



ORGANISATION
FOR ECONOMIC
CO-OPERATION AND
DEVELOPMENT



JOINT TRANSPORT RESEARCH CENTRE

Discussion Paper No. 2009-5

Prepared for the Round Table of 5-6 February 2009 on
Integration and Competition Between Transport
and Logistics Businesses

RAILWAY AND PORTS ORGANIZATION IN THE REPUBLIC OF SOUTH AFRICA AND TURKEY: THE INTEGRATOR'S PARADISE?

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January 2009

The views expressed in this paper are those of the author and do not necessarily represent positions of Thompson, Galenson and Associates, the OECD or the International Transport Forum.

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Saratoga, January 2009

INTRODUCTION

There seems to be an inevitable tendency among transport experts to focus on “their” part of the production system without looking at transport from the point of view of the customer – the shipper/receiver. The result is often either a fascination with pieces of technology or a focus on a single mode. From this point of view, concerns for “efficiency” and economies of scale tend to dominate, while the functioning of the entire door-to-door network and especially the issues of competition within the network often receive short shrift. One purpose of this conference is to correct this.

Having said this, this paper is written from the point of a land transport practitioner, specifically a railways expert. My view of the system, its linkages and competitive forces, is shaped by this perspective. In the course of my career at the World Bank, I have visited many ports and discussed issues of interaction with land-side modes, but will readily defer to ports experts for the details of port operation.

This paper looks in detail at the cases of two countries – the Republic of South Africa (RSA) and Turkey -- that exhibit extreme cases of transport organization. In both countries, the railway and most of the ports are under unitary control, with essentially no regulation and only limited information available to assess behavior. If economies of scale are important, if the “integration” achieved by organizational unification is truly beneficial, and if competition is not needed to limit the behavior of the unified organizations, then these countries should be at the cutting edge of system performance, with high efficiency, low costs and excellent service. If the reverse is true, then they furnish at least a few data points for the analysis of the importance of diversity of organization and competition within the system.

I am a former employee of the World Bank and have worked with Bank teams in both RSA and Turkey. In order to avoid confidentiality issues, I have used only publicly available data or public sources of information. In all cases, opinions given in this report about RSA or Turkey are mine and should not be attributed to the World Bank or any of its members or Directors.

It is hard to understand or appreciate the RSA or Turkey cases without a broader discussion and framework of how the pieces of the logistics chain fit together and how competition exists within the system. This paper will begin with a brief discussion of the pieces of the system and how they fit together. It will attempt to highlight how “integration” and “competition” happen within the system in order to show, in a conceptual sense, how RSA and Turkey differ from other countries.

1. STRUCTURAL DEFINITION AND DISCUSSION OF “LOGISTICS”

The terms “integration” and “competition” are easy to use, but are much harder to pin down in practice. In fact, they are highly complex in their nature and in the combinations or permutations that exist in the system. Integration is actually a **spectrum** of possible relationships that distinguish it from true independence, which might be defined as separate activities (or entities) that interact only at arms’ length. Degrees of integration can begin with information sharing (advance notice of arriving traffic), various kinds of cooperation (common billing), joint ventures to own facilities used in common (rail tracks or truck warehousing in a port), and extending to common ownership either in a single company or within a broader conglomerate or holding company.¹

Within the integration spectrum there is no necessary argument that ownership should be either public or private – there are plenty of examples of both, and of mixes depending on the specific case. In practice, some pieces of the system tend to be privately owned (deep sea shipping and landside trucking), while other pieces (port real estate, aids to water navigation, and roads) are almost always publicly owned. Despite differences of ownership, quite close cooperation and even joint venture ownership are possible.

Perhaps more important, the simple usage of “competition” to imply the set of actions taken by one party to maximize its objectives in conflict with others is at best only a partial description of the way the system actually works. Competitors may very well have multiple, unclear or even unpredictable objectives that will produce unexpected outcomes. Possible objectives could include maximizing the efficiency of the transport system; but, they can also include generating the highest returns (economic and/or financial) for a distinct link or for the entire chain. Other important objectives clearly include explicit social issues such as employment generation as well as local, regional or national development, sometimes in conflict with other localities, regions or countries. Quite frequently since the attack on the World Trade Center, “security” concerns (more or less well defined) have become paramount. Finally, political objectives such as various kinds of “equalization” or cross support from one part of the network to another can govern the behavior of parts (or all) of the system. Ports (sea or air) and their inland linkages are the critical foundations for commercial interaction among nations: as such, they are unlikely to be allowed to focus solely on their own interests.

Finally, in a number of cases the underlying incentives that drive significant parts of the behavior of the system are not sufficiently acknowledged. A good example is labor employment and wages. Because ports have an effective “monopoly” on a nation’s access to world trade, there are economic rents to be extracted from port activities if any of the port actors are so inclined. When all the ports in a country are commonly owned, and/or when all of the ports have the same labor union, the rents are potentially multiplied. The same is true for customs officials who can, in some countries, extract bribes for easing cargo flow.² In both cases, it can be in the interest of the parties to limit competition and inhibit linkages.

Overall, the point to be emphasized is that the interaction between structure (“linkages” or mergers) and competition or integration is not always obvious or straightforward.

Logistics has been defined as the management of the total cost of transport and distribution from producer gate to receiver gate. In simpler terms, transport is what a mode produces; effective and efficient logistical management is what the customer actually needs. Logistics necessarily involves cost, speed and reliability of transport, but also includes loss and damage, time value of inventory, handling costs at interchanges and nodes, packaging, size of shipment, etc.

In reading the papers for this conference, “logistics” seems to be used mostly to characterize containerized flows of relatively high-value products and the remainder of this paper adopts this usage. It deserves emphasis, however, that bulk shippers of iron ore, grain or coal represent a significant share of international trade, and they also want service to be integrated across modes from origin to destination, although the relative tradeoffs between transport costs and speed and reliability of service may differ from containers.

Another important qualification is that the analysis of logistics in this conference seems to focus on **sea** ports. While this may be true for sheer tonnage moved, it leaves out airports that are increasingly important in cargo **value**. As an example, the largest port in the U.S. measured by cargo value rather than tonnage is JFK airport in New York City. Three of the largest ten ports in the U.S. measured by value of cargo are airports. It would be interesting to compare the value of the cargo received at Schipol and Frankfurt airports with the values of cargos at Rotterdam or Hamburg.

In very broad terms, Figures One and Two outline the workings of the logistics network as it relates to this conference.³ Figure One starts with one port serving essentially one set of internal receivers or shippers (its “hinterland”). Figure Two expands the picture to cover two ports and two hinterlands.

Figure One shows a set of deep sea carriers serving a port that may have one or more waterside facilities (quays and cranes). The port may have one or more land side facilities for moving and storing containers and loading them onto the landside modes. An incoming container (or other commodity) then could be loaded onto a truck, a railway or an inland barge, and each of these modes can have competing carriers. Once a container is loaded into a surface carrier, it may then go through an inland handling or consolidation facility before reaching the ultimate receiver. There can even be added links, such as rail shipment from the port to a subsequent handling facility where shipments are then directed by trucks to final receivers.

At this level, horizontal competition could be manifested at a number of points: competing ocean carriers (Carrier 1 versus Carrier 2 or Carrier 3), competing water-side unloading opportunities (A versus B or C), competing land-side loading and cargo management (X versus Y or Z), intra-modal competition (truck company 1 versus truck company 2), railway versus railway, etc). There can also be inter-modal competition when railways compete with trucking and inland water modes (e.g. railway 1 versus trucker 1). Finally, there can be

horizontal competition between chains: that is, the green path involving liner 1, port facility A, port facility X and Trucker 1 could compete with the blue path involving liner 2, port facility B, port facility Y and Railway 2.

One type of potential integration is obvious. If all of the shipping lines integrate (merge), then the port might benefit from use of larger ships, but would lose the competition among liner companies. The same could occur among port facilities, trucking companies, rail companies or inland water operators. It is harder to argue in favor of multiple port ownership and control although ostensible concerns for managing port specialization (or national security) have caused countries to do so. These types of mergers have been called “horizontal” integration, and they have been generally considered questionable because of their impact on intra-modal competition, especially when the owner is a private entity.⁴ In many cases, government agencies or enterprises are allowed more market power because of the (arguable) assumption that they will necessarily act in the broader public interest.

The other type of integration, by linkage, is also clear. It is argued that the quality and cost of logistics services is affected by the connection between services: the quality of the entire linkage chain suffers if the transfer from link to another is defective. As a result, it can be argued that allowing a liner company to own port facilities, or allowing a railway to own part of a port (or, in some cases, allowing a railway to own a trucking company) could guarantee effective and low cost linkages and thus increase efficiency. By extension, an entire chain could be owned by one entity.⁵ In theory, an increase in this type of link integration ought to increase competition at the link versus link level.

