Halifax is Different:

Ports to the future

STEPHEN KYMLICKA

The AIMS Atlantica Ports Series # 4

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Atlantic Institute for Market Studies

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About the Series

Atlantica is a region broadly composed of the Atlantic provinces, south-shore Quebec, the northern tier of New England states, and upstate New York. These territories have a number of characteristics in common – similar demographics, diversity, and migration; a shared history; and interrelated transport issues. These common qualities have led to common public policy interests.1 The dominant container port in Atlantica is the Port of Halifax, while on a tonnage basis, the largest port in Atlantica is Canso, a significant energy hub. The ports of Saint John and Come-by-Chance are also significant players in the energy transfer business.

Ports provide a key service in the transportation network that moves goods from producer to consumer. All goods and network connections do not have the same needs, however, and so the strategy of any port must be tailored to realistic trade flows.

The Atlantica Ports Series takes a comprehensive look at the existing flows, industries, and services that surround Atlantica and asks: What opportunities exist for Atlantic ports to increase volumes? One option would be to extend the regional market by expanding the distribution function. This paper evaluates the conditions for port-distribution synergies and focuses on the use of transload facilities in particular.

About the Author

Stephen Kymlicka is a Halifax consultant, researcher and professor, including a stint with AIMS as Senior Policy Analyst responsible for the Atlantica and Transportation portfolios. He has also ran an MIS and Management consulting firm in Regina for several years, growing the company to 27 employees. Over nearly 20 years, he has worked or consulted for agriculture, oil and gas, chemicals, mining and insurance companies as well as NGOs and several government departments. Among his managerial missions, he has led strategic planning efforts in the public and private sectors.

Stephen teaches International Business and Corporate Strategy at Dalhousie University. He earned an MBA from Dalhousie University and a BSc from St. Francis Xavier University.

EXECUTIVE SUMMARY

The structure of liner shipping networks is evolving and becoming more complex. Understanding the nature of these changes is crucial for analysing the competitive position and growth prospects of container ports.

This paper develops a typology of ports based on three broad categories of criteria: the logic of the port's location in global maritime networks, cargo movements in relation to the port's hinterland, and the characteristics of the port's services. The four major port types defined are: global pivots – which are located on major shipping routes and feature high degrees of cargo transhipment; load centres – which are peripheral to major east-west shipping routes and feature a significant amount of intermodal transload traffic to distant inland markets; regional ports – which deliver most of their cargo to and from a relatively large nearby hinterland; and minor ports where local traffic generates enough volume to make the presence of a small container facility economically viable.

Halifax currently displays characteristics of both a load centre and a regional port.

Transformation into a global pivot is unlikely unless barriers to short-sea shipping to the US Atlantic coast, such as the *Jones Act* and its restrictions on cabotage, can be removed, or markets for which Halifax has a particular geographic advantage (e.g., Africa or South America) develop significantly.

Expansion of Halifax's role as a load centre will require improved rail and road connections to central Canada and the US Northeast and Midwest, as well as continuing improvements in productivity improvement and cost reduction. Growing North American trade with east Asia and the Indian subcontinent via the Suez Canal will improve the likelihood of success here.

Growth in the regional port role is tied to growth in the economy of the Maritime provinces, and given the relatively small population in the region, only modest growth is likely. Prospects for Halifax also may improve to the extent that transload functions can be drawn away from more distant centres like Toronto.

DEFINING PORT TYPOLOGIES

Liner shipping is characterized by a network. The majority of containers are transhipped (moved from one ship to another ship) at intermediate ports before they reach their port of destination. As the structure of liner shipping networks evolves, the position of ports as nodes in the network also changes. Understanding these changes is crucial for analysing the competitive position and growth prospects of container ports.

In general, the structure of liner shipping networks, measured in terms of the number of intermediate ports per voyage, is becoming more complex and the number of specialized transhipment ports is increasing. There are four reasons for this increasing complexity. First, the number of container ports is rising as new ports are built and former bulk ports develop container facilities. This increases the number of possible network structures. Second, annual transport volumes are rising substantially. Thus, the entire network becomes more elaborate. Third, the number of classes of container ships is rising – there are now ships with capacities of 250–500 TEUs,[1] 500–1000, 1000–2000, 2000–4000, 4000–6000, and 6000–8000 – and there are designs for even larger ships. Apart from size, the speed of container ships also differs. This increasing variety of container ships leads to more complex liner shipping networks, in which each of those ships has a particular role. Most carriers have vertically integrated into terminals as vital components of their networks and demand dedicated terminals in important ports. For the liner shipping companies (carriers), the main architects of liner shipping networks, this integration increases the number of network configurations that they can run profitably.

The structure of liner shipping networks and the role that ports play in these networks can be understood using the concept of container-port hierarchy. According to this concept, container ports serve different stylized roles in a liner-shipping network.

Various authors have categorized ports into different types. Hayuth (1981) introduced the term load centres. Notteboom (1997) has refined that concept by defining the following criteria for load centres: (a) they are a regular port of call for round-the-world services, (b) they have large container volumes (greater than 400,000 TEUs per year), (c) their transshipment figures are high, and (d) they have seen a substantial increase in demand in more than two of the periods observed (for emerging load centres). A load centre should meet at least three of these criteria. De Monie (1999) has developed a typology consisting of “global pivots”, “load centres”, “regional ports” and “minor ports”. This typology is based purely on the location of ports in relation to major shipping routes.

The port typology presented in this paper is based on the above-mentioned literature, but it goes beyond the too simple distinction between hub (or load centre) and other ports. Rather, it is based on various variables, and it uses the following detailed criteria, which allow for a precise classification of ports.

