African Journal of Business Management Vol.6 (44), pp. 10807-10825, 7 November 2012
Available online at http://www.academicjournals.org/AJBM
DOI: 10.5897/AJBM12.1088
ISSN 1993-8233 ©2012 Academic Journals

Review

Gateway and hinterland dynamics: The case of the Southern African container seaport system

D. Fraser* and T. Notteboom

Institute of Transport and Maritime Management (ITMMA), University of Antwerp, Antwerp, Belgium.

Accepted 19 October, 2012

The Southern African container port system features a diverse range of different port types and sizes from five African countries. Collectively, ports in this region constituted a significant 40% market share of all container traffic through the African continent in 2005. One of the busiest container ports on the continent, the Port of Durban is located within the Southern African region. The region has seen strong port development in the last 15 years with new ports entering the market or existing ports expanding their supply. Competitive dynamics in the Southern African container port system are however not well researched. Building further upon economic literature and empirical studies on port competition, competitiveness and on port geography literature on the development of port systems, this paper provides an academically-sound and policy-relevant assessment of the development paths of the Southern African container port system. The paper includes a detailed container traffic analysis, applying the net shift model, for major container terminals in South Africa, Namibia, Mozambique, Madagascar and Mauritius from 1985 to 2010. The paper also discloses the level of concentration or deconcentration. Concentration/deconcentration factors applicable to the port system and its respective ranges are identified together with a port range developmental path (linear or non-linear) for each. As such, the paper complements earlier empirical research on European, North American and Asian port systems and thus contributes to advancing and broadening the methodological and empirical discussion on port system development.

Key words: Southern African container ports, Container traffic Analysis, Net Shift, Port Development Patterns.

INTRODUCTION

In the last twenty years, Southern African countries have experienced significant political and economic changes which have directly impacted the growth of container traffic to the region. In 2005, Southern Africa's container traffic accounted for 40% of the continent's volumes, measured in twenty-foot equivalent units (TEU) (World Bank, 2010). This result was a close second to West Africa's 41% container market share on the continent. Durban, the largest container port of Southern Africa, realized average container growth of 8% during the period 1985 to 2010 and currently has a market share of 53% in the region. Maputo (Mozambique), despite its more recent political and economic reforms, is however becoming a significant competitor in Southern Africa. Namibia, located on the west coast north of South Africa, facilitates trade along the Walvis Bay corridors. The Walvis Bay corridor represents an important corridor for the landlocked countries of Southern Africa such as Botswana, the land locked regions of South Africa such as the Northern Cape. Mauritius and Madagascar, although not a land based part of the Southern African region, both islands have an important role being strategically positioned at the crossroad of vital trade routes between Europe and Asia, Africa and Australia. Mauritius too has experienced significant growth of 8% during 1985 to 2010. All five countries within the region have major capital expansion plans for their respective terminals over the next 5 to 15 years. The vast potential

*Corresponding author. Email: darrenronald.fraser@ua.ac.be.

for growth within Southern Africa could give rise to concentration, multi-port gateway regional developments and co-operation between container terminal operators in the region.

While Southern Africa is rapidly gaining an important position on the global container port scene, competitive dynamics in the Southern African container port system are not well researched (Notteboom, 2010a and Notteboom, 2011). This paper seeks to unravel current concentration levels of container traffic within Southern Africa as well as the level of competition between port ranges within the region, the opportunity for the formation of multi-port gateway regions and hinterland dynamics. The analysis is largely adapted from the methodology applied by Notteboom (2010b) to the European container port system.

Ultimately, this paper seeks to answer the following questions regarding Southern African container ports. Are Southern African ports a typical port system or a special case in multi-port gateway development? Given the industry and economic dynamics, which of the container ports in the region is currently demonstrating the most potential to lead in terms of competition and concentration?

The paper is organized as follows. The first part of the study provides a literature review discussing theoretical models on regional port system development. Next, we introduce a quantitative analysis of container throughput and traffic dynamics and concentration levels. Third, the paper addresses gateway and transhipment hub rivalry and zooms in on hinterland corridors supporting hinterland capture areas and trade routes.

THEORETICAL DISCUSSION ON PORT SYSTEM DEVELOPMENT

In their content classification of port studies, Pallis et al. (2011) list 40 papers dealing with the spatial analysis of ports published since 1997. The spatial study of port systems and particularly the analysis of cargo concentration and deconcentration in port systems is a central theme. Ducruet et al. (2009) identify no less than 34 academic studies on port system concentration published between 1963 and 2008. These empirical studies highlight that some port systems and ranges aregetting more spatially concentrated while others are evolving to a more evenlydistributed system. Notteboom (1997) concluded the European container port system is getting more deconcentrated and along similar lines. The analysis of McCalla (1999) points to container traffic deconcentration in North America partly as a result of Greenfield port development. Other interesting studies in this regard include Medda and Carbonaro (2007) on the Spatial distribution of container traffic in the Mediterranean basin and Notteboom (2006) on the use the Ginide composititon analysis for a better understanding of the spatial dynamics in port systems.

A starting point in any theoretical analysis of port system development would be the geographical location of a seaport. The more traditional port system development models point to a shift from an initial pattern of scattered poorly connected ports along the coast line, to a main network of corridors between gateway ports and major hinterland centers. Traditionally, theoretical models on gateway port system development suggest that large ports, which invested early in container infrastructure, attract more and more container traffic. This is aligned to very supply side economic thinking. According to Harper (2010) supply-siders believe that producers and their willingness to create goods and services (port operators investing in container infrastructure) set the pace of economic growth. Notteboom (2010b) further states that the advantages of concentrating cargo in only one or a few ports of call would be stronger at the level of a shipping line than at the port level, simply because not all carriers will choose the same load centers in their liner service networks. The models of Barke (1986) and Hayuth (1981) point to a level of deconcentration which occurs when some of the existing cargo is shifted from large ports to smaller or new ports or when the large load centers only absorb a small portion of the container growth in the port system (Notteboom, 2010b). This phenomenon also known as ‘the challenge of the periphery’ has been the centre of attention in a number of studies (Hayuth, 1981; Slack and Wang, 2002; Notteboom, 2005; Frémont and Soppé, 2007). Slack (2002) argues that one the principal reasons for the challenge of peripheral ports in the case of Singapore are in fact institutional. The monopoly power yielded by the Port of Singapore Authority (PSA) as both owner and operator of the port, imposed berthing and cargo transfer rules on customers effectively enforcing concentration or deconcentration.

The discussion on port systems’ spatial development saw a new impetus with the introduction of the ‘port regionalization’ concept by Notteboom and Rodrigue (2005), implying a gradualprocess where efficiency is derived from higher levels of integration with inlandfreight distribution systems. Market forces and political influences gradually shape regional load centre networks with varying degrees of formal linkagesbetween the nodes of the networks. This newest phase in port spatial development thus results in the incorporation of freight distribution centers and terminals as active nodes in shaping load center development. The port regionalization phase overcomes (1) at a local level: inhibited growth and efficiency realized due to land, nautical and

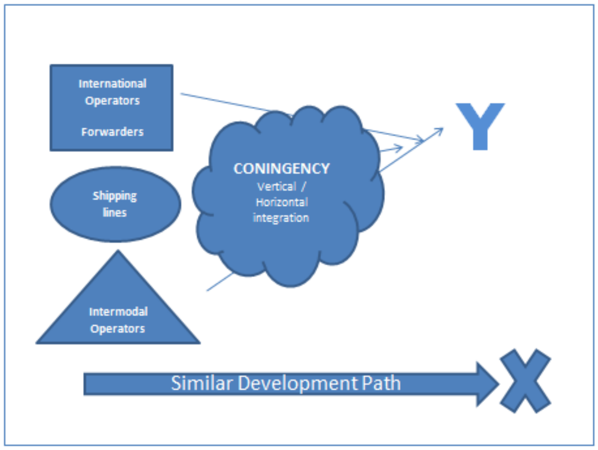

Figure 1. Path dependency and contingency.
Source: Adapted from Notteboom (2009).

environmental challenges and (2) at a global level by permitting the development of a distribution network that corresponds more closely to fragmented production and consumption systems. While Rimmer and Comtois (2009) argue this phase is nothing more than a renewed decentralization, the establishment of regional load center networks goes beyond earlier approaches in the sense that it involves strong functional interactions between nodes which are not necessarily competing, but to some extent acting as complements.

