North American gateways in the age of globalization

Gateways play a strategic role in connecting, organizing and managing freight flows between regional markets and therefore impacting upon the global economy. Rail and highway systems have long been the main support for the North American freight distribution market. This conventional system has now been expanded by the North American Free Trade Agreement (NAFTA), as well as by the globalization of production. This has created an environment where the transport sector is coping to adapt to higher volumes, particularly at major gateways, as well as adhering to more stringent requirements in terms of frequency and reliability of these expanded supply chains. Parallel to this growth, the need to reconcile spatially diverse demands for raw materials, parts and finished goods has placed additional pressures on the function of North American freight distribution and logistics. In the current context, North American maritime gateways are facing several challenges. They are coping with acute trade imbalances resulting in very different freight flows between imports and exports, which are impacting terminal operations and inland logistics. This is associated with a prevalence of transloading where the contents of maritime containers (typically 40 foot) are transloaded into 53 foot domestic containers; a characteristic unique to North American gateway logistics. North American gateways are confronted with largely deregulated freight markets (eg. the Staggers Rail Act of 1980), although pockets of restrictions remain, such as the Jones Act, which imposes strict conditions on coastal shipping between US ports.

Trade synchronisms: China in the balance

The emergence of trans-Pacific trade and China in the global manufacturing market had profound impacts in terms of the volume and pricing of a wide variety of goods. During that period, China mostly focused on the lower range of the added-value manufacturing process in addition to having low labor costs. The usage of China as a privileged location in the global manufacturing system has thus been linked with low input costs (mainly labor) as well as low long distance transport costs brought by containerization. The longer distances of shipping freight from China were positively compensated by lower input costs, as well as the setting of massive economies of scale in maritime shipping through larger container ships. This explains why integration processes in North America, namely the use of Mexico as a low cost manufacturing base, were mainly bypassed in the last decade. Also bypassed was the setting of regional North American supply chains in light of the dominance and efficiency of global supply chains. However, the comparative advantages of China are starting to become eroded eroding in part because of inflationary pressures in input costs, such as labor, as well as higher energy prices and environmental pressures. North American supply chains may be positively impacted by such a trend which will put a greater emphasis on NAFTA as a comparative advantage structure. Changes in the structure and direction of freight flows in North America are to be expected with a higher level of regional orientation.

American containerized trade is characterized by an asymmetry between the nature of its imports and exports. North American retailers account for a substantial share of containerized imports, mostly involving finished consumption goods bound to major

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**Figure 1:** American Foreign Trade by maritime containers, 2010 (in Twenty-foot Equivalent Units (TEUs) sourced from the Journal of Commerce.
inland freight distribution centers. The largest importers, such as Wal-Mart, Home Depot, Target, Sears, Costco, IKEA and Lowe’s, are all mass (Big Box) retailers relying on high volume and low margin goods, which are dominantly produced in China.

Exporters show a completely different profile. A major category of containerized exports concerns recyclies with exporters such as America China Nam, Potential Industries or Cedarwood-Young. Other major exporters include diversified resource-based (Koch Industries) forest and paper products (e.g. Weyerhaeuser, International Paper), agribusiness (e.g. Cargill, Archer Daniels Midland) or chemicals (e.g. Dow, DuPont). Yet, a significant containerized trade imbalance remains. For the major trans-Pacific and trans-Atlantic trade routes, while in 2010 17.1 million TEUs were imported in the United States, only 11.4 million TEUs of laden containers were exported. Thus, about 5.7 million TEUs needed to be repositioned empty.

Trade asymmetry has significant impacts on North American inland logistics. The import-driven segment involves a series of stages to reach a multitude of outlets with a freight density correlated with population density. Since the retail trade is essentially unidirectional, a great deal of retail goods are transloaded at gateways into domestic containers while the maritime International organization for Standardisation (ISO) containers are re-exported empty. The export-driven segment relies on the massification of shipments at major gateways and inland ports. Since many resources (chemicals, forest products, food) are extracted inland at locations that rarely correspond to significant population centers, the reconciliation of containerized import and export logistics is a challenging task. While millions of TEUs will leave American ports empty, many inland locations are facing container shortages.

**North American box logistics: transloading and stuffing**

In North America, longer distances and the availability of a load unit greater than the standard 40 foot maritime container, has favored an active transloading function in distribution centers at gateways. The equivalent of three 40-foot maritime containers can be transloaded into two domestic 53 footers, which is the largest inland load unit in North America. After being transloaded, maritime containers can be brought back to the port terminal and the maritime shipping network. Rail terminals charge by the number of lifts, which means it costs the same to handle a 40 foot or a 53 foot container. The additional costs incurred by transloading are compensated by a consolidation of inland load units with the outcome of anchoring an added value function at gateways, which can be in the range of 30 percent compared with the option of moving maritime containers inland.

