CHAPTER 2

Port Development in Africa

With approximately 80 percent of world merchandise trade carried by ships, maritime transport remains by far the most common mode of international freight transport. It is the backbone to facilitating international trade, offering the most economical and reliable way to move goods over long distances. Ships can carry large volumes of merchandise and use free highways in the seas, which only require infrastructure investments at the seaports. For all countries, how ports perform is an essential element of overall trade costs, as identified in Chapter 1. This is especially the case for Africa, as 15 of its countries are landlocked and face severe infrastructural and trade facilitation problems. For the landlocked nations, ports — together with the inland waterway and land infrastructures (railroads and highways) — constitute a crucial link to the outside world and to the global marketplace. Consequently, high transport-related costs

represent a fundamental constraint to these LLDCs' global competitiveness and their sustained economic growth.

It is generally recognized that the African continent lacks natural ports, while its artificial seaports have been poorly developed (UNCTAD, 1999; Wood, 2004; Hoyle, 1999). African ports became more congested following the rise in GDP growth and levels of global trade witnessed in most African countries in the years leading up to the global financial crisis of 2008. Indeed, over the last decade, the amount of cargo transiting through Africa's ports has tripled, but containerization is still low and the inland transportation linkages remain weak (World Bank, 2009). Nonetheless, as discussed in this and the following chapters, governments are now demonstrating the political will necessary to confront this challenge, in a drive to improve port and other infrastructure. For example, several ports have introduced, or renovated, container and cargo transshipment and bulk terminal (for coal, oil, food and mineral) facilities. This has greatly improved port performance and efficiency, for example in Egypt following the regulatory reforms of 2000.[1]

This chapter assesses port development and performance throughout Africa (Annex 2.1 gives a detailed description of seaports across the continent). It establishes the areas where improvements in port logistics and, more generally, infrastructure, are urgently needed. However, port development in its broadest sense covers not only the development of infrastructure and superstructure, but also environmental concerns. Africa has some 40,000 km of coastline, extending over 32 countries. Port development and activities should not have a harmful environmental impact on land, nor lead to a deterioration in the marine environment through pollution. The African Development Bank Group has an Environment Policy in place to mitigate the potential negative impacts of its projects and programs, including those in the infrastructure sector, and to mainstream environmental and sustainability safeguards throughout the project cycle (see Box 5.2). In this way, the Bank seeks to ensure that all its port development projects conform to international best practice, including the International Maritime Organization (IMO) Convention on Marine Pollution (MARPOL 73/78).

Following this introduction, the next section of this chapter describes the *infrastructure characteristics* of a seaport, which can be divided into two categories or assets: (i) its physical or "hard" infrastructure and (ii) its organization or "soft" infrastructure. The analysis helps to situate African ports within a global context. The subsequent section deals with the capacity and overall efficiency of African seaports, which are generally shown to be among the least efficient in the world, although on a

[1] Before the reforms in early 2000, the World Bank (1998) reported that customs and other clearance procedures at Egyptian ports delayed cargoes by 5–20 days, compared to 1–2 days in more efficient ports. This resulted in high storage costs and damage to cargo, which overall were costing the Egyptian economy about US$1 billion per annum. After the reforms of 2000, Egypt developed one of the most efficient ports in Africa: the time to export decreased from 27 to 10 days between 2006 and 2009, and the time to import from 29 to 25 days over the same period (*Doing Business* website of the World Bank).

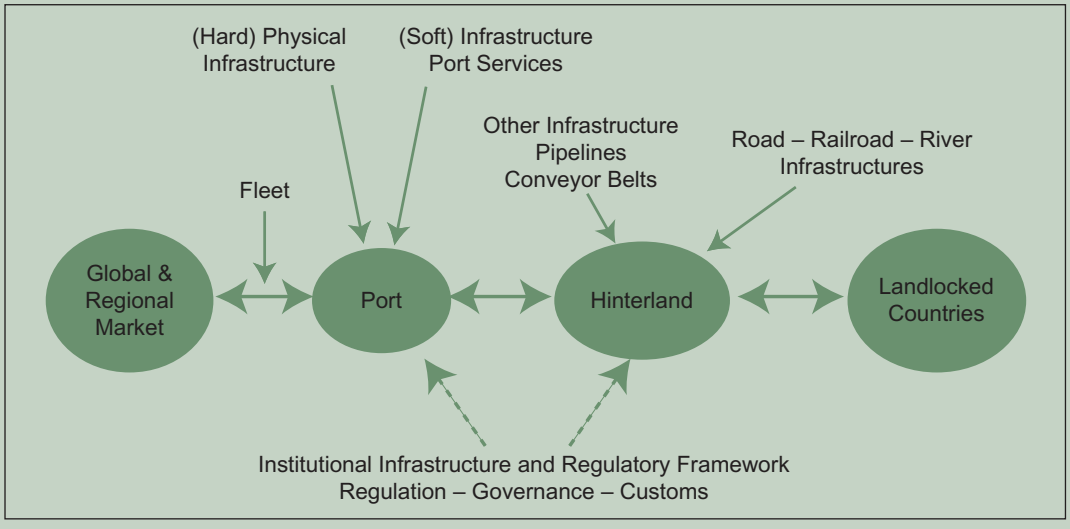
par with ports in other low-income countries in other global regions. African ports' poor performance can be attributed to a range of factors, principally: geography (poor connectivity); inadequate physical infrastructure resulting in congestion; and weak institutional development (reforms and institutional development are covered in Chapter 3). We then turn to the recent investments for regeneration and expansion in port physical infrastructure. Conclusions and recommendations close the chapter.

What Is a Seaport?

A port lies at the heart of the logistics supply chain, linking a country with its trading partners (Figure 2.1). This is especially the case for Africa, which relies on maritime shipping as its principal mode of transportation for both primary and manufactured goods destined for export. Ports are an infrastructure facility allowing goods to be loaded/unloaded, stored, and transferred for inland delivery via other transport modes, such as trucks, trains, or inland waterway vessels. Ports usually have deepwater channels or berths, as well as storage facilities, which determine how much cargo the port can handle and the type and capacity of vessels it can receive.

With the exception of some export processing zones (EPZs) that are located in the vicinity of ports, cargo and merchandise leaving ports come from the hinterland via the infrastructures identified in Figure 2.1. To function properly, the links between ports and the hinterland must operate smoothly to avoid bottlenecks in the ports'

Figure 2.1: Ports at the heart of the logistics supply chain



entrepôts and to minimize dwell times.[2] The quality of a port's physical infrastructure and related services is an important determinant of its overall efficiency. However, as also indicated in Figure 2.1, equally important in this regard is the institutional and regulatory infrastructure.

Hard and Soft Infrastructure in Seaports

To function efficiently and to maximize its potential, a port needs two types of assets: (i) the "hard" physical infrastructure (seaport infrastructure and superstructure facilities for loading and unloading) and (ii) the "soft" infrastructure, which includes all the administrative and customs services necessary to facilitate the transit of goods, plus the supportive information and communications technologies (ICT). The overall efficiency of a port therefore depends directly on the quality of both its hard and soft infrastructure as well as the institutional framework (the number of documents to be completed by shippers and importers; the functioning of customs administration). This chapter concentrates on the efficiency effects related to the hard infrastructure and port services, while Chapter 3 deals with the institutional and soft infrastructure.[3]

- **Seaport infrastructure** provides oceangoing vessels with the necessary facilities to come within reach of the land. It comprises deepwater channels and berths where the ships and other floating craft can tie up alongside, in order to load/unload goods. Harbors require a sufficient depth of water to receive large ships; the size and design of berths vary according to their purpose. For instance, container berths are designed to service containerized cargoes. The hard infrastructure mentioned in Figure 2.1 is essential to the overall efficiency of a port, as it ensures access to intermodal transportation through connections to roads, railroads, and inland waterways. A seaport also needs inside railroad terminals or lines, and road access to the major transport corridors.
- **Seaport superstructure** includes all the facilities aimed at loading and unloading ships, and moving goods to and from other modes of transport. As they approach and leave the docks, large ships are usually moved in tight quarters by harbor pilots and tugboats. The superstructure provides ancillary services like fuel, water, cleaning, and repair services.

[2] "Dwell time" is the time cargo remains in a terminal's in-transit storage areas, while awaiting shipment (for exports) or onward transportation by road/rail (for imports). Dwell time is one indicator of a port's efficiency: the higher the dwell time, the lower the efficiency.

[3] Although all aspects of port efficiency are interdependent in the determination of a port's overall performance, it is convenient to examine the factors identified in Figure 2.1 separately. Therefore Chapter 3 focuses on the role of the regulatory and institutional framework, while Chapter 4 covers the behind-the-border aspects of trade costs (connecting ports to markets).

PORT INFRASTRUCTURE

Berth at the cargo terminal of the Port of Alexandria

Source: Alexandria Port Authority.

Storage area at the International Container Terminal in El Dekheila, Port of Alexandria

Source: Alexandria Port Authority.

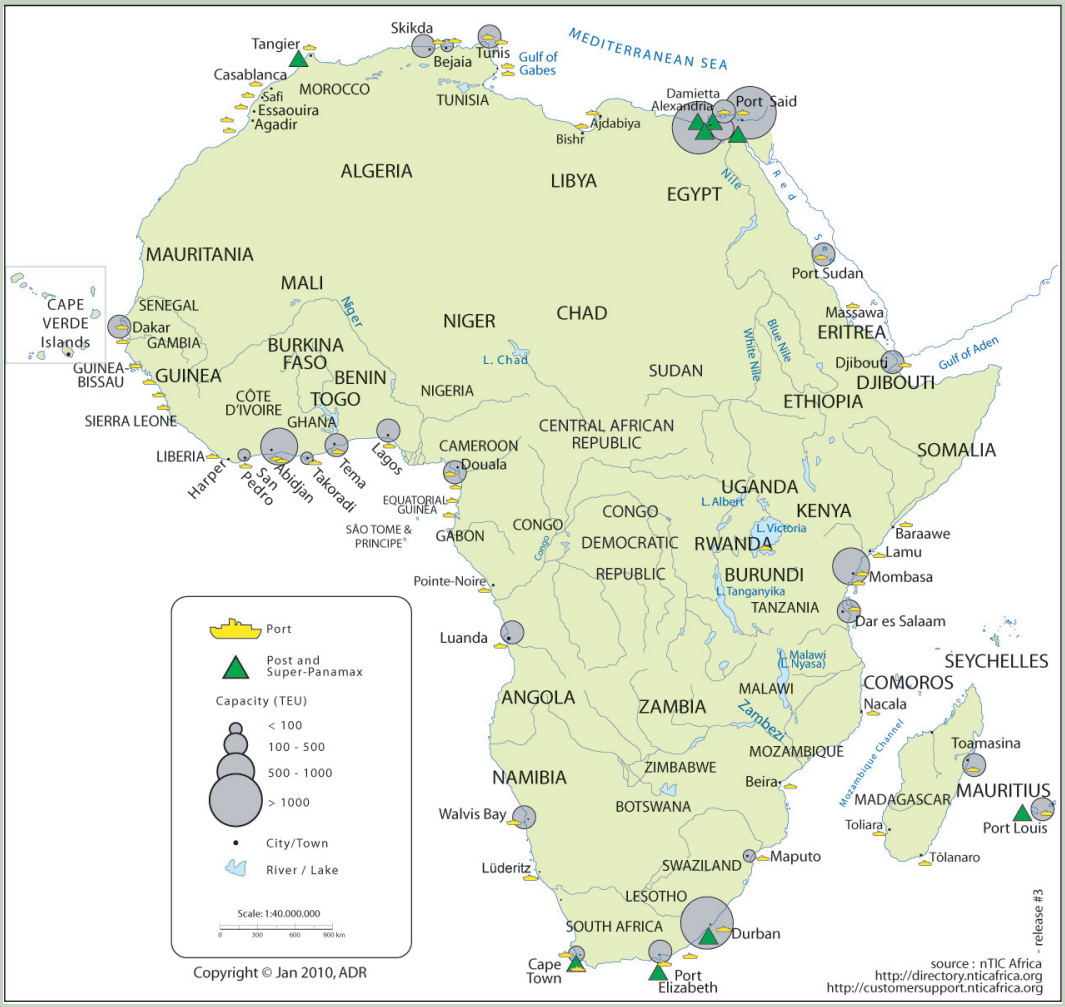
Post-Panamax cranes to unload/load container ships

Source: Port Management Association of Eastern and Southern Africa, PMAESA.