Rodrigue and Notteboom (2010) agree with Rimmer and Comtois that there is a danger of becoming too pre-occupied with the land-based network, without incorporating the realities in the maritime space, and therefore propose an extension of the port regionalization thesis to include a foreland component involving the role of intermediate hubs. Lee et al. (2008) observed that Asian port development was a deviation from the universal port model due to Asia's less developed land connections and consequential increased reliance on feeder shipping centered upon key hubs. Factors such as the nautical accessibility of a port, operational and technical performance also explain traffic volumes in a port. A port's draught therefore influences the type and size of vessels calling at that port as well as ultimately, the configuration of liner service networks and any limitations on the number of calls per loop. Ducruet and Notteboom (2012) argue whether physical factors still play a role in the current spatial patterns of container port systems and raise the question of whether physical factors, geographic proximity and administrative boundaries are still definitive in port system and port spatial development. This implies another influence on port system development, namely the role of liner shipping network configurations.

More recent academic work questions the high degree of path dependency in the development of ports at a regional scale. Hence, early literature and models on port development appear to follow a similar evolutionary and development path. This implies that port development on a regional scale would follow a similar path or milestones in their spatial development. Notteboom (2009) argues that port development processes also show a certain degree of contingency.

As international operators, shipping lines and freight forwarders begin to integrate vertically or horizontally, these 'contingency factors' begin to deviate a port system from developing along similar lines to point X (Figure 1). This results in some level of disparity among concentration patterns in port systems around the world and can result in a different development path to the traditional that is Y. The disparity also could lead to deconcentration. Contingency therefore contradicts the linear/ sequential path development theories of port system spatial development. In other words, it is the combination of path dependency and contingency that explains why port systems around the world do not necessarily develop along the same lines or follow the same sequence of stages as suggested in the models on port system development. Jacobs and Notteboom (2011) show how port development patterns can also be affected by the strategic actions of actors on the opening and closing of 'windows of locational opportunity' for port investments.

There is also an increasing interest in academic literature on the role of political, institutional, regulatory and environmental factors in shaping port system development (Ng and Pallis, 2010; Notteboom et al., 2012) as these factors have to some extent been under-valued by existing models. Iheduru (1996) assessed the

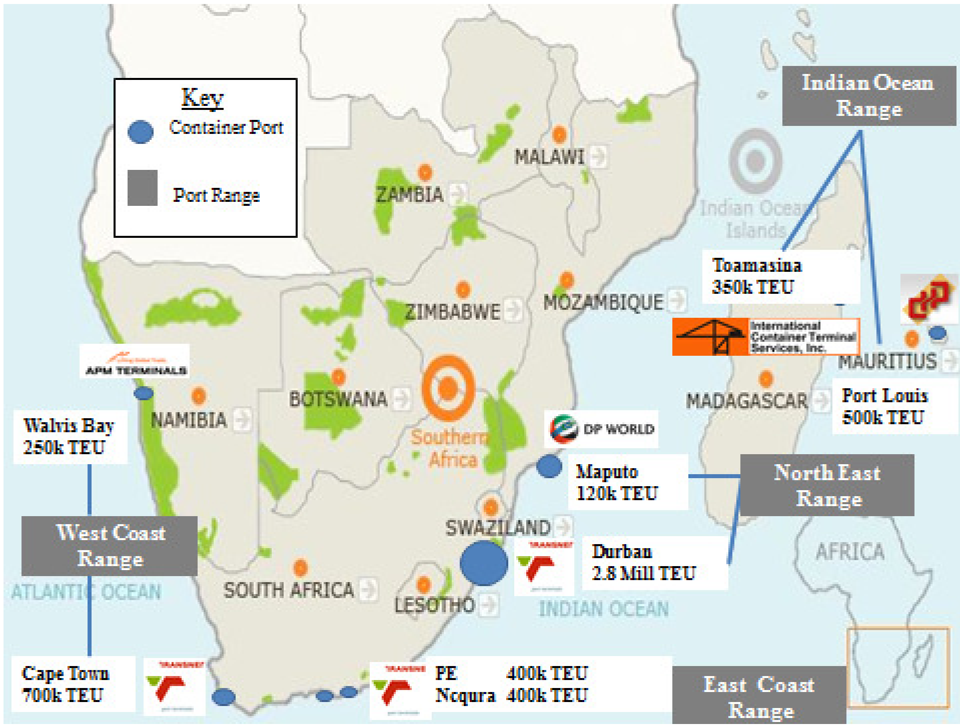

Figure 2. Ports of the Southern African container port system.
Source: Adapted from http://www.thesafaricompany.co.za/Southern_Africa.htm.

impact of geopolitical reforms (the dismantling of apartheid) to the maritime industry on the Southern African region. The findings show that the entry of South African capital leads to take-overs, joint-ventures, and the outright demise of indigenous operators, not to mention the dislocation of coordinated regional plans to the advantage of big companies.

Fair competition and ethical price/tariff determination have necessitated regulatory bodies such as port and competition regulators which aim to ensure fair competition and economically justifiable prices charged to customers. Such regulatory bodies include e.g. the ports regulator and competition commission in South Africa and the Australian Consumer and Competition Authorities in Australia, and are important in environments where natural competition between container ports does not exist and or intra-port competition is weak or lacking.

CONTAINER THROUGHPUT DYNAMICS IN THE SOUTHERN AFRICAN CONTAINER SYSTEM

Following the theoretical review on port system development, this section provides an overview on the volume throughput dynamics analyzed first, holistically for the region. This will include market share positions, volume growth observations and a total region market shift discussion. Figure 2 shows the Southern African ports together with each ports respective handling capacity and operator.

Container throughput dynamics in Southern Africa: Political and economic discussion

The analysis on throughput dynamics is based on container throughput figures measured in twenty foot equivalent units (hereafter referred to as TEU). Average growth rates represented in Figure 3 demonstrate an overall steady growth in the region for the period 1985 to 1995 and 1995 to 2000 with growth reaching maturity during 2005 to 2007, an almost 12% average growth rate. What followed in 2008 was the economic crisis, a complete negative growth trend from which the region is still trying to recover.

Figure 4 is a graphical representation of the total container throughput volumes in the region from 1985 to 2010. The South African container terminals, since 1985 have dominated the market share of container volumes in the region. In September 1985, South Africa felt the impact of the imposition of trade and economic sanctions being imposed on by the European Community and

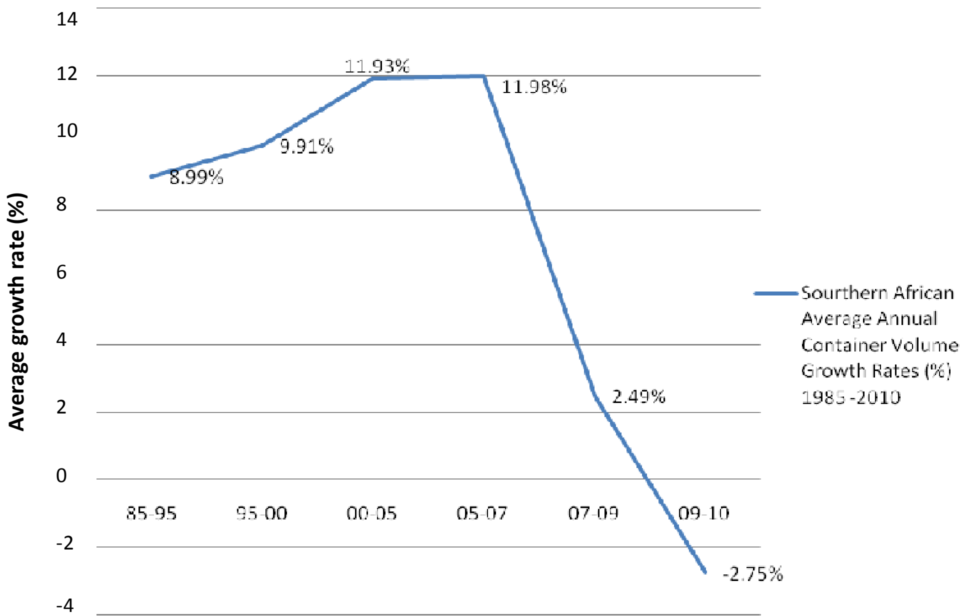

Figure 3. Average regional growth rates.
Source: Own calculation.