Depending on the structure of the system, however, linkage integration also offers opportunities to **suppress** competition. Suppose, for example, a railway owns a port (or is part of a common holding company). It is easy to see how the common entity might control trucking, competing railway or inland water entry to the port in order to favor the owning railway. There are a number of similar ways in which completing a particular link could reduce access by potentially competing participants to a crucial facility. Linkage integration is not always good: in fact, it is always a balance between potentially improved service to one shipper versus denial of access to all other shippers and competitors.

Figure Two raises the issues at a higher level, where there are competing ports competing hinterlands, and more potential carrier combinations. In this case, there are two ports competing with each other for service to hinterlands that partially overlap (see red and black paths). The efficiency of a particular port can increase the size of the overlapping area for which it can offer service.

From this perspective, more possibilities for “integration” emerge, at least some of which clearly can reduce the competition for logistics services from the point of view of the receiver/shipper. For example, if the two ports are under common control, the owner could limit competition or establish tariffs that would force traffic to travel along a desired line that might benefit the owner but not be optimum for the shipper. Or, if there is only one railway serving both ports, the railway might well establish its tariffs in order to steer traffic through a favored port.

As suggested above, the objectives of the owners would then become critical. If all parties are motivated by economic efficiency alone, then the flows through the system would presumably be optimum for all. If, on the other hand, any of the parties has market power and is motivated by financial maximization, then flows might well be distorted in the interest of the owner. If any of the actors is a public authority pursuing social or political goals, then the ultimate effect on flows through the system would be unpredictable (at least on efficiency grounds): this would be especially difficult to predict if the ports, land operating companies or hinterlands are in different countries and subject to different social, political or national priorities.

The above discussion necessarily underlines the issue of regulation where market power exists. In principle, it should be possible for a potential regulator to analyze the operation of a port to determine whether the operator is abusing a market position, either by excessive tariffs or by discriminatory tariffs that favor one shipping line or one access mode over another. It should be possible to determine whether the port is acceptably efficient, and it should also be possible to regulate the tariffs and services of trucks, railways and inland water operators where it can be shown that they have market power.

In practice, even at the individual public operator level, it is difficult or even impossible to do so, partly because of the challenge of asking one public authority to regulate another (when both are subject to the same political control and neither may be seeking fully definable objectives) and partly because few public or private operators are willing (or are required) to produce and publish the information needed to analyze and control their behavior.

This is even more difficult at the linkage or chain level, even though it is at this level that the logistics system is most affected. Even in the case of a single country, a regulator would need authority and expertise in all of the links – shipping lines, ports, trucks, railways and inland water, along with the related warehousing, interchanges, etc. It is even more difficult at the multi-country level because of conflicts of national interests and the non-existence of regulators with real multi-national authority.

With this as background, how can we use the examples of RSA and Turkey to analyze what happens when the various kinds of potential “integration” are carried to their logical extreme?

2. THE REPUBLIC OF SOUTH AFRICA (RSA) CASE

The Republic of South Africa (RSA) is one of the largest countries, and is by far the most developed economy, in Africa. Partly as a result of its wealth, and partly because of its long standing inclusion of western capital and management skills, RSA has had a relatively well

developed transport network. Figure Three provides a general picture of South Africa and its transport network, which includes approximately 362,000 Km of highways (of which about 74,000 km are paved), 21,000 Km of railways, 3900 Km of pipelines and 7 major sea ports.

The organization of the rail, ports and pipelines is shown in Figure Four. The national agency controlling these three sectors is a state-owned holding company, Transnet. Transnet holds an effective monopoly in all of these sectors. Rail is further divided between the Freight Rail activity (previously known as Spoornet) and Rail Engineering (doing business as Transwerk). Ports is divided between the National Ports Authority (NPA), which owns and performs the landlord function of almost all of RSA's ports, and Port Terminals (South African Port Operations, or SAPO) which owns and manages the operations function of almost all of RSA's ports. Pipeline (called Petronet) owns and operates all significant petroleum pipelines in RSA. Transnet is owned and is under the nominal tutelage of the Department of Public Enterprises. To complete the picture, the highway system is under the control of the Department of Transport and its highway agency (SANRAL), which is also tasked with overall transport policy and some aspects of highway regulation.

Transnet is the successor company to South African Transport Services (SATS). SATS was formed during the days of apartheid and the non-recognition by the international community of the apartheid regime. The highly centralized and inwardly focused organization of SATS was a response to the need to marshal all of the State's resources and limit access to outside information as the regime struggled for survival. Transnet inherited the SATS roles and authorities and has retained them with two significant exceptions: 1) South African Airlines was spun off, primarily because Transnet wanted to transfer the losses to the Government; and, the rail passenger functions of the old Spoornet were spun off to the South African Commuter Corporation (SARCC) and to a new intercity passenger rail company (Shosolozza Meyl), again in order to remove the passenger financial burden from Transnet.

Transnet is a major corporation on a world scale, with total assets valued in the range of US\$10 billion and annual revenues in the range of US\$3 billion. Table 1 gives some of the details of the performance of Transnet and its divisions for the past three years. The profits of NPA and Petronet are very high, as is the return on net investment of NPA, Petronet and SAPO.⁶ Spoornet's profits are relatively low, and because Spoornet has about 40 percent of Transnet's assets with only about 20 percent of its income, its return on net assets is much lower than the rest of the organization.

2.1. Spoornet in perspective

Table 2 provides basic size and operational data for most of the world's railways. Spoornet is highlighted in this Table (as is TCDD, to be discussed below). Overall, Spoornet appears to be a relatively large and efficiently operated railway. It accounts for about two percent of the world's track Km and carries nearly two percent of the freight tonnage (1.29 percent of the world's tonne-Km). Spoornet's freight traffic (tonne-Km) is greater than that of any E.U. railway. Its labor productivity (output per staff measured in Traffic Units (tonne-Km + passenger-Km)/Employee)) exceeds all E.U. railways, and its traffic density (TU/Km

of line) exceeds all European railways except for the Baltics and Switzerland. According to South African MOT estimates, Spoornet carries about 20 percent of all freight tonnage, and about 36 percent of all freight tonne-Km.⁷

The appearance is somewhat deceptive, however. In fact, Spoornet contains two high density bulk operations that are effectively distinct from the remainder of the system. One of the high density operations – the Sishen to Saldanha iron ore line – see Figure One, carries about 30 million tonnes on only 880 Km of line. The other high density line – the Coal Export line from the Ermelo region to the Port of Richards Bay – see Figure One, carries about 70 million tonnes of coal on only 574 Km of line. The entire remainder of the railway, known as the General Freight Business (GFB), carries around 80 million tonnes of mixed traffic, **including all of the containerized traffic**, on the remaining 20,000 Km of line. Put another way, the two major bulk lines account for only 6.7 percent of the line-Km, but generate 56 percent of the tonnage and about 60 percent of the tonne-Km carried by the railway.

Thus, the GFB, which provides the rail part of RSA's critical container logistics linkages to the world, actually performs at density levels below those of E.U. countries, and almost certainly would show lower productivity levels if data were available to support the calculation.⁸ Although international tariff comparisons are notoriously difficult, rough calculations indicate that the tariffs on the iron ore traffic (in PPP US\$/Tonne-Km terms) are slightly below the levels charged by US Class I railways for iron ore. Tariffs on the Coal export traffic are two to three times U.S. Class I levels for coal, and the GFB tariffs are 4 to 7 times higher than U.S. Class I practice for other cargos.

The physical condition of the railway mirrors its three businesses. The iron ore line is technically up to date: the 30 million tonne-Km/Km traffic density is high, the 30 tonne axle load is fully up to world best practice (typical E.U. practice is 22 tonnes, typical U.S. Class I practice is 30 tonnes), and the 50 KV, 50 Hz electric traction system is highly efficient.⁹ The 70 million tonne-Km/Km traffic density on the coal export line is quite high, and the 25 KV, 50Hz electric traction system is standard world practice, but the 25 tonne axle load is somewhat low by heavy tonnage railway practice. Aside from these nearly world class systems, though, the remainder of the system is in relatively poor condition, with overage locomotives (average age of 25 years) and increasing derailments.

2.2. NPA and SAPO in perspective

The RSA has seven significant commercial ports (Figure One). Of these, Durban, Cape Town and Port Elizabeth handle mostly containers and higher value cargos. Saldanha Bay handles the iron ore exports from the Sishen to Saldanha line, while Richards Bay handles the coal exports from the Ermelo to Richards Bay line. The Port of Mossel Bay handles mostly bulk liquids while the Port of East London handles a mix of containers and bulk cargo. Transnet is now developing a new port at Ngqura that will handle a mix of containers and bulk cargo and that is targeted to be a transshipment hub for Southern Africa. Table 3 gives a general picture of the scale and nature of operations at the various ports. It deserves emphasis

that, while NPA has a monopoly over the landlord function at all ports, the SAPO monopoly primarily extends to containers and higher valued commodities. Private operators under leases handle a majority of the **bulk** commodities; but, as with Spoornet, Transnet's port management remains fully in control of all of the commodities, especially containers, which are significant in the logistics system.