[1] Twenty-foot Equivalent Unit (TEU). Container ship cargo space is often measured in this standard container size. In practice, forty-foot units have become more prevalent and fifty-three foot containers are often seen in North America.

- **Logic of location.** Here we deal with the role of ports in maritime and hinterland networks.
- **Hinterland role.** The hinterland role refers to how cargo moves in relation to the port, including the importance of (sea-sea) transshipment, the size and geography of the hinterland, and the importance of intermodal links to the hinterland.
- **Service characteristics.** Included are minimum through-put volume at the port, size of the largest vessels that regularly serve the port, and the frequency of the services.

The definitions are below, followed by a summary of the typology in Table 1.

Global pivots are ports located on or very near the main lines of the global maritime networks, that is, the lines connecting the limited number of ports on the global east-west stretch on which the latest-generation vessels are scheduled. The main function of these ports for the hinterland is a transshipment function: more than 60 percent of the cargo handled is sea-sea transshipment. The other 40 percent of the cargo is transported mainly by intermodal modes to a hinterland more than 300 km from the port. The largest vessels, that is, those with a capacity of more than 5000 TEUs service the port regularly, generating a minimum throughput of 600,000 TEUs per year, and all important services call at least twice a week.

Load centres are ports that are peripheral to the main east-west line of the global maritime network, but that serve a large hinterland. The transshipment function is still important but less important than the overland throughput function. Sea-sea transshipment does not exceed 40 percent and is on average 20 percent. The main function of the port is the overland throughput function; about 60 percent of cargo handled is transported immediately to the hinterland. The hinterland is more than 300 km from the port. The port is characterized by an efficient set of intermodal hinterland connections. The largest vessels regularly serving the port are in the range from 4000 to 6000 TEUs, and the latest-generation vessels (more than 6000 TEUs) call now and then. The minimum annual throughput is about 1,000,000 TEUs. Vessels in the 4000-to-6000 TEUs range call at least twice a week.

Regional ports are ports mainly serving agglomerations of a moderate size. They are strategically located near their service areas and farther from the global maritime networks. There is hardly any transshipment. The hinterland on average stretches for up to 500 km from the port. Regional ports are regularly served by vessels of up to 2000 TEUs and handle above 150,000 TEUs annually. Regional ports can vary greatly in volume of cargo handled. Vessels call on average once a week or once every two weeks. Regional ports can, depending on the availability of hinterland connections, take over the functions of load centres. This may be a result of a growth in cargo volumes in the immediate hinterland or because competing load centres are unable to accommodate the growing volumes.[2]

The regional ports serve larger-vessel services (4000–6000 TEUs) for a hinterland that extends for about 300 km from the port. They compete directly with the load centres, serve the same hinterland, and make partial use of the same hinterland connections.

[2] This phenomenon is described by both Barke and Hayuth as the deconcentration phase. Hayuth (1981) introduces the trend towards deconcentration in the container port system as a result of what he calls "the peripheral port challenge". As the port system develops, diseconomies of scale in some load centres emerge in the form of a lack of space for expansion and limited foreland for hinterland accessibility (port congestion due to infrastructural or superstructural bottlenecks). These limitations on the growth of the load centres encourage smaller ports to attract liner services from the load centres.

Minor ports are directly related to a nearby base cargo load location. They arise where local traffic generates enough volume to make the presence of a small container facility economically viable. Such a facility is in general served only by small vessels, in some cases not on a regular schedule. The annual cargo volume is roughly up to 200,000 TEUs.

This framework can be used to analyse the position of a particular port in the maritime network. The different port types are not always mutually exclusive and some ports play different roles in the maritime network. This is especially the case for some of the largest ports in the world, which are not only load centres, but also global pivots. The best example is Shanghai, which is a load centre for a huge hinterland (extending for more than 3000 km) and also a global pivot with a variety of feeder services (for example, into the Yellow Sea). The same combination of functions can also occur in smaller ports, though in such cases, the lack of critical mass is a serious hurdle to full development into either a load centre or a global pivot.

The model is especially useful for an understanding of the different roles and preconditions of load centres and global pivots. As such, it is more relevant in regions with huge transshipment flows (for example, Europe, the Caribbean, and East Asia) than in regions with smaller transshipment flows. However, in the case of North America, new demand for short-sea shipping services is increasing, and policy changes, especially pertaining to cabotage restrictions under The Jones Act,[3] would help. This would further facilitate the development of transshipment facilities – the foundational infrastructure of global pivots.

[3] *The Merchant Marine Act of 1920* (commonly known as *The Jones Act*) limits cabotage (i.e., the carriage of goods between two American ports) to US-flagged vessels. Canada has similar legislation – ostensibly to protect the domestic merchant fleet. Today the northeastern United States has no sites that physically suit the development of a global pivot, and thus there is very little transshipment. In light of increasing demand and the lack of a feasible US site, the United States may need to consider other options.

