Extending the Gateways: Logistic Zones in North American Freight Distribution

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Abstract
Gateways represent a substantial accumulation of intermodal infrastructure aiming at providing international trade capabilities and interfacing international and regional transport systems, including cross-border flows. More than mere infrastructures, gateways are functional entities with co-dependent logistical activities, each supporting different supply chains. Conventionally, these activities were located in proximity to terminals leading to port and airport complexes. With containerization and the growth of international trade the recent years have seen the extension of gateways, mainly through two processes. The first is within the gateway region itself, leading to an “extended gateway” where the main port terminals facilities have been complemented with satellite terminals and various logistical zones performing functions such as transloading, consolidation and deconsolidation. The second concerns the setting of long distance inland corridors with inland ports where logistic zones tend to be co-located with rail terminals, bringing a higher level of massification to inland freight distribution. The paper provides an analysis of these two trends in North America. Although the extension of gateways was mainly the outcome of the growing role of international trade and the complexities of supply chain management, future trends are likely be shaped by a growing level of North American integration. This implies that paradoxically globalization is now indirectly favoring the regionalization of North America since it has been a strong driver in the development of its intermodal transport system.

Keywords
Gateways, Corridors, North America, Regionalization, Inland Ports, Freight Distribution.

North American Gateways: Concentration and Extension

Global Logistics Drivers
Behind the well-known concept of globalization are supply chain management practices that drive production and distribution strategies. The importance of logistics in regional development is commonly understated, particularly by policymakers that tend to prioritize infrastructure investments, also known as hard assets. Yet, it is increasingly recognized that soft assets are fundamental for creating multiplying
effects on existing intermodal infrastructures. While logistics is a sector which is flexible, innovative and continuously adapting to market changes, planning and policy tend to be rigid and autocratic. This may lead to inconsistencies between policy and the functional reality it is trying to accommodate. At start, three interdependent factors are driving global logistics, which are the search for added value, efficiency and control.

*Added value* enables to capture economic opportunities along the supply chain by changing the locational and procedural characteristics of freight distribution to maximize income. Offshoring is a common added value strategy where producers improve their productivity by lowering their input costs (mostly labor) while actors in freight distribution concomitantly add revenue opportunities through a growth of long(er) distance trade. However, this process is paradoxical since conventionally added value was captured because of the deficiencies of transportation, namely at load break points that were able to capture rent as intermediaries that could not be bypassed. Therefore, offshoring and its added value opportunities could not have worked effectively if it has not been for intermodalism, which permitted supply chains to internalize several added value functions.

Logistics capitalizes on *distributional efficiencies* by improving the costs and the performance of the supply chains. An interesting point is that efficiency is a very flexible concept by itself since it has a different meaning depending on the concerned supply chain. While for some it is a simple matter of cost and deliveries within an appointed timeframe, for others it is a matter of time, including the ability to postpone and reroute shipments as condition changes.

Reliability appears to be a convergence factor for both cost and time perspectives, which leads to the issue of *control*. Control insures reliability in terms of performance and costs along the supply chain since the related activities are directly or indirectly (through alliances) under the supervision of the logistic service provider. It has taken many dimensions, some of them unconventional like alliances between maritime shipping companies, terminal operators and inland freight forwarders. Performance, and more importantly the repetitiveness of its parameters have become standard market expectations. Control also includes security issues where it must be demonstrated that all the links within a supply chain are secure and not prone to breaches.

**Gateways and Global Logistics**

Since gateways are the interface between global and regional trade systems, the three factors driving global logistics (added value, efficiency and control) had numerous functional and operational impacts. The two major impacts are:

- **Concentration.** The principle of economies of scale has been a powerful factor behind the development of containerized maritime shipping services since quite logically it lowers operational costs. This had a dual effect that incited a level of concentration of traffic among a more limited number of gateways (see Figure 1). First, economies of scale impacted on the configuration of shipping networks towards a hub and spoke design within pendulum services where larger ports tended to be advantaged. Second, larger ships and additional traffic require capital intensive infrastructure to insure an adequate level of maritime and inland services.
• **Extension.** It became apparent that gateways need to change their business model in terms of how to deal with the joint requirements of growing traffic levels, improved efficiency and level of control imposed by global supply chains. One outcome was the extension of gateways activities within the region and along corridors towards inland ports (see Figure 2).