Reachstacker handling containers

Source: Port Management Association of Eastern and Southern Africa, PMAESA.

Map 2.1: African ports and their characteristics



- **Port administration** organizes and oversees the movement of ships and goods. When ports handle international traffic, customs facilities are also part of the port assets. The administration services include regulation of consignees, import/export documents and permits, phytosanitary certificates, and administration of taxes. As part of the port administration, information and communication technologies contri-

bute to the speed with which goods transit through ports. This includes information systems, electronic databases, and platform management software.

Categorization and Location of African Seaports

Ports are categorized based on their functions and the type of goods they handle, e.g. general cargo ports, hub ports, feeder ports, bulk ports, transshipment terminals, dedicated oil terminals, and river ports (see Map 2.1). These are discussed individually below in Box 2.1.

Capacity and Efficiency of African Ports

African ports often work beyond their capacity limits. Indeed, capacity shortfalls are reported for all Sub-Saharan maritime trading areas (Cameron, 2008). This is partly due to the fact that demand for resources such as oil — which have also led to growing economic activity — have scaled up the demands being placed on ports. However, port capacity and port logistics have not kept up with increasing traffic across most of Africa, causing severe challenges such congestion. As detailed in Box 2.2, this congestion is attributable to several factors, including deficient physical infrastructure, malfunctioning regulatory systems, and poor management. These factors translate into poor port efficiency, raising trade costs in Africa.

African ships are usually old and small relative to evolving global shipping standards, which are shifting toward containerization and increased size. As Table 2.1 shows, by the end of 2005, the average age of the merchant fleet of African countries was 11.8 years, including those with open registry; and 20.5 years without a maritime open registry.[4] By comparison, ships registered in developed economies are the youngest (average age: 9.7 years in January 2008), followed by developing countries (12.3 years) and transition economies (15.5 years) (see Annex 2.2). Furthermore, in 2005 none of the 35 countries that controlled over 95 percent of the world merchant fleet was African (UNCTAD, 2006). In 2007, Africa accounted for only 0.58 percent of the world merchant fleet.

The small number of shipping operators in Africa hinders the development of synergies and stifles competition.[5] The national lines, which offer containerized transportation services, run fleets that usually comprise small and old vessels. Companies generally use multipurpose vessels, as exports (agricultural, natural resources) are usually shipped unprocessed. This situation further contributes to the marginalization of Africa from international markets.

[4] "Open registry" is a national ship registry — under a national flag — open to ships of all nations, regardless of nationality.

[5] Hummels *et al.* (2009) estimate that, after controlling for other factors such as costs related to cargo size, eliminating market power for ships en route to the US from Latin American ports would increase trade volume by 15 percent for Latin American countries. One can surmise that gains in trade volumes would be even higher for Africa, as fewer ships call on African ports.

Box 2.1: Types of ports according to function

General Cargo Ports are medium-sized ports (including container terminals) with a large enough volume to attract frequent direct vessel calls. Volumes are typically between 2–10 million tonnes p.a. and 100,000–500,000 TEUs p.a. Examples of general cargo ports include Port Elizabeth in South Africa and Walvis Bay in Namibia. Most general cargo ports have ambitions to expand into regional hubs.

Hub Ports are large regional ports, with high volumes of direct large-vessel calls. They service a large catchment area, which also serves the smaller regional ports by transshipping containers and general cargo in smaller vessels. Typical examples are Durban in South Africa and Port Said in Egypt. These two ports are ranked among the 60 largest ports in the world in terms of container volume throughput (over 2 million TEUs p.a.).

Feeder Ports are normally smaller ports with limited vessel calls and depth restrictions. They are unable to attract many direct vessel calls because of the small volumes of trade they handle (generally less than 100,000 TEUs p.a.). These ports are mostly fed by smaller coastal services from the regional hub ports. The Mozambican and Angolan ports and many of the West African ports are typical examples. The feeder service and the double handling of containers add to the overall logistics costs.

Bulk Ports are mainly dedicated to handling large volumes of bulk materials, accommodating capesize vessels,[6] with depths of 18–25 m, generally without dedicated container terminals. Typical examples are Richards Bay (coal) and Saldanha Bay (iron ore) in South Africa and Port Saco in Angola and Buchanan in Liberia, both handling iron ore.

Transshipment terminals or ports are large container terminals where cargo is transferred from one carrier to another, or from one type of vessel to another. Examples of transshipment terminals include the ports of Algiers, Durban, Mombasa, and Djibouti. Transshipment terminals handle very large container vessels (above 6,000 TEUs), which very few African ports can handle. Vessels of more than 15,000 TEUs are now in service and these vessels require a quayside depth of 16–18 m (such as Singapore port, and Salalah in Oman). The new port of Ngqura in South Africa, with a depth of 16 m, has been developed as a transshipment port and will receive large vessels from the east and transship to smaller vessels for the East and West African coasts.

Dedicated oil terminals handle crude oil which is most often transported in large capesize vessels of 120,000 to 150,000 dwt, which require greater water depths than can be provided at any of the African ports currently. Oil tankers are mostly handled at offshore moorings which are linked to landside storage tanks via submarine pipelines. This is the case for the ports of Durban in South Africa, Dar es Salaam in Tanzania, and Cabinda in Angola. Some ports, such as Cape Town in South Africa, have dedicated tanker basins.

River Ports are generally small and isolated, and do not serve oceangoing vessels. One notable exception is Matadi port in the Democratic Republic of Congo (DRC), which is 150 km from the coast and serves as the country's main port, but with restricted depth. There is currently a project proposal for the development of a port on the Zambezi/Shire River waterway to serve Malawi, which will require dredging of sections of the river system. However, this development is subject to an economic feasibility study and a positive outcome of an environmental impact assessment.[7]

[6] "Capesize vessels" are very large bulk carriers between 80–150,000 dwt, which used to be unable to transit the Suez Canal and were therefore forced to sail around the Cape of Good Hope to and from Europe. Now those vessels can transit through the Suez Canal as long as they meet the draft restriction (18.91 m/62 ft as of 2008).

[7] The Shire–Zambezi Waterway Project is described in Box 4.1.

Box 2.2: Port congestion in Eastern and Southern Africa

According to the Port Management Association of Eastern and Southern Africa (PMAESA), the factors leading to port congestion in Eastern and Southern Africa are:

- Increased container traffic volumes not consistent with infrastructure development, thus growth outstrips available capacity;
- Long container dwell times, caused by inter alia, poor off-take by rail and the use of ports as storage areas;
- Lack of adequate capacity and poor hinterland transport infrastructures, especially rail and road;
- Inadequate technology and aging, unsuitable equipment and vessels;
- Poorly integrated supply chains;
- Low productivity levels;
- Capacity constraints, for example insufficient container storage space;
- Poor planning such as overbooking of cargo by shipping lines, leading to cancelations and rollovers;
- Bunching of vessels and unscheduled arrivals;
- Changes in routing patterns, causing vessels to make shorter rotations;
- A change in container size from 20 ft to 40 ft;
- Resistance to change in management styles;
- Lack of communication between stakeholders;
- Cumbersome regulatory systems, decentralized documentation processes coupled with bureaucratic clearance procedures;
- General poor planning by the various cargo interveners.

Source: PMAESA (2008).

Table 2.1: Age distribution of African merchant fleet compared to those of other regions

Type	World Total	Developed Economies	Transition Economies	Developing Economies	African Countries including Open Registry[1]	African Countries without Open Registry[1]
Bulk carriers	12.7	11.9	17.8	12.7	14.0	18.0
Container ships	9.0	8.6	10.6	8.9	6.9	12.3
General cargo	17.1	13.4	20.0	17.6	17.3	22.1
Oil tankers	10.1	7.5	11.2	11.0	11.2	21.4
Other types	14.7	13.1	11.8	15.5	17.2	21.2
All	11.8	9.7	15.5	12.3	11.8	20.5

Note: (1) Data for African countries for year-end 2005; data for other countries at January 1, 2008.
Source: UNCTAD (2006; 2008).

Table 2.2: Port capacity and value of trade in Africa

Country	Total TEU Capacity	Ranking (1 to 16)	Trade: Imports + Exports (US$ mn)	Ranking (1 to 16)
Algeria	189,848	13	87,794	3
Angola	407,609	5	58,057	4
Cameroon	200,254	12	6,727	12
Djibouti	294,902	10	531	16
Egypt	4,755,879	1	56,324	5
Ghana	513,204	4	12,268	10
Kenya	585,367	3	13,070	9
Libya	44,202	16	54,720	6
Mozambique	62,516	15	6,000	15
Namibia	144,993	14	6,442	13
Nigeria	235,846	11	95,550	2
Senegal	375,876	6	6,123	14
South Africa	3,781,403	2	158,234	1
Sudan	359,537	7	17,654	8
Tanzania	301,579	9	7,508	11
Tunisia	349,507	8	34,009	7
China	*101,963,351*		*1,760,430*	
Brazil	*6,798,200*		*287,217*	

Sources: WTO database; Containerisation International Yearbook, 2009.
Note: Brazil and China given for comparative purposes.

African Regional Port Situation

The African port situation is characterized by large number of small ports, each with a capacity of less than 1 million TEUs. As shown in the detailed review of ports by subregion presented in Annex 2.1, capacity shortages are widespread, particularly in West and Central Africa.

It is important to note that countries with higher port capacity have higher trade capacity. However, the types of commodity that the country trades in terms of imports and exports also matters (Table 2.2). For example, Egypt is ranked number 1 in Africa in terms of port capacity and South Africa is ranked number 2. However, the value of trade in South Africa is higher than Egypt due to the type of exports, which are mainly expensive minerals such as platinum and gold. Moreover, the value can also be driven by the number of ports that the country services. In the case of South Africa, landlocked economies such as Botswana, Lesotho, Swaziland, Malawi, Zimbabwe, and Zambia depend on its ports, and this explains South Africa's higher trade volumes.

Egypt and South Africa have the highest port capacity in the continent, with Port Said in Egypt as the leading port (see Annex 2.1 for more details). Given that most of the countries in Africa start from a lower base in terms of port capacity, the industry has substantial economic and investment prospects going forward. The *Drewry Report* forecasts an annual growth rate of 2.5 percent in the African port subsector over the next six years, which is close to the global rate. In North Africa, in addition to Egypt's massive investment in the port subsector, other countries such as Morocco and Algeria have also scaled up their investments with the aim of transforming their ports into major transshipment hubs. Similarly, in the Southern Africa subregion, South Africa continues to expand in terms of port capacity to meet its growing demand both nationally and regionally. For example, the new deepwater Port of Ngqura became operational in 2009 to accommodate the latest generation of container ships. Other countries in the subregion, including Namibia and Mozambique, have also embarked on investment and rehabilitation activities in their port subsectors.

In Eastern Africa, the terminal in Djibouti offers the most modern facilities (i.e. for Panamax ships[8]) but needs further investment to increase capacity, particularly to accommodate the high transit volumes from Ethiopia. One of the major concerns in East Africa is the safety risk due to growing attacks by Somali pirates in the Indian Ocean. Port performance in major East African ports such Mombasa in Kenya and Dar es Salaam in Tanzania has a lot of potential but congestion is still rife due to low investment in infrastructure and poor connection to the hinterland.

In West and Central Africa, an infrastructure deficit also continues to hamper port performance and efficiency. This is mainly due to a lack of concrete programs for the transportation sector, leading to a lower prioritization and investment to support the sector. However, in 2009, investments by the French company, Bolloré, in Pointe Noire in the Republic of the Congo, will increase substantially the port capacity there, allowing it to service other parts of the region. Ports in Nigeria have also gone through reforms (see Box 3.3), although congestion there remains a concern.