It is somewhat harder to analyze the efficiency of ports than of railways. The general picture of the Transnet ports is one of efficiency for the bulk ports at Richards Bay and Saldanha Bay as compared with relative inefficiency at the remainder. Port productivity is described as "...very low by international benchmarks. The Durban container terminal lifts on average 17 containers (TEUs) per hour, whereas the international norm is at least 35 TEUs per hour. From a service point of view, the problem is even more severe due to a huge amount of congestion. The equipment used at most of the container terminals is old and generally in poor condition. Although some newer cranes are in operation at Durban container terminal, the average age of the cranes is about 30 years compared to the international norm of around 20 years."¹⁰ Other observers have similarly concluded that the South African ports have productivity levels for containers and higher value cargo about 50 to 70 percent of comparable ports elsewhere, while the bulk ports are relatively efficient. Moreover, productivity at non-bulk ports appears to have been declining over time in some of the more important ports. In addition, water side congestion is generally rated as serious.

For reasons that have never clearly been articulated in current policy, tariffs in RSA public ports are equalized. That is, all public ports have the same charges. At least partly because of the low productivity and higher costs, and at least partly because of the extremely high profitability of Transnet's maritime activities, port charges in RSA are generally cited as high, though the percentage disparity from other countries is not available.

2.3. Pipelines

"The pipeline industry in South Africa is characterized by the monopolistic position of Petronet, a subsidiary of Transnet. Petronet owns and operates almost the entire network with the exception of one crude oil line from Saldanha to Milnerton."¹¹ The 3300 Km pipeline network operated by Petronet (and additional 600 Km are operated privately) carries about 16 billion liters of oil products (refined and crude) and about 334 million cubic meters of Gas. There are no data on comparable prices, but the high profit margins and the solid return on net assets suggest that the prices are not low.

2.4. Regulation of Transnet

Transnet has been largely unregulated, both in economic areas and in safety. According to the NFLS, "Transnet develops rail policy (by default, due to its dominance), conducts economic and safety regulation, provides and maintains infrastructure, and is also responsible for freight transport operation."¹² As to ports, the NFLS also states that "[e]conomic and safety regulation at the ports is solely administered by the agencies, themselves, while seaside

regulation is conducted by the South African Maritime Safety Authority (SAMSA) and the Department of Environmental Affairs and Tourism.”¹³ A recent tariff increase proposed by Petronet was limited by the National Energy Regulator of South Africa (NERSA), which is, interestingly, an energy and not a transport regulator.

2.5. Assessment of the system performance and structure

It would be difficult to provide a more cogent assessment than that provided by the NFLS, a product of the Ministry of Transport. A number of quotations are listed below:

“The National Freight Logistics strategy [NFLS] is a response to the freight system’s inability to fulfill the demand for cargo movement at prices, levels of service, quality of service, and at acceptable levels of reliability in a manner that supports the national developmental strategies. This failure stems from an inappropriate institutional and regulatory structure that does not punish inefficiency and reward efficiency. It is structurally incapable of appropriately allocating external costs and raising efficiency...This strategy signals a shift toward demand-delivery of freight logistics services, rather than a supply approach.” (pg ii)

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 the regulatory frameworks are incapable of resolving problems in the industry. (pg ii)

...South African products that move in the hinterland face a difficult challenge in terms of the inefficiencies in our ports and rail environment. (pg 3)

The existence of operations entities within the same holding company as the infrastructure companies exacerbates perverse behavior and pricing further, while transfer pricing entrenches the inability to introduce competition in the medium and long term without radical shifts in regulatory and industrial restructuring leadership from the state. (pg 6)

The operating environment is characterized by open competition on the one hand (as in the road and airfreight sectors), whilst on the other hand it is characterized by monopolies that reduce efficiency and the value proposition to customers (as in the ports and rail sectors). In addition, shortfalls in infrastructure provision and poor infrastructure maintenance contribute to a poor value proposition to customers and add to the logistics cost burden. (pg 9)

Our infrastructure is inappropriate for the development path of our country, and needs to be revamped... Furthermore, our regulatory regime has not been inadequate to constrain the pricing of monopoly infrastructure entities. The infrastructure monopolies have extracted huge margins from the movement of cargo, without ensuring sustainable levels of re-investment. These profits have tended to be used to subsidise inefficient operations and

loss making components in other areas of the transport and logistics sector, rather than raising our capacity over time. (pg 9)

Monopolies that are sustained within the freight logistics sector contribute significantly to high levels of inefficiency. This leads to a situation in which there is little incentive to reduce costs. This is mainly a consequence of the excessive market power held by organizations within the Transnet group. Again, these are strongly evident in ports and rail... (pg 9)

Even Transnet acknowledged, in its 2008 Annual Report “[t]he company was not sufficiently oriented towards its customers – in fact, Transnet’s inefficiencies were rubbing off on some of its major customers in the form of real losses of international opportunities” and “[l]ow efficiencies resulted in congestion at the ports and unstable service delivery in freight transport.”

2.6. Reform initiatives

The issues discussed above have been well known and much discussed in the RSA for decades, and have been the focus of a number of studies over the time. Minor changes have been suggested, and some legislation has been passed. For example, the National Ports Act provided for the corporatization of the NPA into a separate company wholly owned by Transnet for the purpose, apparently, of clarifying the performance of the landlord function and subjecting its activities to some level of regulation. Transnet opposed this law and has thus far persuaded the Government not to initiate the corporatization process. No other significant reform is in process.

It is hard for an outsider to explain why so little reform has taken place despite the clear need for change and the repeated studies and relatively accurate diagnoses of the kind of reform that would work. To some extent, there are clearly higher priorities of the Government, and political conflicts over the past few years may well have made reform difficult. Perhaps equally important, the lack of progress simply reflects the ability of a well funded and deeply entrenched state enterprise to resist reforms that threaten the power of the agency and its ability to deliver on a vast number of political and social tradeoffs that it has accepted over the years.

3. THE TURKEY CASE

The Turkish Republic, a nation of approximately 72 million, lies between Europe and Asia. It has borders with Azerbaijan, Armenia, Bulgaria, Georgia, Greece, Iran and Iraq. It has long coastlines on the Black Sea and the Mediterranean, and commands the Bosphorus and the Dardanelles (the only connection between the Mediterranean and the Black Sea). It is also

the transit country for several major oil pipelines from the Middle East to the Black Sea and the Mediterranean. Turkey's transport system thus has major international significance.

Turkey enjoys a relatively extensive highway system of approximately 427,000 Km and has a number of private trucking companies. Its 7,500 Km of pipelines are focused on oil and gas, much of it transit traffic. The "Republic of Turkey General Directorate of State Railways Administration" (TCDD), operates both the national railways system (8,697 Km of line) and seven of the country's major sea ports. TCDD thus has held a monopoly on all rail services and controls a majority¹⁴ of the port activity in the country. Figure Five shows the layout of the rail network and the seven TCDD ports as well as the Port of Ambarli.

Many of the railway lines in Turkey were originally built by private companies. Upon the formation of the Turkish Republic in 1923, all private railway lines were nationalized and combined into the "General Administration of Railways and Ports," which was formed in 1924. In 1953, TCDD took its current form as a state owned enterprise (State Economic Enterprise, or SEE, established to provide a monopoly railway service) under the supervision of the Ministry of Transport. TCDD is thus a unitary enterprise, not a holding company, operating the seven ports as a division of the enterprise. In addition, similar to Transwerk in RSA, TCDD has subsidiaries that are the monopoly suppliers to TCDD of manufacture of locomotives under license (Tulomsas), manufacture of passenger coaches (Tuvasas), and manufacture of freight wagons (Tudemas).

Figure Six shows the current organization diagram of the enterprise. Table 4 gives an overall picture of the financial performance of TCDD over the past five years.

3.1. TCDD's rail network

Table 2 compares TCDD to the world's railways. TCDD is smaller than Spoornet and carries significantly less freight traffic, but carries more passenger traffic. TCDD's labor productivity and traffic density are significantly less than Spoornet (though, Spoornet's GFB network would be much more comparable to TCDD). TCDD's labor productivity and traffic density are somewhat below E.U. averages, but not markedly so in many cases. Since 1990, TCDD's traffic has been essentially stagnant; with freight growth of 1.3 % compounded annually, intercity passenger traffic growth of 0.9 % annually, and suburban passenger traffic shrinking by about 4 % annually. TCDD now carries about two percent of Turkey's passenger-Km (98% by road) and about 5 percent of Turkey's tonne-Km (92% by road and 3% by pipeline).¹⁵ In both cases, the railway role has been gradually shrinking for the past 25 years.