Figure 1: Distinct Port Types and Their Characteristics[4]

Aspect	Variable	Global Pivot	Load Centre	Regional Port	Minor Port
Logic of location	Maritime network	Located strategically nearby the intersection of major shipping routes	Peripheral in maritime network	Unimportant position in maritime network	Unimportant position in maritime network
	Hinterland network	Limited natural hinterland	An extensive and voluminous hinterland	A substantial industrial or metropolitan hinterland	Local traffic base
Hinterland role	Transshipment	> 60% (sea-sea) transshipment	< 40% sea-sea transshipment[a]	Little sea-sea transshipment	No transshipment
	Hinterland modes	Limited local hinterland	> 60% direct to hinterland; substantial share (at least 10%) of origins/destinations > 300 km	At least 90% of the volumes with origin/destination < 500 km	Direct local hinterland, at least 90% of the volumes with origin/destination < 100 km
	Intermodal connections	Intermodal connections of limited importance	Intermodal connections important in modal split	A limited number of intermodal services	Hardly any intermodal facilities
Service characteristics	Vessel size	Largest vessels at least 5000 TEUs	Largest vessels at least 4000 TEUs	Largest vessels between 2000 and 4000 TEUs	Largest vessels up to 1000 TEUs
	Service calls	Frequent calls of major services, in some cases dominance of one shipping line	Frequent calls of major services of a number of shipping lines	Calls of secondary services (short-sea, feeder, and secondary intercontinental services), a small number of calls of major services	Feeder and short-sea services
	Minimal annual volume	> 600,000 TEUs	> 1 million TEUs	> 150,000 TEUs	> 40,000 TEUs[b] and < 200,000 TEU

Source: De Langen, van der Lugt, and Eenhuizen (2002

[a]The quantitative criteria are not always mutually exclusive: sometimes a gap or overlap exists. The reason is that the quantitative criteria are not decisive in themselves for the classification but give direction and should always be used in combination with the other criteria.

[b]Ports with a volume of less than 40,000 TEUs are also classified as minor ports, but these are so numerous (and statistics are not available) that we will not consider them further.

[4] It has been observed that this model is Euro-centric in that North America does not have global pivots. The author argues that North America's lack of pivot ports is the result of several factors: *The Jones Act* which discourages the use of non-US ports as hubs, historically efficient land transportation in the US, historically early adoption of short sea shipping in Europe, and the comparative weakness of the US-flagged shipping industry.

Examples of Port Types

To better illustrate the port typology laid out in the previous section, below several significant world ports are discussed and assessed against the framework. (Figures 3 and 4 locate these ports on maps.)

Global Pivots – Algeciras, Gioia Tauro, and Freeport

Algeciras (at the southern tip of Spain, where the Atlantic Ocean meets the Mediterranean Sea), Gioia Tauro (near the toe of the Italian boot, in the centre of the Mediterranean), and Freeport (in the Bahamas, on the route between Europe/North America and the Panama Canal), are global pivots. All have limited hinterland connections – Freeport does not even have rail service – and all are focused on transhipment much more than intermodal connections.

Figure 2: Characteristics of Selected Global Pivots

	Algeciras	Gioia Tauro	Freeport
Maritime network	Intersection	Intersection	Intersection
Hinterland network	Small	Small	Very Small
Transshipment	85%	95%	98%
Hinterland modes	Little landed, but some > 300 km	Little landed	Little landed
Intermodal connections	Some intermodal	Very little intermodal	No intermodal
Vessel size	Vessels > 5000 TEU	Vessels > 5000 TEU	Vessels > 5000 TEU
Annual volume	3,179,614	3,160,981	1,100,000

Sources: Drewry in Baird (2006), Hamburg Port Statistics

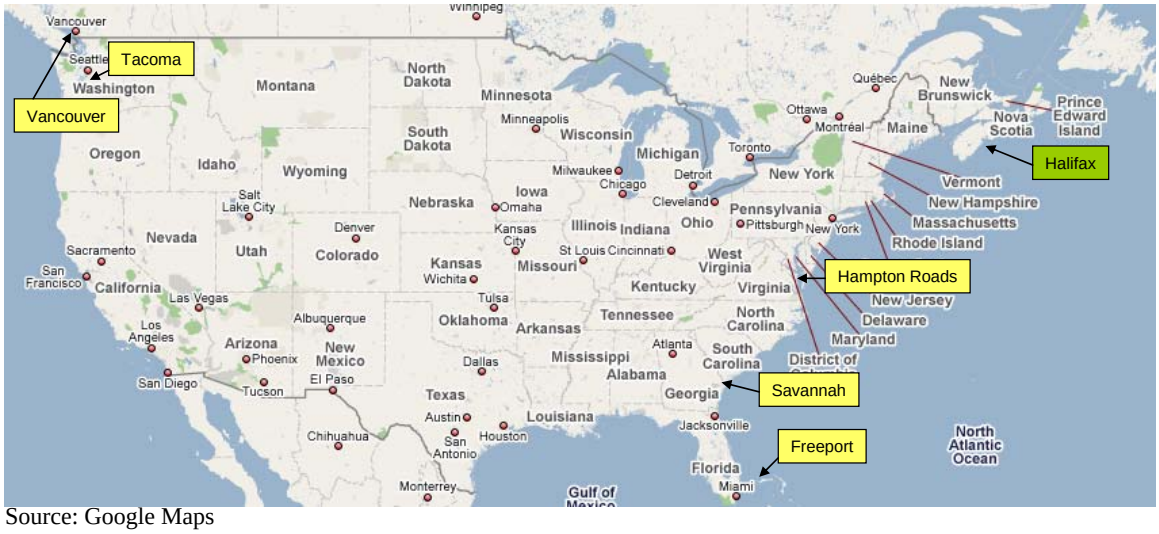
In business model terms, costs are kept down by optimizing throughput against capital costs. For example, only Algeciras has warehouse space but it is not for long term storage. A small survey of major western ports gives an average 43 TEUs per square metre of warehouse space for ports that use warehousing. Algeciras, in contrast, ran 113 TEUs per square metre.

Another way to reduce global pivot capital costs is through low cost land, locating on islands or peninsulas away from large metropolitan areas. Algeciras and Freeport continue to expand because of this. Conversely, Gioia Tauro has run out of expansion room on its peninsula and has become congested. Other Italian ports have been quick to assume the overflow.

