Maputo Corridor Performance Assessment

A Transport Logistics Diagnostic Tool Study

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1. Introduction

This report is the second technical report under the Transport Logistics Diagnostic Tool (TLDT) implementation activity. It presents the results of a corridor performance assessment conducted using the TLDT audit methodology and software.

To assist USAID, other donors, governments, and the private sector in developing countries in identifying and addressing transport logistics problems, the TLDT measures the performance of transport logistics chains in terms of time, price, and reliability, and identifies bottlenecks and assesses their impact on transport systems that constrain the objective of seamless freight flow.[1]

The TLDT process is designed to help USAID and developing country stakeholders and policymakers prioritize problems and communicate with each other about port and logistics chain inefficiencies and potential solutions. The TLDT's screening system (1) assesses and quantifies the relative importance of a problem in a logistics chain, and (2) helps users prioritize improvements credibly and transparently so that all parties can participate in the analysis to arrive at a mutually acceptable result. The tool also evaluates possible interventions to resolve these problems.

TLDT Version 1.0 was delivered to USAID in September 2006. Nathan Associates recently used this tool to analyze the Maputo Corridor and two freight corridors in the ASEAN region as test scenarios for TLDT. The primary objective was to improve the tool's effectiveness and ease of use. A secondary objective was to diagnose the performance of transport logistics in the Maputo Corridor, highlighting barriers in the import/export logistics chain related to infrastructure, services, processes, and policy and regulations that result in delays, increased costs, and poor service or reliability. The team also identified and evaluated potential interventions.

In Chapter 2, we provide a general overview of the Maputo Corridor and its transport logistics system. Chapter 3 summarizes the diagnosis of corridor performance. Chapters 4 and 5 describe the logistics scenario for exported and imported cargo, including nodes and links and the TLDT schematic representation of the Maputo Corridor. Chapter 6 presents a summary of TLDT results by logistics subchain, including price, time, and reliability analysis. Chapter 7 provides a view of the future for the corridor. Chapter 8 offers recommendations and illustrative actions for the Maputo Corridor.

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[1] The TLDT was developed with funding fromboth USAID (under the Trade and Capacity Building contract) and Nathan Associates and its partners.

The TA Team wishes to thank the USAID staff and especially Patterson Brown, who initiated the project, as well as Brenda Horne of the Maputo Corridor Logistics Initiative who provided valuable field coordination. The TA Team is also very grateful for the cooperation of stakeholders interviewed during field work.

2. Background on Maputo Corridor

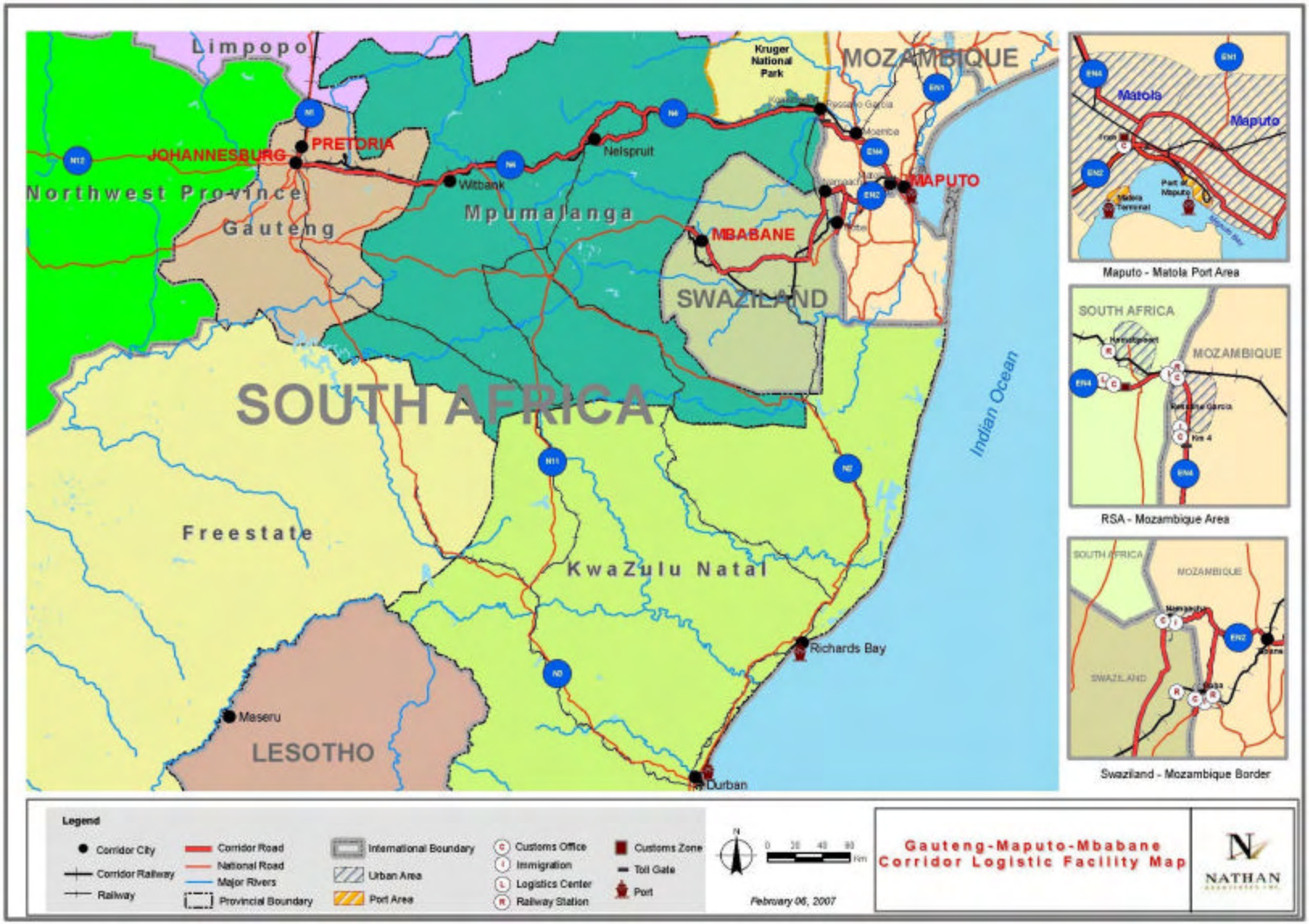
The Maputo Corridor is a major import and export route connecting the northeast provinces of South Africa with the capital and main port of Mozambique (see Figure 1-1). It also serves the South African provinces of Limpopo, Mpumalanga, and Gauteng (to a lesser extent), as well as Swaziland and southwest Mozambique. The corridor runs through some of the most industrialized and productive regions of southern Africa, particularly Johannesburg and Pretoria on the western end of the corridor. The corridor's transport facilities include roads, rail lines, and ports:

- ***Road Network.*** The main road on the South African side is the N4, a two- to four-lane national toll road. In Mozambique the N4 becomes the EN4 after crossing the Mozambique border and progresses to Maputo. The EN4 completed in 2004 is operated by the concessionaire Trans African Concessions (TRAC).
- ***Rail Network.*** In South Africa, Spoornet, the country's national railway, owns and operates the rail lines. In Mozambique, Caminho de Ferro de Moçambique (CFM-Sud) operates the rail line.
- ***Port of Maputo.*** The corridor includes the Port of Maputo, which has two main terminals, Maputo and Matola (see inset in Figure 1-1). The Matola Bulk Terminal, six kilometers upriver from the Maputo Terminal, handles primarily bulk cargo, such as coal, aluminum, light and heavy fuels, mineral oil products, and cereals. Maputo Terminal handles all other cargo, including general cargo, containers, and some specialized bulk cargos. The deepwater port is concessioned to the Maputo Port Development Company (MPDC).
- ***Customs and border control.*** The primary border customs control agencies are South Africa Revenue Services (SARS) and Alfândegas de Moçambique. The border posts in the corridor between South Africa and Mozambique are about 90 kilometers from Maputo at Lebombo on the South African side and Ressano Garcia on the Mozambican side. A customs facility at Kilometer 4 on the Mozambican side is used to clear trucks during peak seasons when border traffic is heavy. This location is scheduled to become a one-stop border post in the near future. Customs for rail imports are handled by agents based in the Komatipoort Customs Zone, known as "the Airport." On the Mozambican side, goods destined for the Mozambique market that exceed a US$500 value are cleared at Tiro (also known as Frigo).
- ***Logistics Services Providers.*** There are many types of logistics service providers in the corridor, both public and private. Port terminal operators, like MIPS MOZAL Aluminum Smelter SARL, STEMA SARL, CFM and Terminal de Carvão da Matola Lda (TCM) and

shipping lines like MOL, MACS, and OACL are part of this group serving the maritime aspects of the transport logistics of the corridor. Clearing and forwarding agents and shipping brokers are located along the corridor but are concentrated in "the Airport."