![World's Major Gateway Systems, 2006](image)

**Figure 1 - World’s Major Gateway Systems, 2006**

The global system of freight circulation is articulated by major gateway regions (or gateway systems), often composed of a cluster of ports and airports. This does not mean that ports and airports are functionally integrated, but that the region they service is a major load center serviced by a variety of globally-oriented supply chains. Put all together, the 39 largest gateway regions accounted for 90% of the containerized and air freight traffic respectively. This underlines their fundamental importance in the transshipment of the world’s trade and as intermediary (or final) locations within global supply chains.
At the North American level a system of multi-port gateway regions is prevalent. Among these gateway regions is noted the increasing dominance of Long Beach/Los Angeles as the major gateways along the Pacific Coast, mainly catering for Asian import cargo. The Pacific Coast now accounts for 55% of the total container volume handled, up from 50% in 1990, placing intense pressures on its main gateways. The share of the Los Angeles / Long Beach port cluster of the total US container traffic grew from 32.4% in 1997 to 37.8% in 2006. During the same period, New York/New Jersey’s share increased slightly from 11.2% to 13.2%. Essentially, traffic doubled every decade, an indication of a rapid growth of international trade as well as the diffusion of containerization as a privileged mode of transportation. However, the extent to which this trend will endure is highly questionable as evidenced by the economic slowdown that began in 2008.

Along these gateway regions, various long distance intermodal rail corridors have been established. The inland rail freight transport system of North America is unique in the world, not only because of its sheer size, but also because of the direct link made between three different coastlines. Major North American hinterlands are changing, namely because of the relative decline of the industrial belt (which has been

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Regionalization and Inland Ports

Extending the Gateways

In light of an emerging commercial environment, gateways are being extended in terms of the functions they perform, the relations they have with their regions and how they are managed. With containerization and the growth of international trade the recent years have seen the extension of gateways, mainly through two dimensions (Figure 3):

- The first is within the gateway region itself, where **port regionalization** leads to an “extended gateway” where the main port terminals facilities have been complemented with satellite terminals and various logistical zones performing functions such as transloading, consolidation and deconsolidation (A).
- The second concerns the setting of medium to long distance **inland corridors with inland ports** where logistic zones tend to be co-located with rail terminals, bringing a higher level of massification to inland freight distribution (B and C).

![Gateway / Port Regionalization (A)](image)
- Satellite terminals and logistics zones.
- Maritime / land interface.

**Inland Port (B-C)**
- Corridor development.
- Regional load centers.

![Corridor](image)

**Figure 3 – The Two Dimensions of Extending the Gateways**
Both dimensions of gateway extension enable the gateway to cope with congestion, particularly through a modal shift (to rail) and a freight diversion where shipments are heading towards inland ports or satellite terminals instead of going to the port terminal facility. This removes truck traffic, including empty backhaul moves, from the congested areas nearby port terminal facilities. On dock rail facilities are suitable to move maritime container directly towards inland destinations, but near dock facilities have an important role to play in the transloading of containers. This brings the issue of the added value activities that are related with an extended gateway since they mainly support its intermediary function (Table 1).