Capacity: Global Comparisons

World container port throughput grew by an estimated 11.7 percent to reach 485 million TEUs in 2007 (UNCTAD, 2008), with Chinese ports accounting for approximately 28.4 percent of this volume. In 2007, Singapore was the busiest port, followed by China and Hong Kong (Table 2.3). Port Said in Egypt and Durban in South Africa were the only African ports to rank in the top 50 container port traffic league in 2007.

Only 13 African countries are ranked among the top 62 developing countries in

[8] "Panamax" ships are the largest ships that can pass through the locks of the Panama Canal (specifically used for dry bulk and container vessels). Panamax ships can measure up to 956 ft long (for container ships), 105 ft wide, 190 ft from the waterline, and up to 39 ft below the waterline. Weight can vary, but based on these measures should average between 65,000–69,000 tons. Ships too large to transit the canal are called "post-Panamax."

Table 2.3: Selected leading ports in the world by volume of containerized cargo, 2007

Global rank	Port	Country	Region	Capacity (TEUs mn)
1	Singapore	Singapore	Asia	27.93
2	Shanghai	China	Asia	26.15
3	Hong Kong	China	Asia	24.00
4	Shenzhen	China	Asia	21.09
5	Busan	South Korea	Asia	13.27
6	Rotterdam	Netherlands	Europe	9.65
13	Los Angeles	United States	USA	8.35
25	Jawaharal Nehru	India	Asia	4.06
36	Manila	Philippines	Asia	2.87
37	Port Said	Egypt	Africa	2.78
42	Santos	Brazil	South America	2.53
41	Durban	S Africa	Africa	2.51
47	Kingston	Jamaica	Caribbean Basin	2.16
50	Melbourne	Australia	Asia/Pacific	2.14

Source: Containerisation International Yearbook, 2009.

terms of container port traffic (Table 2.4). Total containerized cargo volume for the whole of Africa was estimated at just over 15 million TEUs, which is almost half the volume handled by the largest ports in Singapore and China. In Latin America, Port Santos in Brazil has the largest port capacity, although still lower capacity than Port Said in Egypt. However, the total volume for the whole of Brazil is higher than that of Egypt.

Containerization has been growing rapidly in Africa at a pace of more than 10 percent annually. However, container traffic to and from Africa remains marginal compared to overall global traffic. For example, commodities to the Far East or Europe are still carried in break-bulk[9] from African ports. As a reference, Africa's share of container traffic has ranged from 0.6 percent to 0.85 percent of total global volumes over the last 10 years.

In addition, African ports record the highest rate of empty containers shipped out. Algeria, Angola, Libya, and Nigeria have the highest proportion, ranging from 85–100 percent. For Cameroon, Egypt, Ghana, South Africa, and Sudan the shipped cargo is between 63 percent and 100 percent full,

[9] "Break-bulk" is loose, non-containerized cargo stowed directly in a ship's hold, in small, separable units. Loose cement, grain, ores, etc. are termed "bulk cargo," whereas cargo shipped in units (bags, bales, boxes, cartons, pallets, drums, sacks, etc.) is "break-bulk."

while Kenya and Tanzania ship 42–53 percent full. This is a reflection of three main factors that characterize the African shipping industry: (i) its high volumes of unprocessed exports, which do not require containerization; (ii) its low volume of manufactured exports, and (iii) its heavy dependence on manufactured imports. This reflects a fundamental trade imbalance for the continent. Nonetheless, strenuous efforts are being made in countries like South Africa (i.e. Durban port — Pier 1), which is

Table 2.4: Container port traffic for selected developing and African countries, 2006–2007 (million TEUs)

Developing Country Rank		2006	2007	% Change 2006/07
Selected Developing Countries:				
1	China	84.02	101.96	21.36
2	Singapore	25.61	28.76	12.32
5	Malaysia	13.42	15.12	12.68
7	UAR	10.97	12.83	16.96
8	Brazil	6.28	6.80	8.20
12	Indonesia	4.04	6.11	51.23
18	Mexico	2.68	3.07	14.58
20	Argentina	2.43	2.58	5.90
22	Jamaica	2.15	2.19	2.02
25	Dominican Republic	1.86	2.05	10.40
47	Trinidad and Tobago	0.47	0.52	10.51
Selected African Countries:				
13 (1)	Egypt	4.53	4.76	4.94
16 (2)	South Africa	3.55	3.78	6.45
43 (3)	Côte d'Ivoire	0.51	0.54	7.00
44 (4)	Kenya	0.48	0.59	22.12
45 (5)	Ghana	0.48	0.51	7.71
49 (6)	Angola	0.38	0.40	7.00
50 (7)	Tanzania	0.30	0.33	10.78
51 (8)	Mauritius	0.36	0.41	15.19
52 (9)	Sudan	0.33	0.36	10.05
54 (10)	Djibouti	0.22	0.29	33.24
56 (11)	Cameroon	0.20	0.19	–3.76
60 (12)	Madagascar	0.09	0.11	21.55
62 (13)	Namibia	0.08	0.14	74.14

Source: Containerisation International Yearbook, 2009.

Table 2.5: Deployment of ship-to-shore gantry cranes by region and outreach, 2008

	Africa	World	Eastern Europe	North America	South America	South Asia
Panamax	57	1744	71	236	63	48
16–18 rows	31	949	10	131	24	27
18–20 rows	25	698	12	105	22	49
20–22 rows	12	415	0	87	0	4
22+ rows	26	803	0	59	0	0

Source: Drewry Shipping Consultants (2009).

investing in terminals that handle containers only. The use of containers not only facilitates the movement of goods and lowers trade costs, but also addresses security issues such as theft.

In terms of operational performance, one of the major challenges facing the continent is raising the finance to invest in equipment that can handle the world's largest container ships. This means accommodating not only vessels that are currently in service but also the future generation of vessels that might be deployed in the coming years. Table 2.5 gives the number of Panamax and "super post-Panamax"[10] quayside gantry-cranes and their outreach in Africa compared to the rest of the world. Africa has lagged behind in terms of large investments in this type of equipment. For example, Africa has 57 Panamax cranes, which represents only 3 percent of the global total and 24 percent of the number in North America.

Efficiency Indicators for African Ports

Several indices are used to measure the various factors contributing to port performance, some based on subjective indicators (ordinal rankings on a scale), some based on cardinal indicators (e.g. dwell times). Several factors are taken into account when producing these efficiency indices: physical infrastructure; management and services; governance; regulations; customs and institutional framework. According to the indicators in Table 2.6, African ports have a medium efficiency (between 3.72 and 4.63 on a scale of 7, with 7 being the best and 1 the worst) but they have the worst customs clearance, especially in Sub-Saharan Africa (more than 11 days). In the discussion below, the focus is on three specific indicators: turnaround time; dwell time; and Liner Shipping Connectivity Index (LSCI).

[10] The latest generation of "super post Panamax" vessels has a width of about 22 container rows, compared to "post Panamax" vessels, which accommodate 18 container rows.

Table 2.6: Efficiency indicators of selected leading ports by volume of containerized cargo, 2006

Region	Port Efficiency (7=best, 1=worst)	Customs Clearance (days)	Container handling charges (US$/TEU)
North America	6.35	3.50	261.7
Europe (except East)	5.29	4.00	166.7
Middle East	4.93	NA	NA
East Asia and the Pacific	4.66	5.57	150.5
East and South Africa	4.63	12.00	NA
North Africa	3.72	5.50	NA
Former Soviet Union	3.37	5.42	NA
Eastern Europe	3.28	2.38	NA
Latin America	2.90	7.08	251.4
South Asia	2.79	–	NA
West Africa	NA	11.7	NA

Source: World Economic Forum (1999), World Bank surveys, Camara Maritima and Portuaria de Chile (1999), and LSU-National Ports and Waterways Institute (1998).
Note: Efficiency variables per region are not directly comparable because the availability of countries is not the same.

(i) Efficiency Indicator: Turnaround Time

Primary measures of port performance are the average turnaround time per ship, and the tonnage handled per ship-day in port. The ship turnaround is the rate at which cargo is handled and the duration that cargo stays in port prior to shipment or post discharge. It is calculated from the time of the ship's arrival to the time of its departure. Traditionally expressed in days, it is now common to express turnaround time in hours. The port authority (PA) would normally compile statistics giving monthly and annual average turnaround times. The average turnaround time per ship is determined by dividing the total hours by the total number of ships calling at the port.

In its basic form, ship turnaround time does not mean much, as the length of stay is influenced by a number of factors: the volume of cargo, the facilities made available, and the composition of the cargo itself. Thus, it becomes necessary for the port to further break down the basic ship turnaround time according to type of ship: tankers, bulk carriers, container vessels, and general cargo vessels. These may be subdivided further into domestic trade, regional trade, and oceangoing vessels.

In compiling data to determine ship turnaround time or the tonnage handled per ship-day (or ship-hour), a port would normally split total time in port into "time at berth" and "time off the berth." Within each of these and for each service activity, the amount of delay (idle time) would be recorded as well as the reasons for the delay. In particular, the ratio between waiting time for berth and the time spent at berth, known as the *waiting rate*, is a

significant indicator of possible congestion status.

(ii) Efficiency Indicator: Dwell Time

The assessment of a port's performance from the point of view of the exporter/importer focuses primarily on the *dwell time* of cargo in port, measured in terms of the number of days that a tonne of cargo remains on port. A high dwell time is generally an indication that all is not well with the port. The importance of dwell time also varies with the nature of goods.

Capacity and productivity constraints in African ports add to transport costs, by increasing both the port charges and the time in ports (which can be considered as a deadweight loss).[11] When a port cannot handle the largest ships, shipping companies may prefer to use other major handling ports. If cargo or containers need to be transferred to smaller vessels to serve smaller ports, this raises unit costs. As many SSA countries have relatively small ports in terms of cargo-handling capacity, this will increase their freight costs.

As shown in Table 2.7, in Africa dwell time is relatively high (measured in days, whereas in high-performing ports it is typically hours), berth productivity is fairly low, and costs are high. Mombasa appears to be one of the most efficient ports, with only 5 days' dwell time, high berth productivity (60 moves per hour) and the lowest costs (US$ 90 per TEU). With 29 berths and 73 percent capacity utilization, it also has scope to expand operations. This is also supported by Al-Eraqi *et al.* (2008) in a study that evaluates the location efficiency of ports in East Africa and the Middle East. In Kenya, however, the general finding is that most of the ports should improve their efficiency levels at least 1.5 times through bigger berths, improved handling equipment (e.g. post-Panamax ship-to-shore gantry cranes) to speed up the loading/offloading of cargoes, and other infrastructure in order to reduce congestion and waiting time.

South African ports, especially Durban (although it is at full capacity) are relatively efficient but other African ports face problems. Dar es Salaam and Toamasina have relatively low berth times and moderate berth efficiency, but very high costs. This may explain the low capacity utilization, especially as they have relatively few berths.

A number of ports have moderately high costs (not the highest, but above the South African benchmark) and, even if berth productivity is relatively good, high dwell times. Dwell times are particularly high in Port Sudan in the Sudan, Matidi in DRC (which also has low productivity), Tema in Ghana, and Lagos in Nigeria, although berth productivity is often reasonably high. The major problem in these ports is poor turnaround times; in such cases, increasing efficiency could increase capacity utilization and reduce costs. Dakar in Senegal seems to be the most efficient of the West African ports. According to Scheck (2007), the

[11] For discussion see Standard Bank (2008), who report that container handling costs in Africa are often three times higher than in European ports. Moreover, shipping companies have noted that African costs, in particular slow and cumbersome customs procedures, are increasing faster than revenue (Scheck, 2007).