- ***Stakeholders***. The Maputo Corridor Logistics Initiative (MCLI) serves as a voice for the private sector, and plays a major role in coordinating the development of logistics policy between the public and private sectors. A wide spectrum of stakeholders from South Africa, Mozambique, and Swaziland have shown interest in and supported MCLI. These include government departments, cargo owners, road haulers, intermodal operators, rail service providers, logistics companies, clearing agents, forwarding agents, shipping lines, port agents, shipping brokers, professional bodies, associations, financial institutions, border post management, and officials.

Figure 1-1
Map of the Maputo Corridor



3. Corridor Performance Diagnosis

This chapter summarizes the main points of the Maputo Corridor Diagnostic Report produced previously under this project. It presents conclusions of the checklist audit, stakeholders' key issues, main impediments in the corridor, projects and improvements planned for the corridor, and an analysis of the corridor's potential.

CHECKLIST AUDIT CONCLUSIONS

A checklist based on the *TLDT* approach was discussed with selected officials from Mozambique and South Africa and freight forwarders involved in the Maputo Corridor. The checklist covered (1) the general conditions of the transport infrastructure and fleet for each mode, (2) the level of development of transport services, (3) the structure of the freight forwarding industry, and (4) the following sectors: Customs, ports and maritime transport, rail transport, road transport, and logistics services. The checklist survey revealed the following strengths and weaknesses in the Maputo Corridor transport logistics system:

- Strengths
  - Both countries have a full customs valuation based on WTO rules and have a reduced number of tariff bands.
  - The Rail Infrastructure upgrade program from Maputo to Ressano Garcia is almost complete (axle loading—18 tons per axle).
  - The Port of Maputo's landlord scheme allows it to be flexible and offer facilities for operation by private sector operators.
  - The world-class toll trunk highway, N4 and EN 4, operates under a concession agreement to connect both countries through a fast, safe, and well-maintained road.
- Weaknesses or Gaps (these areas need special attention and reforms)
  - Customs
    - Lack of an electronic single window in Mozambique
    - Lack of direct trader input to Mozambican customs
    - Limited EDI system does not connect the two countries
    - Limited clearance of documents with post audit
    - Limited computerized risk management

- No electronic processing of inward general manifest on the Mozambique side.

— Ports and maritime shipping
- Lack of computerized information systems serving ports and linking ports, shippers, and freight forwarders
- Lack of automated gate entry
- Lack of off-dock container yards
- Limited bonded distribution facilities.

— Rail transport
- Lack of dedicated track for freight services (especially for containers)
- Lack of wagons that can carry more than 80 tons
- No provision for long trains that can operate with more than 50 wagons
- Lack of modern locomotives and poor maintenance on the existing ones
- Discontinuation of cyclical track maintenance, especially in Mozambique.

— Road transport
- Low standards for international truck facilities at border crossings and transloading areas
- Lack of *Transport International Routier* (TIR) agreements or similar customs transit agreement that allow trucks to travel easily from one country to the next with transit goods
- Limited enforcement of the convention for harmonizing the inspection requirements on goods crossing the border

— Logistics services
- Lack of communication links with shippers, customs, port management, and other logistics service providers
- No ability to track and trace rail wagons
- Limited numbers of personnel trained in logistics management
- Lack of cross-docking facilities or a national booking center.

More detailed information on the status of reforms and improvements by sector is provided in Appendix D of the Corridor Diagnostic Report.

KEY ISSUES RAISED BY STAKEHOLDERS

The TLDT team identified issues hampering the performance of the corridor through surveys conducted as part of the *TLDT* transport logistic system audit. The team refined its initial survey findings with the help of the Maputo Corridor Logistics Initiative (MCLI) staff. The MCLI also helped distribute the findings to corridor stakeholders for determining the level of importance of these problems in their operations and overall corridor efficiency. The following list presents issues that logistics service providers and shippers identified as major issues in using the corridor.

Infrastructure

Border Posts

- Space limitations at Lebombo/Ressano Garcia border post for parking and future development.
- No EDI link between Mozambique and South Africa customs.
- No one-stop border post.
- No bonded warehouses near customs zones (Komatipoort) or the Port of Maputo.

Information Systems

- No modern gate information system at Port of Maputo (barcodes, cameras, computer systems).
- Lack of an advanced computerized information system in Port of Maputo to allow port and users to exchange information on cargo status.
- Lack of an advanced computerized information system, throughout the corridor, linking the countries to allow port and users to exchange information on cargo status (related to border EDI issues).

Port of Maputo

- The draft of the Maputo and Matola port channels (12 m) is inadequate for larger vessels.

Rail Connections

- Insufficient railway capacity in link between South Africa and the port, related to line rehabilitation.
- Insufficient and inadequately equipped freight facilities along the Pretoria–Maputo rail corridor.
- Turnaround time of trains is very long—20 to 40 days.

Logistics Facilities

- Lack of true logistics centers in the corridor, outside of Johannesburg, to promote competitiveness of industries.
- Insufficient parking facilities, service areas, and truck stops on the EN4.

Operations

Customs and Border Posts

- No dry port operations near the border between Mozambique and South Africa.
- Delays and long border post clearance times, including congestion caused by combined processing of passengers and freight.
- High level of congestion: separate clearing and immigration system for commercial and passenger/ tourists.
- Customs declaration is done twice, each time requiring different procedures and documentation.
- Expensive customs supervision of trucks crossing the border because of gap between border posts.

- Inefficiency at border because of inadequate staffing and organization.
- Excessive paper documentation required for Mozambique customs.
- Border posts on both sides are not operational 24/7. Border open only 10 hours per day, with commercial clearing closing at 3 p.m.
- Some bribery and corruption related to requests for speedier service.
- No single administrative document or electronic single window for customs clearance in Mozambique, leading to inefficient operations.
- Short working hours of Frigo Customs Area and lengthy processing times.

Information Systems

- No public information regarding standard operating procedures for cargo processing at the border.

Port of Maputo

- High compulsory scanning fee.
- Relatively low frequency and number of vessels calling at Maputo.
- High cost of coastal shipping from Maputo to and from Durban.
- Transshipment of imports through port constrained by bond requirements.

Rail Transport

- No rail passenger service across the border.
- Lack of locomotives and rolling stock to operate on rehabilitated line, especially CFM. Underpowered CFM locomotives sometimes require trains to be split, causing delays
- Lack of regularly operating trains (although the five-train schedule is sometimes achieved with Spoornet locomotives).
- Inefficient cooperation between CFM and Spoornet and no common train schedule.

Road Transport

- Informal payments required at police checkpoints on EN4.

Logistics Services

- Lack of trained logistics personnel (e.g., e-commerce skills, data management and interface solution, supply chain distribution).
- Few value-added services (cross-docking, customization, manufacturing support, labeling, subassembly, reverse logistics), especially in Mozambique.

Policy

- Lack of clarity and transparency from Government regarding plans for border post, retarding private sector investment in infrastructure.
- No regulations requiring electronic single window or single administrative document.
- Mozambican legislation does not allow for extra-jurisdictional execution of clearing and control functions at border posts.
- Inflexible, nontransparent policy imposed by recent scanning regulations.

- No public pricing schedule from Spoornet.
- Lack of integrated transport strategy between countries (Mozambique and South Africa), although corridor committees are working on common problems and South Africa has a Transport Corridor Development policy.

More detail on these issues is provided in the Maputo Corridor Diagnostic report, Table 4-3 and Appendix E.

MAIN IMPEDIMENTS TO CORRIDOR EFFICIENCY

A further elaboration of selected impediments from the list above is provided below.

Compulsory Scanning at Port

A charge for non-intrusive inspection scanning applies to every piece of cargo handled in the Port of Maputo. The measure was adopted in light of international security standards and potential violations of customs rules, but no international requirement for introducing scanning technology for customs or security inspections in Mozambique exists. Furthermore, the fee is mandatory on 100 percent of shipments, including bulk cargo—which is normally not scanned—and empty containers, whether the shipment is inspected or not. Scanning fees are very high in comparison with fees of other countries and are not scaled to cargo value and volume. The rigidity of these procedures and fees is rarely seen in other ports using non-intrusive cargo scanners and is generating criticism, especially among shippers who are not willing to pay the fees. The consequences are alarming. The Port of Maputo announced that $171 million in investment has been put on hold until scanning charges are removed from transit cargo. MCLI demonstrated that cargo shippers from South Africa and Swaziland are shifting cargo back to Durban, which scans only 10 to 15 percent of containerized cargo. SARS provides the service free of charge. Cargo shippers are also shifting cargo to Richards Bay, which handles predominately bulk cargo (which does not have to be scanned).[2]

Lack of One-stop Border Post

Officials in both countries have been discussing a one-stop border post for the past six years. The current configuration and procedures at the borders make the import and export processes more costly and time consuming than necessary. Transporters must present different documents in the two custom areas and endure prolonged procedures to cross the Lebombo-Ressano Garcia border.