Table 1 - Added-Value Functions Performed by an Extended Gateway

<table>
<thead>
<tr>
<th>Activity</th>
<th>Functions</th>
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</thead>
<tbody>
<tr>
<td>Consolidation / Deconsolidation</td>
<td>Inventory management practices.</td>
</tr>
<tr>
<td></td>
<td>Cargo consolidated (or deconsolidated) into container loads (paletization).</td>
</tr>
<tr>
<td></td>
<td>Attaining a batch size (group of containers) fitting a barge or a train shipment.</td>
</tr>
<tr>
<td></td>
<td>Breaking down batches so that they can be picked up by trucks.</td>
</tr>
<tr>
<td>Transloading</td>
<td>Change in to load unit (Maritime / Domestic).</td>
</tr>
<tr>
<td></td>
<td>Consolidation, deconsolidation and transloading commonly mixed.</td>
</tr>
<tr>
<td>Postponement</td>
<td>Opportunity to route freight according to last minute and last mile considerations (dwell time).</td>
</tr>
<tr>
<td></td>
<td>Buffer within a supply chain.</td>
</tr>
<tr>
<td>Light transformations</td>
<td>Forms of product and package transformations (packaging, labeling).</td>
</tr>
<tr>
<td></td>
<td>Customization to national, cultural or linguistic market characteristics.</td>
</tr>
</tbody>
</table>

Mainly because of the problem of availability of maritime containers inland and the existence of a larger load unit (53 foot containers) maritime containers are picked up at the port terminal to be brought to a transloading distribution center. The empty maritime container is brought back to the terminal (or an empty container depot) and the domestic container is brought to the near-dock rail facility or the satellite terminal to be shipped inland. Transloading conveys a number of advantages to its users, but also has a few disadvantages:

- **Importers.** An important benefit for importers is the reduction of unit transport costs per TEU if the contents of maritime containers are transloaded into a lesser number of domestic containers. A common ratio in North America is putting the contents of three maritime containers into two domestic containers. This conveys a notable advantage in terms of haul and intermodal costs (number of lifts). There is also the possibility to perform a series of added value activities at the same time to insure customization and final preparation for retail. Additionally, transloading offers the opportunity to reassess the final destination of a load in view of changing regional market conditions. There are also some drawbacks for transloading, particularly its associated costs and time delays (at least one day) since it essentially represents an additional load break along the supply chain. Transloading also assumes the availability of domestic
Regionalization and Inland Ports

Containers, which can be problematic if trade flows are imbalanced for the concerned port terminal. It should also be considered that not all cargo is suitable for transloading. For instance, if the goods have a high density the capacity of domestic containers cannot be fully utilized. Last, transloading involves a risk of damaging the cargo as well as potential theft.

- **Maritime shipping.** Maritime shipping companies also benefit from transloading since it reduces the repositioning of empty containers from inland locations. The outcome is a higher usage rate of maritime container assets through faster turnovers. This is particularly important if trade flows are imbalanced. There is however a risk of container damage. Paradoxically, transloading makes less maritime container equipment available inland for exports, which involves less revenue for return trips.

Extending the gateways is also part of improving the distributional efficiency and reliability through conventional infrastructure investment projects. They involve capacity expansion projects at terminals as well as for the infrastructure linking these terminals to their hinterlands. Rail has been the dominant focus of such strategies, leading to improvements in long distance rail corridors and the setting of logistics zones at key locations along these corridors.

**Logistic Zones**
The development of large logistics zones has been an important component of the expansion of gateways since in co-location with intermodal rail terminals they result in an operational inland port. Managed large distribution centers tend to develop on the principle of internal economies of agglomeration (within the distribution center). The larger the distribution center, the lower their operational costs. Logistic zones (or Freight distribution clusters; FDC) expand these advantages through external economies of agglomeration implying that the concentration of distribution centers within the cluster, even if they concern different supply chains, has the potential to reduce an array of costs. These become important factors in site selection:

- **Land.** One important aspect behind a managed distribution cluster is the availability of land that has already been zoned for such a use. Logistic firms are very sensitive to the availability and the cost of land because they consume a large amount of space, implying that land is one of the most significant costs in their operations. For a user, land acquisition (or renting) costs are thus reduced, particularly in relation to a standalone initiative. A careful analysis of the demand can lead to the provision of a mix of functional parcel sizes reflecting the needs of the industry. Local and regional governments are also able to establish preferential taxation procedures if a logistical zone fits regional development policies.