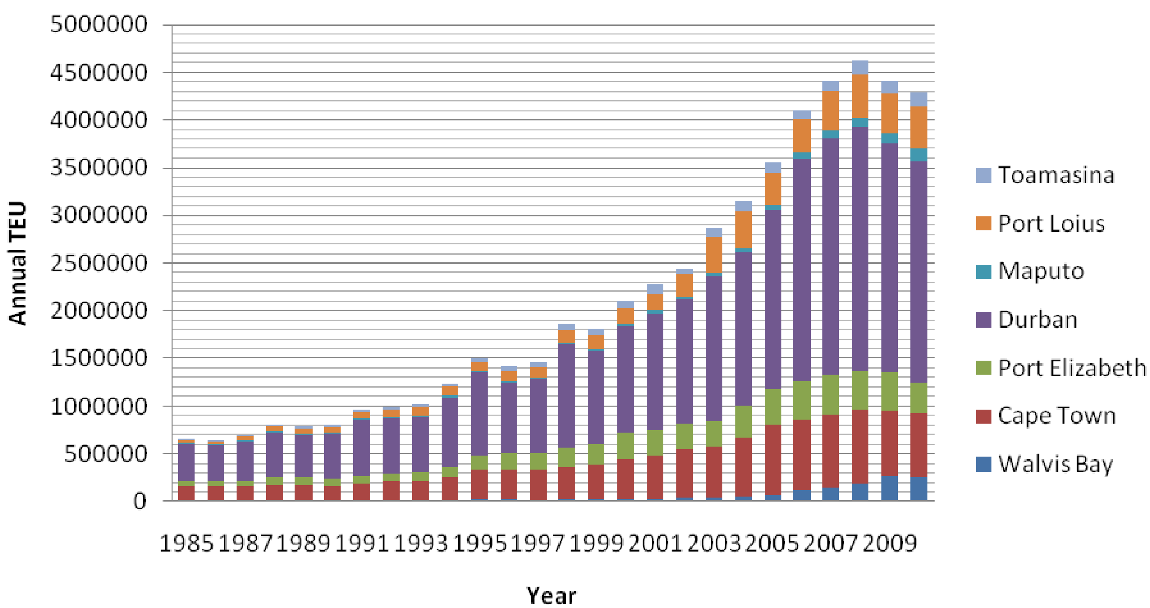

Figure 4. Total Southern African container terminal throughput.
Source: Containerization International and own calculation.

Commonwealth countries (by October of the same year). The sanctions caused an overall reduction in container volumes of -2.3% (1986) in all of the South African container terminals. The decline was however short lived. South Africa developed extensive measures to circumvent the sanctions. According to Levy (1999) this was through costly import-substitution and the transshipment of cargo through countries that were not participating in the embargoes. From 1985 to 1989, export volumes roseby 26% (Levy, 1999) and overall average container growth in South Africa during this period was 4%. The economic sanctions had a greater impact on capital flows than it did trade. During the period 1994 to 2000, South African container terminals realized significant growth in container throughput following the unbanning of the African National congress in 1990 (ANC, 2011). The subsequent first democratic election in 1994 spurred further growth.The period 1990 to 1999 container volume growth was recorded at an average of 11%. Peak container traffic growth was realized in 1995 at Cape Town, Port Elizabeth and Durban growing 33%, 36% and 20% respectively.

The Indian island container ports of Port Louis (Mauritius) and Toamasina (Madagascar) have realized both container volume and market share growth from 1985. Port Louis has more than doubled its market share from 4% in 1985 to 10% in 2010. Toamasina has maintained a steady position increasing from 2% market share in 1985 to its current 3% share in 2010. Average annual container growth rates for the island ports during South Africa's period of sanctions (1985 to 1990) reached 18% (Port Louis) and 15% (Toamasina) confirming Levy's (1999) fact of increased South African transshipmentsduring the period of sanctions. Port Louis realized a steady growth in container throughput,it is important also to note that thetransshipment incidence relative to captive volumes at Port Louis increased (2001 and 2002) from 5% to 30% of total throughput. Port Louis has since maintained transshipment volumes of almost 50% of the terminals throughput (Mauritius Port Authority, 2010). Frankel (2010) credited Mauritius's economic success to the following policy related factors: the policy of creating a well-managed Export Processing Zone, conducting diplomacy regarding trade preferences, avoiding currency overvaluation, and facilitating business.

Madagascar is the world's fourth-largest island and is located on the eastern side of the African continent in the Indian Ocean off the coast of Mozambique. The country is still in recovery due to political instability following the 2009 coup that ousted President Marc Ravalomanana and was compounded by the impact of the 2008 to 2009 global slump. The Port of Toamasina handles 90% of Madagascar's container traffic and more than 80% of all trade traffic on the island. The operation of the port was contracted to Madagascar International Container Terminal Services (MICTS), a subsidiary of Filipino company International Container Terminal Services Inc under a 20 year concession agreement signed in May 2005 (International Finance Group, 2008).

Located on the eastern side of Southern African, Mozambique is fast developing economically and socially after 15 years of intense civil war (1977 to 1992). The country has realized steady growth recovering from the war recession periods, -5.1% real GDP in 1992 to growth of 6.3% recorded in 2009 (World Bank, 2010). The Maputo container terminal too has realized phenomenal growth even through the current recessionary periods of 2008 to the current year. Growth rates in 2008 and 2009 were recorded at 15% and 2010 growth a staggering 35% despite the economic crisis.

The Port of Walvis Bay in Namibia is located on the west coast of Southern Africa. The country gained independence from South Africa in 1990. Between 1985 and 1993, container volumes at Walvis Bay appeared to be very unstable and for some periods within that time frame, some negative growth was realized.After the harbor at Walvis Bay was deepened in 2000, the port began attracting greater cargo container cargo. In 2000 Walvis Bay's market share was at 1%, by 2004 it had doubled to 2% and in 2010 it held 6% of the total regions market.

Container throughput dynamics in Southern Africa: Current situation

Table 1 represents the current position of the major container ports in the Southern African region in terms of current (2010) market share as well as each container port'scompounded annual growth rate (CAGR) between 2000 and 1985.The ports' market sharesof(based on TEU throughput) over the10 year period have remained relatively stable except for:

- Walvis Bay more than doubled its market share from 1 to 6%.
- Cape Town lost 5% market share largely to Walvis Bay.
- Both Maputo and Port Louis realized marginal market share gains.

Overall, in terms of market share and volume growth, Walvis Bay, Maputo and Port Louis respectively have lead growth in the region with a CAGR of 26, 16 and 11% respectively (Annexure 1). The South African container Ports of Cape Town, Port Elizabeth are ranked with the lowest growth rates over the comparable periods. The shift shares provide a more detailed analysis of these shifts.

The emergence of multi-port gateway regions in Southern Africa

In order to obtain a more detailed insight in throughput dynamics, Notteboom (2010a) states that it is useful to examine volume shifts among port groups. Gateway

Table 1. Southern African container terminal volumes and market (Mkt) share (1985, 2000 and 2010).

Range	Port	1985			2000		CAGR		2010			CAGR
		Thous TEU	Mkt share (%)	Size rank	Thous TEU	Mkt share (%)	(%)	Size rank	Thous TEU	Mkt share (%)	Size rank	(%)
West Coast	Walvis Bay	18	3	4	26	1	3	2	256	6	4	26
	Cape Town	146	22	7	410	20	7	7	668	15	7	5
South East	Ncqura	0	0	1	0	0		1	78	2	1	
	Port Elizabeth	56	9	6	287	14	12	6	319	7	5	1
North East	Durban	388	59	8	1114	53	7	8	2317	53	8	8
	Maputo	6	1	2	32	2	12	3	143	3	3	16
Indian Ocean	Port Loius	28	4	5	161	8	12	5	443	10	6	11
	Toamasina	12	2	3	69	3	13	4	141	3	2	7
	Total	654	100		2099	100			4 366	100		

Source: Containerization International and Own Calculation.

regional analysis further strengthens the merits of selecting a container terminal group or range approach rather than analyzing an individual port in isolation. This implies distinguishing port ranges within a region for the purposes of understanding volume shifts (among other variables). The frameworks applied for regional range grouping are varied. Rimmer and Comtois (2009) distinguish the port ranges in the Chinese case geographically. The division is simplya northern, central and southern range as adopted from the Sun YatSens transport plan for China in 1919, and has been maintained since. Notteboom (2010a) applies two criteria for the grouping of ranges within a port. The first is the locational relationship of the grouped ports relative to identical hinterlands effectively clustering the ports in one port range. The second is the calling patterns in the liner service networks of shipping lines together with the competitive relationships among the ports. The organization of the Southern African container terminals ranges have been grouped based on shared hinterland and liner service call patterns and geographical positioning. This is detailed in Annexure 2.