Trade in the corridor is growing, as is congestion during peak hours. A one-stop border post would not only facilitate trade between Mozambique and South Africa and benefit other countries in the region, but also boost the attractiveness of the Maputo Corridor versus Durban or Richards Bay. The post would speed clearing processes, enhance security controls, capitalize the corridor, and involve construction of sorely needed high quality infrastructure.

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[2] See MCLI Reader Newsflash 289, 17 November 2006.

A feasibility study and draft plans for a one-stop border post at Kilometer 4 have been completed. Committees and government bodies in both countries exist to handle negotiations. The groundwork has been laid. Governments and stakeholders in the corridor are eager to execute this project, but are waiting to determine whether international aid will support the project.

Cost of Coastal Shipping

Coastal shipping in Mozambique is not well developed, and the few feeder shipping lines that do operate use old vessels. Infrastructure is also aging and inadequately maintained. The depth in the Port of Beira, for example, is not adequate for larger vessels. A few operators dominate coastal shipping, so costs are very high. For TSB to move cargo from Melalane to Maputo by rail and then to Durban by feeder vessel is more costly than sending the cargo from the plant to Durban (500 km distant). While weak demand may be a consequence of high costs and low frequency, it also provides little incentive to make improvements or increase service frequencies.

No Single Administrative Document to Clear Customs or Related EDI System

Freight forwarders and clearing agents must prepare two documents in Komatipoort Customs Zone, the Single Administrative Document (SAD) 500 for South Africa, and DA 500, and Memorandum for Mozambique customs. Customs in Mozambique uses the UN's Automated System for Customs Data (ASYCUDA) to process import and export data, while South Africa uses CAPE for import documents and Export System for export documents. South Africa implemented the SAD 500, which has been expanded to major corridors in the region to lower the cost of moving goods across the borders. Mozambique is considering implementing the SAD 500. The ASYCUDA customs document collects the same information as the SAD 500, but in a different format. The use of different platforms prolongs the clearing process and prevents integrated border processing and management. An efficient system would consist of a single set of documents, data transfer by EDI, and a single border post.

Lack of CFM Locomotives and Railway Infrastructure

Proper freight service from the Komatipoort railway node to the Port of Maputo requires more CFM locomotives. At present, some cargo is delayed more than a day at the border until locomotives from Mozambique arrive. For sugar and general cargo exports, the dispatcher at Komatipoort telephones CFM to send a locomotive. Depending on the availability of locomotives, the wait can be a matter of hours or days. If the locomotive is underpowered and the train split up, the second half of the cargo may not be picked up for another three days. The transit time from Nelspruit to Durban is approximately eight days, and from Nelspruit to Maputo, four days. According to stakeholders, this could be cut to two days if the situation in Komatipoort improved. An expected delivery of locomotives will alleviate this problem, but coordination and cooperation between CFM and Spoornet also needs to be enhanced to ensure reliable and competitive service.

Inadequate Frequency of Vessels Calling Maputo and Connections

Shippers and logistics service providers, including freight forwarders, point out that attracting more business will require increasing service frequency and connections. On the other hand, shipping lines do not offer sufficient service frequency at the port because of relative small cargo volumes. Increasing service frequency can help break this impasse. MIPS had been losing approximately 1,000 TEUs per year from MMC because of a lack of direct calls to the Far East, but this service has now been added to Maputo. Also, MOL South Africa recently announced the addition of a ninth vessel to the service, which will arrive in Maputo in late May.

4. Transport Logistics Scenario for Export Cargo

We created two scenarios with the TLDT to assess performance in the Maputo Corridor, one for export cargo coming from South Africa and Swaziland, and the other for import cargo from the Port of Maputo to South Africa. This chapter describes the export flow originating in seven nodes that serve the hinterland of the ports of Maputo, Richards Bay, and Durban. In the model, the nodes are termed "distribution centers" (DCs).

HINTERLAND NODES

The distribution center nodes are the main origination points of export cargo. Other rail and road nodes providing key logistics/traffic activities are included in the model.

For corridor analysis, we selected six DCs and created ten other rail and road nodes. Nine nodes (DCs and rail-nodes) including the port are connected by rail links, indicating that the cargo is transported by rail. The other nine (including the port) are linked by road, indicating that the cargo is transported by road. Both links have as main destination the Port of Maputo.

The hinterland of Maputo includes the production areas of Nkomazi, Limpopo, Mpulalanga, and Machadadorp in South Africa and Mbabane in Swaziland. Within these regions we selected the corridor users with a high level of exports and a diversified portfolio of products.

Rail Corridor Distribution Center Nodes

Melalane Sugar Mill. The TSB Sugar Company is approximately 60 kilometers east of Nelspruit, in the Nkomazi region of the South-Eastern Lowveld of Mpumalanga, South Africa. The TSB sugar mill in Melalane produces refined and raw sugar marketed nationally or exported through the South African Sugar Association. Production takes place very close to the mill. Approximately 10,000 TEUs per year are moved by rail and road from the mill. Other products exported from TSB's two mills, Melalane Mill and Komati Mill, are citrus, lime, stockfeed, and molasses.

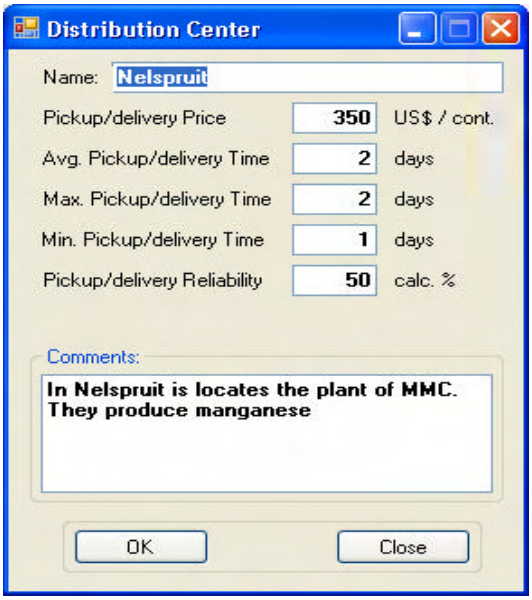
Phalawara. The Palabora Mining Company, whose main location is Phalawara, produces copper, magnetite, nickel sulfate, anode slimes, sulfuric acid, and vermiculite. The company in South Africa is in the Limpopo province 240 Kms from Komatipoort. The company is the only producer of refined copper in South Africa and has a strong presence in Germany and the United States. Its associated processing plants manufacture more than 2.7 million tons of copper a year.

It has an underground block caving mine with a production rate of 30.000 tons/per day of copper ore.

Middelburg. Columbus Stainless is in Middleburg in the Mpumalanga Province of South Africa. The company produces stainless steel flat products, 25 percent of which stay in the local market with the rest exported (more than 6,000 containers a year). Main markets include Europe, the Americas, the Middle East, and the Far East.

Nelspruit. Manganese Metal Company (MMC) in Nelspruit is the world's single largest producer of pure electrolytic manganese metal. MMC production capacity is 30,000 tons per annum. It is a preferred supplier of pure electrolytic manganese metal to a global market. The Nelspruit Distribution Center node for MMC has important rail loading operations whose times and costs are shown in Figure 4-1.

Figure 4-1
Nelspruit MMC Node



These production and distribution centers generate approximately 39,000 containers a year that move through the Maputo or Durban corridors. Some of this cargo has been shipped through Durban because of high coastal shipping costs, scanning fees, security issues, loyalty with Durban port, or lack of value-added services. TSB has indicated that citrus exported to Europe and Japan must be exported through Durban because the port complies with the demands imposed by these regions.

According to the cost comparison analysis in the Corridor Diagnostic Report, the time for rail cargo from Nelspruit or Middleburg to Maputo port takes on average 3 to 5 days less and on average 2 to 3 dollars/ton less than for Durban Port. In addition, lower costs at the Maputo port put it in a strong position to compete for cargo from these areas.