- **Accessibility.** This is a standard factor based upon the proximity of the FDC to terminals (rail and port) and customers. For logistic zones attempting to fulfill the role of an inland port, co-location with an intermodal rail terminal is a very important factor. The notion of accessibility tends to vary based upon if the FDC is mainly import or export oriented. Import-oriented FDCs tend to be at intermediary locations along corridors towards main consumption markets. Export-oriented FDCs tend to be in proximity of major transport terminals, particularly ports. An important factor is that the region must be in itself an important market, both from a production and
consumption perspective. A logistic zone that has a limited local market presents a higher risk since it services a market that is much more contestable. In the context of higher energy prices accessibility becomes even more important as final distribution costs (“last mile”) tend to increase exponentially with distance because of empty backhauls. Another important criteria in site accessibility concerns its temporal accessibility implying that a logistic zone is open around the clock, enabling to better match the flexibility of supply chain management.

- **Infrastructures.** Another common strategy is the provision of utilities (electricity, water, sewage, etc.) as well as roads, such as a dedicated highway ramp, as an incentive. FDCs also offer the opportunity to provide warehousing space available for various term leases as well as equipment supporting logistics and distribution activities.

- **Anchor tenants.** The presence of large logistic firms, or the distribution branch of a large firm such as a retailer is fundamental. A large firm brings with it substantial capital investment, expertise and more importantly a cargo volume. It shows to other potential users the commitment of an industry leader and that the logistic zone thus has a value proposition.

- **Planning and regulations.** A managed FDC has the advantage of being able to provide a “fast track” process for the construction and operation of freight distribution activities. It thus has a support from various levels of government. Procedures granting permits are already in place in addition of insuring compliance to safety, security and environmental regulations. Since the FDC is part of a planning process (commonly a public-private partnership), there are provisions for expansions and additional infrastructures as it develop and expand. One important attribute that can assist FDC at attracting added value activities and consolidate their role and function is the status of a free trade zone. This can include custom clearance and flexibility for importers and exporters about which type of added value can be performed.

- **Economies of agglomeration.** The principle of economies of agglomeration for a FDC implies a variety of cost reduction because a critical mass is attained. Because of the volume of freight being handled within a specific area, there is a potential of consolidation of loads from a variety of users into shuttles, particularly between the FDC and major transport terminals. There are thus more full truck loads (FTL), improving the efficiency of distribution. The FDC thus can become a logistical market in itself with a variety of service providers bidding for contracts that are "outsourced". This can include shared services such a labor, transloading or information technologies and telecommunications.

- **Internal multiplying effects.** The proximity effect involving several logistical firms within a FDC also leads to the diffusion of best practices related to management, information technologies (e.g. software) and efficient compliances to rules and regulations. This promotes the training of a pool of labor leading to an array of productivity gains.

As stated, the principle of co-location is fundamental to the operational efficiency of an inland port. Several recent logistic zones projects in North America are capitalizing from this advantage where the planning and setting of a new intermodal rail terminal is done concomitantly with a logistics zone project. Figure 4 presents selected recent logistic zones projects that were designed in co-location with a new or renovated intermodal rail facility. Some involve substantial acreage and it remains to be seen if the allocated land will be fully used.
Figure 4 - North American Rail Terminals and Selected Co-Located Logistics Zone Projects

Co-located logistics zone projects tend to be significantly larger than conventional logistics zones that tend to be solely serviced by road. The convergence between the need for rail companies to develop large terminals to accommodate economies of scale and the capital intensiveness of these investments has incited partnerships with large commercial real estate developers who have the capital and expertise to develop large logistics zones. CenterPoint Properties, which was acquired in 2006 by a branch of CalPERS (California public employees’ retirement fund), is a salient example of a commercial developer actively involved with several rail operators in the development and management of logistics zones. While in most cases CenterPoint will bring forward a project after a terminal development project has been announced, the trend is shifting towards a concomitant planning of the intermodal rail terminal and the logistics zone. In one case (Crete, Illinois), CenterPoint made the decision of developing a logistics zone beforehand and the rail operator CSX latched on afterwards with its National Gateway Program.