Table 2.7: Efficiency indicators for selected African ports, 2006

	Dwell Time (days)	No. of Berths	Moves per Hour	Capacity Utilization (%)	Cost (US$/TEU)
East Africa					
Kenya: Mombasa	5	29	60	73	90
Madagascar: Toamasina	9	6	22	35	184
Mozambique: Maputo	22	2	22	40	155
Tanzania: Dar es Salaam	7	11	20	45	275
Sudan: Port Sudan	28	17	20	78	150
Southern Africa					
Angola: Luanda	12	11	14	77	320
Namibia: Walvis Bay	8	8	8	60	110
South Africa: Cape Town	6	34	36	70	121
South Africa: Durban	4	57	45	100	121
West Africa					
Benin: Cotonou	12	11	NA	70	180
Cameroon: Douala	12	18	40	70	220
Congo, DR: Matidi	26	10	7	75	120
Ghana: Tema	25	14	40	60	168
Nigeria: Lagos	22	42	28	60	155
Senegal: Dakar	7	52	10	80	160
North Africa					
Morocco: Tangier	NA	1	NA	NA	NA
Algeria: Bejaia	NA	21	NA	NA	NA
Tunisia: Rades	NA	7	NA	NA	NA
Egypt: Port Said	NA	20	NA	NA	NA

Sources: Ocean Shipping Consultants (2007) for SSA; International Containerisation Yearbook, 2009 and the World Port Source website: http://www.worldportsource.com/index.php.
Notes: Dwell time is in average container days; Berths gives number of docks; and productivity is the average container moves per hour (mph); Capacity Utilization (CU) is percentage capacity utilization for containers and cost is for imports per TEUs (usually the same for exports, except in South Africa where it is US$243).

average wait time in Africa is 4 days and berth productivity is 25 moves per hour, whereas in Europe it is 2 days' waiting time and berth productivity of 40 moves per hour.

For shipping lines, port efficiency and cost are major factors in deciding whether or not to call at a port. Kenya and South Africa appear to be most efficient and among the lowest-cost ports; Namibia is relatively low-cost but not as efficient. Thus, it is likely that large container ships would only call in Kenya and South Africa, and perhaps Senegal in West Africa. In this regard, there

would be an incentive to transfer cargoes to smaller vessels to serve smaller ports, contributing to higher costs and lower capacity utilization elsewhere. Although there are evident problems with costs in Madagascar and Tanzania, in general Eastern and Southern Africa are better served by port infrastructure than is West Africa.

Dwell time, unlike ship time in ports, identifies areas where improvements may be sought. However, it does not provide a breakdown according to the various procedures that need to be completed before cargo can be shipped or delivered. Failure to address dwell time contributes to high congestion levels, which acts as a constraint to the competitiveness of African ports. Notteboom (2006) calculated that in East Asia, the time spent in port averages 20 percent of the total transport time, whereas in Africa this ratio increases to over 80 percent. The shipping company Delmas calculated that in 2004, 146 days were lost on the weekly service between Europe and Africa because of congestion, which translates into an estimated loss to the shipping companies of US$ 5 million. In Lagos (Nigeria) in 2003, the average cost was higher than in Felixstowe (UK) (Palsson *et al.,* 2007).

(iii) Efficiency Indicator: Liner Shipping Connectivity Index (LSCI)

UNCTAD's Liner Shipping Connectivity Index (LSCI) is a measure of a country's level of integration into the existing liner shipping network. It captures liner shipping services to a country's port(s) using five components: (i) the number of ships; (ii) the container carrying capacity (in TEUs) of those ships; (iii) maximum ship size; (iv) number of services; and (v) the number of companies that deploy container ships on services to and from a country's ports. The LSCI can be considered a proxy of the accessibility to global trade. The higher the index, the easier it is to access a high capacity and frequency global maritime freight transport system and thus effectively to participate in international trade. Therefore, the LSCI can be considered both as a measure of a country's connectivity to maritime shipping and as a measure of trade facilitation.

The countries with the highest overall LSCI rankings are those most actively involved in trade. The export-oriented economies of China and Hong Kong (China) rank first, followed by the transshipment hub of Singapore. Large traders such as the UK, Germany, and the US are also in the top 15. As shown in Table 2.8 below, the best-connected countries in Africa in the 2009 LSCI were Egypt (ranked 1st in Africa; 17th internationally), Morocco (2nd in Africa, 23rd internationally) and South Africa (3rd in Africa; 29th internationally). At the other end of the scale, Guinea Bissau, Eritrea, and Somalia were the worst connected. Over the period 2007–2009, Morocco dramatically improved its LSCI ranking, from 9.0 in 2007 to 38.4 in 2009. This was the result of major investments in the sector. Other countries also improved their ranking in the 2009 index (e.g. Egypt, South Africa, Nigeria, Côte d'Ivoire, Ghana, and Djibouti) while others (e.g. Sudan, Senegal, Tanzania, and Guinea Bissau) witnessed a decline.

Table 2.8: UNCTAD Liner Shipping Connectivity Index, 2007–2009

	2007		2008		2009	
	LSCI	Int. Rank	LSCI	Int. Rank	LSCI	Int. Rank
Top Six Countries (in 2009)						
China	127.9	1	137.4	1	132.0	1
Hong Kong, China	106.2	2	108.8	2	104.5	2
Singapore	87.5	4	94.5	3	99.5	3
Netherlands	84.8	5	87.6	5	88.7	4
Republic of Korea	77.2	8	76.4	10	86.7	5
United Kingdom	76.8	9	78.0	7	84.8	6
Selected Developing Countries						
Malaysia	81.6	7	77.6	9	81.2	10
Sri Lanka	42.4	19	46.1	19	34.7	26
Mexico	31.0	25	31.2	26	31.9	31
Brazil	31.6	24	30.9	27	31.0	33

	2007	2008	2009		
	LSCI	LSCI	LSCI	Int. Rank	African Rank
African Countries					
Egypt	45.4	52.5	52.0	17	1
Morocco	9.0	29.8	38.4	23	2
South Africa	27.5	28.5	32.1	29	3
Nigeria	13.7	18.3	19.9	50	4
Côte d'Ivoire	15.0	16.9	19.4	53	5
Ghana	15.0	18.1	19.3	54	6
Djibouti	10.5	10.4	18.0	58	7
Senegal	17.1	17.6	15.0	63	8
Mauritius	17.2	17.4	14.8	64	9
Togo	10.6	12.6	14.4	68	10
Namibia	8.4	11.1	13.6	69	11
Benin	11.2	12.0	13.5	70	12
Kenya	10.8	11.0	12.8	72	13
Cameroon	11.6	11.1	11.6	73	14
Congo	9.6	11.8	11.4	74	15
Angola	9.9	10.2	11.3	75	16

cont.

Table 2.8: cont.

	2007	2008	2009		
	LSCI	LSCI	LSCI	Int. Rank	African Rank
Tanzania	10.6	10.5	9.5	83	17
Libya	6.6	5.4	9.4	84	18
Mozambique	7.1	8.8	9.4	85	19
Sudan	5.7	5.4	9.3	86	20
Gabon	8.6	8.9	9.2	88	21
Madagascar	7.8	7.8	8.6	91	22
Algeria	7.9	7.8	8.4	96	23
Guinea	8.5	6.4	8.3	97	24
Gambia	4.7	5.0	7.5	103	25
Mauritania	7.9	7.9	7.5	104	26
Tunisia	7.2	7.0	6.5	107	27
Sierra Leone	5.1	4.7	5.6	111	28
Liberia	4.5	4.2	5.5	112	29
Cape Verde	2.5	3.6	5.1	115	30
Comoros	5.5	5.2	5.0	117	31
Seychelles	5.3	4.5	4.9	118	32
Dem. Rep. of Congo	2.7	3.4	3.8	137	33
G. Bissau	5.1	5.3	3.5	143	34
Eritrea	–	3.3	3.3	145	35
Somalia	3.1	3.2	2.8	149	36

Countries such as South Africa, Morocco, and Egypt are geographically well positioned as major hubs in Africa, which has contributed to their higher LSCI ranking.

Countries at the bottom of the index include small island states, which rely on small feeder service connections to a regional hub, and landlocked countries, which have only inland waterways connections serviced by small ships. The composition of the worst connected countries (which are mostly in Africa) changes more frequently than the best connected countries, as the overall numbers of companies and services are very low. A withdrawal of one service provider or one service can therefore strongly impact the overall ranking. This is particularly relevant for small island countries such as Comoros, Seychelles, Cape Verde and São Tomé and Principe.

While African least developed countries (LDCs) have seen improvements in the TEU capacity in general, there is still a large gap between their capacity and that of developed countries. The two LDCs with the biggest TEU capacity are Senegal (128,496

TEUs) and Angola (100,000 TEUs), while the comparable figure for China, Germany, the United Kingdom, and Singapore is more than 1 million TEUs.

Investments for Rehabilitation and Expansion

Many African countries are investing in port infrastructure to meet growing demand and improve port performance, while major international container operators are also eager to invest. Several examples suggest that port development is taking place, even if it is too early to see the results. In Egypt, in 2000, significant reforms and investments in port infrastructure elevated that country to premier position in terms of port capacity in Africa. South Africa has followed with the opening of Pier 1 container terminal in Durban in 2007, which is highly automated to address capacity and productivity constraints. Ngqura, another container terminal in South Africa, became operational in 2009. Namibia also invested heavily in the Walvis Bay port and is seeking to attract private sector participation. Morocco is among the few African countries with equipment to handle Panamax vessels and the government plans a US$ 2.5 billion public investment in the ports subsector.

Investments are also underway in other parts of Africa. Equatorial Guinea aims to double its port capacity and transform the country into a major shipping hub. The port project and associated infrastructure will cost around US$ 4.5 billion and is due to be completed in 2011. Côte d'Ivoire is planning to spend over US$ 60 million to upgrade the port of Abidjan into a regional trans-shipment hub for West Africa — an improvement that would help redress the current imbalance across the continent. Mozambique's Nacala Development Corridor is planning to invest US$ 150 million to upgrade its port, rail, and road infrastructure over the next five years to raise capacity to 4 million tonnes. The Djiboutian port of Doraleh, under a concession contract to DP World, has already raised US$ 400 million to develop a container terminal. The Kenya Ports Authority has ambitious plans for more investments in Mombasa. The Democratic Republic of Congo, through a concession contract, has also made significant investments in the port of Pointe Noire, which will increase capacity in the region. For the most part, these investments come from large foreign investors.

The investments cited above, underway or planned, show strong dynamism that should yield large economy-wide benefits. For example, the new container terminal at Pointe Noire (Congo Brazzaville) is expected to boost permanent employment in the port to reach 1,000 employees by 2018 (compared to just 230 permanent jobs at present). In parallel, the site will generate nearly 200 jobs during the execution of the infrastructure works.

Assessing the full benefits of these investments will require more data on port performance that is currently lacking, especially for African ports. Using East Asia as a case in point, the cost of expanding port capacity in that region to a total of 36 million TEUs would cost about US$ 1.4 to 2.9 billion p.a. at the financial rate of return of 10 percent (Abe and Wilson, 2009). The total consumer surplus due to the expansion

would amount to US$ 8 billion a year. Such gains warrant further large capital injections into the port subsector in the region.

Summary: The Way Forward for African Ports

The growth in global trade over the past decade, together with increasing containerization and an improved policy framework in Africa (see Chapter 1), have boosted demand for African port capacity. With 80 percent of the volume of world trade carried by maritime vessels, the importance of ports in the logistics supply chain is paramount. However, trade imbalances, congestion, low productivity/efficiency, and low connectivity to other regions impede Africa's full integration into the world trading system. To illustrate the logistical problems facing the ports in the region, it has been estimated that the share of total transport time spent in port (dwell time) may be up to four times higher in Africa than in East Asia. To remedy the inefficiencies, the infrastructure and services of African ports need to be improved along the dimensions identified in this report. In particular, the following critical areas of action need to be addressed:

(i) Regional imbalances. Two regions that are most lacking adequate port facilities are the west coast (from Equatorial Guinea to Namibia) and the east coast (from Tanzania to South Africa). As a result, ports such as Durban and Dar es Salaam have come to serve as the main points of entry for numerous landlocked countries in the region, creating congestion risks and bottlenecks. Lack of seaport choice also increases the level of dependence for landlocked countries on the usually poor hinterland transport facilities. Imbalances also result in weak links in the chain of ports called upon by liners, since it is the weakest link that determines the type of vessel used for multi-port deliveries.