Road Corridor Distribution Center Nodes

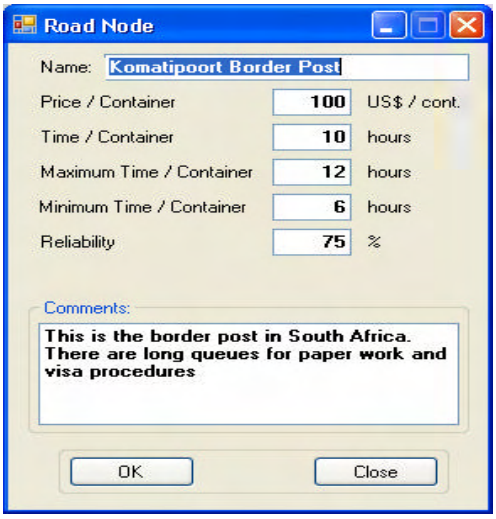
Mbabane. The capital of Swaziland and vicinity enjoys well-developed road links with South Africa. An older east-west link, called the Goba line, makes it possible to export bulk goods from Swaziland through the Port of Maputo. In the past, most of Swaziland's exports went through Maputo. However, conflict in Mozambique in the 1980s diverted many Swazi exports to ports in South Africa. The sugar industry is Swaziland's leading export earner and private employer. Soft drink concentrate (a U.S. investment) is the country's largest export earner, followed by wood pulp and lumber from cultivated pine forests. Pineapple, citrus fruit and cotton are other important agricultural exports.

Machadadorp. The Ncomatzi mine of Centametal (Pvt) Ltd is in Machadadorp. The company produces chrome ore. The mine is about 50 kilometers from Nelspruit and ships between 20,000 and 25,000 containers per year. The company is on the N4 line and most of the cargo is shipped via Maputo.

Other Corridor Nodes

Important rail nodes include Ressano Garcia and Komatipoort stations. Locomotives are changed at these nodes and cargo often stays there for more than 12 hours depending on locomotive availability or schedules. There is no additional cost charged to the shipper at these nodes. Data on the Komatipoort road node is shown in Figure 4-2. Delays and long lines at the border post cause inefficiency; in both nodes times are long compared to international standards. At all the border posts in South Africa, Mozambique, and Swaziland transporters wait in long lines to obtain paperwork to cross the borders. On average, this takes up to 3 hours.

Figure 4-2
Komatipoort Border Post Node



MAIN EXPORT FLOWS

The main export flows in the Maputo Corridor are from South Africa to Mozambique. These flows represent more than 120,000/containers per year. The main products are coal and magnetite

and more than 50 percent of all cargo is transported from west to east. Exports from Mozambique total approximately 1,000 containers per year and the main products are carried by rail. These flows are detailed in Figure 4-3.

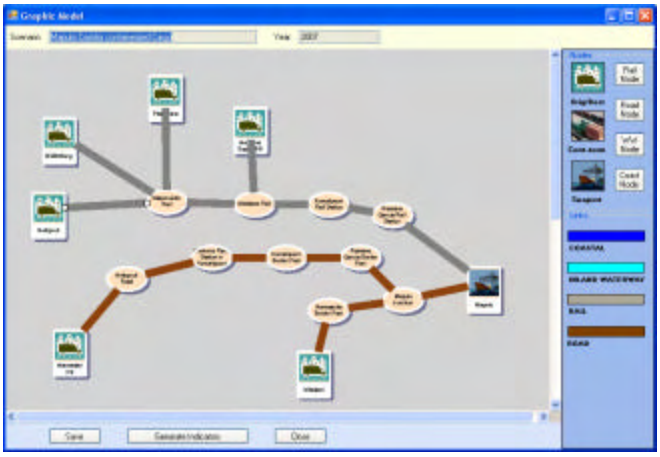
Figure 4-3
Export Flows Included in the TLDT Model

TLDT SCHEMATIC REPRESENTATION OF MAPUTO CORRIDOR

Figure 4-4 shows the schematic diagram of the Maputo Corridor created in the TLDT. The rail link from the Port of Maputo to the Nelspruit DC is 191 kilometers. Along this line is the Melalane rail node, with a 10 kilometer connection to the Melalane sugar mill. There is also the Kaapmuiden rail node, with a line connecting to Phalawara (169 kilometers) and another line connecting to Middleburg (100 kilometers). The road link starting from the Port of Maputo goes in two directions. One heads to Machadadorp (340 kilometers) and the other to Mbabane, Swaziland (250 kilometers). The gray line in Figure 4-1 represents rail transport and the brown line represents road transport.

Figure 4-4

TLDT Diagram of the Maputo Corridor



5. Transport Logistics Scenario for Import Cargo

This chapter describes the imports flow coming from the Port of Maputo port to nodes in South Africa.

HINTERLAND NODES

The three distribution center nodes are the final destinations of two main import commodities—fertilizers and ferrochrome. Other road nodes providing key logistics/traffic activities were included in the model. To analyze cargo coming from Maputo via the corridor, we selected three distribution centers and created four other road nodes. Eight nodes, including the port, are connected by road, which means that trucks transport this cargo.

Road Corridor Distribution Center Nodes

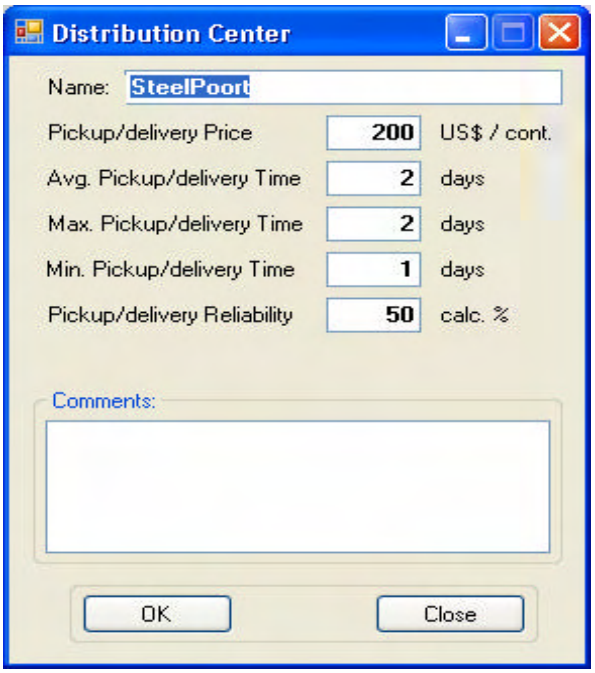
Hectospruit and Lydenburg. Omnia Fertilizers has plants in Hectospruit and Lydenburg. Listed as part of the chemical sector, the company supplies a wide range of industrial and specialty chemicals, explosives to the mining industry, and fertilizer to the agricultural industry. Omnia's operations are in South Africa, Australia, Botswana, Mali, Mauritius, Namibia, New Zealand, Brazil, Swaziland, Tanzania, Zimbabwe, and Zambia. The company also supplies products to Lesotho, Malawi, Cameroon, France, Mozambique, DRC, Angola, Kenya, Ethiopia, Madagascar, Chile, and Argentina. In its latest report, Omnia mentions that the fertilizer market moves approximately 1,800,000 tons of product. The potential cargo for the Maputo Corridor from the plant at Hectorspruit is approximately 15,000 containers a year primarily moving via Maputo.

Steelpoort: Xstrata South Africa, the world's second largest ferrochrome producer, is located in Steelpoort. Headquartered in Zug, Switzerland, the company maintains a substantial position in seven major international commodity markets: copper, coking coal, thermal coal, ferrochrome, nickel, vanadium, zinc and aluminum. At Steelpoort, the company imports more than 15,000/containers a year basically via Maputo. The company is looking to diversify its mining business and announced a $4 billion offer for nickel producer Lion Ore Mining International, which will provide expansion opportunities in South Africa and more cargo volume for the corridor.