Cargo concentration patterns in the Southern African container port system

Shift analysis methodology

The primary technique used for this research is the net shift analysis as introduced by Notteboom (1997). This technique examines container shifts among port groups in order to get a more detailed insight into port throughput dynamics. The shift-share analysis is a scientific method which was originally developed in the framework of regional economic analysis. The analysis is a method of analysing regional growth, a technique that compares regional growth with growth at the state (or national) level (Econsearch, 2011). This method is however easily applicable to ports, for the purpose of obtaining more insight into the issue of port traffic growth. According to Notteboom (1997), net shift analysis allows a researcher to divide the growth or decline of a variable (in the case of ports) into relevant segments-the ‘share’ effect and the ‘shift’ effect. The ‘share’ effect reflects the expected growth of container traffic in a seaport as if it would simply maintain its market share and, as a consequence, would evolve in the same way as the port range as a whole (same growth rate as the range). The total shift reflects the total number of containers (in this case TEU) a port has actually lost to or won from competing ports in the same range, with the expected container traffic (share effect) as a reference. The results will be computed quantitatively and displayed graphically, after applying the econometric formula:

1. Absolute growth of container Traffic

$$\mathrm{ABSGR}_i = \mathrm{TEU}_{it_1} - \mathrm{TEU}_{it_0} = \mathrm{SHARE}_i + \mathrm{SHFT}_i$$

2. Share effect

$$\mathrm{SHARE}_i = \left(\frac{\sum_{i=1}^{n}\mathrm{TEU}_{it_1}}{\sum_{i=1}^{n}\mathrm{TEU}_{it_0}} - 1\right)\cdot \mathrm{TEU}_{it_0}$$

3. Shift effect

$$\mathrm{SHFT}_i = \mathrm{TEU}_{it_1} - \frac{\sum_{i=1}^{n}\mathrm{TEU}_{it_1}}{\sum_{i=1}^{n}\mathrm{TEU}_{it_0}}\cdot \mathrm{TEU}_{it_0}$$

where ABSGR_i is the absolute growth of container traffic in port i for the period t_0-t_1 expressed in TEU, SHARE_i is the share-effect of port i for the period t_0-t_1 expressed in TEU, SHFT_i is the total shift of port i for the period t_0-t_1 expressed in TEU, TEU_i is the container traffic of port i expressed in TEU, and n in the number of ports in the container port system (Notteboom, 1997; 2010a). Once the data has been quantified each container terminal's net shift can be computed and results deducted in terms of each ports position relative to other ports in the same gateway range and relative to all the ports in the region (in total). The results or output of the model will answer the following research questions.

Question 1: Is Container volume cargo getting more concentrated at only one gateway in the region?
Question 2: Which of the container ports in the region are currently demonstrating the most potential to lead in terms of competition and concentration?
Question 3: What developmental path has the Southern African container port system and its ranges followed in terms of spatial development theory?

Volume shift analysis

The Volume shift analysis assists in determining the intensity of competition and other dynamics within a container port system. This is effectively a calculation of the net volume of containers shifted between individual ports, port ranges or port categories. Notteboom (1997, 2010a) expresses this mathematically as follows:

$$\mathrm{VOLSHFT}_{\mathrm{intra}} = \sum_{j=1}^{m}\mathrm{VOLSHFT}_{\mathrm{intra}_j} \text{ with } \mathrm{VOLSHFT}_{\mathrm{intra}_j} = \frac{\sum_{i=1}^{r}|\mathrm{SHFT}_{ij}| - |\sum_{i=1}^{r}\mathrm{SHFT}_{ij}|}{2}$$

$$\mathrm{VOLSHFT}_{\mathrm{total}} = \frac{\sum_{i=1}^{n}|\mathrm{SHFT}_{ij}|}{2} = \mathrm{VOLSHFT}_{\mathrm{intra}} + \mathrm{VOLSHFT}_{\mathrm{inter}}$$

$$\mathrm{VOLSHFT}_{\mathrm{inter}} = \sum_{j=1}^{m}\left(\frac{|\sum_{i=1}^{r}\mathrm{SHFT}_{ij}|}{2}\right)$$

Where $\mathrm{VOLSHFT}_{\mathrm{intraj}}$ is the net volume of TEU shifted between ports of group j, $\mathrm{VOLSHFT}_{\mathrm{inter}}$ the net volume of TEU shifted between ports situated in different port groups, $\mathrm{VOLSHFT}_{\mathrm{total}}$ the total net volume of TEU shifted between container ports in the system, r is the number of ports in group j, n = number of ports in the port system and m = number of port groups in the port system. Although it is helpful in determining concentration patterns, competitive dynamic and developmental paths, the data dependant shift analysis methodology's limitation is that it does not suffice in understanding more localized dynamics. This can be overcome by using complimentary tools such as interviews, observation and archival/documentary Sources: (Mouton, 2001).

Total system range shift analysis

Figure 5 graphically illustrates the total shift analysis of all the ports as grouped within the Southern African container port system. Each 'bar' depicts the port system's total shifts over a specific period. As described earlier these shifts reflect the total number of containers (in this case TEU) a port has actually lost to or won from competing ports. The period 1985 to 1990 and 1995 to 2003 appear to show a domination in volume shifts by the Indian Ocean range. This was due mainly to the significant growth at Toamasina and Port Louis of 77 and 64% caused by an almost doubling of transhipment cargo. This also intensified competition for transhipment volumes between the two ports. Following negative volume shifts during the periods 2003 to 2007, and the ranges collective -9% growth in 2009, the Indian Ocean range defied economic recessionary pressures in 2010, realising steady growth of 8% and demonstrating a range shift volume win for that period.

The dominant range (from a market share perspective), that is the North East range of container ports at Durban and Maputo,was a major net shift winner in 2003 to 2005 and 2005 to 2007 as depicted in Figure 6. During these

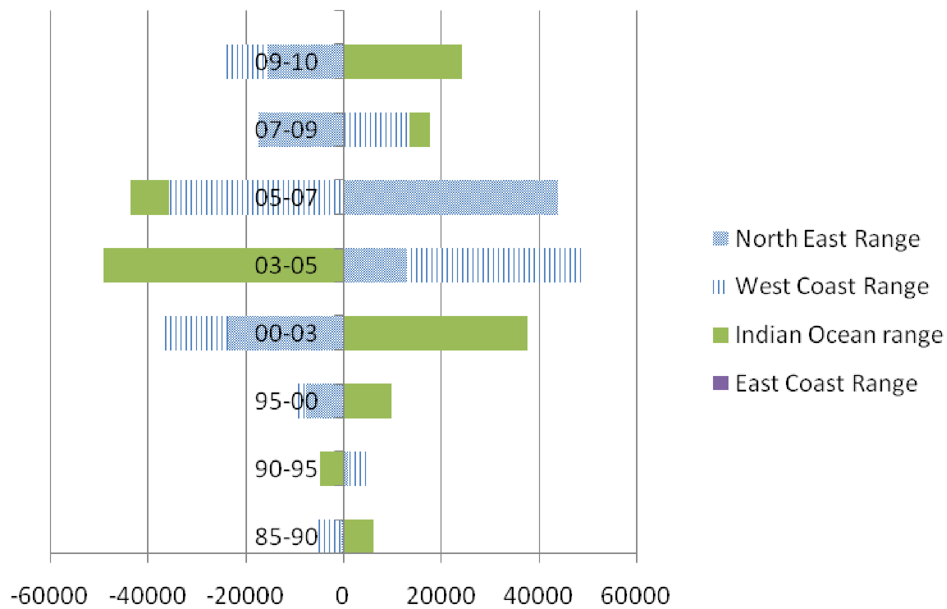

Figure 5. Southern African Port Range shift analysis.
Source: Own calculation.

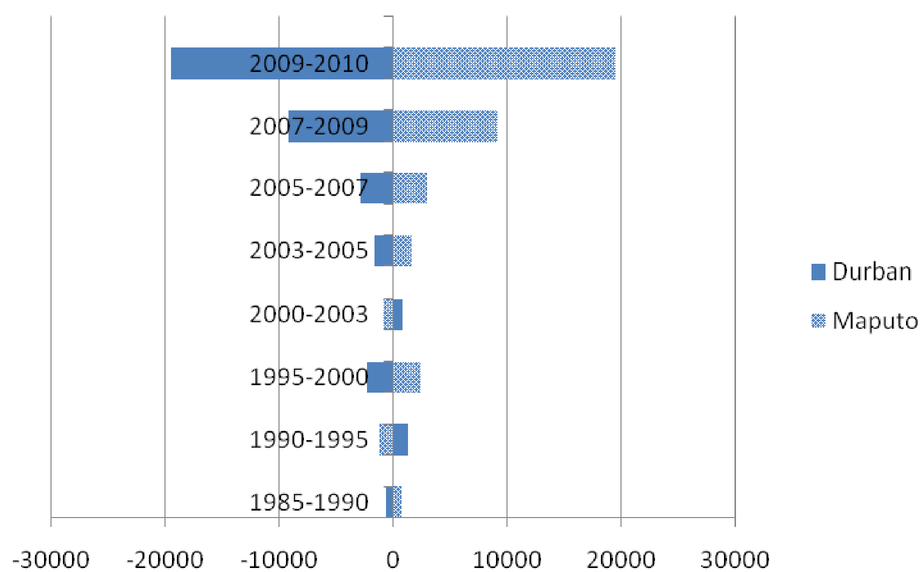

Figure 6. Intra Range shifts (North East Range).
Source: Own calculation.

periods of observation South Africa experienced average GDP growth of 4.3 and 5.4%, while Mozambique recorded 7.4 and 8% average GDP growth. Also during the period 2003 to 2007, Transnet (the government entity owning and operating the Port of Durban) underwent a very successful turnaround strategy, which included major capital investment in additionaloperational capital equipment such as gantry cranes and straddle carriers and port superstructure such as the widening and deepening of the port channel. The Port of Maputo's

Table 2. Summary of Inter-Port range winners and losers.