Figure 3: European Port Map

Source: Google Maps

Figure 4: North American Port Map



Source: Google Maps

Historically transhipment has been a volatile business and has only come into its own with the economies of post-Panamax ships combined with the rarity of ports to handle these vessels and the congestion in import-export ports. Nonetheless despite the efficiencies, they remain expensive capital projects. To ensure their long-term viability, they are frequently dominated by a major player. Maersk completely dominates Algeciras and has a stake in Gioia Tauro. Freeport is owned by Hutchison Whampoa, which has tremendous negotiating power through its ownership of strategic ports world-wide.

Load Centres – Tacoma and Vancouver

What sets apart Tacoma and Vancouver is the ability to get cargo out of town. Annual TEUs per person (0.55 and 0.83 respectively) are greater than average container traffic per capita in the US and Canada (0.11). Furthermore, their throughputs are high. Our survey average TEUs per square metre of warehouse was 43, whereas Tacoma and Vancouver processed 230 and 72, respectively. Average TEUs per metre of wharfage for non-pivot ports was 728, while Tacoma and Vancouver processed 1,304 and 816, respectively.

Figure 5: Characteristics of Selected Load Centres

	Tacoma	Vancouver
Maritime network	Peripheral	Peripheral
Hinterland network	Extensive	Extensive
Transshipment	< 50%	< 50%
Hinterland modes	> 60% landed and >10% >300 km	> 60% landed and >10% >300 km
Intermodal connections	Intermodal critical	Intermodal critical
Vessel size	Vessels > 5000 TEU	Vessels > 5000 TEU
Annual volume	2,066,447	1,767,379

Clearly these are not global pivots. They lie in major urban centres where land is at a premium. They are the home to extensive warehouses and multiple class-1 rail services. Although Maersk owns one terminal in Tacoma (APM), there are two others. Vancouver does not have a private container terminal.

Equally clearly, these results are not simply a result of demand for west-coast ports. Between 2000 and 2005, the compound annual growth rate for containers at US ports was 7.6% (see Figure 6), yet many west coast ports underperformed.

Tacoma and Vancouver are load centres. They have optimized their supply chains to maximize port throughput to and from inland markets. Although they have warehouses located nearby, they also service inland ports. In the case of Tacoma, there are substantial facilities in Spokane and Lacey available by rail or truck and Lewiston by barge. Vancouver has substantial inland distribution facilities in Calgary and services destinations as for east as L.L. Bean in Freeport, Maine. In fact, it is the optimization of the corridor from Vancouver which comprises the core of the $590 million federal Pacific Gateway initiative. Promotion of the plans go to great length to emphasize that new port infrastructure, per se, is not required but that efficiencies are required to increase throughput inland.

Figure 6: Growth in Container Traffic, Major West Coast North American ports 2000-05

Port	2000-2005 CAGR
Tacoma	12.28
Vancouver	8.73
Los Angeles	8.55
Seattle	6.89
Oakland	6.80
Long Beach	6.45
Portland	-10.68

Source: United States, Port of Vancouver website

It is not clear whether or not it is possible to have a load centre without a substantial local market. In theory it should be possible, even attractive. An optimized corridor should have low costs and fast turnarounds at the load centre on the same grounds as a global pivot. The reluctance in North America to have fully private ports may restrict access to capital and without that commitment it seems unreasonable to expect logistics firms to invest heavily in building corridor capacity. As such, there do not appear to be examples. Savannah is sometimes held up as a candidate and will be discussed separately.

Regional Ports – Hampton Roads and Savannah

Hampton Roads (Norfolk, VA) is sometimes discounted as benefiting from participation by the US military. No doubt this helps in infrastructure maintenance and dredging; however, the infrastructure could not help Hampton Roads grow if it were not for some substantial competitive advantages. Hampton Roads is the only major port between Washington, DC and Raleigh, NC; each is less than 350 km away.

This suggests Hampton Roads is a regional port and that the immediate market is swallowing the majority of its throughput. In fact, if you assume Norfolk served everyone from metro Washington down to Raleigh, the throughput per person would be very close to the US average of 0.11 TEU per person.[5] The port also acts as a local distribution centre, which accounts for the huge amount of warehouse space and the low warehouse throughput (21 TEU/square metre). What is truly amazing is that Hampton Roads can manage this complexity and still process 9,483 TEU per acre (second only to the global pivots). It is quite evident that the Hampton Roads must maintain a huge logistics support industry to achieve these rates.

Figure 7: Characteristics of Selected Regional Ports

	Hampton Roads	**Savannah**
Maritime network	Peripheral	Peripheral
Hinterland network	Extensive	Extensive
Transshipment	< 50%	< 50%
Hinterland modes	> 60% landed and > 10% > 300 km	> 60% landed and > 10% > 300 km
Intermodal connections	Intermodal critical	Intermodal critical
Vessel size	Vessels > 5000 TEU	Vessels > 5000 TEU
Annual volume	1,981,955	1,901,520

Hampton Roads has invested strongly in translating this efficiency into the role of a load centre and most analysts believe this is the future for the port. The key part of the argument is that although New York is

closer to Europe, it is congested and has less draft for the largest post-Panamax ships. Conversely, travelling down to Savannah or Brunswick would add time.

There is no question that Savannah has been wildly successful. After years of decline in the 1960s and 1970s, metro Savannah has grown from about 200,000 people in 1980 to 310,000 in 2004. The well-cited strategy of attracting distribution centres from major retailers combined with heavy port infrastructure improvement has been part of this success. Of the major US ports, Savannah had the largest growth rate (15.33%) between 2000 and 2005.

It has been argued that Savannah is a load centre port. This assignment is based largely on the low population of Savannah and the resulting high traffic per person (6.13). The assignment is further strengthened by the provision of on-dock rail (the "James D. Mason" shuttle service which connects to the class-1 rail services) and dredging allowing servicing of post-Panamax ships.