These production and distribution centers import approximately 40,000 containers a year mainly through Maputo Corridor. Although the fertilizer business has subsided in the last two years,

Omnia Fertilizers is increasing the total volume of cargo transported in the corridor. Xstrata is also planning to increase cargo volumes. The Steelpoort node for Xstrata has approximately 35 truck operations per day, with 20 to 34MT per truck. Time and cost of operations are shown in Figure 5-1

Figure 5-1
Xstrata Node

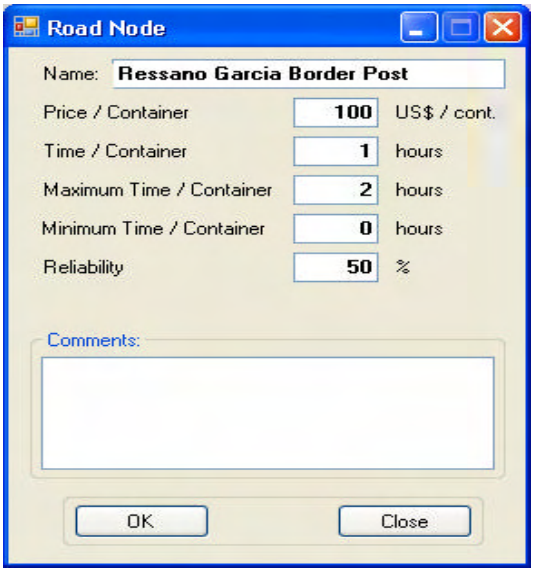


According to Figure 5-1, the delivery price is about US $2/Km and the average time required by the logistics service provider (including freight forwarders) to deliver the product after leaving the port of Maputo is 2 days. The 50 percent delivery reliability rate is not considered good. According to the cost comparison analysis in the Corridor Diagnostic report, bringing cargo from Durban would take 2 to 3 days longer and cost more than US $1,000.

Other Nodes

The Ressano Garcia and Komatipoort border posts are important nodes, and both present major problems for passengers as well as freight. Freight and passenger traffic cause congestion, cargo is often delayed for many hours because of cross-border procedures and freight customs paperwork, and lengthy delays and long lines make cargo flow inefficient. The model considers Alfandengas custom zone as part of Ressano Garcia. Data on the Ressano Garcia node is shown in Figure 5-2. The cost of paperwork for an import/export truck is approximately US$100. Reliability is low due to variable times and costs.

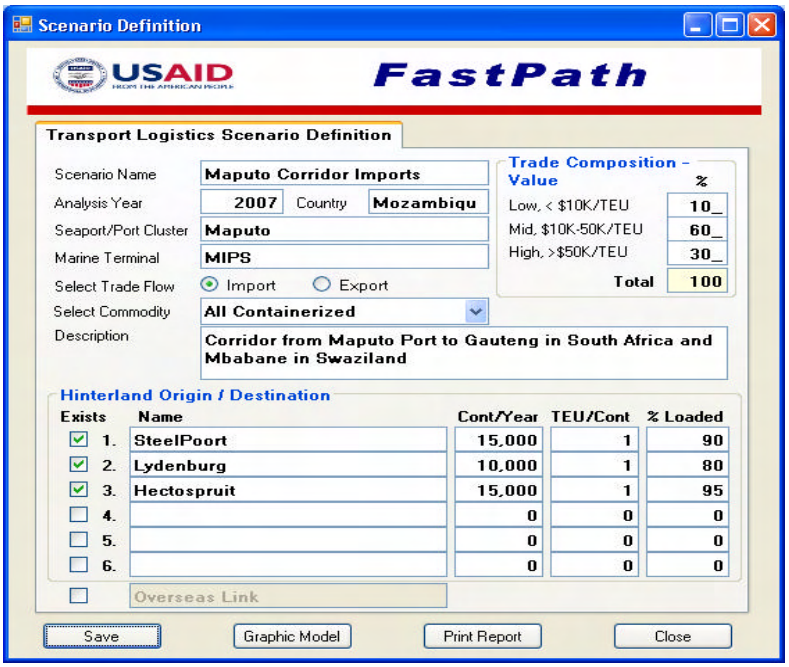
Figure 5-2
Ressano Garcia Border Post



MAIN IMPORT FLOWS

Imports in the corridor flow from Mozambique to South Africa. The main commodities are containers, fuel, fertilizers, and cement. Of the approximately 9.1 million tons of cargo transported in 2004, 10 percent was imported. Due to different constraints, much of the cargo that should be transported by rail from Maputo to South Africa is being transported by road. Flow of these nodes is shown in Figure 5-3.

Figure 5-3
Import Flows Included in the TLDT Model

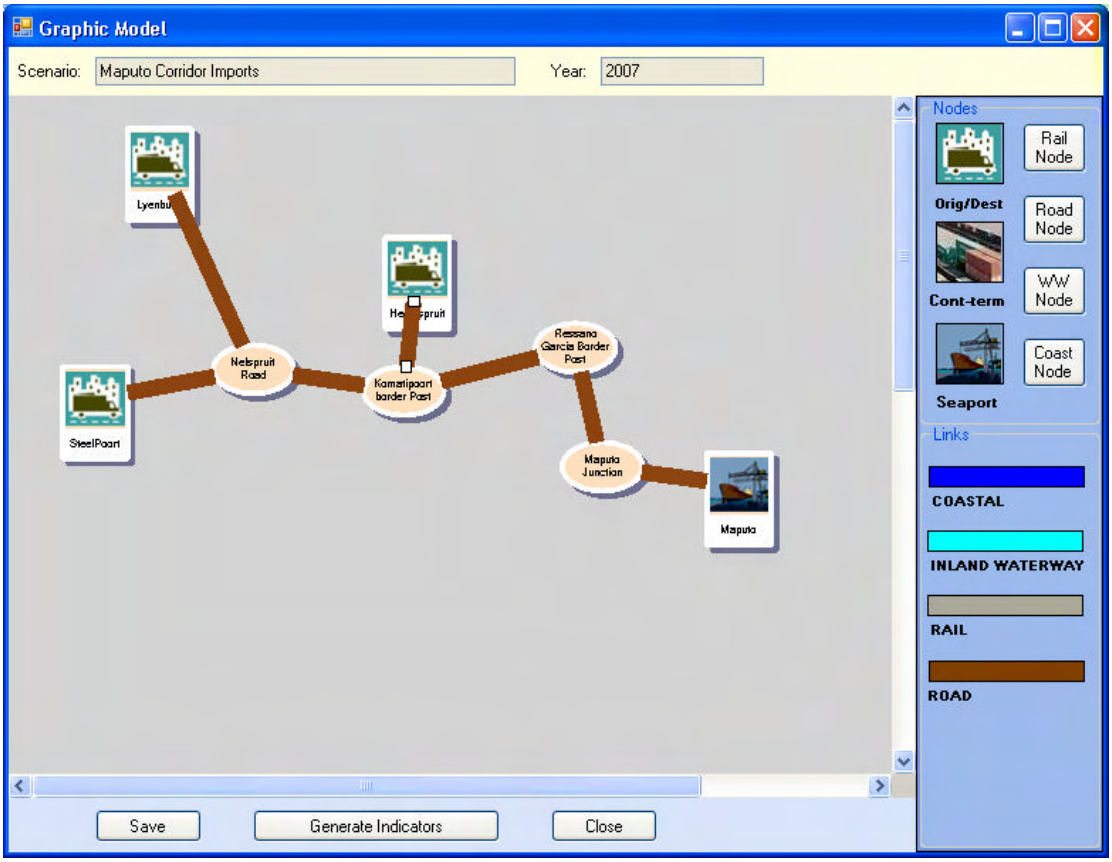


TLDT SCHEMATIC REPRESENTATION OF MAPUTO CORRIDOR

Figure 5-4 shows a second schematic diagram of the Maputo Corridor created in the TLDT. The road linking the Port of Maputo to Steelpoort is 280 kilometers long in Mpumalanga. Along this line is the Lydenburg road node, with a 150-kilometer connection to the Nelspruit node, and the Hectosruit distribution center's 10-kilometer link to the Komatipoort border post.

Figure 5-4

TLDT Diagram of the Maputo Corridor import flow



6. Summary of Results by Logistics Subchain

COST, TIME, AND RELIABILITY

Figures 6-1 and 6-2, generated by TLDT, summarize the cost, time, and reliability of the Maputo Corridor's transport/logistics chain from a shipper's point of view. The first line in each figure presents summary data on the total logistics chain (including road, rail, border crossing, and port) and a weighted average price for transit time and reliability. Reliability is in terms of the percent of average transit time that includes 90 percent of the variation in transit times for different shipments. The logistics score summarizes performance relative to norms for developing countries.

Performance for the whole chain is summarized in Table 6-1. The level of performance is roughly the same for imports and exports, except for reliability, which is less for imports, due to larger rail variations in time.