Table 4 highlights another aspect of railway performance – TCDD loses money in **all** its areas of rail activity. The ratios of revenue to expenses in 2007 are: suburban passenger, 79.3%; intercity passenger, 16.7%; and, freight, 31.9%. These ratios are unusual in two aspects: 1) freight is highly unprofitable; and, 2) suburban passenger traffic is less unprofitable than either freight or intercity traffic. The losses on passenger service are largely generated by tariffs that average about one-third those in the E.U. (one-fourth the U.S. levels)

and somewhat lower productivity than the E.U. Losses on the freight traffic have essentially the same causes, though the tariff disparity is not as great. Interestingly, a part of the freight losses is caused by the fact that TCDD has reduced its freight tariffs significantly over the past 20 years, while neither traffic nor productivity grew significantly. Moreover, as Table 2 shows, TCDD has a much higher percentage of passenger traffic than Spoornet and the U.S. system, though TCDD is roughly comparable with many E.U. railways in its passenger to freight traffic proportions.

In technical terms, TCDD's maximum axle load of 20 tonnes puts it at the low side of E.U. practice for freight traffic, and makes it difficult for TCDD's freight operator to compete with trucks. In addition, about 80 percent of TCDD's traffic is concentrated on half the network, meaning that the remainder of the system is even less financially justified (for freight or passenger services).

TCDD is also a problem from a national perspective, as Table 4 shows. TCDD's railway losses have risen to the range of US\$ 1 billion annually, making it the largest deficitary public enterprise, accounting for about 0.3 percent of GDP. Subsidies paid by Government are now in the range of US\$ 500 million.

3.2. TCDD's ports

Table 5 profiles the seven ports operated by TCDD (as shown in the TCDD Annual Statistics). All of the seven ports handle general cargo and break bulk. At around 800,000 TEU, Izmir is the major container port, though Haydarpaşa and Mersin handle lesser amounts of containers.¹⁶

It is difficult to assess the efficiency of the TCDD ports. A World Bank analysis stated that a proposed project in Turkey "... will reduce the logistical costs associated with the current inefficiencies and high costs of both the railway and port sub-sectors, allowing importers and exporters to develop existing trade-related businesses."¹⁷ As Table 4 shows, if the high port profits, now used to support rail losses, were reduced to normal levels, port tariffs could probably be reduced by as much as 30 to 50 percent, with a direct impact on Turkey's trade competitiveness.

3.3. Regulation

TCDD's tariffs and safety have been essentially unregulated, leaving TCDD free to set its tariffs. In practice, TCDD has been constrained by the normal degree of political interference in the affairs of state enterprises. More important, there has probably been a relationship between the size of TCDD's subsidies and its tariff policy. This may be a part of the explanation of the unusually high suburban tariffs: but, there is no apparent explanation for TCDD's low freight tariffs.

3.4. Assessment of System Performance

It is common in World Bank loans for the Government to issue a “Letter of Development Policy” to the Bank that provides the underlying Government evaluation of the performance of the economic sector involved in the loan and states the policies to be followed by the Government in deploying loan funding. The Minister of Transport’s letter stated “[i]n common with many rail companies throughout Europe TCDD’s performance has declined in recent years. Passenger numbers have declined by around 50 % during the 10-year period, to a market share of round 2%. Over the same period freight traffic has declined by around 10% to a market share of around 4%. At the same time TCDD’s financial position is precarious. TCDD made a loss of 292 million US \$ in 2003 and expected loss for the year 2004 is 513 million US \$. Treasury has transferred 331 million US \$ to TCDD in 2003.”¹⁸ The Minister also stated three objectives: “(i) to significantly reduce the current fiscal burden of TCDD on public finance, (ii) to increase the competitiveness of the Turkish economy by reducing the logistic costs associated with the inefficiencies of the railway and port sub-sectors; and (iii) contribute to Turkey’s accession to the European Union.”¹⁹ There is little doubt that Turkey pays a high price for the railway’s inefficiencies and the high costs of TCDD’s ports.

3.5. Reform Initiatives

After a number of years of discussion, and TCDD resistance to change, the Government has decided to restructure TCDD. The approach consists of two elements: restructuring of the railway, and separation and concessioning of the ports.

3.5.1. Railway Reform

The railway reform program is broadly based on the E.U. model, with a separated infrastructure manager (no decision on accounting versus institutional separation), open access for freight operators that might want to compete with TCDD’s freight operator, infrastructure access charges (to be developed), TCDD railway operators will be structured as autonomous public corporations under Government ownership, suburban passenger operations will be transferred to local governments with services provided by TCDD under contract, or by private operators, and the three manufacturing subsidiaries will be divested. In addition, the reform program includes a component for labor force adjustment and a significant component for asset modernization. In parallel, a regulatory body for infrastructure charges, licensing and safety certification will be developed, along with development and publication of an MIS to produce all required reporting information.

3.5.2. Port Reform

After years of discussion (and encouragement from the E.U. and the World Bank), the Turkish Government gave the Privatization Agency the task of concessioning the ports. As of today, the status of concessioning is:

- Mersin was contracted for 36 years in 2007 and is now in private operation.
- Iskenderun is now in the tender process
- Izmir has completed the tender process and the 49 year contract is pending approval of the State Council

- Derince has completed the tender process and the 36 year contract is pending State Council approval
- Samsun has completed the tender process and has Privatization Agency approval. It will now go to the State Council
- Bandirma has completed the tender process and has Privatization Agency approval. It will now go to the State Council
- Haydarpasa was closed.

The process for each port is fully complete only after State Council approval of the contract. Before approval, port revenues and costs remain on the TCDD books. After approval, excess staff will remain on TCDD books until the staff adjustment program is implemented.

4. THE RSA AND TURKEY CASES COMPARED

There are a number of similarities and differences between the two cases:

- Transnet is a holding company, whereas TCDD operated the railways as an integral division.
- Transnet control covered rail, most ports and pipelines whereas TCDD had no control over pipelines.
- Transnet overall is profitable and, at least according to its Annual Report, each of its Divisions is profitable as well (though Spoornet is only marginally so, and appears to have been marginally unprofitable in the past). The TCDD rail network is strongly unprofitable, and port profits have been insufficient to cover railway losses.
- After the transfer of the intercity and suburban passenger functions, Spoornet is totally focused on freight, with passenger losses now the responsibility of Government. TCDD has a major passenger component in both intercity and suburban areas, similar to Spoornet 15 years ago. Port profits in Turkey have thus not only been supporting rail freight activities, but have also leaked out into the passenger sector.
- Both TCDD and Transnet are essentially unregulated and both have had a strongly dominant position in port traffic, though Transnet faced some competition in bulk traffic through the ports of Saldanha Bay and Richards Bay, and TCDD faced container competition from the Port of Ambarli. Trucking competition was the only significant constraint on their pricing and service behavior.
- By virtue of their public ownership and at least partial monopoly position, both were subject to political intervention in policy decisions.
- Because of their employment level and economic power, both were able to resist reform for many years (and Transnet is still successful in doing so).
- Interestingly, TCDD publishes Annual Reports that provide a reasonable amount of information with which to assess its operations (better, in fact, than most E.U. railways) whereas Transnet has, in the name of “integration,” ceased publication of such data.
- Most important, despite having access to all of the economies of scale of large organizations with significant market power, and despite the opportunities for “coordination” that unification of rail and ports (and pipelines) arguably offers, neither entity is efficient, neither offers

adequate service to the country, and neither was able to maintain its assets properly. Both charged high prices in the ports sector, harming the international logistics and trade position of the country.

5. IMPRESSIONS FOR DISCUSSION BASED ON RSA AND TURKEY

I have used the word “Impressions” rather than conclusions because two cases do not characterize the full range of relationships in the logistics area, nor do they constitute a dataset adequate to support strong conclusions. With this acknowledged at the outset, the RSA and Turkey cases do suggest a number of points for debate.

Ownership and control of ports with a common hinterland poses the risk of manipulated tariffs for a number of reasons. There is the temptation to “equalize” tariffs either in order to promote access to remote regions or to favor one or another part of the hinterlands for partisan political reasons. Perhaps more important, without competition, the ports offer an irresistible opportunity to generate monopoly rents that are then transferred to employees or the owning agency, or others, usually with highly opaque accounting. Consolidated accounting erases the ability to measure the results of any individual port.

Link-type integration can also be bad if it denies others access to one of the links. In RSA and in Turkey, the port operator has (or had) a clear incentive to favor rail access over trucks (though the RSA Government’s lack of control of overweight trucks has a countervailing impact), partly because of the internal corporate relationship and partly because the rail link offers another opportunity to generate or distribute a monopoly rent from the port. Moreover, when rail and port are commonly owned, the resulting consolidation of information makes it very difficult to isolate the performance of the parts.

Having a single rail operator for multiple ports is also probably questionable, especially when the rail operator is not efficient. This could put the rail operator in the position of generating rents that competition between the ports might otherwise generate. It could also permit the rail operator to favor one of the hinterlands over another. This effect could be alleviated by highly effective truck and/or water competition, but the full effect will depend on the size and shape of the hinterland affected. Both of these effects would be more serious in RSA if the ownership of the ports is devolved to local authorities, and they will be more serious in Turkey when (assuming the process is completed) the ports are privately operated by separated companies.