Transloading enables a more efficient use of both container assets (international and domestic) and can facilitate international trade by freeing transport capacity. For instance, moving maritime containers over long distances in the North American transport system can be considered a suboptimal usage of transport equipment, particularly from the perspective of maritime shipping companies. Conversely, the global maritime shipping industry is mainly designed to handle 40 foot containers and cannot accommodate domestic containers. However, a large amount of transloading for inbound shipments may reduce the availability of maritime containers available for export at inland locations. This is a salient problem for the export of containerized commodities.

**Container terminal operations in gateway ports**

According to figures from the American Association of Port Authorities (AAPA), the North American container port system (US and Canada) handled about 45 million TEUs in 2011, just below the record volume of 46 million TEUs in 2007. The San Pedro Bay ports of Long Beach and Los Angeles together handled about 14 million TEUs in 2011. Other major cargo centers include the port of New York/New Jersey which reached 5.5 million TEUs in 2011 and the northwestern seaport cluster (Seattle, Tacoma and Vancouver) representing some 6 million TEUs. In contrast to Asia, Europe or the Caribbean, North America does not count any transshipment hubs (transshipment incidence of only 5.8 percent), in spite of expectations from some ports to capture this role. The transshipment function takes place in a few offshore hub terminals along the Caribbean (Freeport, Bahamas or Kingston, Jamaica for instance) well positioned to act as intermediary locations between major shipping routes (Asia–Europe, Europe–Latin America) and offering lower costs. The expansion of the Panama Canal by 2014 may trigger more transshipment activities in the Caribbean (see our Panama Canal contribution in issue 51 of Port Technology International).

The dominance of inbound logistics imposes a focus on the availability of import containers and gate operations. The specific nature of the container flows in North America had an impact on the terminal operating industry. Hence, the US West Coast has quite an extensive penetration of shipping line terminal operators, mostly Japanese and Korean. The involvement of Asian shipping lines in the North American container terminal industry is strongly entwined with the first wave of Asian export-oriented strategies with Japanese and Korean interests able to secure terminal assets in the 1980s and 1990s. In spite of their importance, Chinese carriers are less represented as there were few assets left to be acquired or developed with the export-oriented strategy of China came in full force in the late 1990s.

The diffusion of slow steaming (ships reducing their average cruising speed from the 23–25 knots to 18–19 knots) as a prevalent practice for containerized maritime shipping will tie up a greater quantity of containers in transit and incite transloading at gateways. Containers (the majority owned by shipping companies) are thus kept within maritime circuits.

**Inland Logistics**

The North American freight distribution system conveys several opportunities to extract added value from distribution efficiencies. One notable form is cross-docking where a distribution center essentially acts as a high throughput sorting facility where inbound shipments are reconciled with various outbound demands. Big box stores are heavy users of this form of sorting of inbound freight flows to a multitude of large stores. For instance, the world’s biggest retailer, Wal-Mart, delivers about 85 percent of its merchandise using a cross-docking system. This structure takes advantage of the massification of shipment along long distance rail corridors: a decomposition of shipments at a regional warehouse /cross-docking facility services an array of stores with daily trucking services.

North American inland logistics are also increasingly influenced by the setting of large inland logistics facilities, notably inland ports where a logistics zone is co-located with an intermodal terminal facility. Infrastructure investments tend to reinforce the existing efficiency of the inland transport system where long distance is dominated by rail and where limited, if any, inland barge services are possible. As additional economies of scale are achieved inland, a rebalancing between gateway and inland logistics is expected to take place conveying a greater share of added value for inland facilities. The new heartland corridor linking the terminals of Norfolk to the Chicago hub is a salient example. The benefits of double-stacking are expanded with double (or triple) tracking and the setting of inland load centers servicing their respective market areas. This also permitted the
setting of large scale intermodal rail terminals because such economies of scale were feasible. Thus, North American inland terminals tend to service large market areas.

**Moving towards a new port system geography?**

From a historical perspective, the geography of North America has led to route specialization among gateways. The bulk of Asian cargo flows is handled in the West Coast ports, in particular Long Beach and Los Angeles, but the use of the all-water route through the Panama Canal has accounted for a growing share in recent years. Caribbean cargo finds its way in North America via the container ports in Florida and Georgia (Miami, Savannah). Liner shipping services between Europe and North America are primarily calling at ports north of Hampton Roads. The construction of a new lock system in the Panama Canal, which would allow vessels of up to 12,500 TEUs, is expected to lower this geographical specialization.

There are few new ports in North America with the exception of Prince Rupert, British Columbia, exploiting a niche market of shorter trans-Pacific distances and long distance rail access to the Chicago hub, and the Mexican Pacific coast that has seen the setting of new terminal facilities such as in Lazaro Cardenas. APM Terminals recently secured a 32-year concession contract for the designing, financing, construction, operation and maintenance of a new container terminal at the latter port. Several ports have expansion projects that may capture a greater share of the traffic (eg. Mobile, Jacksonville, Norfolk), but it remains to be seen to what extent these additional capacities will be used in freight distribution.

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