Table 2 - Characteristics of Recent Co-Located Logistics Zone Projects

<table>
<thead>
<tr>
<th>Logistic Zone</th>
<th>Acreage</th>
<th>Ownership</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CentrePort Canada</td>
<td>20,000</td>
<td>Public</td>
<td>Rail-airport co-location</td>
</tr>
<tr>
<td>Global Transportation Hub</td>
<td>3,250</td>
<td>Public</td>
<td></td>
</tr>
<tr>
<td>Montreal Logistic Hub</td>
<td>541</td>
<td>Public</td>
<td>Planned for 2013</td>
</tr>
<tr>
<td>CN Calgary Logistics Park</td>
<td>580</td>
<td>Private</td>
<td>Planned for 2013</td>
</tr>
</tbody>
</table>
The Governance of Regionalization

As the extension of gateways expand the territorial reach well beyond conventional jurisdictions, both from a geographical and functional perspective, new forms of governance are emerging. One mainly concerns the role of port authorities while the other relates to the governance of logistics zones.

The Changing Role of Port Authorities

Conventionally, a port authority acts as a landlord, a regulator and an operator:

- **As a landlord**, a port authority manages the port assets under its jurisdiction. This commonly concerns the provision of infrastructures such as piers and the dredging of waterways. The provision of infrastructure financed by public funds was a common endeavor undertaken by port authorities.
- **As a regulator**, a port authority sets the planning framework, namely tariffs, customs and safety, as well as the enforcement of national and port related rules and regulations.
- **As an operator**, a port authority provides the day to day services to ships (e.g. pilotage and towage) and to merchandises (e.g. loading / unloading).

Globalization and the growing complexity of supply chains are inciting port authorities to undertake strategies aiming at a better level of coordination of their hinterland (Van der Horst and De Langen, 2008). This can take numerous dimensions, but the development of inland ports and logistical zones appear to be an emerging paradigm. Still, port authorities tend to be reluctant to undertake partnerships with inland ports, mostly out of concern of losing added value activities and employment. Also, inland ports may promote port competition by offering access to new freight corridors and can thus challenge the fundamental hinterland of a port and its related cargo.
There is a growing level of coordination between port authorities and inland ports, particularly among the largest ports (Figure 5). The later tend to have more congestion issues as well as the volume and the financial and technical capability to undertake these initiatives. In Europe, the dominant strategy is the setting of dedicated rail or barge services towards inland port, while in North America port authorities tend to set up logistical zones within their adjacent areas to better anchor traffic. With deregulation, the trend is a changing role of port authorities within their region, which has mainly taken two dimensions:

- **Concessionning** has reduced the role of the port authority as an operator since this role is increasingly assumed by specialized terminal operators that are renting terminal facilities over long periods of time (up to 30 years). The dominant rationale behind this process was that port authorities tended have poor levels of performance in their terminal operations. Many are global terminal operators having terminal assets in a wide variety of markets.

- **Cluster governance** is an emerging and extensive trend where the port authority assumes leadership in activities that conventionally were outside its jurisdiction. These include the setting of inland terminals and logistics zones (directly or in partnership), various strategies to monitor and improve performance, setting port community systems, promoting environmental and social initiatives, being involved in training and education for port related employment as well as facilitating relations with its surrounding urban areas.

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Port Community Systems
An emerging trend in the role of port authorities is the management of the regional freight transport system. One endeavor in that direction concerns the setting of Port Community Systems (PCS), which are an information entity that makes available logistical information among the actors involved in port-related freight distribution. The above figure illustrates the main actors involved, including freight forwarders that act as intermediaries for importers (consignees) or exporters (consignors), terminal operators that are the interface between the port foreland and hinterland, customs, ocean carriers, inland carriers and the port authority itself. Conventionally, the transactional relations between these actors are very complex, with some being unilateral and proprietary.