Using port profits to support rail losses and rail investment hurts **both** port and rail. It results in higher port tariffs than are necessary, reducing the productivity of the entire economy. It also drains the port of investment needed for rehabilitation, replacement and expansion, and it harms the freight system of the country if, as is the case in Turkey and was the case in RSA, the port surpluses are used to support rail **passenger** deficits and

investment.²⁰ The only significant case to be made for non-transparent transfer of funds generated from one place in an “integrated” system to another part of the system is political convenience.

Lack of transparency and information, especially under consolidated reporting makes oversight and regulation at any point difficult if not impossible. The increasing consolidation of Transnet in RSA has removed even the vestiges of independent accounting for Spoornet, and has made port-by-port results in NPA or SAPO difficult. In response, RSA is beginning to create regulators for some port functions, but it seems clear that the new regulators will be hobbled by lack of information and attempts to implement regulations that will inevitably conflict with policies and political objectives (port equalization is a good example).

The injection of explicit (or hidden) political objectives makes behavior unpredictable because the objectives often conflict with explicit efficiency objectives and with market forces. The result is usually unfavorable to a proper functioning of the networks. Governments, such as RSA, have justified their controls of the entire network on the basis of competition with other nations, apparently believing that it is somehow nations that are competing to form logistics chains. In fact, a complete logistics chain is a complex set of interacting pieces, only a very few of which are open for public intervention. Attempts by Governments to influence the logistics chains are almost certain to fail. This obviously raises the question of what should be the role (if any) of governments in the logistics chain?

Figures One and Two, along with the RSA and Turkey cases raise a critical question for the E.U. It is clear that the Commission, beginning with Directive 91-440 and continuing through its subsequent Directives and Packages, intended to ensure that, on the rail side, there would be effective competition at all ports, no matter who the port owner or rail infrastructure manager might be. In Figure One and Figure Two terms, this would have meant that every (independent) port in the E.U. should at least in theory have competitive rail entry from all national freight operators. Moreover, as the Commission’s policy has evolved, it should be possible for each E.U. port to enjoy access by multiple private operators as well. In practice, the programs of several railways, notably DB Holding and Railion, pose a paradox. DB’s action to acquire many other freight operators in Europe, without fully breaking the connection with infrastructure (in Germany) poses a threat of a number of the kinds of reduction of competition, both by merger and by linkage, that would reduce freight rail competition in the E.U., not only in port access, but across much of Europe as well. In addition, ownership of, for example, both the old DB cargo and the old NS Cargo, could expose the ports of Rotterdam and Hamburg (for example) to a single rail carrier with clearly mixed and less than transparent motives. It is worthwhile asking again who is competing and for what in assessing the future structure of the E.U. rail freight sector, both through ownership and access charges.

At least in RSA and Turkey, integration and merger probably did reduce competition, and the economies have paid a significant price through underinvestment and inefficiency. A reasonable suggestion is that both mergers and the various levels of “integration” ought to be subject to a reasonable burden of proof. While it seems likely that many kinds of integration will be justifiable, this cannot be taken on faith.

As an example of what rail versus rail competition can do, for ports, railways and the logistics system, it is interesting to cast a brief glance at the US railways since the Staggers Act deregulated the system.

Prior to the deregulation, the Interstate Commerce Commission (ICC – now called the STB, or Surface Transportation Board) had tightly controlled almost all aspects of rail competition, including tariffs and mergers. In 1981, in the first year of deregulation, there were 37 private rail freight companies, and the average tariff charged was about US\$0.0429 per tonne-Km (in 2006 constant \$). By 2006, the average freight tariff had fallen to US\$0.0194 per tonne-Km, a 55 percent reduction in constant terms. This was not just an artifact of the increase in coal shipments based on cheaper Western coal (coal rates fell by over 61 percent), but was felt in all commodities, including containers (reduction of about 46 percent in real terms), with percentage reductions ranging from 28 to 51 percent in real terms.

After deregulation, a number of major things happened: first, the railways employed innovative technology in order to improve the efficiency of labor and capital; second, a number of operating methods were adopted (especially unit trains) that permitted much higher efficiency; third, tariff innovations, especially contract tariffs²¹ where railways could invest in support of guaranteed volumes, permitted a much more direct relationship between what the railway could sell and the customer wanted to buy. Finally, in apparent contradiction of the need for more competition, the number of Class I (large) railways was allowed to decrease through merger from 37 to 9, largely because the railways successfully argued that these would mostly have an end-to-end effect increasing length of haul and increasing competitiveness with trucks rather than being side-to-side mergers which would reduce rail competition. At least in this case, largely end-to-end mergers (linkage) did increase competition, with major benefits for the economy.

NOTES

1. It is worth noting that common ownership does not necessarily guarantee integration. In many cases conglomerates are notorious for having poorly coordinated or even competing subsidiaries.
2. Some countries generate up to 40 percent of their total government revenues from import duties.
3. These Figures are considerably simplified purely for the purpose of highlighting the major possibilities of competition and integration or merger. In particular, Figure Two could be expanded to show three ports or more, multiple hinterlands, etc. In addition, for simplicity, both Figures look at inbound flow on a ship entering a port in the country of destination. It does not show the mirror image system in the country of origin. For simplicity these Figures look at a one-way flow: obviously all flows could be reversed. Finally, pipelines are excluded from the Figures because they are significant only in bulk flows: in some ports and countries this is a significant share of tonnage and value sent through the overall logistics chain.
4. Not all possibilities for horizontal competition exist in all cases. Small ports may have only one liner and one set of handling facilities in any case. Few ports (the larger U.S. ports might be the exception) have competing railways, but most ports have competition among trucking companies. Not all ports have inland water services.
5. In fact, there was a point at which one railway company, CSX in the U.S., did own deep ocean and inland water shipping, and did control certain port facilities.
6. Because Transwerk has only one customer (Spoornet) and Spoornet only one supplier of maintenance services, it is difficult to say what Transwerk's performance would be if it were an arm's length entity.
7. NFLS, p. 4.
8. The last year in which Transnet published a Divisional Report for Spoornet was in 2004. In 2004, the labor productivity for the Coal Export line was given as 13.86 million TU/Employee, with the productivity of the Iron Ore line at 24.99 million TU/Km, and the GFB shown as 1.49 million TU/Km. It should be noted, however, that even the 1.49 million level shown for the GFB exceeds most E.U. railways, probably because the GFB did not involve passenger services whereas most E.U. railways carry a high percentage of passenger traffic. See Spoornet 2004, pg 60.
9. 50 KV traction is actually unusually high, but is possible in this application because the space around the railway permits higher clearances.
10. NFLS, p. 24.
11. NFLS, p. 20.

12. NFLS, p. 8.
13. NFLS, p. 8.
14. The Port of Ambarli, the largest container facility in Turkey, has been private (Zeybek 2008, Table 3)
15. TCDD Istatistik Yilligi, p. 108, p. 109.
16. TCDD 2007 lists the Izmir throughput at 898 000 TEU, whereas Zeybek, 2008, states that the capacity of Izmir is only 443 000 TEU. The source of this discrepancy is not clear. In addition, according to Zeybek, the capacity of Ambarli is 1.5 million TEU, making it the largest container port in Turkey.
17. World Bank 2005, p. 3.
18. World Bank 2005, p. 29.
19. World Bank 2005, p. 29, p. 30.
20. It is interesting to note that Transnet's monopoly ownership of the pipelines in RSA actually produced even higher operating income ratios than in the ports – money that also did not yield adequate maintenance of the pipelines, let alone the ports or railways.
21. The ICC had ruled that contract tariffs were illegal, before the Staggers Act.

Table 1. Transnet Revenue and EBITDA* Table by Division
(Millions of Rand)

	2006				2007			2008		
	Revenue	EBITDA	EBITDA %	Return on Net Assets (%)	Revenue	EBITDA	EBITDA %	Revenue	EBITDA	EBITDA %
Freight Rail (Spoornet)	14,055	2,910	20.7	8.8	14,574	3,522	24.2	16,598	5,151	31.0
Rail Engineering (Transwerk)	3,645	738	20.2	48.6	7,310	1,088	14.9	8,156	1,188	14.6
National Ports Authority (NPA)	5,438	4,242	78.0	24.9	6,107	4,628	75.8	6,843	5,198	76.0
South African Ports Organization (SAPO)	3,585	1,193	33.3	29.7	4,098	1,561	38.1	4,843	1,810	37.4
Pipelines (Petronet)	1,060	860	81.1	16.3	1,218	931	76.4	1,292	990	76.6
Total	26,034	10,301	39.6	16.7	26,889	11,149	41.5	30,091	13,185	43.8

* Earnings Before Interest, Depreciation and Amortization

Note: most recent exchange rates have been: one Euro=13.251 Rand, and one US\$=10.2415 Rand. PPP\$ multiplier is ~2.5

Source: Transnet Annual Reports 2006, 2007, 2008.

Return on net assets is not available after 2006. Red, italicised numbers are estimated.