	Winners	Losers
Shift 1985-1990	Indian Ocean range	North East range West Coast range
Shift 1990-1995	North East range West Coast range	Indian Ocean range
Shift 1995-2000	Indian Ocean range	North East range West Coast range
Shift 2000-2003	Indian Ocean range	North East range West Coast range
Shift 2003-2005	North East range West Coast range	Indian Ocean range
Shift 2005-2007	North East range	West Coast range Indian Ocean range
Shift 2009-2010	Indian Ocean range	North East range West Coast range

Source: Own calculation results.

concession to DP World coupled with the country's positive economic growth and development path also resulted in double digit growth figures. In 2007, growth in Maputo was recorded at 29%.

The west coast port ranges of Cape Town and Walvis Bay demonstrated market shift wins in the periods 1990 to 1995, 2003 to 2005 and 2007 to 2009. In the 2007 financial year, Walvis Bay attributed the 22% increase in container volumes (majority being transhipment) to an increase of 49% increase in import and 30% increase in export containers (Port Technology International, issue 43). The port of Cape Town like other Transnet ports realised growth in 2004 and 2005 of 14 and 21% respectively following the re-focus strategy implemented by the group in order to turn the business around. Table 2 provides a summary of the inter-port range shifts.

Intra shift analysis: North East range

The next phase in the analysis interrogates the intra-range volume shifts, that is, shifts between ports within the same region. Intra- range volume shifts identify which container ports within a specific range have captured container traffic away from other competing ports.

Figure 6 shows the intra shift analysis of the North East range of Ports, Durban and Maputo. Besides the periods 1990 to 1995 and 2000 to 2003, Maputo is the definite volume shift winner within the range. The rationale for the shift is as follows.

First, from a hinterland perspective, Maputo provides shorter road and rail distances to the Gauteng area, the economic heart of South Africa, compared to the hinterland routes from the port of Durban, as we will demonstrate later in this paper.

Second, there has been a considerable amount of structural development, co-ordination and co-operation between the key infrastructure role players (road, rail and port) of the Maputo development corridor.

Thirdly, bilateral removal of visa requirements for Mozambique and South African nationals and the extension of the border posts of both countries to 12 h a day for people and 16 h a day for goods also gave an additional stimulus to Maputo (Ntamutumba, 2010).

Intra shift analysis: Indian Ocean range

The Indian Ocean range islands of Madagascar and Mauritius's intra range shift analysis (Figure 7) clearly illustrates the intense competitive rivalry between the two container ports. Each of the periods of observation (within the 25 year period) reflects a non-linear or periodic swing to either port with no trend towards a single consistent volume shift winner. The footloose nature of the volume shifts are largely due to the following factors: (1) High incidence of transshipment cargo due to limited hinterland capture area; (2) Rivalry and fierce competition

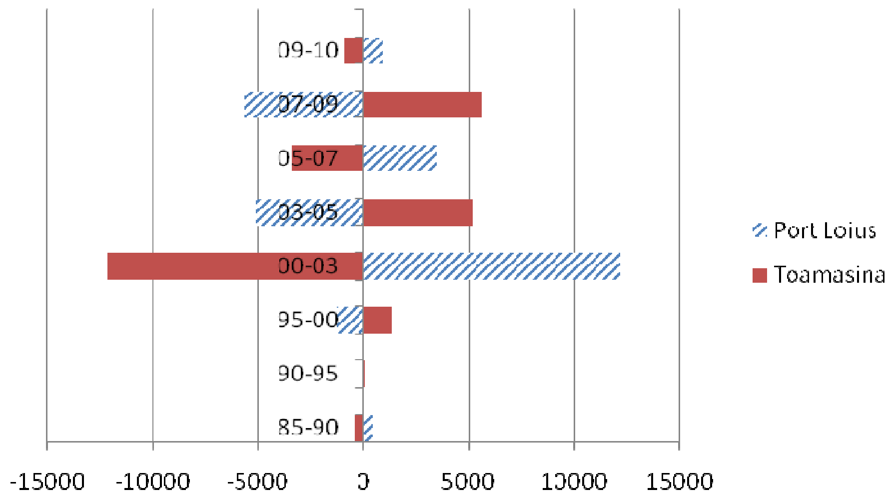

Figure 7. Intra shift analysis Indian Ocean range.
Source: Own calculation.

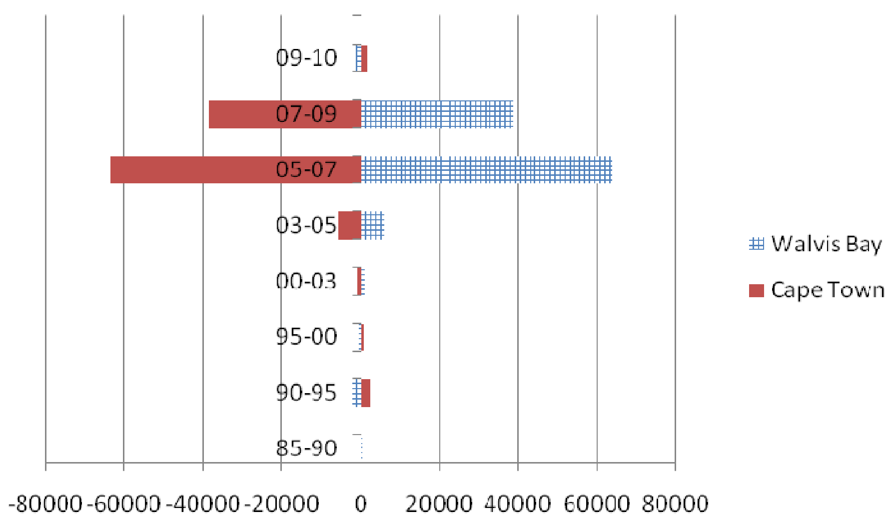

Figure 8. Intra shift analysis: West coast range.
Source: Own calculation.

for transshipment volumes due to the relatively close proximity of the two islands; (3) Madagascar's political instability following the 2009 coup that ousted President Marc Ravalomanana.

Intra shift analysis: West coast range

The intra-range shift analysis (Figure 8) in respect of the west coast ports of Walvis Bay and Cape Town show a dominant volume shift win for Walvis Bay over the entire period of observation, 2000 to 2009.

The port of Cape Town experienced significant volume shift share losses compared to Walvis Bay are due to the following:

1. Cape Town expansion project to double the terminals capacity to 1.4 million TEU commenced in 2007 with disruption to the operation.
2. The economic slowdown with a higher impacton Cape Town compared to Walvis Bay which during the same period attracted a new service Maruba Container Lines

thereby adding incremental transship and captured container cargo. By 2010, Walvis Bay and Cape were on a similar path with respect to volume losses.

Intra shift analysis: East Coast range

A complete shift analysis was not possible for the East coast range (Port Elizabeth and Ncqura). The port of Ncqura was commissioned in October 2009 and therefore only one year data was available. An important observation, however, was the volume shift between ports. Port Elizabeth lost 79,500 TEU in 2010 whilst Ncqura gained 78,543 TEU in the same year. This was an almost equal shift in actual volumes.The volume shift was due to a combination of a business decision by Transnet for certain cargo to be diverted from Port Elizabeth to Ncqura and the development of the east coast corridor into the hinterland from the port of Ncqura.

CURRENT ISSUES AND TRENDS IMPACTING ON THE SOUTHERN AFRICAN PORT SYSTEM

In the previous section regional port range allocations were made and a detailed container traffic volume analysis (market share, volume growth and shift-share analysis) was disclosed. In this section we consolidate these findings with the view of understanding their impact on current issues affecting the development of the Southern African container port systems and its related multi-port gateway regions. These issues include: rivalry among ports within the same port range for gateway status or rivalry among ports for a transshipment hub identity. The validity of port regionalization and path dependency in the Southern African container port context will also be unpacked and the outlook for the regions ports against the backdrop of governance, regulatory and environmental frameworks will also be discussed.

Rivalry among Ports for gateway cargo

According to Hayuth and Fleming (1994) and Van Klink and van den Berg. (1998) gateways can be defined as nodal points where intercontinental transport flows are being transshipped onto continental areas and vice versa. Notteboom (2009) defined a gateway as a network point that acts as an entrance to another network.