However, Savannah has minimum survey TEU volumes per acre (1,585) and per square metre of warehouse (15.48). This suggests that the Port of Savannah is acting as a regional port and local distributor.[6] Since it is unlikely that everyone in Savannah has twenty pairs of Nike shoes, explanation is required. The secret to the success of Savannah is location at the intersection of several land corridors, resulting in its ability to act as a regional land pivot. Going inland, Savannah is closer to Atlanta, Macon and Columbus (where GAPorts runs an inland facility) than Brunswick or Charleston, SC. Along the coast on the I-95, it is less than two hours from Charleston. Furthermore, being the first Georgia port if sailing from the north and less than an hour and a half from Brunswick, it might be faster to unload in Savannah and truck rather than berth in Brunswick directly.

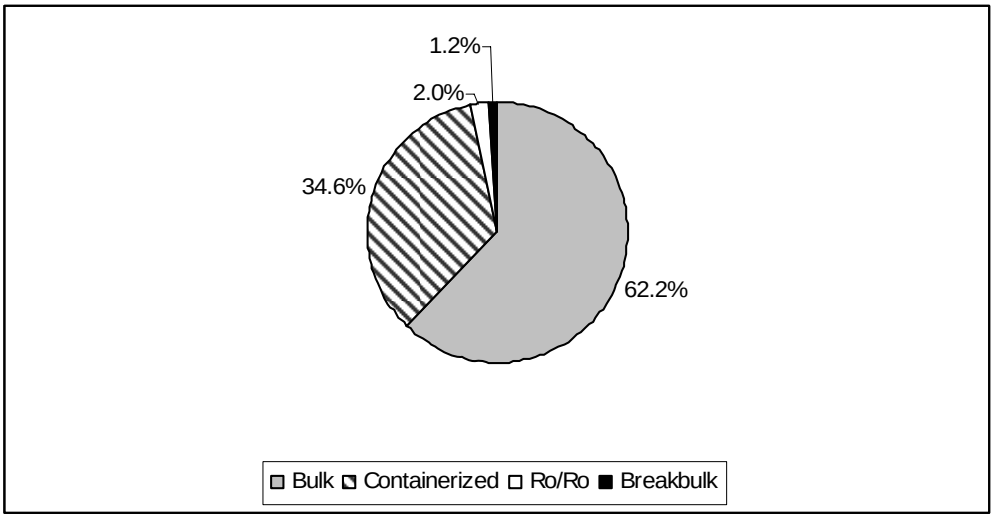
Rail is not competitive with truck at less than 400 miles and since most of Georgia and South Carolina is within this radius of Savannah, it is more reasonable to see the volume of traffic per person closer to 0.15 which is commensurate with the US container traffic per capita (0.11) you would expect in a regional port.

[6] Warehouse space includes only facilities within the port. Low values can not be explained by operational considerations at, say, Wal-Mart. It might be argued that Savannah is continuing to expand and that these efficiency measures reflect this expansion rather than market behaviour. If this were so, then anticipated traffic volumes would reflect optimism worthy of a planned economy. Even if expansion depressed the values by 50%, Savannah would still have efficiencies comparable to a regional port.

FINDING HALIFAX IN THE PORT TYPOLOGY

Indicative of the changes in global trade practices is the increase, over the long term, in the number of containers coming through the port of Halifax. (From ten years ago, TEUs are up 15%, although there have been year-over-year declines from 2005 to 2006 and 2006 to 2007).[7] However, Halifax has long been a major source of dry bulk gypsum and liquid petroleum commodities, and their export dominates the port in terms of total tonnage. The current breakdown can be seen in Figure 3.

Figure 8: Halifax Cargo Tonnage Throughput, 2007 (12.2 million tonnes)[8]



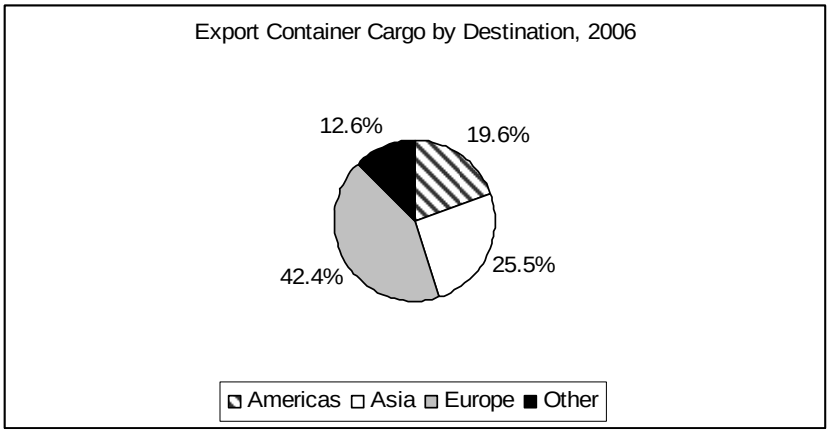
(Breakbulk is cargo shipped in various-shaped packages as opposed to standardized containers. Bulk is non-packaged material (e.g., liquids, coal). Ro/Ro – roll-on, roll-off – includes cars, trucks, etc.)

In 2005 the port handled over 550,000 TEUs containing 2,085,335 tonnes for import and 2,559,660 tonnes for export. Of this container traffic, between 65 and 70 percent arrived or departed by rail. More than half started or ended in Ontario or Quebec, and 17.3 percent started or ended in the American Midwest. The rest arrived or departed by truck. Twenty-two and a half percent starts or ends in the Atlantic provinces; 3.6 percent has New England as a market.[9] The dominant trade lane for this last segment triangulates in Montreal or Ontario for return cargo.