Table 3. South African Ports

	Functions		Commodities	Percent of Tonnage*
	Public	Private		
Richards Bay	Break Bulk, Bulk, Containers	Bulk	Coal, Steel, Iron Ore, Other	48
Durban	Containers, Bulk, Break Bulk	Break Bulk, Bulk	Steel, Granite, General Cargo	24
Saldanha	Break Bulk, Bulk	Bulk, Break Bulk	Iron ore, other ores	16
Cape Town	Containers, Bulk, Break Bulk	Break Bulk, Bulk	General Cargo, Fruit, Timber, Meat and Fish	6
Port Elizabeth	Break Bulk, Bulk, Containers	None	Ores, Fruit, Scrap	4
East London	Break Bulk, Bulk, Containers	None	Cars and parts, General Cargo	1
Mossel Bay	Bulk, Break Bulk	Liquid Bulk	Oil, General Cargo	1

* Export tonnage is about 122 Million Tonnes, Imports are about 39 million Tonnes.

Source: National Freight Logistics Study

Table 4

General Profitability Analysis of TCDD operations (millions of constant 2007 US\$)

	\$2,000.00	\$2,001.00	\$2,002.00	\$2,003.00	\$2,004.00	\$2,005.00	\$2,006.00	\$2,007.00
Suburban Passengers								
Expenses	\$ 64.31	\$ 57.20	\$ 58.64	\$ 45.72	\$ 58.36	\$ 59.05	\$ 54.00	\$ 53.38
Revenues	\$ 43.62	\$ 38.51	\$ 36.14	\$ 33.00	\$ 34.42	\$ 40.98	\$ 42.88	\$ 42.32
Net Loss	\$ 20.69	\$ 18.69	\$ 22.50	\$ 12.71	\$ 23.94	\$ 18.07	\$ 11.12	\$ 11.06
Revenues/Expenses (%)	\$ 67.83	\$ 67.32	\$ 61.63	\$ 72.19	\$ 58.98	\$ 69.39	\$ 79.40	\$ 79.28
Mainline Passengers								
Expenses	\$ 462.25	\$ 479.68	\$ 467.50	\$ 439.85	\$ 478.70	\$ 478.84	\$ 485.35	\$ 504.22
Revenues	\$ 81.19	\$ 83.34	\$ 83.95	\$ 81.76	\$ 74.81	\$ 80.79	\$ 81.43	\$ 84.00
Net Loss	\$ 381.07	\$ 396.34	\$ 383.55	\$ 358.09	\$ 403.89	\$ 398.05	\$ 403.92	\$ 420.22
Revenues/Expenses (%)	\$ 17.56	\$ 17.37	\$ 17.96	\$ 18.59	\$ 15.63	\$ 16.87	\$ 16.78	\$ 16.66
Total Passengers								
Expenses	\$ 526.57	\$ 536.87	\$ 526.14	\$ 485.56	\$ 537.06	\$ 537.89	\$ 539.36	\$ 557.60
Revenues	\$ 124.81	\$ 121.84	\$ 120.09	\$ 114.76	\$ 109.23	\$ 121.77	\$ 124.31	\$ 126.32
Net Loss	\$ 401.76	\$ 415.03	\$ 406.05	\$ 370.80	\$ 427.83	\$ 416.12	\$ 415.05	\$ 431.28
Revenues/Expenses (%)	\$ 23.70	\$ 22.69	\$ 22.82	\$ 23.63	\$ 20.34	\$ 22.64	\$ 23.05	\$ 22.65
Freight								
Expenses	\$ 909.31	\$ 744.91	\$ 812.64	\$ 765.36	\$ 818.92	\$ 880.45	\$ 887.75	\$ 880.44
Revenues	\$ 205.34	\$ 187.31	\$ 209.03	\$ 231.10	\$ 256.88	\$ 271.13	\$ 275.79	\$ 281.08
Net Loss	\$ 703.97	\$ 557.60	\$ 603.61	\$ 534.27	\$ 562.04	\$ 609.32	\$ 611.96	\$ 599.36
Revenues/Expenses (%)	\$ 22.58	\$ 25.14	\$ 25.72	\$ 30.19	\$ 31.37	\$ 30.79	\$ 31.07	\$ 31.92
Total Railway								
Expenses	\$1,435.88	\$1,281.78	\$1,338.78	\$1,250.93	\$1,355.98	\$1,418.34	\$1,427.11	\$1,438.04
Revenues	\$ 330.15	\$ 309.15	\$ 329.12	\$ 345.86	\$ 366.12	\$ 392.90	\$ 400.10	\$ 407.40
Net Loss	\$1,105.73	\$ 972.64	\$1,009.66	\$ 905.07	\$ 989.86	\$1,025.44	\$1,027.01	\$1,030.64
Revenues/Expenses (%)	\$ 22.99	\$ 24.12	\$ 24.58	\$ 27.65	\$ 27.00	\$ 27.70	\$ 28.04	\$ 28.33

Port Services								
Expenses	\$ 229.45	\$ 205.52	\$ 204.29	\$ 181.17	\$ 190.55	\$ 202.86	\$ 188.54	\$ 166.09
Revenues	\$ 369.91	\$ 378.76	\$ 418.57	\$ 359.88	\$ 342.17	\$ 333.61	\$ 360.98	\$ 257.38
Net	\$ (140.45)	\$ (173.24)	\$ (214.28)	\$ (178.71)	\$ (151.62)	\$ (130.75)	\$ (172.44)	\$ (91.29)
Revenues/Expenses (%)	\$ 161.21	\$ 184.29	\$ 204.89	\$ 198.64	\$ 179.57	\$ 164.45	\$ 191.46	\$ 154.96
Grand Total TCDD								
Expenses	\$1,665.33	\$1,487.30	\$1,543.07	\$1,432.10	\$1,546.53	\$1,621.20	\$1,615.65	\$1,604.13
Revenues	\$ 700.06	\$ 687.91	\$ 747.69	\$ 705.74	\$ 708.29	\$ 726.51	\$ 761.09	\$ 664.77
Net Loss	\$ 965.28	\$ 799.40	\$ 795.38	\$ 726.36	\$ 838.24	\$ 894.69	\$ 854.56	\$ 939.35
Revenues/Expenses (%)	\$ 42.04	\$ 46.25	\$ 48.45	\$ 49.28	\$ 45.80	\$ 44.81	\$ 47.11	\$ 41.44
Total Subsidies paid by Government	\$ 257.75	\$ 381.10	\$ 368.18	\$ 360.96	\$ 407.63	\$ 430.42	\$ 462.34	\$ 446.89
Output (000,000)								
Tonne-Km	\$9,761.00	\$7,486.00	\$7,169.00	\$8,669.00	\$9,417.00	\$9,152.00	\$9,676.00	\$9,921.00
Passenger-km								
Suburban	\$1,592.00	\$1,355.00	\$1,265.00	\$1,295.00	\$1,328.00	\$1,375.00	\$1,399.00	\$1,473.00
Intercity	\$4,215.00	\$4,149.00	\$4,017.00	\$4,583.00	\$3,835.00	\$3,661.00	\$3,878.00	\$4,080.00
TOTAL	\$5,832.00	\$5,568.00	\$5,282.00	\$5,878.00	\$5,163.00	\$5,036.00	\$5,277.00	\$5,553.00
Revenue/Tonne-Km (US\$)	\$ 0.02	\$ 0.03	\$ 0.03	\$ 0.03	\$ 0.03	\$ 0.03	\$ 0.03	\$ 0.03
Revenue/Passenger-Km (US\$)								
Suburban	\$ 0.03	\$ 0.03	\$ 0.03	\$ 0.03	\$ 0.03	\$ 0.03	\$ 0.03	\$ 0.03
Intercity	\$ 0.02	\$ 0.02	\$ 0.02	\$ 0.02	\$ 0.02	\$ 0.02	\$ 0.02	\$ 0.02
Traffic Index: 1990=100								
Freight	\$ 123.32	\$ 94.58	\$ 90.57	\$ 109.53	\$ 118.98	\$ 115.63	\$ 122.25	\$ 125.34
Suburban	\$ 54.32	\$ 46.23	\$ 43.16	\$ 44.18	\$ 45.31	\$ 46.91	\$ 47.73	\$ 50.26
Mainline	\$ 121.16	\$ 119.26	\$ 115.46	\$ 131.73	\$ 110.23	\$ 105.23	\$ 111.47	\$ 117.28

Conversion Factor 1.26 Million Lire/US\$

Source: TCDD, Istatistik Yilligi, various issues

Table 5. TCDD Ports (2007)

	General Cargo, Break Bulk (000 tonnes)	Containers (000 tonnes)	Containers (000 TEU)	Tonnes Handled (000)		Total	Percent tonnes
				Outbound	Inbound		
Haydarpasa	651	3277	397	1376	2552	3928	10.7
Derince	3027	4	1	845	2186	3031	8.3
Samsun	1616	0	0	2276	3329	5605	15.3
Mersin	3177	2428	232	367	1480	1847	5.1
Iskenderun	1846	0	0	538	1078	1616	4.4
Bandarma	8465	0	0	3799	4666	8465	23.2
Izmir	3210	8858	898	7740	4328	12068	33.0
Totals	21992	14567	1528	16941	19619	36560	100.0