(ii) Capacity. Congestion, delays in expansion plans, the need for rehabilitation, upgrading or new construction are systemic problems that plague many African ports. With the economic downturn and reduced demand for many primary commodities, the problems of congestion and delays have eased for the moment. Although capital financing is likely to be more difficult to obtain given the liquidity constraints, the current environment provides an opportunity to implement the planned improvement projects with less disruption to normal port activities.

(iii) Size and Container Accommodation. Spurred by the growth in containerized cargoes, the need for ports to offer increased berth size and state-of-the-art container-handling activity has expanded. However, most African ports do not have the capacity to handle gearless ships and port equipment is often inadequate or poorly maintained. As a result, most African ports cannot receive ships exceeding 2,500 TEUs, even though ships of up to 15,000 TEUs are now sailing the major international routes. Many smaller African ports are unable to justify the acquisition of expensive equipment such as quayside gantry cranes, and must rely on mobile

cranes and ships' cranes (geared vessels). This prevents ports achieving the desired international benchmarks for container movements per hour (40 per hour in the region), which in turn affects the cost competitiveness of the port.

(iv) Other Infrastructure. Longer berth lengths, wider ship turning circles, and deeper access channels alongside berths for modern ships are needed.

(v) Land Access. Land access, for both road and rail, is restricted in many African ports since the latter are generally surrounded by densely developed areas. Resulting delays and congestion in both the delivery and removal of cargoes to and from the port affect port capacity and increase costs. In some cases, greenfield sites may be called for, rather than trying to heap more facilities onto an already overcrowded port infrastructure.

The analysis in this chapter suggests that, in many instances, large productivity gains can be achieved by improving existing ports. At the same time, improvements in the regulatory environment are also necessary. Improvements in port management, often implying reform leading to the introduction of public–private partnerships (PPPs), may be needed to provide the necessary funding to carry out major rehabilitation and expansion. These regulatory and institutional aspects are covered in Chapter 3. Furthermore, since ports are part of the larger trade logistics chain, reforms need to go beyond improving the efficiency of ports alone and work toward integrating the ports more efficiently into the broader economy. As argued in Chapter 4, this means guaranteeing well-functioning, multimodal (road, rail, inland water, and air) transport links between ports and the hinterland.

References

Abe, K. and J.S. Wilson. 2009. "Weathering the Storm: Investing in Port Infrastructure to Lower Trade Costs in East Asia." World Bank Working Paper No. 4911. Washington, DC: World Bank.

Al-Eraqi, A.S, C.P. Barros, A. Mustaff, and A.T. Khadar. 2008. "Evaluating the Location Efficiency of Arabia and African Seaports using Data Envelopment Analysis (DEA)." Working Paper, School of Economics and Management, Technical University of Lisbon.

Drewry Shipping Consultants Ltd. 2009. *Annual Review of Global Container Terminal Operators 2009*. London: Drewry Publishing.

Hoyle, B. 1999. "Port Concentration, Interport Competition and Revitalization: The Case of Mombasa, Kenya." *Maritime Policy and Management,* 26 (2): 161–74.

Hummels, D., V. Lugovskyy, and A. Skiba. 2009. "The Trade Reducing Effects of Market Power in International Shipping." *Journal of Development Economics*, 89 (1): 84–97.

Lloyds MIU. 2009. *Containerisation International Yearbook*. 40th edition. London: Informa.

Notteboom, T.E. 2006. "The Time Factor in Liner Shipping Services", *Maritime Economics & Logistics*, 8: 19–39.

Pálsson, G., A. Harding, and G. Raballand. 2007. "Port and Maritime Transport Challenges in West and Central Africa." SSATP Working Paper No. 84. Washington, DC: World Bank.

PMAESA. 2008. "Consultative Workshop on Port Congestion in the PMAESA region", Mombasa.

Scheck, J. 2007. "Port Infrastructure in Africa", Presentation at the 5th Intermodal Africa 2007 Conference, Durban, South Africa, March 29–30, 2007.

Standard Bank. 2008. *African Infrastructure Survey — Harnessing Local Opinion and Insight.* Research Economics, Africa Hardcover.

UNCTAD. 1999. *UNCTAD's Contribution to the Implementation of the United Nations New Agenda for the Development of Africa in the 1990s: African Transport Infrastructure, Trade and Competitiveness*. Report No. TD/B/46/10. New York and Geneva: UNCTAD.

——. 2006. *Landlocked Developing Countries: Facts and Figures*. New York and Geneva: UNCTAD.

——. 2008. *Review of Maritime Transport, 2008*. New York and Geneva: UNCTAD.

——. 2009. *Transport Newsletter*, No. 43, Second and Third Quarters 2009, Geneva.

Wood, G. 2004. "Tanzanian Coastal and Inland Ports and Shipping: Crises and Policy Options." *Maritime Policy and Management,* 31 (2): 157–71.

Wood, G. and P. Dibben. 2005. "Ports and Shipping in Mozambique: Current Concerns and Policy Options." *Maritime Policy and Management,* 32 (2): 139–57.

World Bank. 2009. *Africa's Infrastructure: A Time for Transformation, Part 2 — Sectoral Snapshots*. AICD Report. Washington, DC: World Bank.

Annex 2.1: Overview of African Port Facilities, Capacity, and Infrastructure by Subregion and Country

This annex discusses the main ports in Africa in terms of their infrastructure, facilities, and capacity. For the purposes of this review, the ports are divided into six subregions:

i. ***North Africa***: Algeria, Egypt, Libya, Mauritania, Morocco, and Tunisia;
ii. ***East Africa***: Djibouti, Eritrea, Kenya, Somalia, Sudan, and Tanzania;
iii. ***Southern Africa***: Angola, Democratic Republic of Congo, Mozambique, Namibia, and South Africa;
iv. ***Central Africa***: Cameroon, Congo, Equatorial Guinea, and Gabon;
v. ***West Africa***: Benin, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Nigeria, Senegal, Sierra Leone, and Togo;
vi. ***Island Countries***: Mauritius, Madagascar, Comoros, São Tomé and Principe, Seychelles, and Cape Verde.

The two premier ports serving the continent are Port Said in Egypt and the port of Durban in South Africa (see Table 2.9 for a listing of Africa's top container ports in 2007). Excluding these two, port capacities across the continent are generally patchy, and in need of improvement and development.

(i) Ports in North Africa

The North Africa subregion includes Algeria, Egypt, Libya, Mauritania, Morocco and Tunisia, which are all middle-income countries, except for Mauritania. Egypt has the largest capacity and is home to some of Africa's biggest and most sophisticated ports. The ports in the other North African countries are relatively small and have adequate facilities to handle the low volume of traffic. In all the ports, cranes are connected to national rail networks, supporting an efficient movement of goods.

In **Egypt**, the *Port of Alexandria* has witnessed significant reforms since 2002, which have improved its performance. The port has two main container terminals: the Alexandria Container Terminal and the Alexandria International Container Terminal. The Alexandria Container Terminal has a storage capacity of 11,000 TEUs and is scheduled to benefit from sophisticated handling equipment, including post-Panamax gantry cranes. The new infrastructure is expected to reduce the average waiting time for ships. The terminal has a rail connection to support the movement of goods. The Alexandria International Container Terminal has a smaller storage capacity of 7,000 TEUs.

Table 2.9: Africa's top container ports, 2007

Port	Country	TEUs handled 2007 (000s)	Post and Super Panamax facilities
Port Said	Egypt	2,768.9	Yes
Durban	South Africa	2,511.7	Yes
Damietta	Egypt	1,195.6	Yes
Cape Town	South Africa	874.6	Yes
Mombasa	Kenya	585.4	No
Abidjan	Côte d'Ivoire	507.1*	No
Tema	Ghana	458.1	No
Dakar	Senegal	424.5	No
Port Elizabeth	South Africa	415.9	Yes
Port Louis	Mauritius	413.8	Yes
El Dekheila	Egypt	453.2	Yes
Luanda	Angola	407.6*	No
Alexandria	Egypt	385.0	Yes
Rades	Tunisia	383.2	No
Port Sudan	Sudan	342.2	No
Dar es Salaam	Tanzania	334.1	No
Lagos	Nigeria	235.8	No
Djibouti	Djibouti	221.3*	No
Douala	Cameroon	217.7	No
Walvis Bay	Namibia	145.0	No
Toamasina	Madagascar	112.4	No
Skikda	Algeria	100.0	No
Maputo	Mozambique	80.4	No
Bejaia	Algeria	70.8*	No
San Pedro	Côte d'Ivoire	58.5	No
Takoradi	Ghana	55.1	No
Tanger-Med	Morocco	NA**	Yes

Source: Containerisation International Yearbook, 2009.
* 2006 data.** no data available at time of survey in 2008

The container terminal at *Damietta* is the biggest in Egypt, with a storage capacity of 30,000 TEUs. The terminal benefits from rail connections to Cairo and other parts of the Nile delta and Upper Egypt. Two additional super post-Panamax cranes and other sophisticated machinery have been ordered. There are plans to dredge and extend the existing container channels and a new terminal is expected to be opened by the end of 2009.

The *Port of El Dekheila* has two container terminals: Dekheila Container Terminal and Dekheila International Container Terminal. Both ports have state-of-the-art, post-Panamax equipment capable of handling high volumes of cargo. The Dekheila Container Terminal is served by rail tracks, making it more efficient to move goods. There are also plans to acquire super post-Panamax gantry cranes for Dekheila.

Port Said is the busiest port in Africa and serves as a major hub. It has two main container terminals: Port Said Container Terminal and the Suez Canal Container Terminal. Port Said Container Terminal has state-of-the-art handling equipment including post-Panamax cranes, which are set to increase in number. The terminal has one rail terminal to facilitate the movement of goods. The Suez Canal Container Terminal is the busiest in Africa, with the largest number of super post-Panamax, ship-to-shore equipment in Africa. The terminal is also linked to a rail line. *Sokhna Port* also has post-Panamax equipment. Recent reforms in Egypt in the port subsector have led to significant investments which have boosted performance, so that

Egypt now surpasses South Africa in terms of global rankings in container traffic.

Morocco is geographically located on one of the main liner shipping routes. From 2004–2007, its Liner Shipping Connectivity Index was in the range 8.50–9.40, but this has risen dramatically in recent years, to reach 30 in 2008 and 38 in 2009 (see Table 2.7). Now Morocco is ranked 23rd at the global level, according to the LSCI. Data for recent years show that the port of *Casablanca*, which accommodates over 70 percent of Moroccan maritime trade volumes, has absorbed most of the country's trade increase. The largest ongoing project in the port subsector is in Tangier, where the *Tanger-Med* port has the biggest capacity in the country (3.5 million TEUs). This multipurpose port entered into operation in July 2008 and is primarily intended for transshipment, and part of the traffic will also service the hinterland. The project Tanger Med II is currently under development and consists in an expansion of the container terminal capacity of the Tanger Med I to 8 million TEUs.

Algeria has two main ports: *Algiers* and *Bejaia*, which provide services to the neighboring landlocked countries of Mali and Niger. The ports are located within easy access of the major markets of Europe and the United States. The two ports are relatively small but are well equipped to handle the small volume of cargo in and out of the port. Algiers, as a transshipment port, had benefited from the recent concession process to Dubai Ports. Bejaia is the larger and busier of the two ports. Rail facilities are available under gantry cranes connected to national rail network. Bejaia has two main limitations: first, the length and the depth of its berths restrict the size of vessels that can access the port. Second, the port does not operate 24 hours per day.