Containerized export cargo has many destinations (see Figure 4).

[7] http://www.portofhalifax.ca/downloads/10-yearcontainerstatistics.pdf
[8] http://www.portofhalifax.ca/downloads/AnnualStatistics-3yearhistory.pdf
[9] Patrick Bohan, personal communication with author, April, 2006.

Figure 9: Export Destinations for Container Cargo, 2006



Source: Port of Halifax Website, 2007

The variety of destinations, which is unique, reflects the fact that Halifax is a regular stop on many shipping routes. A list of the routes stopping in Halifax can be seen in Table 6. These exploit Halifax's position far out into the Atlantic Ocean – a position that makes Halifax not only the closest North American mainland port to Europe, but also the closest North American port to Africa and the second-closest to Brazil (after Miami).

Figure 10: Regular Shipping Schedule, Halifax, 2008

Description	Sailings per Week	Lines
UK and Continent of Europe	9.5	ACL, Europe West Indies Line, Hapag-Lloyd, Nirint, NYK Line, OOCL, Eimskip, Wallenius-Wilhelmsen
Caribbean, Bermuda, Central and South America	7.4	Bermuda Container, Costa Container, Europe West Indies Line, Hapag-Lloyd, Melfi Marine, Nirint, Zim
Mediterranean, Black Sea	6.4	ACL, China Shipping, Costa Container, Hapag-Lloyd, Melfi Marine, Nirint, Zim
Africa	2.5	ACL, Wallenius-Wilhelmsen, Zim
Middle East, Indian subcontinent	4.5	ACL, Hapag-Lloyd, National Shipping Company of Saudi Arabia, NYK Line, Zim
Japan, Far East, Southeast Asia	8	China Shipping, Hapag-Lloyd, NYK Line, OOCL, Zim
Australia, New Zealand	2	NYK Line, Zim
North American Intercoastal trade	8.9	ACL, China Shipping, Costa Container Line, Eimskip, Hapag-Lloyd, Melfi Marine, Oceanex, Zim

Note: Average weekly frequency includes biweekly and monthly sailings for each route. Container runs often have other options, such as ro-ro. Sailings will not add up to berthings as some sailings service multiple routes. In addition, there are many bulk sailings and weekly ro-ro only runs to the UK, the Continent, and the Mediterranean.

Source: Port of Halifax (http://www.portofhalifax.ca/english/port-at-a-glance/sailing-schedule/index.html)

With this overview of Halifax in hand, we can assess the port in terms of the typology discussed previously.

Figure 11: Port Type Analysis – Halifax

Aspect	Variable	HALIFAX	Global Pivot	Load Centre	Regional Port
Logic of location	Maritime network	Located on great circle route – closest mainland North American port to Europe, Africa, and Asia via the Suez Canal	Located strategically nearby the intersection of major shipping routes	Peripheral in maritime network	Unimportant position in maritime network
	Hinterland network	Limited regionally but extensive remotely	Limited natural hinterland	An extensive and large hinterland	A substantial industrial or metropolitan hinterland
Hinterland role	Transshipment	Approx. 12% (sea/sea) transshipment	> 60% (sea/sea) transshipment	< 40% sea/sea transshipment	Hardly any sea/sea transshipment
	Hinterland modes	Over 50% to Ontario or Quebec, 21% to US Midwest, 22.5% Atlantic Canada, rest over 300 km to a variety of markets	Limited local hinterland	> 60% direct to hinterland substantial share (at least 10%) of origins/destinations > 300 km	At least 90% of the volumes with origin/ destination < 500 km
	Intermodal connections	Crucial. By CN rail to Ontario and through to Chicago. By truck down to Boston.	Intermodal connections of limited importance	Intermodal connections important in modal split	A limited number of intermodal services
Service characteristics	Vessel size	Largest vessel 5714 TEUs (OOCL Chicago), most between 4000 and 5000.	Largest vessels at least 5000 TEUs	Largest vessels at least 4000 TEUs	Largest vessels between 2,000 and 4000 TEUs
	Service calls	Frequent calls of major services of a number of shipping lines – see Table 6	Frequent calls of major services, in some cases dominance of one shipping line	Frequent calls of major services of a number of shipping lines	Calls of secondary services (short-sea, feeder and secondary intercontinental services), a small number of calls of major services
	Minimal annual volume	490,071 TEUs in 2007, representing 35% of Halifax cargo by weight.	> 600,000 TEU	> 1 million TEUs cargo	> 150,000 TEUs

Source: Port of Halifax: Web site, 2005 Annual Report, and discussions with Patrick Bohan

Halifax does not function as a global pivot. The primary determinant in this assessment is the relatively low level of transshipment that occurs in Halifax. The main barriers to the introduction of feeder services into the Great Lakes are the 25 percent tariff on imported ships, seaway tolls, the differing design of ocean and lake ships, capacity constraints in the Great Lakes ports and the occasional ice in the seaway at Montreal. The main barriers to feeder services into lower New England are the Harbor Maintenance Tax and cabotage restrictions under the *Jones Act*. However, if North American trade with other continents continues to grow and begins to use the new post-Panamax ships, those barriers may be overcome by market forces.

Of the two remaining options, it is not clear that Halifax is a perfect fit for either category.

In some aspects, Halifax functions as a regional port. Approximately 125,000 TEUs of business is done within the Maritime provinces. Over 40 percent of this traffic is sea/sea transshipment; the rest of the regional cargo arrives or departs by truck.[10]

On the other hand, about 425,000 TEUs have a market outside of the region. Less than 5 percent of this amount goes by sea/sea transshipment; the vast majority goes by rail to destinations between 1250 km and 2700 km inland. These factors are more characteristic of a load centre.