Both the Ports of Durban and Maputo are nodal points each linked to corridors with Gauteng, the central production and consumption zone in the region, as the end node in the supply chain. Given that cargo is transported from these two ports onto continental areas inland effectively defines Durban and Maputo both as gateways. The two hinterland corridors are graphically illustrated in figure 9 below (Corridors 1 and 2).

The two north east range corridors are orientated towards Gauteng:NATCOR -Durban to Gauteng (2) and MAPUTO CORRIDOR -Maputo to Gauteng (1). The Maputo Corridor is well positioned along one of the most industrialized and productive regions of Southern Africa. Two gateways in such close proximity however results in intense rivalry for market share. The extent to which (from a distance perspective) can be summed up in Table 3.

Comparatively, from both a rail and road perspective, Maputo is a shorter distance to Johannesburg and Pretoria. This has both cost and time implications for freight customers. The Maputo corridor involves some level of co-operation in the region across borders (South Africa/Mozambique) and across organizations (Transnet Freight rail and DP World Maputo).The shorter distances from Gauteng to Maputo (compared to Durban) clearly illustrates the competitive advantage the Maputo corridor has over the Natcor (Durban corridor).

Maputo’s competitive advantage over Durban was observed during the recessionary periods, 2008 to 2010. In a period where most container terminals lost volumes, Maputo grew 15% in 2009 and 35% in 2010. In the same period Durban lost 6 and 4% of their volumes respectively. The shift gains also substantiate this in Figure 6.

The shift towards Maputo can however only be limited to the handling capabilities/capacity of the port. Durban was indeed still the biggest container port maintaining a regional market share of 53% at 2010 whilst Maputo held 3%. Any further gains for Maputo will be limited to the ports increased capacity to handle any further incremental volumes. Given the port of Maputo’s ambitious capacity expansion plans for the future, Durban will need to find initiatives to defend its status as the primary gateway port into Southern Africa. In addition to capacity improvements, the port needs increased focus on improved operational efficiencies, more competitive tariffs and a more reliable service offering

Competition between Cape Town and Walvis Bay also largely focuses on gateway cargo.Despite the distance from Cape Town (the most southern point in the region), the port of Walvis Bay stated its strategic intent as ‘A natural gateway for international trade’ with the ability ‘to reach the Gauteng market via the Trans-Kalahari Corridor instead of going via Durban or Cape Town, saving 7 to 11 days of transit time’ (Port Technology International, 2011). In addition to serving the geographic hinterland in close proximity to the port of Walvis Bay, the container terminal also seeks to serve the economic

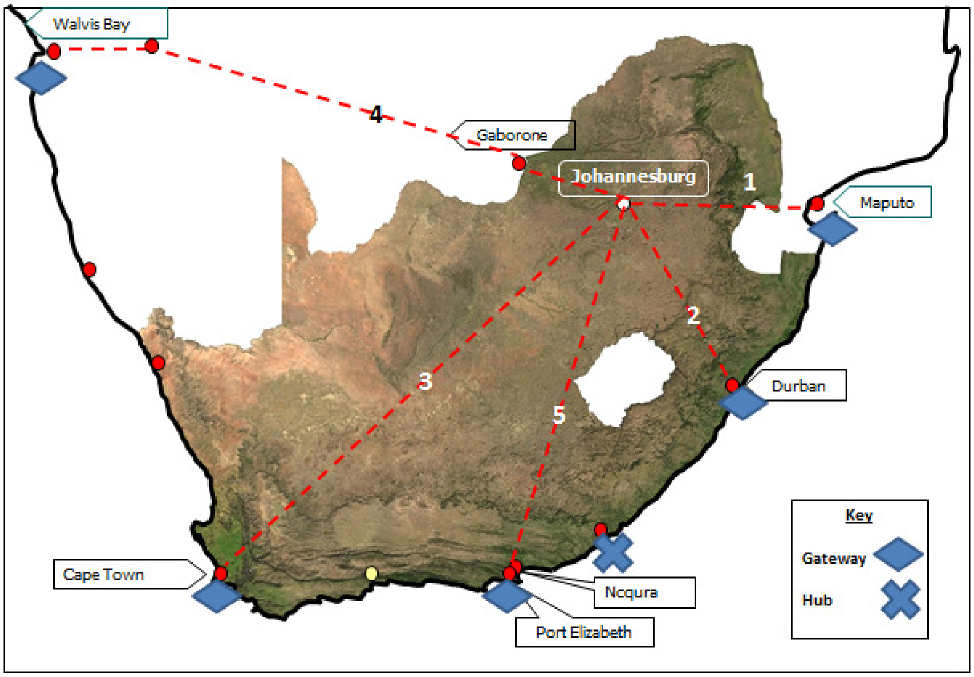

Figure 9. Southern African freight corridors.
Source: Adapted from Google Earth, routes are approximations.

Table 3. Comparative distances of Maputo and Durban to industrial hub.

Comparative rail distances in km		
From	Maputo	Durban
Johannesburg	581	720
Pretoria	574	786
Comparative road distances in km		
Johannesburg	469	598
Pretoria	444	656

Source: Own (Adapted from AA.co.za and the Transnet Freight rail distance calculator).

hinterland namely Gauteng.This gateway case is similar to European ports situated in the south of France, such as Marseilles, which could actually feed northern Europe through efficient road and rail networks.

The Walvis Bay Corridor consists of three trade routes (Figure 10) connecting the port of Walvis Bayto six SADC member countries namely, South Africa, Angola, Zambia, Botswana and the Democratic Republic of Congo. The three corridors are known as the Trans-Kalahari Corridor (TKC), the Trans-Caprivi Corridor (TCC) and the Trans-Cunene (TCuC).

The comparative distances to Johannesburg listed in Table 4 illustrate the vast differences in distance between the two ports. Given that Ncqura has been identified as the transshipment hub for the region (Damasane, 2008; Notteboom, 2010b), Cape Town is best positioned as a gateway for the western regions of Southern Africa as well as a secondary gateway for Gauteng (after Durban).

With Cape Town and Walvis Bay both gateways, serving the same hinterlands increases rivalry tensions between the two ports. From a hinterland perspective, currently Cape Town is the port with the shorter distance to Gauteng compared to Walvis Bay. The Walvis Bay corridors however best serve the landlocked Southern African regions of Zambia, Botswana and parts of Zimbabwe.

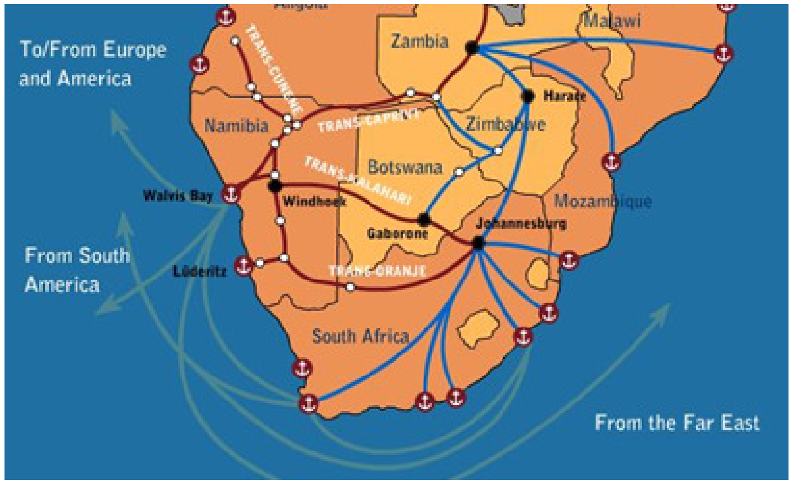

Figure 10. The Walvis Bay corridors.
Source: Walvis Bay corridor group (http://www.wbcg.com.na).

Table 4. Comparative distances of Maputo and Durban to industrial hub.

Comparative rail distances in km		
From	Walvis Bay	Cape Town
Johannesburg	The Walvis bay corridor is a combination of rail (Walvis Bay to Gobabis via Windhoek), where after containers are transported via road and continue on rail from Lobatse in Botswana to Johannesburg.	1509
Comparative road distances in km		
Johannesburg	2800	1437

Source: Own (Adapted from AA.co.za and the Transnet Freight).

The islands of Madagascar and Port Louis service for captive cargo is limited to the size of the islands (population served) and productive capacity to export commodities. The Indian Ocean range is therefore seen more as a hub region than a gateway port region. The port of Ncqura has been positioned strategically by Transnet as the transhipment hub port for Southern Africa.

Rivalry among Ports for transshipment hub status

According to McCalla and Robert (2008), transshipment is defined as a container handled twice within the same terminal deriving revenues from each transaction/move.