The purpose of a PCS is not necessarily to create new information systems to manage freight activities, but to effectively link existing databases and management systems through a web portal, particularly through the conversion of different formats. Web portals are particularly suitable as an interface as web access is close to ubiquitous and increasingly supported by portable devices such as cell phones / personal digital assistants. The outcome is an improvement in the transactional efficiency and quality of actors among the logistical chain and correspondingly the efficiency of the regional freight distribution system. There are thus opportunities to improve performance (costs and reliability) that can be used as marketing strategies by the users of a PCS. It is important to underline that for each port region, a PCS can take different forms due to various physical, modal, jurisdictional and operational characteristics.

Among specific PCS applications can be noted:

- **Vessel call management.** A carrier is able to issue a berth and anchorage request and to receive an authorization from the terminal operator. The firms involved in port services, such as pilotage, towage and mooring can also receive a service request at the same time. Simultaneously, related public authorities are notified, such as the port authority, customs and the port police.

- **Container handling management.** Carriers (such as shipping companies or trucking firms) can interact with respective terminal operators through a standard interface, removing the issue of dealing with different terminal information systems. The cargo manifest is simultaneously provided to the carrier and the terminal operator as well as to regulatory agencies such as customs and the port authority. This enables an automatic cross-referencing with customs, clearing the cargo for import or export much faster.

- **Gate management.** Electronic management of inbound and outbound movements at the terminal gate, which dominantly concern freight forwarders, shipping lines, trucking firms and terminal operators. It is possible to cover all the inland logistical operations, such as transport contracts, release orders and admittance orders, with a single electronic document. If the e-document is provided in advance, often by 24 hours, then all the processes can be pre-cleared, leaving only the physical movement of pick up or delivery to take place. This improves the throughput of existing gates, often more than doubling their capacity, without new infrastructures except automatic gate processing equipment.
• **Security and control.** Strategies to automate the authorized and secure usage of the facilities, including access to cargo. A particular approach leans on the optical character recognition of license plates and container identification numbers. Real time observation can be cross-checked with bills of lading with discrepancies, which are subject to manual verification. This can also include other scanning devices such as radiation detection or RFID. Again, this results in a better usage of existing assets and at the same time it improves security procedures.

• **Tracking.** All of the above enables through IT integration the tracking of container loads throughout the port community, from the moment they have been unloaded from a containership, while they are clearing the terminal gate or when they have been delivered. This permits a better level of supply chain management and asset utilization within the port community.

The setting of PCS is commonly a process that takes place through several phases. Depending on the existing level of information technology usage, some steps may not be required with the setting of a PCS becoming a matter of portal development and data interoperability. As the following box underlines, Port Metro Vancouver is pursuing integrative strategies with terminal and rail operators.

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**Expanding the Gateway: Port Metro Vancouver**

At the end of May 2010, Canadian National Railway Company (CN), together with Port Metro Vancouver, announced a supply chain collaboration agreement aimed at boosting the port’s importance for both import and export cargoes. Now comes word that CN has formed a similar agreement with TSI Terminal Systems Inc. to enhance service levels to their mutual customers and draw greater volumes of container traffic through Port Metro Vancouver. The two parties have signed a memorandum of understanding intended to drive a mutual focus on system efficiencies, improved communication, and close monitoring of their gateway performance. CN and TSI characterized the pact as a companion to CN’s collaborative agreement with the port.

*TSI is an important partner of CN in serving the international steamship container lines calling at Port Metro Vancouver,*” said Claude Mongeau, president and CEO of CN. “This agreement aims to improve supply chain performance at the Port by establishing a close working relationship with TSI in support of increased efficiency and service innovation.

*TSI handles approximately 70% of the containerized cargo moving through its two terminals, which it operates under long-term lease at Port Metro Vancouver.*

*On the heels of similar agreements for competitor CN, Canadian Pacific (CP) has announced the signing of agreements aimed at increasing business through the Canadian West Coast port of Vancouver. CP signed separate pacts*
with DP World Vancouver and with TSI Terminal Systems Inc. (TSI), a subsidiary of Global Container Terminals.

DP World Vancouver and CP plan to coordinate identification of available tools and processes for productivity improvements for railways, terminals, and shipping lines. This will include improved information systems that enhance the visibility and predictability of customer supply and demand.