Table 6-1
Rating of Total Logistics Performance

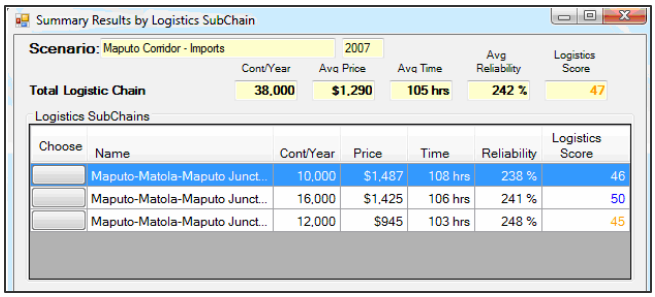
Indicator	Exports	Imports
Overall performance	Fair-Poor	Fair-Poor
Price	Poor	Poor
Time	Fair	Fair
Reliability	Fair-Poor	Poor-Very Poor

SOURCE: TLDT analysis.

This assessment corresponds with the subjective evaluations of importers and exporters as well (see issues in Chapter 3).

Figure 6-1
Summary of Export Logistics Performance

Figure 6-2
Summary of Import Logistics Performance



Figures 6-3 and 6-4 compare the corridor's performance with international norms, with a focus on price and time. The price bar graphic shows a big gap between the different modes of transport and the norms. The port has the biggest gap (more than US $300) and rail the smallest. In the time bar figure we can see that road transport is competitive but that port operational efficiency is a problem.

Figure 6-3

Maputo Corridor Logistics Performance Compared to International Norms— Price

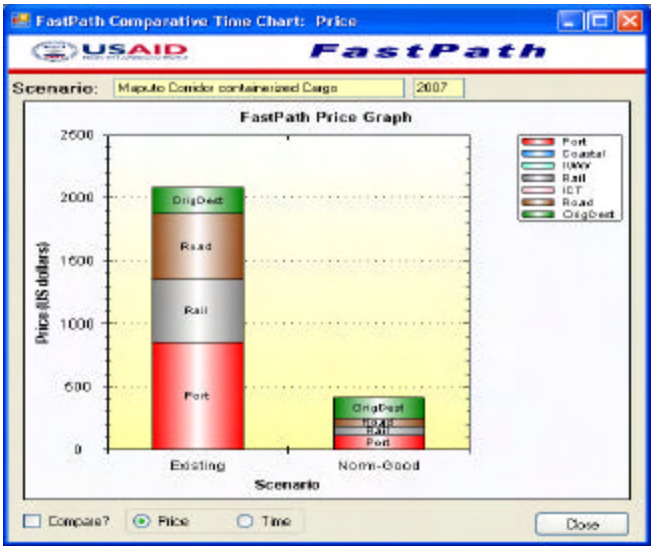
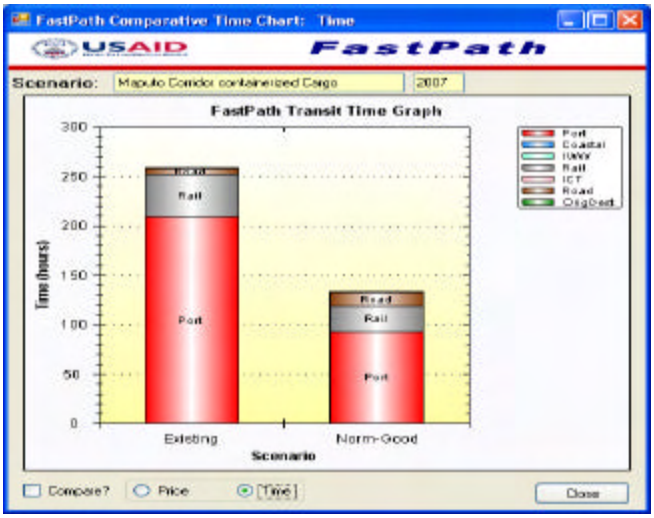


Figure 6-4

Maputo Corridor Logistics Performance Compared to International Norms— Time



Maputo Port

The TLDT evaluation for the Port of Maputo and customs at the port is shown in Table 6-2. Though costs in the Maputo Corridor are relatively high by international norms, they are less than for the use of Durban (for commodities considered here). The time spent in the port for both handling and customs is relatively low, but the reliability of the port and customs is relatively poor due to variations in time.

Table 6-2

Port and Customs Logistics Performance, Exports and Imports

Indicator	Value	Rating	Value Range for Good Norm
EXPORTS			
Port charges – handling ($US/TEU)	120	Poor	US $10–US$50
Port charges – other fees ($US/TEU)	35	Poor	US$0–US$15
Customs charges ($US/TEU)	146	Poor	US$5–US$15
Intermodal transfer fees ($US/TEU)	50	Poor	US$25 –US$50
Port handling time (hours)	23	Good	15–25 hours
Customs time (hours)	8	Good	8–24 hours
Port reliability (percent of avg. time)	268	Poor – Very Poor	5% – 40%
Customs reliability (percent of avg. time)	100	Fair - Poor	160% – 400%
IMPORTS			
Port charges – handling ($US/TEU)	120	Poor	US $10 – US $50
Port charges – other fees ($US/TEU)	35	Poor	US$0 – US $15
Customs charges ($US/TEU)	250	Poor	US$10 – US $40
Intermodal transfer fees ($US/TEU)	50	Poor	US$25 – US $50
Port handling time (hours)	23	Good	15-25 hours
Customs time (hours)	24	Good - Fair	8– 24 hours
Port reliability (percent of avg. time)	268	Poor – Very Poor	5% –40%
Customs reliability (percent of avg. time)	100	Fair - Poor	160% –400%

SOURCE : TLDT analysis.

Rail Transport

Rail logistics performance in terms of transport time is very poor for the Ressano Garcia line and fair to poor for other rail lines; performance is better for non-containerized goods. Rail costs are relatively high per kilometer

Table 6-3

Rail Transport Logistics Performance, Imports and Exports

Indicator	Value	Rating	Value Range for Good Norm
Transport costs ($US/TEU)*	174	Very Poor	US$4.4– US$13.2
Unit transport costs ($US/TEU-km)	1.9	Very Poor	US$0.05–-US$0.15
Average transit time (hours)	20	Very Poor	0 – 3 hours
Reliability (percent of avg. time)	210	Poor-Very Poor	5 %– 40%

*SOURCE : TLDT analysis. * Using the Ressano Garcia line as an example.*

Road Transport

Road transport logistics performance in the corridor is fair to good as measured by transport time, but costs are relatively high per kilometer. Reliability is relatively poor with a lot of variability, but still substantially better than rail. Road transport is more expensive than rail, but is used extensively because it is more reliable.

Table 6-4

Road Transport Logistics Performance-Import and Exports

Indicator	Value	Rating	Value Range for Good Norm
Transport costs ($US/TEU)*	150	Poor	US$7.5– US$ 9
Unit transport costs ($US/TEU-km)	2.5	Poor	US$0.05 – US$0.15
Average transit time (hours)	1	Good	0–3 hours
Reliability (percent of avg. time)	222	Poor-Very Poor	5% –40%

*SOURCE : TLDT analysis. * Example of Kaapmuiden to Nelspruit.*

Border Crossing Post

The border crossings at Komatipoort and Ressano Garcia are relatively efficient for most of the year, but reliability is relatively poor because of congestion at certain times of the year and of the day.

Table 6-5

Efficiency of Border Crossing Logistics Performance

Indicator	Value
Transport Costs ($US/TEU)	100
Average Transit Time (hours)	10
Maximum Transit Time (hours)	12
Minimum Transit Time (hours)	6
Reliability (percent of av time)	75

SOURCE : TLDT analysis.

ANALYSIS OF LOGISTICS SCORES

Logistics efficiency scores calculated with TLDT range from 20 (poor) to 80 (good). A logistics score between 70 and 80 indicates that time, cost and reliability in the total supply chain is efficient and competitive according to international standards of similar countries.

The total logistics chain score for cargo exported through the Maputo Corridor is 44. The time, cost, and reliability and overall logistics efficiency is fairly good. The score for the total logistics chain and subchain is shown in Figure 6-1. The score for cargo imported through the corridor is 47. Time, cost, reliability and overall logistics efficiency is better than exports but still below the "good" range of 60 to 80.

CONCLUSIONS ABOUT PERFORMANCE

The unbalanced flow of goods in the corridor between Gauteng and Maputo raises logistics costs and causes some operational difficulties. Exports from South Africa to Maputo are 120 times more in quantity than the imports from Maputo. The average price of imports and exports is very similar, but still high compared with international norms of competitive regions, and logistics scores are relatively low, 42/80 for exports and 48/80 for imports.

Price is the main issue when compared with international norms; the port and rail systems, especially, have to adjust their price policies. Transit times are not far from good international norms, especially in the port, which is a plus for the corridor. But variation in times, particularly for rail, is a major concern.

