpiling and silo storage)
- Ship loading or discharging
- Stevedoring
- Clearing & forwarding
- Stock management and daily reporting
- Rail scheduling and flow management

The operations have demonstrated further commitment to the provision of world-class service through the achievement of ISO compliance and the installation of CommTrac. Terminal management software, this software has been installed in both the Richards Bay (South Africa) and Maputo (Mozambique) terminal facilities. The different terminals are the following (Grindrod, 2012c):

1. Grindrod’s coal and magnetite terminal in Maputo (Mozambique)) currently has an export throughput capacity of 6.0 million tons. To meet increased demand, Grindrod is in the completion phase of a feasibility study which could add up to 20 million tons of future export capacity. Grindrod also has a 48 000m² footprint in Maputo Main Port where sized coal is handled on behalf of customers (GML). The coal is loaded by skip and either vessel or shore crane to minimise the degradation of the sized product. Grindrod owns and operates Maputo Car Terminal (MCTL) which began operating in 2007. Current throughput capacity is 52 000 units per annum; phase 2 and 3 of the expansion programme will take annual throughput to 250 000 units. The Maputo Car Terminal is ideally located for the import and export of vehicles to or
from Gauteng and offers an alternative import/export corridor to the South African motor vehicle industry.

2. Grindrod Mozambique Limitada (GML) operates the dedicated “soft handling” bulk Terminal within the Main Port of Maputo, Mozambique. GML has developed from very humble beginnings in 2009 to what is today a multi-million ton bulk export facility. GML was established to exclusively handle Sizend Coal out of South Africa however through continued demand from other African countries; GML is now handling bulk coal exports from countries such as Botswana and Zimbabwe. Grindrod will continue to create export opportunities for countries that may not have an established route to market.

3. Navitrade Terminal (Richards Bay) has a throughput capacity of 3 million tons of coal per annum with infrastructure dedicated to exporting via a conveyor connection to the Port. Kusasa Terminal (Richards Bay) has warehousing (60 000m$^3$) and silo capacity predominantly used for heavy minerals (phosphate rock and metal ores). These facilities are also conveyor connected to the port. Valley Terminal (Richards Bay) has warehousing capacity of 100 000m$^3$ and is belt connected for imports directly from the Richards Bay Dry Bulk Terminal (predominantly used for sulphur and other phosphates). Sea Munye Terminal (Richards Bay) has no direct port connection but offers specialised services including containerisation, bagging and blending for numerous niche dry bulk commodities.

4. Grindrod Terminals operates a terminal in the port of Durban at Maydon Wharf. Operations focus predominantly on fertiliser and containers but the various facilities are capable of handling a multitude of dry bulk commodities. The Maydon Wharf facilities have both landing and shipping rights.

5. Capable of handling various dry bulk imports and exports, the terminal is located within the main port of Walvis Bay (Namibia). At present the handling of coal, copper concentrate, zinc and lead form the majority of the operation; however the terminal has the capacity to handle additional dry bulk commodities.

Grindrod Terminals strive to overcome any logistical and storage challenges that may arise and are committed to providing customers with efficient and effective world-class service. Grindrod Terminals’ current combined capacity is in the region of 12 million
tons with plans in pre-feasibility stage to expand these capacities in the dry bulk sector (mainly coal) to more than 25 million tons (Grindrod, 2012c).

4.5. Conclusion

Legislation and policies have been introduced and discussed, this gives a clear vision on what is expected and which guidelines there are for improvement on national freight transport, all to introduce and implement the intermodal transport sector. Sustainability is a concept that, no matter what, it comes forward to attain an economic effective, environmental friendly and social beneficial country.

The corridors that were identified as being the study areas show room for improvement and are definitely the two most attractive corridors. These corridors are fully populated, tourist attractions and economic hubs. If intermodal transport can be sustainable and effective, this could be the beginning of extraordinary future plans in South Africa. SA needs an example of a success story to improve on the implementing on the next best thing, which makes intermodal transportation the best and ideal solution to South Africa’s problem areas (all can be declined if intermodalism is implemented).

The quality of infrastructure in the freight logistics sector, in South Africa, is insufficient to sustain a world class logistics system. The operations on that infrastructure are not targeted at fulfilling the road or rail demand, but rather at modifying demand around the supply structures and constraints. The funding of national roads (although below the levels necessary to sustain all roads in good condition) is the only part of the industry to practice sustained re-investment in infrastructure, R900 mill per annum will be allocated and R5.2 billion private sector investment in toll road concessions. Airport infrastructure necessary to move airfreight has also improved considerably over the last decade. Secondary roads and assets and infrastructure in ports and rail have however attracted very low levels of investment and the condition of this infrastructure now remains a contributor to inefficiencies in freight logistics and an impediment to national competitiveness (SA, 2008:36).
In road freight, asset care remains a problem for the many smaller road freight providers and contributes to poor road safety. For the larger road freight operator’s levels of asset care have improved over the last decade, as is evidenced by the decreasing average age of vehicles owned by larger road freight logistics companies (SA, 2008:36). The poor quality of the underlying resource base contributes to a lack of integration, particularly between the different modes, and this worsens inefficiencies in the sector.

At corridor level this situation results in (SA, 2008:37):

- Insufficient investment in infrastructure to cope with growth in the demand for freight traffic,
- A rail system characterised by poor levels of efficiency and reliability that results in more goods being moved by road,
- Port and airfreight systems that do not provide the necessary capacity to deliver a cost-effective and reliable service to customers,
- High growth of heavy vehicles (some of which are overloaded) using a secondary road network not designed or maintained to a standard sufficient to support such traffic.

This situation is particularly prevalent on the dominant high value export corridor from Gauteng to Durban, but also to a lesser extent in other locations such as between Gauteng to Cape Town, the rail system to Maputo, the secondary road networks of provinces such as Mpumalanga, airfreight capacity at certain regional airports, to name but a few (SA, 2008:37).