Source: TCDD Annual Statistics, 2007, pg 75,76

Horizontal and Link Competition with One Port

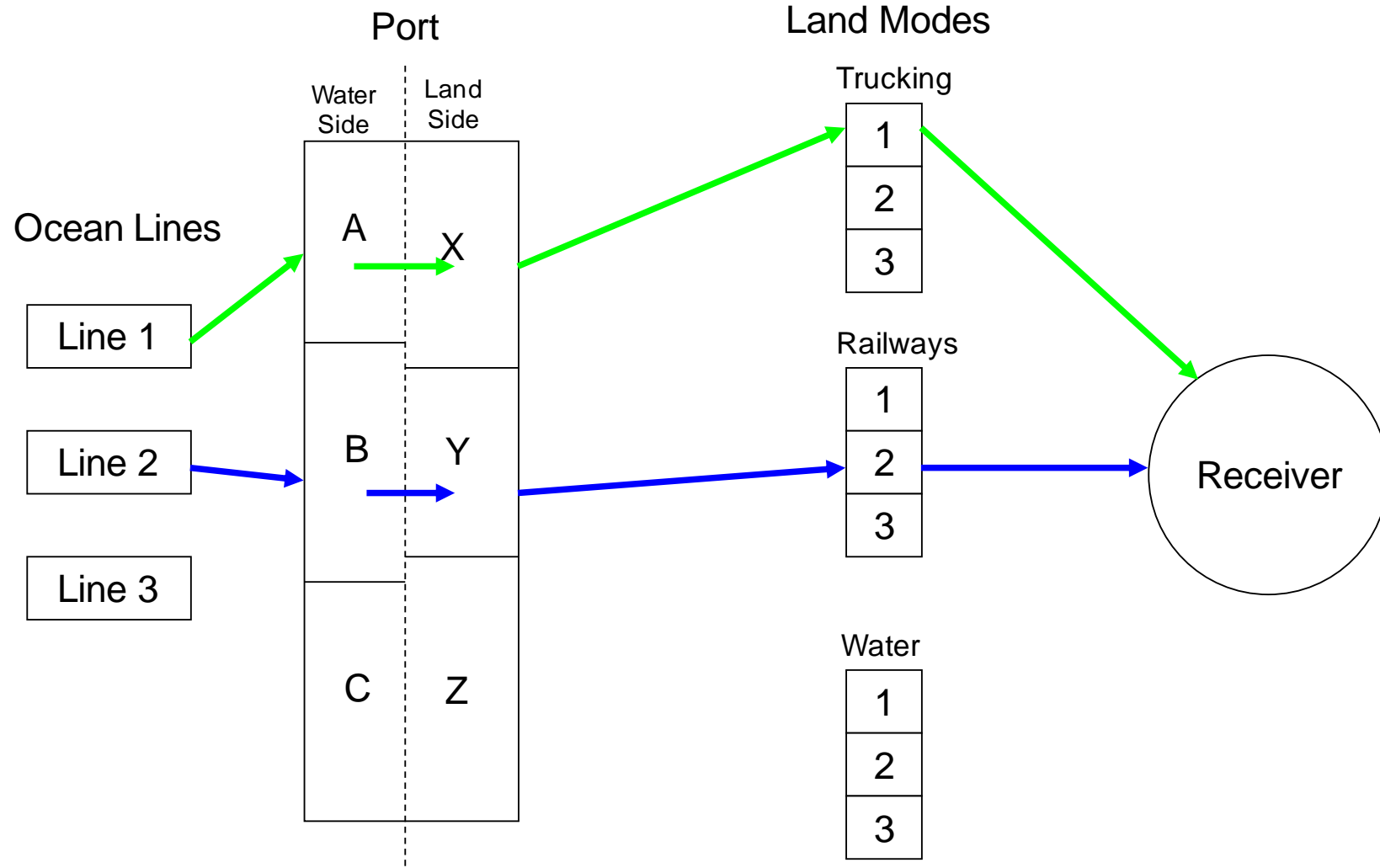


Figure One

Port and Hinterland Competition

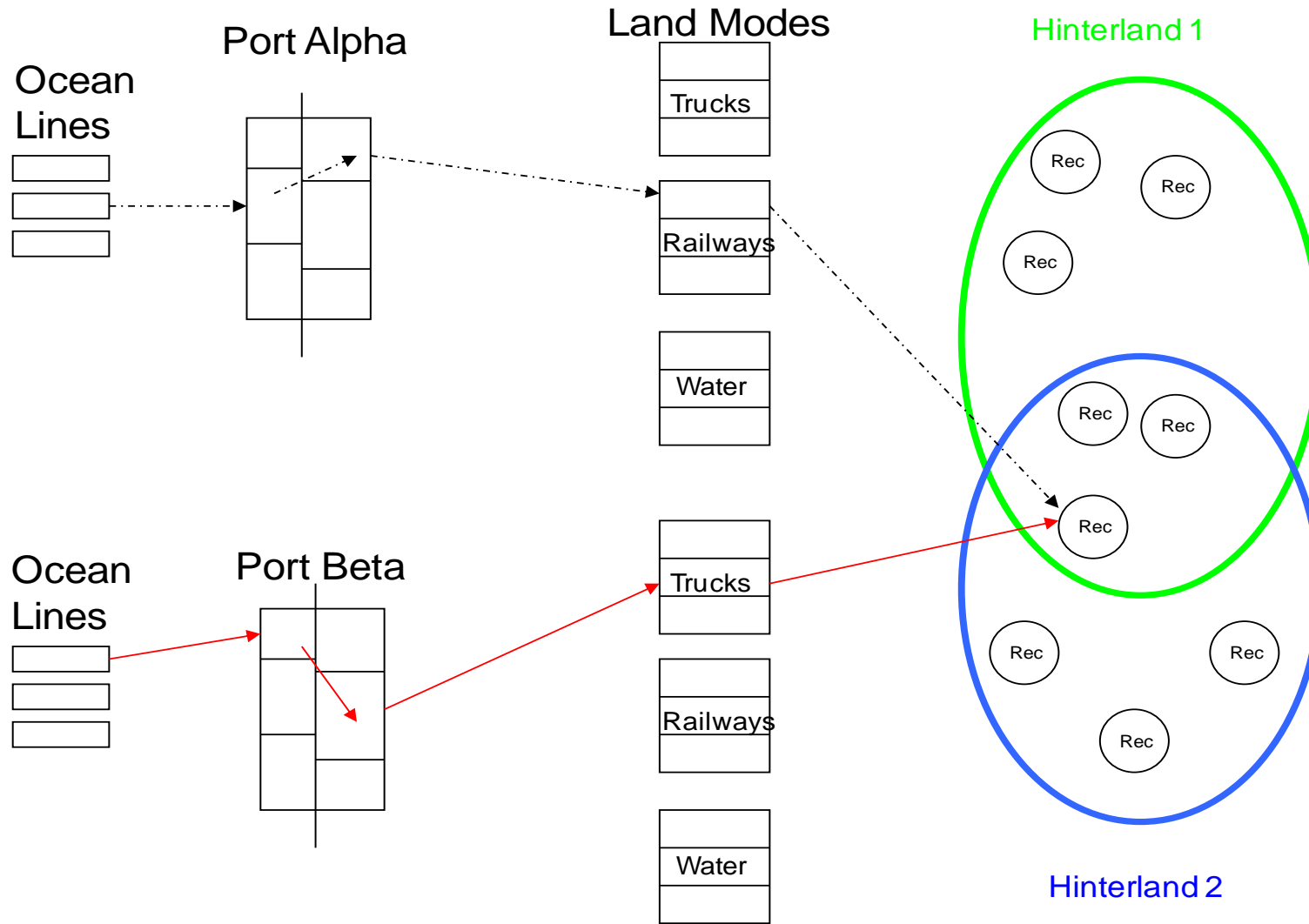


Figure Two

Figure 3

RSA Transport Network

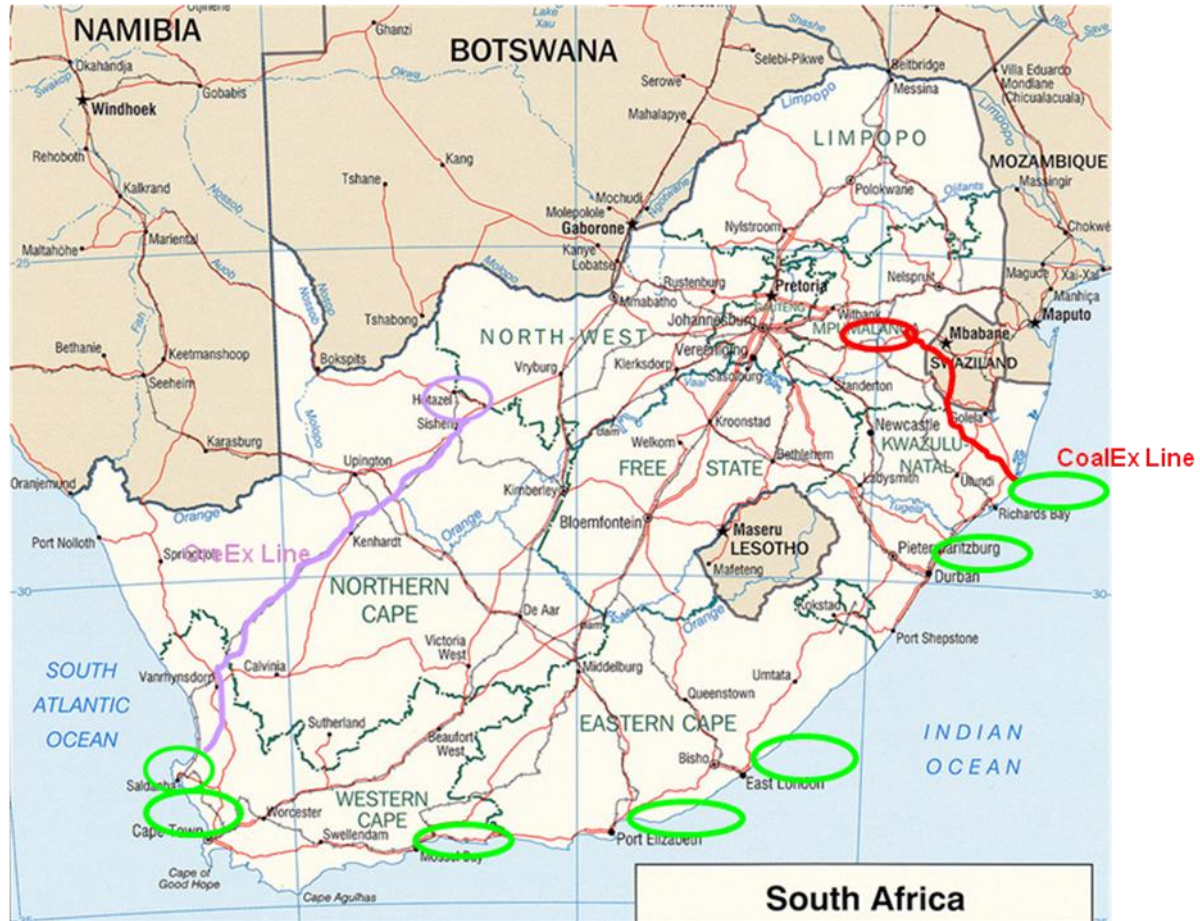