Results should improve with projects such as the one-stop border post, the presence of DP World as the container terminal operator, modifications in scanning policies, and improved vessel frequency to the Far East. The corridor should be monitored steadily to analyze the effects of these projects and to measure the effect of policy and process modifications.

7. Planned Improvements and Corridor Potential

PLANNED IMPROVEMENTS

This corridor is undergoing a number of improvements, and more are planned by the Port of Maputo, Spoornet, CFM, Trans African Concessions (TRAC), and the Customs authorities. These improvements will address some of the issues described earlier in this report. They include the following projects.[3]

One-stop Border Post. The proposed facility will be 4 kilometers from the border post on the highway to Maputo and will provide a one-stop, around-the-clock service to the trade and travelers. It will be managed by a bilateral authority with officials from both governments and is expected to be completed before 2010. Funding is pending.

Port Rehabilitation and Improvement Project. MPDC will continue with its substantial US$70 million rehabilitation and improvement project, which includes upgrading Maputo port access for post Panamax-type vessels; expanding terminals; building granite, car, iron, and heavy sands ferrochrome terminals; and building an oil pipeline from Dobela to the Matola refinery.

Rail Corridor Stabilization Program and Future Line Expansion. CFM and Spoornet are together aiming to develop the rail corridor. The initiative is twofold: deal with current problems (e.g., rehabilitation of Ressano Garcia Line), then double the capacity of the rail and change the equipment to increase capacity. For general freight, Spoornet plans to renew and modernize rolling stock, infrastructure electrical systems, and train authorization systems. This will greatly reduce average transit times and the variation in transit times.

TRAC N4 Upgrades. TRAC announced a $24 million upgrade of the N4 between Wonderfontein and Belfast. The goal is to preserve major links on the Maputo Corridor, largely through light repairs and sealing of existing roads. The upgrade will provide users with a 4-lane double carriageway road between Pretoria and Belfast. TRAC is also working on a preliminary design for the proposed Nelspruit Northern Ring Road that will provide an alternative east-west route for motorists now using the N4 through Nelspruit central business district.

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[3] Project details are provided in Chapter 4 of the Corridor Diagnostic Report.

Modernization of Fresh Produce Terminal. A US$16 million redevelopment of the fresh produce terminal is expected to be operational for the 2007 export season, and further modernization completed for the 2008 season, when new steri-facilities will be available for Far East citrus exports.

POTENTIAL FOR THE CORRIDOR

Freight traffic through the corridor is expected to continue growing over the next two decades. The Centre for Supply Chain Management at the University of Stellenbosch in South Africa forecasts that combined road and rail cargo of South African exports to Mozambique and transit cargo using the Port of Maputo will grow from 6 million tons to 19 million tons by 2009, and to 30 million tons by 2019.

Maputo Corridor once carried 14 million tons of traffic by rail. Express trains moved both containers and perishables. But when routine maintenance was discontinued, the volume of rail cargo declined dramatically. Today, the 6 million tons shipped from Maputo and Matola represent only 34 percent of potential port-bound road cargo and 57 percent of potential rail transit cargo.

According to the forecast presented during the joint conference of CFM and Spoornet in March 2007, by 2009 the volume of cargo through the corridor will reach approximately 1,000,000 containers per year (19.3 mill ton). It is also expected that Mozambique will increase its exports and improve its trade balance with South Africa.

Port of Maputo. Port potential is currently seen as 11 million to 16 million tons per annum. MPDC sees the optimal capacity of Maputo terminals as 11 million tons per year and of the Matola bulk terminal as 6 million tons per year. Ultimate capacity through further investment in infrastructure is thought by MPDC to be in excess of 20 million tons.

Rail Freight. The market potential for rail along the corridor through Mozambique to and from Maputo is seen by Spoornet, the South African rail operator, as 15 million tons per year by 2010. The potential and forecast volumes in Table 7-1 are based on the rehabilitated rail line being brought back into full service.

Road Freight. The market potential for road freight along the corridor through Mozambique to and from Maputo is seen by MCLI as 2.5 million tons per year by 2010. The figures for potential and forecast traffic (Table 7-2) are subject to 24-hour border transit operations and the availability of port investment.

To enable each mode of transport to realize its potential in the Corridor, the transport logistics system must be efficient. Maputo Corridor has good prospects for improvement in this area for two reasons: (1) the Mozambican and South African authorities have initiated individual joint reforms to improve systems linked to the corridor, and (2) the private sector has been taking steps to improve transport logistics services along the corridor, notably through the MCLI. Active private sector projects to install new facilities in the Port of Maputo will lead to more traffic and better service, as long as the investment climate is encouraging for public-private partnerships.

Table 7-1

Actual, Potential, and Forecast Industry Volumes for Rail (000 metric tons)

Commodity	Import or Export	Actual 2006	Potential (Not on Rail)	Forecast 2010
Containers	Imports and export	3	100	2,200
Steel	Export	0	500	600
Ferrochrome	Export	300	600	1,000
Sugar	Export	100	100	150
Citrus	Export	1	60	150
Cereals	Import and export	0	0	200
Bulk Coal	Export	1,800	2,000	2,200
Magnetite	Export	1,700	3,000	9,000
Timber	Export	0	40	50
Other Break-bulk	Export	0	250	300
Other Bulks	Import and export	0	200	300
Granite	Export	0	250	300
Fuel	Import	300	310	340
Cement	Import and export	120	150	175
Total Port Rail Traffic		4,324	7,560	14,765
Approximate Trains Per Day		3	10	29

SOURCE : *MCLI / MPDC.*.

Table 7-2

Actual, Potential, and Forecast Industry Volumes for Road ('000 metric tons)

Commodity	Import or Export	Actual 2004	Potential 2006[a]	Forecast 2010
Steel	Import and export	47	225	250
Ferrochrome	Export	162	500	1000
Sugar	Export	60	100	200
Citrus	Export	95	120	400
Forest products	Export	6	25	350
Other Breakbulk	Import and export	30	120	120
Granite	Export	1	66	100
Vehicles	Import and export	0	12	38
Total port road traffic		401	1,168	2,458
Approx truck loads @ 30 million tons		13,367	38,933	81,933
Approx trucks / 24 hours		45	130	273
Approx trucks / hour		2	5	11
Approx value of trade (USD 000)		274,971	800,914	1,685,485

[a] *Currently shipped through ports other than Maputo*

SOURCE : *MCLI / MPDC.*

8. Recommendations and Illustrative Actions

The following recommendations for the logistics sector and policymakers focus on customs service improvement, transport system development, logistics service provider implementation, and policy reevaluation. In addition we have provided some illustrative actions. These actions are not comprehensive, but do deal with the most important priorities as we see them.

LOGISTICS SYSTEM AND CUSTOMS DEVELOPMENT

The analyses in the preceding chapters highlight the fact that current inefficiencies in the Maputo Corridor logistics system and border crossing problems are holding back the development of the Corridor for import and export trade. Given the competition with Durban port as an alternative, these should be addressed as soon as possible to keep the momentum going for Corridor development.

There a number of improvements that should be made in the system, by both the public and private sectors, in order to reduce inefficiencies. These include:

- Developing an electronic linkage between South African and Mozambique Customs that can automate the process for custom clearance procedures and significantly speed up the freight flows at the border crossing. According to the World Bank's, Doing Business publication, in Mozambique takes approximately 38 days to complete an export process and 39 days for an import, while in South Africa it takes 31 and 34 respectively. In other countries in Subsaharan Africa with similar conditions, such as Senegal, Gabon and Gambia, the period to export has been brought down to 19-22 days for exports and 23-26 days for imports. Mozambique should be able to reach those standards and go even lower in the future toward the OECD average of 10-12 days.
- Completing the development of a single administrative document in electronic form in Mozambique.
- Implementing a monitoring system using Bar codes or RFID and electronic seals to track and secure cargo that goes from the Komatipoort customs area to the Port of Maputo port on transit status. Such a monitoring system will also be useful in developing a secured South Africa–Mozambique transport and logistics system that meets increasing international demand for secure shipments.