[10] The position of Halifax as the dominant port for Atlantic Canada is not really in question. There are other significant regional ports; however, they tend to specialize in bulk commodities. Various considerations (e.g., lack of class 1 rail or depth) constrain their ability to attract container cargo.

POTENTIAL STRATEGIES

What opportunities are present for Halifax in trying to more fully emulate one of the three port typologies discussed above? We examine each in turn.

Global Pivot

The best chance for a global pivot strategy is to attract a major shipping line that will guarantee traffic flow, streamline operations, and streamline the logistics chain. The risk of this strategy is reduced margins when there is underutilization of existing capacity.[11] However, consolidation in the liner industry has meant that by focusing on one line there is a trade-off of losing an existing service versus attracting alliance partners. For example, Ceres Global, which operates one of the terminals in Halifax, is owned by NYK Lines, a member of the Grand Alliance. Macquarie Investments, which operates the other container terminal in Halifax, has no shipping line although it has often partnered with Hanjin.

Transshipment growth is attractive. 2004 saw world growth in transshipment at 15% while container traffic generally grew at 11%.[12] Natural growth of a pivot strategy might occur under several conditions. These include the development of emerging markets for which Halifax has a geographic competitive advantage (Africa, South America). This growth is likely to be incremental and slow in comparison to growth in world trade. The rate of growth might be increased if port fees can be reduced (e.g., changing the stevedoring union agreement to allow streamlining of transshipment) or if there are substantial changes in regulation (e.g., removal of the Harbor Maintenance Tax or the cabotage restrictions under the *Jones Act*).

The UN identifies the following as success factors for a global pivot.[13]

- location (proximity to major world routes)
- quick turnaround time
- quality services with efficiencies and productivity
- reasonable costs
- ability to accommodate super larger ships – deep water, advanced equipment
- excellent networks covering neighbouring feeder ports
- existence of logistic cluster supporting value-added logistics activities
- no red tape and no burdensome paper work
- advanced information technology
- intermodal infrastructures – access to rail, air and road distribution networks
- local markets producing freight volume

[11] Intra-port competition is a good thing, however, only if the market is twice the size of the Minimum Efficient Scale of the port service (see Peter de Langen, *Analysis of the Benefits of Intra-Port Competition*, 2005).
[12] Baird
[13] UNESCAP, 2006 drawing heavily from Whitelaw, 2002

In theory, intermodal infrastructure and large local markets are not required as seen in the pivot examples given earlier. In this light, potential best practices which could aid this strategy include:

Cost reductions: it is unlikely that this is possible given the general use parameters for the port today. High overhead associated with premium land, on dock rail, and warehouse developments work against cost reductions. Furthermore, the cost structure associated with the stevedoring agreements does not favour efficiencies.

Quick turnaround times: The new Ceres post-Panamax cranes will help, but Halifax rates at the bottom of the surveyed ports in terms of TEUs per metre of wharfage (301). Under the current configuration, Halifax is estimated to be at 60% of its sustainable capacity.[14] Even adjusting for capacity (501), Halifax would still rate as inefficient compared to all of the ports discussed except Freeport.

Reduced paperwork: This is a challenge for all ports since 9/11. Increasingly the United States has placed inspectors at ports around the world. This has happened in Halifax already. Electronic data interchange (EDI) and advanced scanning technology should help, but not all players in the logistics chain use the same technology.

Major shipping lines: One option might be to entice a major shipper into a new location. For example, a new terminal could be built at the south end of Dartmouth where there is little development. On one side, a major shipping line would bring logistics strength, advanced integrated information technology and a different approach to logistics integration including stevedoring. On the other side, this approach would require a change in thinking given the under-use of the current facilities.

Clearly productivity and competitive costs are related. Ports that can reduce the number of lifts and have the fastest lift times have an advantage. Innovations, like simultaneously servicing the ship from both sides and automation, can drive down costs, making the port a desirable part of a supply chain route.

Load Centre

Halifax arguably is a load centre already: 65% to 70% of the cargo that flows through the port goes to or comes from the continental interior using the on-dock CN rail service. This produces great efficiencies as can be seen from the exceptional TEU volume per square metre of warehouse (170). The key challenge for Halifax is having only one corridor into the interior.

Halifax faces competition as a load centre for certain parts of North America from Montreal and New York; the competition from Vancouver is very limited. Both Montreal and New York are clear load centres and have location advantages over Halifax for a large part of the hinterland. Thus, Halifax is not well situated at first glance to grow as a load centre at the expense of either of the other ports.

However, world shipping volumes continue to grow, and New York has serious congestion problems. The American ports north of New York do not have the infrastructure to handle the overflow, nor do they have the intermodal connections to serve inland markets. The US ports south of New York are farther away. They have good connections inland but face serious congestion bringing cargo back up the east coast by land. Montreal has excellent connections but is far off any major shipping route, and thus it is not able to team up with a US port for a multi-stop route.

[14] Karen Oldfield, Reaching Atlantica Conference, June 2006

Under those circumstances, Montreal will benefit from traditional Europe–North America shuttles and from cargo from Asia that has been transshipped in Europe. Halifax has the potential to be a load centre for routes that continue down the US east coast. This position will be strengthened if ships need to lighten their load before arrival in ports like New York, which cannot serve the largest ships.

Load centres get most of their value from access to corridors – in the same way that a global pivot requires a location near multiple shipping lanes. There is some hope that the completion of the twinning of the TransCanada in Quebec and New Brunswick will produce additional viable routes. There is great hope for East-West interstate corridors through northern New England to Montreal and Watertown. In anticipation of these developments, and in the hope of producing efficiencies in the trucking system, there are plans for a network of inland ports or terminals that will provide the distribution functions that, say Lacey and Spokane provide for Tacoma and Seattle. Since CN is currently running at about 30% of full capacity, there is no need to adopt an optimization strategy akin to the Pacific Gateway.