Two factors have significantly contributed to positioning Southern Africa as an ideal transshipment hub. Firstly, increased container vessel sizes and shipping line mergers and alliances give rise to economic benefits from reducing the number of port calls (Notteboom, 2010a). Secondly the increasing transit fees of the Suez canal and increased piracy at the Gulf of Aden present the Southern African ports to shipping lines as potential transshipment hubs (an alternative of the Cape route over the Suez canal). This ideal is based on Southern Africa's location between the major south-south sailing routes, such as between Asia and West Africa and Asia and South America (Notteboom, 2012).

The main rivals for transshipment cargo amongst hub ports in the Southern African Port system are Ncgura and Port Louis. Both ports are geographically positioned along main trade routes. The Port of Ncqura was from the investment planning stage, positioned as a deep water transshipment hub. Port Louis since 2002 has realized a significant increase in transshipment over captive cargo.

Transshipment cargo surpassed captive cargo at Port

Table 5. Identification of the spatial development patterns in the Southern African port system.

Port group	Concentration-deconcentration	Concentration factors	Deconcentration Factors	Path dependency
Southern African Port System	Mixed with the insertion of new gateways and offshore hubs.	Political and Economic stability.	Increased participation of new ports on container scene. Well-coordinated/managed corridors. Capacity Expansion projects. Regional Integration (SADC)	Non- linear
North East Range Durban - Maputo	Deconcentration away from Durban Decentralization partly due to integration of Maputo with inland rail terminal City Deep (Gauteng)		Gains of Maputo due to (1) Political stability; (2) Strong Economic growth; (3) Economic integration and bilateral trade agreements; (4) Major infrastructure (road) development and strong management of the Maputo corridor. Durban: (1) Congestion; (2) Greater road and rail distances to production and consumption hinterland than Maputo; (3) Peripheral port challenge	Durban: Non-linear. Contingency factors :as per de-concentration factors Maputo: Linear positive growth and development path. Main current constraint is capacity berths and draught and space (stack).
East Coast Range Port Elizabeth (PE) - Ncqura	Reconcentration with focus moving from PE to Ncqura and the insertion of Ncqura as an intermediate hub	Ncqura as Greenfield Port with deepest draught in the system range.	Strategic business decision of Transnet to divert local gateway cargo from PE to Ncqura.	PE: non-linear traffic development due to shift to Ncqura (open only recently).
West Coast Range Cape Town (CTCT) - Walvis Bay (WB)	Deconcentration away from Cape Town		Well managed and co-ordinated Walvis Bay Corridor group. More efficient border operation. Cape Town facing peripheral port challenge and congestion during extreme weather conditions.	CTCT: Non-linear development WB: Non-linear. Demonstrated highest market share and volume growth in the last 10 years.
Indian Ocean Range Port Louis (PL) Toamasina (TS)	Mixed	Footloose nature of volume shifts demonstrates no definite concentration or de-concentration for both ports		PL and TS: Non-linear

Louis from 2005 continuing to 2009. By 2009, transshipment cargo in Port Louis constituted 53% of total port volumes (Mauritius Port Authority, 2010). The Port of Ncqura was commissioned in October 2009 as a

South Africa's transshipment hub, and realized 43% of transshipment incidence (Transnet Port terminals, 2010).

Given that both Ngqura and Port Louis are ideally positioned to fulfill the role of a Southern African hub that handles transshipments from the rest of the world to East and West Africa as well as transshipments on the South-South trade corridor between Asia and South America, rivalry for transship volumes between the two ports will remain intense. A competitive advantage over a rival port can be achieved through operational efficiencies, competitive transshipment tariffs and a level of flexibility with respect to transshipment container storage where applicable.

CONCLUSION

Given the volume growth, and strategic geographical positioning of Southern Africa, the regionis rapidly gaining an important position on the global container port scene.To date competitive dynamics in the Southern African container port system have not been well researched. This paper identified the current concentration levels of container traffic within Southern Africa, the validity of port developmental path dependency and identified the current stage of port development at both a total port system and port range level. The analysis was largely adapted from the process applied by Notteboom (2010b) to the European container port system.

Following the theoretical spatial development model discussed as well as the traffic analysis, we integrate the theory and the model results at a container port system and container port range level in order to (1) disclose the level of concentration or deconcentration; (2) Describe the concentration/deconcentration factors applicable to each port system and range and (3) define the port system and port range developmental path (linear or non-linear). The findings are summarized in Table 5.

The results lead to some interesting conclusions. The challenge of the periphery appears to be prolific in the region, demonstrated by the significant and sustained shifts from larger ports such as Durban and Cape Town, to smaller ports such as Maputo and Walvis Bay. The most significant contribution to this has been the high degree of corridor development and management at the Maputo and Walvis Bay corridors.

Notwithstanding the significant handling capacity differences between the smaller (shift share winner) and larger (shift share looser ports) both Maputo and Walvis Bay have positioned themselves as gateway ports for the regions hinterland, in direct competition with Durban and Walvis Bay.

The Indian Ocean island container ports on the other hand demonstrated irregular shifts with no one overall port winner over the period of observation. This footloose nature of the shifts is indicative of island ports where tranship container cargo is highly contestable.

The future outlook for the region offers both opportunities and challenges. Although relatively stable, the region is still significantly affected by some political tensions such as, the Madagascar coup and Mozambique land expropriation. In addition, in order to accommodate fifth and sixth generation vessel calls, the ports in the region will need to accelerate investments to accommodate incremental container volumes (the 'MSC Sola' (11.660 TEU) called Ngqura, Durban and Port Louis in the early summer of 2012). The major upscaling in vessel size in Southern Africa from a typical size of 4000 TEU to an increasing number of post-panamax units clearly favours the ports that offer deep draft access channels, sufficient terminal capacity and a fast vessel turnaround time. This issue is expected to lead to more cargo concentration towards these ports.This will come at a significant cost amidst increased regulatory compliance (environmental, competitive) as well as land space constraints.

Considerations for future research of ports in the region could include: (1) Gateway and hub corridor strategies and competitiveness given the SADC integration process and (2) the emergence of Southern Africa's position for South-South transit routes along the Cape of Good hope at the level of transhipment flows given upscaled vessels (that is, an extension of the work of Notteboom, 2012) and (3) the impact of regulations and governance (competition and environmental) on Southern African container port development.

REFERENCES

Barke M (1986). Transport and Trade Edinburgh. Edinburgh: Oliver & Boyd.

Damasane N (2008). *African Buisiness Events.* Retrieved November 13, 2011, from African Buisiness Events: ttp://www.ppt2txt.com/dm/www.africanbusinessevents.com.

Ducruet C, Notteboom T (2012). The worldwide maritime network of container shipping: spatial structure and regional dynamics, *Global Networks, doi:10.1111/j.1471-0374.2011.00355.x*

Ducruet C, De Langen P, Notteboom T (2009). Revisiting Inter-Port Relationships under the New Economic Geography Research Framework. In d. L. Ducruet C, *Ports in Proximity Competition and Coordination amaong Adjacent Seaports* (pp. 11-27). Surrey: Ashgate Publishing Limited.

Econsearch (2011). Shift Share Analyis. Retrieved November 11, 2011, from Econsearch : Economic Research: http://www.econsearch.com.au/pages/services/regional-analysis/shift-share-analysis.php

Fossy J (1986-2010). *Containerisation International Yearbook.*London: Informa U K Limited.

Frankel J (2010). *Mauritius: African Success Story.* Retrieved February 1, 2012, from National Bureau of Economic Research: http://www.nber.org/papers/w16569.

Frémont A, Soppé M (2007). Northern European range: shipping line concentration and port hierarchy. In: Wang J, Notteboom T, Olivier D, Slack B (Eds.), Ports, Cities, and Global Supply Chains. Ashgate, Alderschot pp.105-120.