CP said ongoing discussions are providing other opportunities for improvement in the performance of the supply chain, creating further growth in container traffic through Centerm in Vancouver.

Under their agreement, CP and TSI, which handles more than 70% of the containerized cargo that moves through the Vancouver gateway, will coordinate working groups in the fields of operations, technology and marketing to identify tools and processes for productivity improvements, again including a focus on information systems that give better insight into customer demand.

From: Logistics Management, August 3 2010.

Governance of Inland Ports

Inland ports have a wider range of options than ports in terms of their governance model, where the landlord model prevails. The ownership and the management of an inland port can be public, private or a combination of both (Table 3). Since an inland port is a long term project that is unlikely to be profitable in its initial phase, they represent a high risk for private investors. It is not surprising to realize that the largest private player in North America, CenterPoint Properties, is financially backed by a pension plan (CalPERS) where the time horizon for returns on investment is more long term. Since among the benefits of inland ports are job creation and a better usage of regional transport infrastructures, they tend to be perceived as projects of public benefit.

Table 3 - Main Governance Models for Inland Ports

<table>
<thead>
<tr>
<th>Model</th>
<th>Characteristics</th>
<th>Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Ownership</td>
<td>A public or a private actor entirely responsible for development and operations. Single vision and conformity to a specific role.</td>
<td>Potential lack of flexibility in view to changes (single mandate). Potential conflicts with surrounding communities.</td>
</tr>
</tbody>
</table>

Public – Private Partnership

<table>
<thead>
<tr>
<th>Help combine public planning of infrastructures with private operational expertise. Public (local) interests represented. Tendency to prioritize public interests over private interests.</th>
</tr>
</thead>
</table>

Landlord Model

<table>
<thead>
<tr>
<th>Public ownership and private operations (a form of PPP). Long term concession agreements. Managerial flexibility between the owner, the site manager and the operators. Most of the risk assumed by private operators.</th>
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</thead>
</table>

Asymmetries in North American Freight Distribution

Trade and Containerized Traffic Asymmetry

American containerized trade is characterized by an asymmetry between the nature of its imports and exports (Figure 6). North American retailers account for a substantial share of containerized imports, mostly involving finished consumption goods bound to major 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. It is worth mentioning that about 60% of all Chinese trade surplus with the United States is the outcome of American owned firms operating in China and importing their output to the United States.
Asymmetries in North American Freight Distribution

Figure 6 - American Foreign Trade by Maritime Containers, 2009 (in TEUs)

Exporters show a completely different profile. A major category of containerized exports concerns recyclables with exporters such as America Chung 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 transpacific and transatlantic trade routes, while in 2008 18.9 million TEU were imported in the United States, only 8.5 million TEU of laden containers were exported. Thus, above 10 million TEU needed to be repositioned empty.

Import and Export-Based Logistics

In the context of trade asymmetry, extended gateways are forced to accommodate substantial imbalances between import and export-based freight distribution as they are related to completely different supply chains. Compounded by long distance freight transportation, reconciling import and export-based logistics is a challenging task in view of the asymmetry in terms of destinations, load units, and supply chain management (Figure 7):

- **Import-based** containerized cargo tends to dominantly concern retail goods, implying that the distribution pattern is a function of the population density. Since the majority of the population is urbanized, the distribution pattern is nodal but spread over the geography. This characteristic incites transloading at the gateways as massification advantages decline rapidly once an inland

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Asymmetries in North American Freight Distribution

Asymmetries in North American Freight Distribution

The trade asymmetry being depicted has significant impacts on North American 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 (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.
Reconciling the availability of containers in a distribution system where imports and exports logistics are very different is thus problematic, with an enduring problem of finding available maritime containers inland. An hybrid solution involves using conventional bulk transport systems to bring commodities to the gateway where they can be transloaded into maritime containers. Conversely to the above pattern, China is a mirror image with the advantage that the export-based activities (mostly retail and manufactured goods) are along the coast and highly clustered, lessening repositioning issues substantially.