Pressure to enhance these corridors may come from increased marketing and trade with Asia, especially India.

Since the port represents another handling cost element in the supply chain, there are intense pressures for cost reduction. Nonetheless, additional infrastructure is required which means costs will be higher than for global pivots. Productivity/competitiveness is achieved by reducing the number of lifts; however, this requires on-dock rail services – ideally class-1 rail services. Customs and other logistical services are often required. Land prices tend to be higher than with global pivots because of the relative size of local markets.

Of course, some additional cost may be acceptable if Halifax can provide alternative sources of value. Traditionally reduced on-dock time, reduced transit time (by rail) and reduced risk (through providing an alternate supply chain) have provided this added value. In particular, this value is applicable to medium value goods required for just-in-time production operations.

In the same way location on multiple shipping networks is critical for a global pivot, access to multiple inland corridors enhances the value of the load centre. Occasional transfers from ship to truck occur when rail does not service the desired hinterland, or when products require special treatment.

Regional Port

Halifax also is arguably a regional port since 22% of the port traffic is going to or coming from regional destinations. There are regional ports which are experiencing substantial growth. Good examples between 2000 and 2005 would include Chester, PA (14.32%), Philadelphia (13.72%), and Boston (12.14%). These ports had largely been bypassed for larger ports in recent years[15] but with organic growth and congestion in competing ports, these have made a comeback.

However, logistical support cannot always be drawn from the entire province and there is not enough volume to generate the logistics cluster required to effectively grow regional traffic. The result is that many goods first head to Toronto where they are transloaded and returned to the Maritimes.

[15] Dominic Taddeo, President of the port of Montreal, in speaking of this competition went so far as to say "We killed Boston." (comments to the Canadian Senate Committee on Transportation, February 7, 2007.

Regional ports vary significantly from the first two models. As the ultimate origin or destination of goods, flexibility of service is more important than cost. Service components could include hours of service, warehousing, paperwork/customs resolution, legal support, container transload/consolidation, trucking support, etc. Typically, volumes are not sufficient to cover the high volume infrastructure demanded of global pivots or load centres, but there may be specialized infrastructure to service the needs of local producers or consumers.[16]

Besides growing the Maritime economy generally, the challenge is to attract transload functions back from Toronto. Neither Norfolk nor Savannah provides useful lessons since they have significantly larger regional populations. Likely this business needs to be won back piece by piece. This growth is likely incremental and slow in comparison to growth in world trade

[16] Magala (2004), while acknowledging the importance of the "provision of customer value through flexible port services," argues for the importance of efficiencies in regional ports; however, Magala assumes that the regional port is in close proximity to a more dominant port. As such, he sees the regional port "competing as part of an integrated supply chain." This assumption does not always hold.

CONCLUSION

Most successful ports are specialized towards a particular market segment. All characteristics of the port (kinds of ships serviced, land connections, warehousing, support industries) align in the most efficient way, based on the competitive advantages that exist (proximity to market, inexpensive land, or customs union)) to execute the targeted strategy.

Halifax at present appears to have a dual role – or a split personality – as part regional port and part load centre. This is rarely an intended configuration[17] because it is very difficult to execute concurrently a high value differentiated strategy (regional port) and a low cost commodity strategy (load centre). In this light, Halifax does not map easily onto the best practices of other ports.

For Halifax to grow, it must focus on one strategy. If the goal is radical rather than incremental growth, the chief opportunity lies with a load centre (gateway) strategy. This is because regional growth is largely a function of economic growth in the region, while load centre growth can leverage the growth of the continent.

Key actions that would advance this strategy[18] include:

- Enhancement of corridors (e.g., east-west highway, border crossings, highway twinning).
- Teaming up with an inland hub (e.g., Buffalo).
- Aggressively marketing opportunities with the Indian sub-continent both in India and in Canada.
- Focusing on and demonstrating low cost efficiencies. This could include monitoring and publishing efficiency statistics like TEU/crane hour, etc., to ensure that the shipping community views Halifax as a load centre and not a regional port.
- Differential pricing to attract target traffic.
- Reduced paperwork.

Expectations should match market realities. First, volumes require supply as well as demand. India and some other south Asian countries continue to experience infrastructure and regulatory barriers. New goods are not likely to flood the market in the next few years. Second, New York and Norfolk have shown themselves to be the preferred ports in the north Atlantic.[19] This means that initial growth in trade from Asia will likely be seen in other ports first. It is likely that when the wave comes, say in five years, it will come quickly indeed.

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[17] Some ports find themselves between two strategies if they try to establish themselves as load centres yet fail to attract a critical mass of traffic – usually because of poor hinterland connections. Halifax is a rare case because, until relatively recently, the load centre function has evolved because of natural locational advantages rather than an aggressive marketing or organizational alignment.

[18] These actions will support a global pivot strategy if the regulatory climate or trade flows make the pivot strategy viable.

[19] Provincial Gateway study (2007).

The risk inherent in this strategy is that smaller local firms may find the port less responsive in its quest for economies of scale. This can be mitigated, at least in part, by local firms acting co-operatively as a single buyer of port services. Given the expectation of rapid change in port volumes, efforts along this line should be started now. In fact, the national Retail Shippers Association has already played a central role in recent port successes in the transload area. Local operators should learn from this that there is not only “strength in numbers” but that a business case based solution is the best means to draw together all of the competing/cooperating interests; port, terminal, shipper, line and inland grid.

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