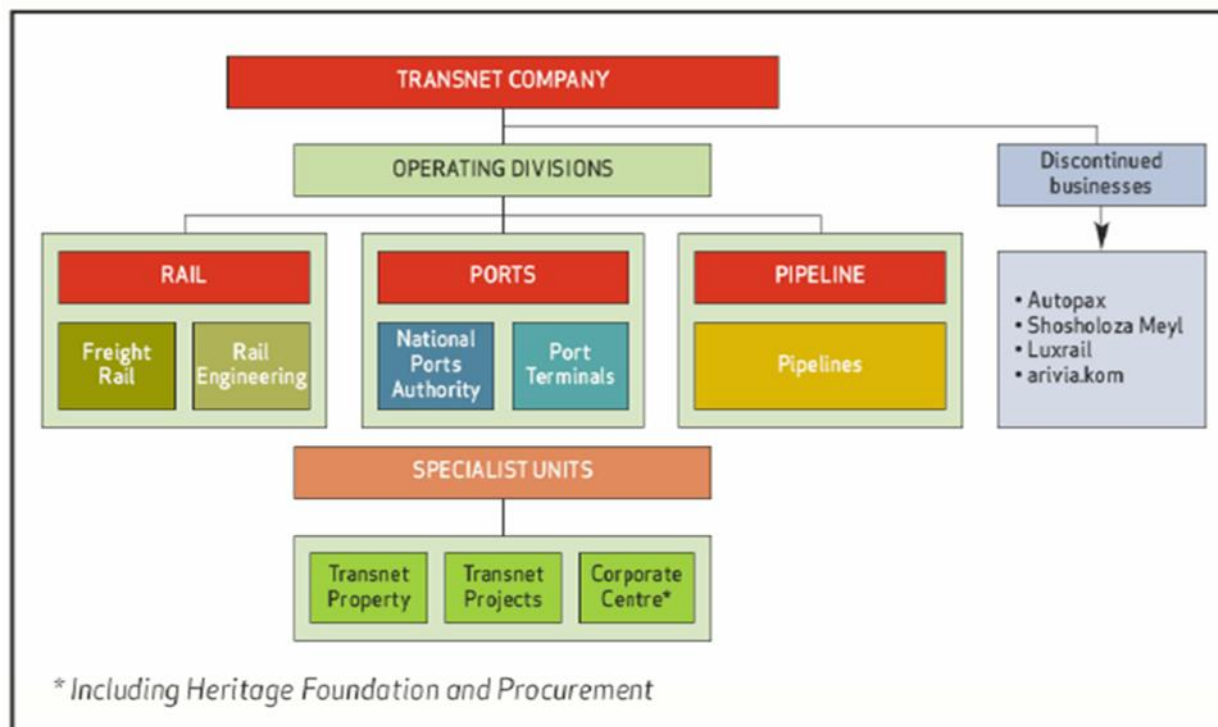


Figure 4

The Structure of RSA Rail, Ports and Pipelines

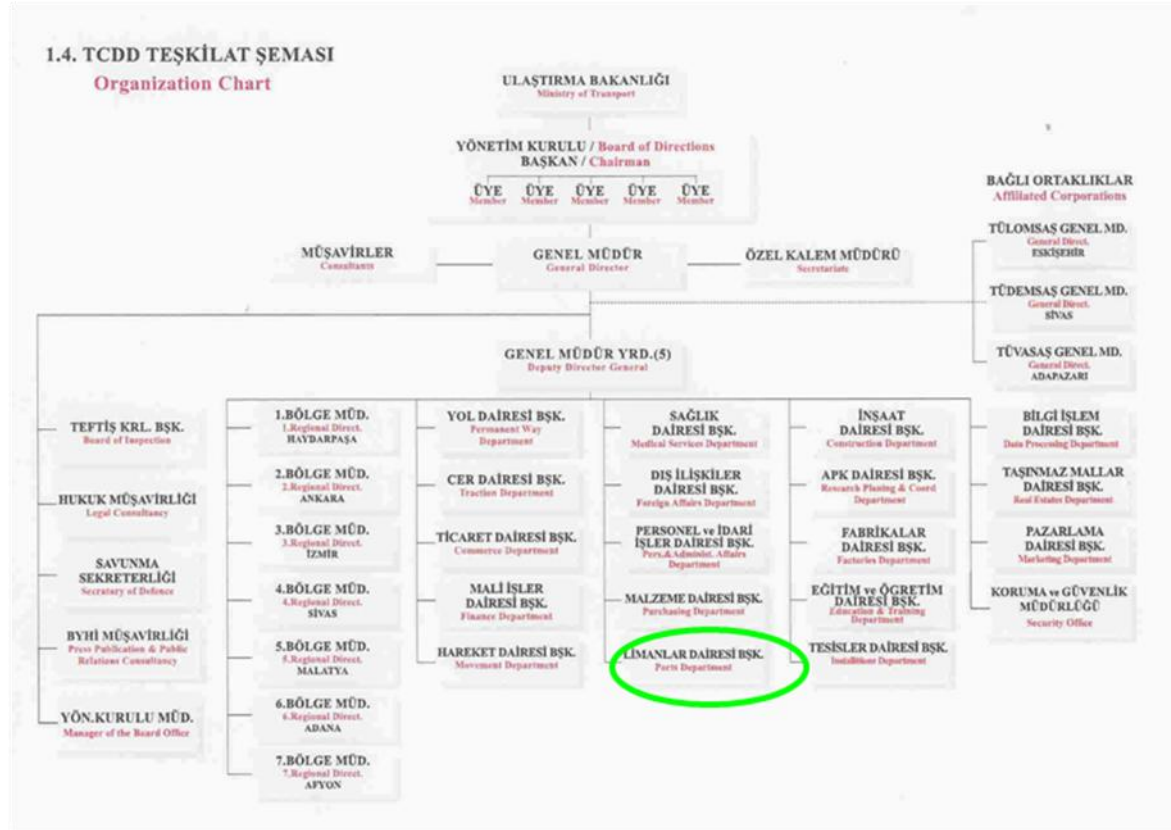


Source: Transnet Annual Financial Results, 31 March 2008

Figure 5



Figure 6



Source: TCDD İstatistik Yıllığı 2003-2007

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