Harper D (2010). *Supply side Economics.* Retrieved October 18, 2011, from Investopedia: http://www.investopedia.com/articles/05/011805.asp#axzz1b7l7ArvJ
Hayuth Y (1981). Containerization and the load center concept. Economic Geography *57(2):* 160–176.
Hayuth Y, Fleming Y (1994). Spatial Characteristics of Transportation Hubs: Centrality and Intermediacy. J. Transp. Geogr. *2(1):* 3-18.
Iheduru C (1996). Post-Apartheid South Africa and Its Neighbours: A Maritime Transport Perspective. J. Modern Afr. Stud. 34(1):1-2.
Informa UK (2011). Ports and Terminals: Africa. Containerization International Year book 2012, pp.141-145.
Informa UK (2011). Ports and Terminals: Indian Ocean. Containerization International Year book pp.148.
International Finance Corporation World Bank Group (2008). *Madagascar: Port of Toamasina.* Retrieved February 2, 2012, from International Finance Corporation: World Bank Group: http://www1.ifc.org/wps/wcm/connect/de45eb004983911d83acd3336b93d75f/CIA_PPPseries_Toamasina.pdf?MOD=AJPERES.
Jacobs W, Notteboom T (2011). An evolutionary perspective on regional port systems: The role of windows of opportunity in shaping seaport. Environ. Plann. 43:1674-1692.
Lee S, Song D, Ducreuet C (2008). The spatial evolution in global hubport cities. Geoforum pp.372-385.
Levy (1999). *Sanctions on South Africa : What did they do?* Retrieved January 29, 2012, from Economic Growth Centre Yale University: http://aida.wss.yale.edu/growth_pdf/cdp796.pdf
Mauritius Port Authority (2010). AIVP 12th International Conference Cities and Ports : Port Louis. Port Louis: Mauritius Port Authority.
McCalla J (1999). Global change, local pain: Intermodal seaport terminals and their service areas. J. Transp. Geogr. 7:247-254.
McCalla J, Robert J (2008). Container transshipment at Kingston, Jamaica. J. Transp. Geogr 16:182-190.
Medda F, Carbonaro G (2007). Growth of Container Seaborne Traffic in the Mediterranean Basin: Outlook and Policy Implications for Port Development. Transport Reviews: A Transnational Transdisciplinary J. 27:573-587.
Mouton J (2001). How to succeed in your Masters & Doctoral Studies: A South African Guide and Resource Book. Pretoria: J.L. van Schaik.
Ng A., Pallis A (2010). Port governance reforms in diversified institutional frameworks; generic solutions, implementation asymmetries, Environ. Plann. A 42:2147-2167.
Notteboom T, Rodrigue J (2005). Port regionalization: towards a new phase in Port Development. Maritime Policy Manag. pp.297-313.
Notteboom T (1997). Concentration and load centre Development in the European container Port System. J. Trompon Geogr. 5(2):99-115.
Notteboom T (2005). The peripheral port challenge in container port systems. In H. London: Routledge. Leggate, Int. Maritime Transp. Perspect. pp.173-188.
Notteboom T (2006). Traffic inequality in seaport systems revisited. J. Transp. Geogr 14(2):95-108.
Notteboom T (2009). Path Dependency and Contingency in the Development of Multi-Port Gateway Regions and Multi-Port Hub Regions. In: Ports in Proximity: Surrey: Ashgate. Competition and co-ordination among adjacent seaports. pp.55-74.
Notteboom T (2010a). From multi-porting to a hub port configuration: the South African container port system in transition. Int.J. Shipping TranspLogistics 2(2): 224-245.
Notteboom T(2010b). Concentration and the formation of multi-port gateway regions: An update. J. Transp. Geogr 18:567-583.
Notteboom T (2011). An application of multi-criteria analysis (MCA) to the location of a container hub port in South Africa.Maritime Policy Manag. 38(1):51-79.
Notteboom T (2012). Towards a new intermediate hub region in container shipping? Relay and interlining via the Cape route vs. the Suez route. J. Transp. Geogr. *22*: 164-178.
Notteboom T, De Langen P, Jacobs W (2012). Institutional plasticity and path dependence in seaports: interactions between institutions, port governance reform and port authority routines, J. Transp. Geogr http://dx.doi.org/10.1016/j.jtrangeo.2012.05.002
Ntamutumba (2010). Study for the Establishment of a Permanent Regional Corridor Development Working Group in PMESA region. Retrieved February 10, 2012, from UNECA Web Site: http://www.uneca.org/atpc/events/23-25Nov10Mombasa/Study%20Done%20by%20Consultant.pdf
Pallis A, Vitsounis D, Langen PD, Notteboom T (2011). Port Economics, Policy and Management: Content Classification and Survey. Transp. Rev. *(31)4:* 445-447.
Port Technology International (2011). *Port of Walvis Bay: committed to being the gateway to Southern Africa.* Retrieved February 5, 2012, from Port Technology International Edition 43: http://www.porttechnology.org/technical_papers/port_of_walvis_bay_committed_to_being_the_gateway_to_southern_africa
Rimmer J, Comtois C (2009). China's container-related dynamics: 1990–2005. Geo. J. 74: 35–50.
Rodrigue J, Notteboom T (2010). Foreland-based regionalization: Integrating intermediate hubs with port Hinterlands. Res. Trans. Eco. *27:* 19-29.
Slack BJ (2002). The challenge of peripheral ports: an Asian perspective. Geo. J. *56:* 159–166.
The International Bank for Reconstruction and Development The World Bank. (2010). *Africa's Infrastructure: A Time for Transformation.* Washington DC: World Bank.
Transnet Port Terminals. 2010. Transnet Port Terminals. Transnet Ann.l Rep. pp. 198.
Van Klink, Van den Berg (1998). Gateways and Intermodalism. J. Trans. Geo. *(6)1:* 1-9.
Wang (2000). The evolution of a regional container port system: J. Trans. Geo. *8:* 266-275.
Winkelmans W, Notteboom T (2007). Port Master Planning: balancing stakeholders' interests. In K. D. (Eds), *The Reality and Dilemmas of Globalisation*. Gdansk: Gdansk University. pp. 395-408.

Annexure 1. Salient feature of southern African container terminals.

Terminal	Current capacity[1] 2009 (Million TEU)	Draught[2] (m)	Ownership structure	Future developments to 2015 (Million TEU)
Walvis Bay	0.250	14.4	Container Terminal Operated by Nanport and APM terminals.	0.500 by 2013 and increase draught to 14 to 16 m deep.
Cape Town	0.700	14	All of the South African Terminals are owned and operated by Transnet, a government registered Company. (Note: Transnet also holds the country's cargo rail operation as well as the Port Authority.	Port conversion to an RTG facility will increase capacity to 1.4 million TEU by end 2012.
Ncqura	0.400	15		Ramp up f capacity to 0.800 TEU
Port Elizabeth	0.400	11.8		0.400 no known planned developments.
Durban[3]	2.800	12.5		Capacity increase to 4.5 million TEU by 2018 Further capacity will be through the development of the old Airport site in the South Of Durban.
Maputo (Mozambique)	0.120	11.5	Operator Mozambique International Port Services Public private partnership between DP World Maputo holding a (60% share) and Mozambique Ports and Railways or CFM (40% share)	Development up to 0.400 TEU by 2015.
Port Louis (Mauritius)	0.500	12.2	Container operation concession agreement to the Cargo handling corporation limited in 1999.	0.750 TEU by 2013. Developing a new 1 mill TEU terminal following the construction of new breakwater.
Toamasina (Madagascar)	0.350[4]	12	Madagascar International Container Terminal Services (MICTS), a subsidiary of Filipino company International Container Terminal Services Inc. (20 year concession agreement) signed in May 2005.	Expansion to meet 0.426 TEU demand forecast. Extension of the breakwater, the construction of a new dock with a length of 320 m, the deepening of draught to 14 m.

Sources: Adapted from Transnet Annual Report, 2009; World Bank AICD Surveys, May 2007; Ramsaha, 2010; World Bank, 2009; Various Port Authority's, Containerization International, 2011.

Annexure 2. Southern African port range classifications.

Range	Container Ports within range	Range grouping rational (based on Hinterland and Liner Service)
North East range	Durban and Maputo (South Africa and Mozambique) Location. North East region of Southern Africa	Hinterland with reference to Figure 13, The Natcor (2) represents the Durban to Guatang hinterland. Gauteng being the production and consumption centre in South Africa. The Maputo corridor (1) demonstrates some level of co-operation in the region across borders (South Africa/Mozambique The corridor (1) also reaches the production and consumption hub, Gauteng.
West Coast range	Walvis Bay and Cape Town (Namibia and South Africa)	Walvis Bay: Three main corridors with connectivity to the Port Walvis Bay to six SADC countries (Refer to Figure 13 (4)). The trans Kalahari and Trans Oranje corridors move cargo to the same destinations as Cape Town. Cape Town: The West Cape Core corridor (3) orientated towards Gauteng (the countries industrial hub).

[1]Refers to the terminals determined capacity based on available resources and as reported by each.
[2]The deepest berth draught has been provided. Not an indication of all berths at the port.
[3]Durban represents the Pier1 and Pier 2 container terminals as published by IOL 5/04.2012.
[4] PORTS IN AFRICA: COUNTRY PROFILES, World bank 2009.

Annexure 2. Contd.

Indian Ocean range	Port Louis and Toamasina (Mauritius and Madagascar)	Geographically Port Louis and Toamasina are strategically located at the crossroad of main maritime routes: Far East and Africa and Europe and Australia. Vital connection for Indian Ocean islands and peripheral regions
South East range	Pot Elizabeth and Ncqura (South Africa)	Port Elizabeth and Ncqura are located 12 km apart and both use the East Cape South Corridor (orientated towards Gauteng)