**Market Potential of Inbound Logistics**

The market potential of an extended gateway is complex to assess since it combines the conventional port hinterland to which are overlaid the respective market areas on linked inland ports. An extended gateway could have a comparatively weak immediate hinterland but if well linked through inland ports by long distance rail corridors, it could account for a noticeable market share. Additionally, market areas for import and export logistics must be independently considered since it was underlined that they are asymmetric. Here, we will focus on inbound logistics since it has been the dominant driver in the setting of inland containerized freight distribution systems in North America.

As inbound logistics is dominantly related to the retail sector (see Figure 6) population can be used as a simple proxy for market potential. Many large retail supply chains rely on daily deliveries to maintain the stores’ inventory levels. Thus, 500 miles is considered to be the upper limit of an operational daily radius for trucking, although shorter distances are generally preferred. On Figure 8 the share of the total American population within a 500 miles radius from each major freight distribution cluster is depicted. From this standpoint, the optimal location is in the vicinity of Columbus, with 47% of the US population accessible within a day of trucking. Most locations within the Midwest have a share above 35%.
Asymmetries in North American Freight Distribution

Figure 8 - Market Accessibility of Major North American Freight Distribution Clusters

Still, since an important share of retail goods are imported through container ports, it is important to also consider port throughput as a factor in concordance with market accessibility. It underlines the difference between regionally anchored and long distance logistic functions. For instance for Los Angeles / Long Beach, only 15% of the US population is within 500 miles while for New York this share is double (30%). Thus, a great share of the logistical activities performed at LA/LB concern long distance freight distribution along the Los Angeles / Kansas City / Chicago rail corridor as the regional market is not large enough to support such a volume. For New York, more than 80% of all the traffic is bound to the immediate hinterland. LA/LB is therefore more an extended gateway than New York. On the Canadian side, the two most important container ports stand at two extremes; Montreal covers 23% of the American population within 500 miles while Vancouver covers only 4%. Thus, because of the geographical structure of the North American consumption market a similar observation arises with Vancouver more dependent on its extended gateway function than Montreal.
Conclusion: Breaking the Asymmetry

Extending the gateways is the outcome of several commercial and technological forces imposing a higher level of integration of the hard and soft assets supporting supply chains. The process of port regionalization where the gateway is being supported by the emergence of inland ports connected by high capacity rail corridors have underlined that logistical zones are an integral part of this extension. Because of the shift in production brought by globalization, transpacific trade has been an important driver for intermodal transport development in North America. In such a context, the priority of the stakeholders, notably rail operators benefiting from the lucrative long distance intermodal traffic, has been placed on insuring that import logistics offers the capacity and efficiency of handling such flows. With a North American freight distribution system that is asymmetric, inbound and outbound logistics differ radically as they concern different markets, supply chains, and load units. Such an asymmetry is costly, as it imposes the repositioning of empty containers, an issue that has been mitigated by an active transloading function taking place at gateways.

A paradoxical issue is that gateways are not necessarily competing through their own endogenous strategies, but mostly as an outcome of the exogenous strategies of maritime shipping companies, terminal operators, freight forwarders and logistic service providers. These actors impose a “filtering” of policies through their decision making, which is how and where they invest in new or expanded facilities. The setting of inland ports is the outcome of such a process where the pre-requisites are leaning towards the co-location of logistics zone with new intermodal terminals. It is therefore rail operators and large commercial real estate developers that decide on the location and size of such facilities as they are bound to imperatives related to commercial potential and return on investment. It is thus not surprising in the North American context to observe that inland ports tend to be massive facilities.

There are several indications that the commercial environment that has supported asymmetry in freight distribution is shifting, notably with lower growth opportunities concerning the North American retail sector. The extended gateways that are likely to be the most successful in the future will be those that reconcile the most effectively this asymmetry. Inland ports will play an important role in this process by being an interface for the deconsolidation of imports and the consolidation of exports. Paradoxically, in a system leaning on containerized freight distribution, developing an export strategy leans on securing import volumes, particularly at inland locations.

References

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