Tunisia has seven ports, handling more than 95 percent of its international trade, and over 1,300 km of coastline. The main port is the *Port of Rades*, which handles 350,000 TEUs per annum. To attract large container ships, in early 2007 the government launched a deepwater port project at Enfidha, 17 meters deep and able to accommodate 80,000-tonnes vessels. This will enable Tunisia to attract large ships passing through the central Mediterranean, which are estimated at 10.3 million TEUs. In addition, this port will boost Tunisia's trade with the European Union, which accounts for 80 percent of all of its foreign trade, 97 percent of which is conducted by sea. The Tunisian coastline has the potential to become a strategic location for transshipment between the EU and the entire Maghreb region. With this new deepwater port, the goal is to capture a flow of 3 million additional containers per annum by 2020.

Libya has two main ports, *Benghazi* and *Tripoli*. The Port of Benghazi operates only for 12 hours, which limits operations. The Port of Tripoli is also limited in terms of operating hours.

Table 2.10: North Africa — port infrastructure, capacity, and facilities

Port	Country	Berths types and dimensions (m)	Terminal Facilities		Railroad Facilities	Dwell Time (days)
			Total Area (000m²)	Storage TEUs (000s)		
Algiers	**Algeria**	10 ro-ro [D(7.10)] 3 container [D(11)]	175	5.6	Quays connected to national rail network	NA
Bejaia		4 container/ro-ro [D(12); L(500)]	90	9.0	Gantry cranes connected to national rail network	NA
Oran		General cargo for geared vessels	410	3.0	Quays have rail links	NA
Alexandria (Container Terminal)	**Egypt**	3 container [D(14); L(520)] 1 ro-ro [D(14); L(160)]	163	11.0	Rail link to terminal	NA
Alexandria (International Container Terminal)		1 container [D(12); L(180)]	110	7.0	Rail link to terminal	NA
Damietta		4 container [D(14.5); L(1,050)]	1,000	30.0	Rail connections to Cairo and other parts of the Nile Delta and Upper Egypt	NA
El Dekheila (Container Terminal)		4 container [D(12-14); L(1,040)] 50m ro-ro ramp	380	20.0	Rail link to terminal	NA
El Dekheila (International Container Terminal)		2 container [D(12); L(512)]	190	NA		
Port Said (Abba Quay)		1 container/ro-ro [D(13.7); L(250)]	375	NA	NA	NA
Port Said (Container Terminal)		1 container [D(14); L(970)]	467	24.0	One rail terminal	NA
Port Said (Suez Canal Container Terminal)		4 container [D(16.5,); L(1,200)]	600	24.0	300m rail line	NA

(cont.)

Table 2.10: cont.

Port	Country	Berths types and dimensions (m)	Terminal Facilities		Railroad Facilities	Dwell Time (days)
			Total Area (000m²)	Storage TEUs (000s)		
Sokhna	**Egypt**	1 container [D(17); L(750)]	180	24.2	3,000m rail line	NA
Benghazi	**Libya**	1 general cargo [D(8.5); L(1,228)]	4,400	24.4	NA	NA
Tripoli		3 Container [L(11)] ro-ro facilities available	210.1	NA	NA	NA
Nouadhibou	**Mauritania**	1 general [D(8); L(128)] 1 general [D(7); L(110)]	NA	NA	Rail linked	NA
Nouakchott		3 general/container [D(9-10.3); L(107)]	NA	NA	NA	NA
Casablanca (Container Terminal)	**Morocco**	3 container [D(12); L(380)] 1 ro-ro [D(8);L(160)]	45	5.0	Available	NA
Casablanca (Mole Tarik/ Ro-Ro Terminal)		5 container [D(7.5-8.2);L(500)] 3 Ro-ro [D(8.2);L(300)]	19	3.0	Available	NA
Tanger-Med		1 container [D(18);L(400)]	390	35.0	NA	NA
Tangier		1 container [D(16);L(800)] 1 ro-ro [D(6.5);L(173)] 3 general [D(9);L(308)]	460	NA	2 rail tracks	NA
Rades	**Tunisia**	1 container	325	NA	NA	NA

Key: D= Depth; L = Length; Ro-ro = Roll on/roll off vessel.
Sources: Containerisation International Yearbook 2009 — based on survey conducted in 2008; Africa Infrastructure Country Diagnostic Report (World Bank, 2009).

(ii) Ports in East Africa

The East African subregion is composed of Djibouti, Eritrea, Kenya, Somalia, Sudan, and Tanzania. Port Sudan is the largest port in terms of total area, while Djibouti is the largest in terms of storage capacity. Kenya has the busiest port (Mombasa) which provides the major export gateway to landlocked countries in the subregion. The Djibouti terminal offers the most modern facilities but needs more investment to meet the high transit demand from Ethiopia.

One of the major concerns in East Africa is the safety risk due to growing attacks by Somali pirates in the Indian Ocean. Insecurity in the Somali waters has led to a rise in the cost of shipping insurance, which has resulted in high freight costs. In 2008, shipping companies reported that they had handed over about US$ 80 million in ransom payments to Somali pirates.

In **Kenya**, the *Port of Mombasa* is the busiest port in East Africa. It services Uganda, Rwanda, Burundi, Southern Sudan, and the eastern gateway for the Democratic Republic of Congo. The port handles containers, general cargo, dry bulk, and liquid bulks. The container terminal has a storage capacity of 7,272 TEUs and benefits from a rail link to the city of Mombasa, although there is a greater dependence on road transport. The strongest growth has been noted in the container sector. However, the port struggles to cope with heavy throughput traffic which has often resulted in chronic congestion. According to the Kenya Ports Authority, Mombasa is approaching saturation point. The port was designed to handle 20 million tonnes per annum and reached 16.4 million tonnes in 2008. This is projected to rise eventually to 30 million tonnes per annum by 2030.[12] The container terminal was designed to handle 250,000 TEUs per annum, whereas in 2008 its throughput was 615,733 TEUs.

Furthermore, the terminal's performance is constrained by its small storage capacity and depth, which limit the size of vessels using the port. The available equipment cannot load/unload cargoes fast enough to avoid congestion. Lack of modern advanced handling equipment, such as super and post-Panamax ship-to-shore gantry cranes, has also led to congestion and delays. Two major challenges experienced by the port in Mombasa are: (i) poor hinterland connectivity due to substandard and unreliable rail services as well as poor road infrastructure and missing links and (ii) the inability of road transporters to cope with demand. In view of the compelling need for greater capacity, in 2009 the Kenya Ports Authority submitted to the National Environment Management Authority (Nema) an environmental impact assessment study report on dredging works aimed at accommodating post-Panamax containers to boost Mombasa's competitiveness. Once the navigation channel is completed, this would allow large oil tankers to dock, thereby reducing the cost of crude oil imports, as currently Kenya has to use a large number of smaller vessels, which increases freight costs.[13]

---

[12] Kenya Ports Authority website, Nov. 30, 2009. http://www.kpa.co.ke/InfoCenter/News/Pages/MombasaPortsRemainsARegionalHub.aspx

[13] *Daily Nation* online (Nairobi), November 4, 2009.

Table 2.11: East Africa — port infrastructure, capacity, and facilities

Port	Country	Berths types and dimensions (m)	Terminal Facilities		Railroad Facilities	Dwell Time (days)
			Total Area (000m²)	Storage TEUs (000s)		
Djibouti	**Djibouti**	2 stern-ramp ro-ro [D(11.5); L(250)] 2 Container [D(9.5-12); L(400)]	220	12.0	3 on-dock 600m rail tracks for intermodal container traffic. Rail-link dockside to Ethiopia.	NA
Assab	**Eritrea**	7 general cargo/ container/side/ quarter-ramp ro-ro 2 stern-ramp ro-ro L: 145m	360	2.6	NA	NA
Mombasa	**Kenya**	5 container [D(11);L(586)]	220	7.3	Rail link to Mombasa	5
Port Sudan	**Sudan**	2 container [D(12.6); L(427)]	1,200	10.0	Available	28
Dar es Salaam	**Tanzania**	1 container [D(11.5); L(549)]	180	7.0	Terminal for inland rail movements	7
Mtwara		2 multipurpose	15	NA	NA	NA

Key: D= Depth; L = Length; Ro-ro = Roll on/roll off vessel.
Sources: Containerisation International Yearbook 2009; data based on survey conducted in 2008; Africa Infrastructure Country Diagnostic Report (World Bank, 2009).

Sudan'*s* main port is *Port Sudan,* which also services landlocked Chad. The port handles containers, general cargo, dry bulk, and liquid bulks. Port capacity has reached its maximum and to address this situation, two container berths are under construction. The *Port of Suakin*, 45 km from the Port of Sudan, has been identified as the site for future expansion to reduce the pressure on Port Sudan.

Tanzania's biggest port is *Dar es Salaam*; the others being Mtwara and Tanga. The port of Dar es Salaam has three deepwater berths and handles containers, general cargo, dry bulk, and liquid bulks. Over 95 percent of Tanzania's cargo transits through the port, as well as transshipment cargo to and from Zambia, Malawi, DRC, Burundi, and Rwanda. The port is witnessing large increases in the general

cargo sector as well as consistent growth in dry and liquid bulk traffic. The strongest growth has been in the container sector, where transit, transshipment, and national gateway traffic is handled. According to Wood (2004), problems of competitiveness are at least partially due to under-investment, management failures, skills shortfalls, and difficulties in interfacing with the railroad network.

The **Djibouti** Container Terminal has the capacity and facilities to accommodate larger volumes of cargo than it is currently handling. The 20-year concession granted in 2000 to Dubai Ports International, a subsidiary of Dubai Ports Authority, has enabled the port to acquire the most advanced equipment on the east coast of Africa (e.g. two post-Panamax, ship-to-shore gantry cranes). The port has three rail tracks for intermodal container traffic, and a rail link from the dockside to the Ethiopian capital. Djibouti's port subsector is of strategic importance beyond its borders, in particular as a gateway for Ethiopian cargo, which accounts for around 70 percent of Djibouti's throughput. However, the port's full potential has not been achieved due to inadequate capacity of the port's container terminal facilities. The main challenges to be addressed by Djibouti port authority are: (i) low availability of rail wagons and locomotives, (ii) delays in cargo deliveries, (iii) congestion in the port terminal, and (iv) high costs to importers/exporters.

(iii) Ports in Southern Africa

The Southern Africa subregion includes Angola, Mozambique, Namibia, and South Africa. South Africa has the largest and most developed ports, with Durban as the second busiest port in the continent. The ports in Mozambique handle goods for the neighboring landlocked countries of Malawi, Zambia, and Zimbabwe, thanks to developed railroad networks; however they are in urgent need of capacity development.

Angola's two main ports are *Lobito* and *Luanda*. Lobito is the smaller of the two, with two general cargo berths and very basic cargo-handling facilities. The port is linked to the national railroad network. The port of Luanda is Angola's main port. There is congestion in most cargo-handling sectors and the scope for volume development is constrained by lack of capacity. The port has the potential to service Zambia and DRC, however, this is not possible due to the poor road and rail networks. In response, the Angolan government has devised an action plan to address the following constraints: inadequate infrastructure, lack of handling equipment, low productivity, poor management, high labor-intensive processes, heavy administrative clearance processes, and lack of use of information technology in ports.

Mozambique's ports are of strategic importance to the neighboring countries of Malawi, Zimbabwe, Zambia, Swaziland, and South Africa. The majority of the country's ports have strong rail connections beyond its borders. *Maputo* offers rail connections to South Africa, Zimbabwe, and Swaziland. Similarly, the *Port of Beira* has rail connections to Zimbabwe and marginally to Malawi and Zambia, while the *Port of Nacala* connects to Malawi.