- Improving the information system available to importers, exporters and freight forwarders, so that data interchange is facilitated, particularly with customs, and that shipments can be easily tracked.[4]
- Establishing the one-stop border post for freight and passengers between Mozambique and South Africa. This has been under discussion for some time, but needs to be finalized immediately. The new operating areas should be in operation in 2010 before the World Cup event starts.
- Promoting the use of containers in the Corridor. This can be done through the development of bonded warehouses and container yards outside the port and identifying other issues with container movements that discourage container shipments in the Corridor. This requires agreement with Customs and a clear policy to encourage private investment in these warehouses and container yards. Also some private sector focus on this issue is needed, possibly through MCLI.
- Providing an organizational structure to facilitate improving customs and border post operations and setting up the new one-stop area including:
  - A bilateral regulatory and institutional committee (regulatory): To draft policy and regulations for border operations, taking into consideration and harmonizing the internal rules of the two countries.
  - An implementation committee (operational): To put into service border post functions after site construction is finalized and to be in charge of initial training of personnel hired to work at the post, conceiving operation manuals and standards, etc.
- Improving the peak hour operations at the border crossing between Mozambique and South Africa, particularly when tourist and public buses arrive. At these hours all the staff should be organized to receiving people with an organized queue in a covered area. Mozambique customs should organize special lines for the different administrative procedures. South Africa should provide more personnel during rush hours.
- Authorization of rail passenger service across the borders to avoid the border crosses by foot. Controls inside the train and in the stations must be implemented with security personnel.
- Controling of bribery in the border premises. Police officers in the area need to more effectively enforce the law. Also, an ID should be required for all personnel that work in the border area.
- Encouraging the installation of full-service Logistics Service Providers (3PL/4PL), possibly in association with local companies, in the Corridor area between Nelspruit and Maputo to support the core business of shippers and consignees, bring logistics know how to the region, improve supply chain management functions, and promote the development of technology in

[4] This could be similar to the tradeXchange system in Singapore. This platform provides seamless inter-connectivity among commercial and regulatory systems for the Singapore trade and logistics community. In addition, it will offer a single electronic window for integrated workflow, submissions and enquiries to the Sea Ports, Airports, Maritime Authorities, Customs and Controlling Agencies. Other applications of the logistics information system in the well known logistics hub of Singapore include port-net and marine-net

the transport/logistics system. To attract these industries, tax benefits, flexible legal regulations for establishing joint businesses and competitive infrastructure are necessary. Some benefits that these organizations could help provide include:

  - Offering pick and pack, warehousing and distribution activities
  - Creation of advanced value service as cargo tracking and tracing, cross-docking, special packing, quality assurance and quality checking or providing special security systems

- Promote training of logistics services providers' personnel to improve their responsiveness to client needs and scope of services

Illustrative Action Plan

Short-Term Actions

- Finalize the agreement with South Africa to create one-stop border posts for freight and for passengers. The two governments need to agree on the location, controlling process and policies. (SARS, Alfândegas);
- Set up an implementation committee to monitor the progress of the one-stop border posts (SARS, Alfândegas);
- Complete implementation of the SAD 500 by the Mozambican Customs Administration. (Alfândegas);
- Set up a bi-lateral committee with public and private sector participation to plan and monitor the improvement of EDI between South Africa and Mozambique, and in particular the automatic electronic conversion of customs data from South African standards to Mozambican standards, and vice versa. Develop the Terms of Reference for a call for bids on system improvements. (SARS, Alfândegas , MCLI, Immigration);
- Develop a security plan for the transport and logistics system between South Africa, Mozambique and Swaziland, to meet the increasing international demand for secure shipments (Ministries of Transport, MPDC, SARS, Alfândegas , MCLI);
- Identify peak hours at the border posts and set up more efficient staffing policies for immigration and customs officials to speed up the passport and documentation control process (SARS, Alfândegas , MCLI, Immigration);
- Develop a policy to encourage private-public and local-foreign partnerships for investment in logistics infrastructure and service development. (Ministries of Commerce, MCLI);
- Continue special consultation sessions to highlight logistics issues between logistics service providers, national logistics gateway managers and MCLI

Medium-Term Actions

- Call for bids on one or more contracts for the development of an electronic linkage between South Africa and Mozambique. The goal to complete implementation should be 2010. (SARS, Alfândegas);

- Invite international 3PL/4PL companies to develop alliances with national freight forwarders in Mozambique, to increase the range of logistics services available. (Ministries of Commerce, MCLI);
- Develop an E-market service to cluster all entities which are related to the port of Maputo and provide ship owners or operators a one-stop shop service. (MPDC, MCLI, Port Operators, Shipping lines);
- Promote the training of logistics personnel within universities or specialized institutes in Mozambique and/or South Africa. (Ministries of Commerce, MCLI);

Many other actions suggested by the analysis in this report could be considered in a workshop environment, possibly coordinated by MCLI.

TRANSPORT SYSTEM DEVELOPMENT

Maputo Port

The Port of Maputo has taken significant steps to become more efficient by working with private concessions to develop and manage its terminals. One of the biggest challenges of the Port is to become the first option for importers and exporters along the Maputo Corridor and to take advantage of its lower costs compared with Durban and Richards Bay. The Port of Maputo should continue with its current actions, including:

- Expanding its terminal facilities, including new granite, coal/magnetite/car/iron ore and heavy sands, ferrochrome terminals
- Upgrading Maputo Port Access for post-Panamax type vessels.
- Improving its information system
- Improving connectivity with the rail system

Some recommendations for the sector include:

- Providing more container services for Europe and the Far East, which should be encouraged with initiatives and promotion to containerize cargo moved through the Corridor. (MIPS);
- Promoting the use of container services in the Corridor;
- Encouraging competition with feeder services to Durban to keep Maputo Port costs down;
- Completing the computerization of port operations and linking them to a freight track and trace system. This would involve the integration of port systems to substantially reduce paperwork and data re-entry, and the development of a portal for controlled access by a range of stakeholders;

Illustrative Action Plan

Short-Term Actions

- Develop plans to connect IT systems at the port with customs and freight forwarders (MPDC, Customs, Private Sector);
- Develop a plan for specific rail connections to the berth areas or to a staging area for containers (MPDC, CFM);
- Publicize an official port tariff to clearly inform exporters and importers about port charges. (MPDC).

Medium-Term Actions

- Prioritize investments in the port to meet shipper needs (MPDC, MCLI, Shipping companies);
- Implement the plan to connect the port IT system to a range of stakeholders (MPDC);
- Install automated gates to container yards (MPDC, MIPS);
- Implement the plan for specific rail connections to berth areas or to a staging area for containers (MPDC, CFM).

Road Transport System

- The TRAC concession was a major improvement in corridor highway capacity. This is serving now as the main mode connecting Maputo to its hinterland. The tolls affect road transport costs but they are reasonable given the level of service. Increasing road transport competition in the corridor could also reduce transport costs. A service area along the Ressano Garcia–Maputo link could be established for trucks and drivers

Illustrative Action Plan

Short-Term Actions

- Support ongoing reforms, especially the initiative to build the one-stop border post that will help with road border congestion (SARS, Alfândegas, Private Sector);
- Develop a policy to encourage container transport in the Corridor, including the appropriate number of axles for large container trucks (Ministries of Transport, National Road Agency and TRAC).

Medium Term

- Move toward signing a TIR type agreement to facilitate freight movement (Ministries of Transport, SARS, Alfândegas);
- Develop a service area for truckers between Ressano Garcia and Maputo (TRAC, MCLI, trucking companies);

Railway System

Road transport has become the dominant mode of transport despite the corridor's historical dependence on rail. This imbalance has raised costs for freight and made rail connections unreliable. CFM and Spoornet have embarked on a major stabilization program to improve rail services and make rail transport more competitive. This includes

- Rehabilitating the rail line from Komatipoort to Maputo;
- Rehabilitating the signaling system;
- Managing through trains for selected commodities;
- Purchasing locomotives, container flats, and freight wagons; and
- Improving and modernizing the means of coordination between CFM and Spoornet.

Illustrative Action Plan

Short-Term Actions

- Authorize rail passenger service across border between South Africa and Mozambique in order to take the pressure off of the road border post (Ministries of Transport, CFM, Spoornet);
- Support and encourage procurement of more locomotives and equipment by CFM (Private Sector, Spoornet);
- Identify gaps in human resources available for rail operations and fill the gaps (Spoornet, CFM);
- Develop a regular and common schedule of train services across the border (CFM, Spoornet, Ministries of Transport, SARS, Alfândegas);
- Improve communication channels between the two railways to coordinate improvement activities (Spoornet, CFM, MCLI).

Medium-Term Actions

- Develop and implement infrastructure, facility and rolling stock maintenance policies to preserve the rehabilitated and new infrastructure (CFM, Spoornet).

INSTITUTIONAL, LEGAL, AND POLICY CHANGE

It should be noted that many of the recommendations and actions listed above involve changes to institutions, laws and policies of the governments involved. These are actions that require sustained effort and the involvement of multiple parties in planning and implementation.