The *Port of Maputo* is Mozambique's largest port and handles cargo to and from

Table 2.12: Southern Africa — port infrastructure, capacity, and facilities

Port	Country	Berths types and dimensions (m)	Terminal Facilities		Railroad Facilities	Dwell Time (days)
			Total Area (000m²)	Storage TEUs (000s)		
Lobito	**Angola**	2 general cargo	40	3.0	Linked to national railroad	NA
Luanda		TC1: 2 container TC2: 2 container [D(10.5); L(450)] TCG2: 2 general cargo/container [D(10.5); L(450)]	227	NA	NA	12
Beira	**Mozambique**	4 container [D(11); L(645)]	200	3.6	3 rail tracks	20
Maputo		1 container [D(11.5); L(300)]	80	1.5	2 rail tracks	22
Nacala		2 container [D(14); L(335)] + [D(12); L(37)]	84	1.8	2 rail tracks	NA
Walvis Bay	**Namibia**	3 container [D(12.8); L(503)] 2 general [D(10.6); L(574)] 2 general/ro-ro (for geared vessels) [D(12.6); L(349)]	45	1.9	NA	8
Cape Town	**South Africa**	5 berths [D(15.5); L(1300)]	970	12.0	Rail transfer facility with rail-mounted yard gantry	6
Cape Town (Container Terminal)		6 container [D(10.7-14); L(1,554)]	970	12.0	Rail transfer facility with rail-mounted yard gantry	NA
Durban (Container Terminal)		7 container [D(11.2); L(1,900)]	1,122	14.5	3 rail tracks each 760m equipped with 45t rail-mounted gantry cranes	4

(cont.)

Table 2.12: cont.

Port	Country	Berths types and dimensions (m)	Terminal Facilities		Railroad Facilities	Dwell Time (days)
			Total Area (000m²)	Storage TEUs (000s)		
Durban (Container Terminal Pier 1)	**South Africa**	1 container [D(11.9); L(180)] 1 container [D(11.9); L(180)] 1 container [D(11.8); L(180)]	120	3.5	3 railway lines, 50 rail wagons per line. 2 reach stackers and 2 rail-mounted gantry cranes	NA
East London		7 berths [D(10.7); L(1,204)] 6 berths [D(10.7); L(1,206)]	38	1.5	Direct rail-link to all major cities and neighboring countries	7
Port Elizabeth		2 container [D(12.2); L(635)]	22	3.1	2 lines which accommodate 25 rail wagons per line	6
Richards Bay		3 multipurpose [D(14.4); L(540)] 3 multipurpose [D(14.2); L(644)] 1 multipurpose [D(18.7); L(200)]	21,570	NA	NA	NA

Key: D= Depth; L = Length; Ro-ro = Roll on/roll off vessel.
Sources: Containerisation International Yearbook, 2009 — survey conducted in 2008; Africa Infrastructure Country Diagnostic Report (World Bank, 2009).

South Africa, Swaziland, and Zimbabwe. It is southern Africa's nearest port to the rapidly developing mega-markets of Asia and is the closest deepwater port to the capital Johannesburg. The port has small storage capacity of 1,504 TEUs, which is inadequate for its needs.

The *Port of Beira* is Mozambique's second port after Maputo. It links directly to Zimbabwe and Zambia by road and rail networks, and to Malawi by road only. However, the Sena rail line linking Beira with Malawi and the Tete Province is currently being rehabilitated. The port has a storage capacity of 3,654 TEUs. It has more facilities for loading and offloading than the port of Maputo, with three rail stacks. The *Nacala harbor* serves its own hinterland and

landlocked Malawi to the west, to which it is connected by rail. It has the potential to service Zambia through Malawi. Because of it natural deep water and sheltered position, Nacala has no restrictions on ship movement or size.

With the ending of the civil war and significant reforms in the country, there are now positive opportunities for coastal shipping in Mozambique, although the capacity for developing inland shipping appears to be very limited (Wood and Dibben, 2005). Future growth depends on local participation, training and skills development, and the broader social, economic, and transport infrastructure.

South Africa now has eight major ports: Durban, Richards Bay, Cape Town, Mossel Bay, East London, Port Elizabeth, Saldanha, and Ngqura. South African ports play an important role for the landlocked economies of the subregion, including Botswana, Lesotho, Swaziland, Malawi, Zimbabwe, and Zambia. South African ports are equipped with modern facilities including super post-Panamax, post-Panamax, and Panamax ship-to-shore container equipment, and the ports are linked to the rail network.

The *Port of Durban* is South Africa's main general cargo and container port. It is the second busiest port in Africa and is strategically placed on the world shipping routes. The Durban Container Terminal storage capacity of 14,5000 TEUs has state-of-the art handling equipment with super post-Panamax and post-Panamax and Panamax ship-to-shore container equipment. The upgrading and re-equipping of port infrastructure are well advanced, including the widening and deepening of the port entrance and channels to enable much larger, later-generation ships to use the port facilities. Meanwhile congestion on the roads outside port terminals has become a major problem. To address this challenge, the Port of Durban opened another port terminal, Pier 1, which handles containers only. This terminal is highly automated, which has improved productivity and reduced congestion at the port of Durban. The increased use of containers has also reduced theft of goods at the harbor.

The Port of Cape Town is another busy container port, second in South Africa to Durban. The emerging oil industry in West Africa has also become a significant factor for the port's repair and maintenance facilities. The harbor and Table Bay are subject to strong winds during the months of April to September, and this can sometimes disrupt cargo-handling and ship refits in the port.

Richards Bay is South Africa's biggest dry bulk port, built in 1976 as one of the world's leading coal export platforms but has since expanded into other bulk and break-bulk cargoes. Currently, Richards Bay handles 60 percent of South Africa's seaborne cargo, making it South Africa's leading port in terms of volume handled. The port is the largest in area in South Africa, with total land and water surfaces of 2,174 ha. and 1,443 ha. respectively.

The Port of East London has a car terminal on the West Bank, which includes a four-storey parking facility connected by dedicated road to the adjacent DaimlerChrysler factory. The terminal has a theoretical design throughput of 50,000

units a year with 2,800 parking bays. The parkade can be expanded to 8 storeys to increase the throughput to 180,000 vehicles a year and the provision of a third berth is also possible. The multipurpose terminal on the East Bank handles an increasing volume of containers and is geared for 90,000 TEUs a year — many for the motor industry. However, the port lacks gantry cranes.

Port Elizabeth container terminal has three berths and is equipped with one post-Panamax and one Panamax ship-to-shore container gantry. The port has adequate rail and road links with other parts of the country. The container terminal can load railroad trains directly under the gantry cranes, without containers having to be double handled, thus speeding up delivery to inland destinations. The terminal has three quayside gantry cranes and is supported by a number of straddle carriers. Motor vehicle components constitute a large proportion of the container traffic at Port Elizabeth. Plans are underway to replace the Panamax with post-Panamax cranes.

It is important to note that the investment in the new deepwater port of *Ngqura* has been influenced by the need to support the activities of the Coega Industrial Development Zone, which generate both dry and liquid cargo. In this regard, ports not only play their central role in the logistics chain but also help to support industrial policies that facilitate trade. The Port of Ngqura is expected to be fully functional by year-end 2009, and will be serving the latest generation of container ships.

Although South Africa is ranked highly in terms of performance, there are still some areas in need of improvement. These targets are stated in Transnet's[14] strategic goals, and are expected to be met between 2009 and 2012. Expected outcomes include: sustained infrastructure capacity provision ahead of growth demand; integrated planning of port infrastructure; safe and secure world-class port system; competitive and efficient port system that drives volume growth; and human capital development. Box 2.3 presents recent highlights in the development of port terminals in South Africa.

In **Namibia,** *Walvis Bay* is the main port. It is a general cargo port and is being aggressively marketed as an alternate port of choice to South African ports. There are good roads and rail connections with the rest of Namibia while the Trans Kalahari Corridor links the port with Botswana and Johannesburg in South Africa. The port has a total of nine berths, handles in excess of 2 million tonnes of cargo annually, and is attracting a greater number of shipping lines as regular callers. In October 2009 the Namibian Ports Authority invested in a N$100 million deal to purchase new equipment to improve port performance. The new rubber-tired gantries (cargo-moving cranes) will improve storage capacity by 42 percent. Furthermore, the system will reduce costs by about 10 percent compared to a conventional stacker system.

In Southern Africa it is important to note that many ports in postconflict areas still suffer from the legacy of a lack of infrastructure development and investment, even though the conflicts may have ended more

[14] Transnet is a state-owned organization operating and controlling major transport infrastructures within South Africa.

Box 2.3: South Africa: recent highlights in the development of port terminals

Eight Specialized Port Terminals

- Durban, Richards Bay, Cape Town, Mossel Bay, East London, Port Elizabeth, Saldanha and Ngqura (the latter became operational in 2009)

Highlights in 2009

- All ports have been dredged to promulgate depth
- The process of widening and deepening the entrance channel at Durban port underway; to be completed by June 2010
- Expansion of the Cape Town Container Terminal on track
- Operationalization of Port Ngqura
- Capital investment of Rand 4.2 billion

Strategy

- Creating infrastructure capacity ahead of demand
- Improving port efficiency
- Managing the port position as a gateway for trade

Focus Areas in 2009/2010

- Growing real estate revenue and cost containment
- Delivering infrastructure and capacity improvements ahead of demand
- Building human capital through talent management and training

Key Risks

- Not providing adequate infrastructure, which could impact revenue
- Non-compliance with legislative requirements
- Risks of non-compliance with safety policies
- Inadequate skills
- Global economic environment resulting in low volumes.

Source: Transnet Limited Annual Report 2009

than 10 years earlier. In Angola, port development effectively ceased at the outbreak of civil war in 1975, at a time when containerization was being introduced in other African ports. Major upgrading has therefore been necessary, and severe congestion has plagued the port operations at Luanda for many years. In addition, civil unrest has had an effect on the transport and transit corridors servicing the ports. Corridors that used to be relatively efficient were closed for many years in the 1970s and 1980s (such as Lobito, Nacala, Maputo, and Beira) because of civil war. This resulted in the decline of the ports concerned as well as the economic decline of landlocked countries that relied on these ports. For example, the World Bank estimates that for Malawi, by the late 1980s, additional transport charges since the closure of the corridors passing through Mozambique (Beira and Nacala in particular) caused cumulative losses of more than US$ 75 million. Postconflict countries such as

Table 2.13: Central Africa — port infrastructure, capacity, and facilities

Port	Country	Berths types and dimensions (m)	Terminal Facilities		Railroad Facilities	Dwell Time (days)
			Total Area (000m²)	Storage TEUs (000s)		
Douala	**Cameroon**	1 container (for geared vessels) [D(11.5); L(220)] 1 container ro-ro (for geared vessels) [D(11.5); L(220)]	170	13.0	Terminal connected to CAMRAIL (capacity 2x44 TEUs)	NA
Matadi	**DRC**	2 container (for geared vessels) [D(7.6–8.9); L (350)]	40	2.8	2 rail tracks	25
Pointe Noire	**Republic of Congo**	2 general cargo (for geared vessels); L 520. Ro-ro facilities available	20	NA	NA	18

Key: D= Depth; L = Length; Ro-ro = Roll on/roll off vessel.
Sources: Containerisation International Yearbook, 2009 — survey conducted in 2008; Africa Infrastructure Country Diagnostic Report (World Bank, 2009).

Mozambique should be commended for their efforts to scale up investments in ports.

(iv) Ports in Central Africa

The Central Africa subregion includes Cameroon, the Democratic Republic of Congo, the Republic of Congo, Equatorial Guinea, and Gabon. The subregion has some of the least developed ports in Africa. The port of Douala in Cameroon is the most developed.

Douala is the largest port in **Cameroon,** handling over 95 percent of the commercial traffic, and having a storage capacity of 13,000 TEUs. The port services the surrounding landlocked countries of Central African Republic and Chad. The port has fairly low depth, which restricts the size of vessels that call on the port. The terminal is connected to the Cameroon Railway. Even though Doula has emerged as one of the most efficient ports on the west coast of Africa, it has limited capacity.

The **Democratic Republic of Congo**'s main port is *Matadi*. This is a small port, situated on the left bank of the River Congo halfway between the Atlantic Ocean and Kinshasa. The port is connected by two rail facilities. The main concern is congestion due to poor infrastructure and space.

The **Republic of Congo**'s main port is *Pointe Noire,* which has ambitions to become a premier deepwater port in Central Africa. The port only operates at certain times during the day (0700–1200 hrs and 1430–1700 hrs),

which limits its efficiency. Nonetheless, Pointe Noire is undergoing significant infrastructure works such as refurbishing and extending existing quays, purchasing the latest equipment such as gantry cranes, and developing a logistics area next to the port. A new container terminal in the port of Pointe Noire became operational on July 1, 2009 as a major transshipment hub and also for hinterland import and export in the Congo basin. This provides access to the principal transport corridors of the subregion, in particular serving the DRC, the CAR, and the north of Angola.

(v) Ports in West Africa

The West Africa subregion includes Benin, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Nigeria, Senegal, Sierra Leone, and Togo. The major ports are Abidjan, Tema, Dakar, and Lagos. Abidjan is recovering from loss of business due to internal conflict. Sierra Leone and Liberia have also come out of conflict and the ports are in need of rehabilitation. West Africa counts numerous ports but to date there is no comprehensive regional strategy to organize the flow of ships and connect the sea to the hinterland. According to the Port Management Association of West and Central Africa, an infrastructure deficit continues to hamper port performance and port efficiency. This is mainly due to a lack of concrete programs for the transport sector, leading to lower prioritization of resources to the ports subsector.

Cotonou port in **Benin** is situated along the Gulf of Guinea. The port is rail-linked but has limited capacity to handle high volumes of cargo. The depth only accommodates small vessels. The port handles containers, general cargo, dry bulk, and liquid bulks. It also provides transshipment to the neighboring countries of Burkina Faso and Niger. The Port of Cotonou is operating beyond its capacity and is in need of rehabilitation.

Abidjan and *San Petro* are the main ports for **Côte d'Ivoire**. Abidjan port is the bigger of the two but with very basic handling equipment that cannot be used for large vessels or for high-volume loading and offloading. However, in 2008 the government initiated the Ile Boulay expansion project for Abidjan, which aims to double the handling capacity to 3 million TEUs per year. Ile Boulay will eventually have a 1,500 m wharf length, a draft of 15 m, and will cover an area of 60 ha.[15]

The *Port of Banjul* is the **Gambia**'s main seaport, handling 90 percent of its foreign trade. Senegal, Guinea Bissau, and Guinea are the three main destinations for re-exported cargoes through the Port of Banjul, which is strategically located close to major shipping routes. The port can accommodate large vessels but lacks rail facilities. Container traffic has seen an average 11 percent annual growth rate in recent years and now handles over 30,000 TEUs each year. Containers (although 90 percent are empties) form the largest export.

The *Port of Tema* is **Ghana**'s busiest seaport. It handles transshipped and transit cargo goods destined for the hinterlands/landlocked countries of Burkina Faso,

[15] Port Autonome d'Abidjan, http: www.paaci.org. See also: http://www.winne.com/specialevents/2009/ene/port.php

Table 2.14: West Africa — port infrastructure, capacity, and facilities

Port	Country	Berths types and dimensions (m)	Terminal Facilities		Railroad Facilities	Dwell Time (days)
			Total Area (000m²)	Storage TEUs (000s)		
Cotonou	**Benin**	1 ro-ro 6 general 1 container [D(11); L(220)]	65	NA	Available	12
Abidjan	**Côte d'Ivoire**	2 container [D(11.5); L(200)] 2 container [D(12.5); L(440)] 1 ro-ro [D(12.5); L(200)]	250	6.0	Available	NA
San Pedro		1 general [D(11-12); L(581)] 1 general [D(9); L(155)]	100	NA	NA	NA
Banjul	**Gambia**	5 general/ container/ro-ro [D(10); L(750)] (max vessels L: 182.9m)	38.9	NA	None	NA
Takoradi	**Ghana**	5 multipurpose [D(9-10); L(714)] 1 ro-ro	390	1.8	Rail line 100m from the port	NA
Tema		2 container [D(11.5); L(566)] 1 container [D(10); L(200)] 2 container [D(10); L(366)] 7 multipurpose [D(8); L(1,281)]	254	5.0	None	25
Conakry	**Guinea**	2 general [D(8); L(340)] 3 multipurpose [D(8.5-10); L(550)] 1 container [D(10.5); L(269)]	480	5.0	NA	NA
Monrovia	**Liberia**	4 general [D(9.14); L(609)]	45	NA	NA	NA

(cont.)

Table 2.14: cont.

Port	Country	Berths types and dimensions (m)	Terminal Facilities		Railroad Facilities	Dwell Time (days)
			Total Area (000m²)	Storage TEUs (000s)		
Lagos — Container Terminal	**Nigeria**	4 container [D(10.5); L(1,001)]	50	14.6	Available	NA
Lagos — Old Apapa Quays		20 berths [D(9); L(2,459)]	1,200	2.0	Linked to national rail system	NA
Lagos — Tin Can Island		7 general/ro-ro [D(10)] 2 ro-ro [D(9.5)]	NA	NA	None	NA
Calabar		3 general [D(11)] 4 General [D(8)]	NA	NA	None	NA
Onne		1dcontainer [L(250)] 1 ro-ro [D(5.7); L(250)]	200	NA	NA	30
Port Harcourt		13 berths [D(7.6); L(1,390)]	470	NA	NA	NA
Warri		5 general [D(11.5); L(1,250)] 8 general [D(6.5); L(1,500)] 1 ro-ro [D(11.5); L(250)]	NA	NA	None	NA
Dakar	**Senegal**	20 ro-ro [D(8-12); L(3,463)] 15 container/ro-ro [D(8-11.6); L(2,562)]	11	NA	NA	7
Freetown	**Sierra Leone**	1 container [D(8.84); L(174)] 2 container [D(9.6); L(331)]	85	1.1	NA	NA
Lomé	**Togo**	2 container [D(11-12); L(250)]	80	NA	Linked to the national rail system	NA

Key: D= Depth; L = Length; Ro-ro = Roll on/roll off vessel.
Sources: Containerisation International Yearbook, 2009 — survey conducted in 2008; Africa Infrastructure Country Diagnostic Report (World Bank, 2009).

Mali, and Niger. Tema has encountered substantial congestion problems that look set to continue over the short-term at least. It has a storage capacity of 5,000 TEUs. The port lacks modern handling equipment suitable for large vessels, to facilitate faster turnarounds. In addition, the port does not have rail facilities. The future plan is to develop a second container terminal and dredge to increase the depth of the port. *Port of Takoradi* is Ghana's second port and is situated on the Gulf of Guinea (Atlantic Ocean) in the south of the country. The port has a storage capacity of 1,784 TEUs. Ghana Railways Corporation is 100 m from the port. Takoradi port is gearing up for further upgrades and increased private sector participation. The future plans include construction of two new container berths and rehabilitation of port access roads.

Guinea's main port is *Port of Conakry*. This is a small port with a storage capacity of 5,000 TEUs.

The *Port of Lagos* is **Nigeria**'s primary seaport. The other ports are *Calabar*, *Onne*, *Port Harcourt,* and *Warri*. Port of Lagos is split into three main divisions: Lagos Port, Old Apapa Port, and Tin Can Island. Lagos handles significant volumes of trade from neighboring Benin, Niger, and Cameroon. The terminal handles imports of consumer goods, foodstuffs, motor vehicles, machinery, and industrial raw materials. Lagos, Apapa, has traditionally played the role of the major public port in Nigeria. Lagos Port Complex (port of Lagos) is located at the Apapa area of Lagos, South West Nigeria. Apapa Port's operational area consists of standard berthing area, cargo handling, stacking areas, and storage facilities.

Ports in Nigeria have undergone significant reforms. However, congestion is still a concern. As the economy has continued to grow since the booming oil times, there is a need to develop port capacity to keep up with demand. According to the Nigerian Ports Authority, the main challenge for Nigeria is to scale up investment in ports in order to meet changes in vessel sizes and architecture.

Dakar is the principal port serving **Senegal** and the surrounding landlocked countries. The Port of Dakar handles container, general cargo, dry and liquid bulk traffic. Growth in the container sector is constrained by lack of available capacity and facilities to speed up the loading/offloading processes to ensure faster turnarounds.

(vi) Island Countries

These include the **Cape Verde Islands** and **São Tomé and Principe** in the Atlantic Ocean and **Madagascar, Mauritius,** and the **Seychelles** in the Indian Ocean. The other island countries have smaller ports and do not handle large vessels, which also reflects the size of their economies. The general observation is that the larger the economy, the busier the port. Unlike the island countries in the Caribbean (which have relatively larger economies), the African island countries (with the exception of Mauritius) are visited by few shipping lines. This increases the cost of shipping.

Port Louis in **Mauritius** is located on an important trading route between Africa and Asia and is the busiest port among the island countries. In 2007 it handled 413,828 TEUs and ranked as one of Africa's 10 busiest ports. The Mauritius Container Terminal is

the largest, covering an area of 274,500 sq m. The port is able to handle post-Panamax vessels; it has 5 post-Panamax ship-to-shore gantry cranes. According to the *Enabling Trade Index 2009*, Mauritius has the highest score (33) in Africa. However, the poorest score is in the quality of transport services, which leads to delays in shipping.

Madagascar's main port is *Toamasina*, which has a storage capacity of 2,300 TEUs. In 2007 the port of Toamasina handled 112,427 TEUs. The port facilities are just adequate to handle the volume of cargo considering the size of the economy. The other smaller islands (Seychelles, Cape Verde Islands and São Tomé and Principe) handle even less cargo, also reflecting the sizes of their economies.

Annex 2.2: African Merchant Fleet, by Flag of Registration and Type of Ship, as of January 2007 (dwt 000s)

Flag	Oil tankers	Bulk carriers	General cargo	Container cargo	Other types	Total
Algeria	26	234	75	0	442	777
Angola	8	0	12	0	26	47
Benin	0	0	0	0	0	0
Cameroon	69	0	3	0	6	79
Cape Verde	4	0	13	0	6	23
Comoros	243	224	480	5	57	1,010
Congo	0	0	0	0	1	1
Congo (DR)	2	0	1	0	14	17
Côte d'Ivoire	1	0	0	0	4	5
Djibouti	0	0	3	0	1	4
Egypt	345	778	332	58	134	1,646
Equatorial Guinea	1	0	6	0	13	19
Eritrea	3	0	19	0	3	25
Ethiopia	0	0	125	0	0	125
Gabon	1	0	4	0	3	8
Gambia	5	0	5	0	2	12
Ghana	5	0	15	0	67	87
Guinea	0	0	0	0	9	9
Guinea-Bissau	0	0	0	0	2	2
Kenya	8	0	2	0	6	16
Libya	13	0	62	0	24	99
Madagascar	17	0	18	0	6	32
Mauritania	0	0	1	0	24	25
Mauritius	0	8	15	0	43	66
Morocco	113	0	41	90	122	365
Mozambique	0	0	11	0	17	27
Namibia	0	0	4	0	52	56
Nigeria	384	13	28	0	99	524
São Tomé & Principe	1	7	32	0	2	42
Senegal	0	0	2	0	17	18
Seychelles	111	0	4	0	30	145
Sierra Leone	105	7	232	5	23	372
Somalia	2	0	5	0	4	10
South Africa	10	0	0	30	70	110
Saint Helena	0	0	0	0	1	1

Flag	Oil tankers	Bulk carriers	General cargo	Container cargo	Other types	Total
Sudan	1	0	26	0	1	29
Togo	0	0	4	0	8	12
Tunisia	67	26	3	0	25	122
Tanzania	14	0	23	0	2	39
Total	**1,548**	**1,299**	**1,606**	**187**	**1,367**	**6,007**
World fleet	**382,975**	**367,542**	**100,934**	**128,321**	**62,554**	**1,042,328**
Percentage of world fleet:						
Africa	0.40	0.35	1.59	0.15	2.19	0.58
Developing countries of Asia	21.97	25.00	29.06	16.45	16.09	22.69
Developing countries of S. America	2.28	1.39	4.27	0.52	4.39	2.07
Developed countries	20.37	12.40	17.14	28.43	31.71	18.92

Source: UNCTAD (2008).