Comparative North American and European Gateway Logistics: The Regionalism of Freight Distribution

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A modified version of this paper had been published in:

Journal of Transport Geography, vol. 18, no. 4, pp. 497-507

Comparative North American and European Gateway Logistics: The Regionalism of Freight Distribution

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Abstract

The global freight distribution system has been impacted by convergence in terms of technology, infrastructure, modes and terminals. Still, in spite of strong converging forces, it can be argued that logistical practices are far from being uniform. This paper analyses the regionalism in freight transport systems by providing a comparative analysis of gateway logistics practices in North America and Europe. It is demonstrated that Europe and North America are not walking the same paths when it comes to the configuration of transport and logistics networks, via operational decisions and the setting of a regulatory framework. The attributes of gateways, corridors, hinterlands, regulation, governance, value chains and labor provide an analytical framework to understand the regionalism of freight distribution in the North American and European contexts, as well as anywhere else.

Keywords

North America, Europe, gateway, logistics, freight, comparative analysis, regionalism

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1. Introduction

The global freight distribution system has been impacted by convergence in terms of technology, infrastructure, modes and terminals. Containerization has been one of the strongest forces behind the standardization of global freight distribution systems (Levinson, 2006; Notteboom and Rodrigue, 2009). This led to the emergence of global supply chain management practices trying to reconcile a variety of price, capacity, efficiency and operational constraints. There are numerous examples of the setting of global supply chain strategies, such as maritime shipping companies establishing networks servicing global markets (Notteboom, 2004), transnational port operators setting a geographically diverse portfolio of terminals (Slack and Olivier, 2006) or logistic services providers insuring a seamless distribution between production and consumption markets (Hesse and Rodrigue, 2004). Thus, various factors and conditions of convergence have been the object of much research and analysis. This approach is quite understandable as modern supply chain management favored investigations seeking to identify and understand how standardization and harmonization were diffusing along supply chains, helping to improve efficiency and productivity.

Still, in spite of strong converging forces, it can be argued that logistical practices are far from being uniform. When they take place over a regional geography, they result in regional logistical strategies that have to take account of a large array of specific attributes linked with locations such as modal preferences, infrastructure ownership, policy and regulation. Historical path dependency (i.e. the so-called “memory” effects) in policy-making and firms’

operational strategies heavily influence regional differences as regional distribution practices tend to endure in spite of technological and regulatory changes. The “regional effect” is thus significant, underlining the continuing relevance of the comparative analysis of freight transport systems.

North America and Europe are two major markets sharing many commonalities notably in terms of a strong import function (inbound logistics) and advanced freight distribution systems linking them to global trade flows. Yet, they also differ significantly in terms of how logistical strategies are taking place over their respective territories. Earlier comparative studies have revealed Europe and North America are not walking the same paths when it comes to the configuration of transport and logistics networks, via operational decisions and the setting of a regulatory framework. For example, Slack (1996) demonstrated that large differences exist in intermodal rail terminals and networks in North America and Europe. Button (1997) underlined that North-American transport policy making relies more on “big bang” approaches, while in Europe policy making has a more incremental nature. Since then, ongoing globalization and regulatory changes raise again the question concerning the major elements enabling a comparative analysis of North American and European gateway logistics. To what extent can the geography of transportation provide a framework to such an analysis?

Transport geography reveals that the main spatial characteristics of transport systems pertain to the joint consideration of infrastructures, locations and interactions, which defines systems of circulation (Rodrigue et al., 2009). Additionally, regional geography focuses on the general characteristics of a region, ranging from physical attributes to socioeconomic elements. The core tenet leans on the concepts of formal and functional regions where the first defines homogeneous characteristics within a bounded geographical framework while the second

refers to a functionally integrated system of relations, often around a node (e.g. De Blij and Muller, 2008). A formal region tends to have a notable temporal stability while a functional region is continually changing. Previously, there was a significant concordance between the formal and functional character of regions, implying that inland logistics was mainly a national strategy. Three major trends contributed to a divergence of this approach in recent decades:

- Globalization. A generic term relating to many issues, namely the international division of production where corporations are seeking various input cost reductions through global sourcing practices as well as expanded market opportunities. The functional relations resulting in such a process are well beyond any regional formalism.
- Economic integration. A new form of expanded regionalism set in place by multilateral agreements where jurisdictional and regulatory issues are harmonized. It can be seen as an attempt to have formal regionalism more in balance with the existing functional regionalism. Such an approach is particularly privileged by the European Union.
- Intermodal transportation. Intermodalism is associated with a higher level of integration between different systems of circulation. This integration leads to new functional structures, namely global production networks, each tending to have its own organizational and spatial behavior depending on the concerned supply chains.

Transportation and supply chains tend to have a strong nodality that can be expressed as market areas (hinterlands) and yet this nodality is constantly shifting because of commercial changes, infrastructure investment and new technologies. A regionalism of freight distribution can therefore be constructed as a set of functional regions in which gateways, corridors, hinterlands, regulation, governance, value chains and labor are of particular relevance in their

definition. They provide an analytical framework to understand the regionalism of freight distribution in the North American and European contexts, as well as anywhere else. In this paper these dimensions are being investigated comparatively with their implication for the respective functional freight regions being provided. In spite of a convergence brought by globalization and containerization a profound regionalism and its diverging impacts are noted within supply chains.

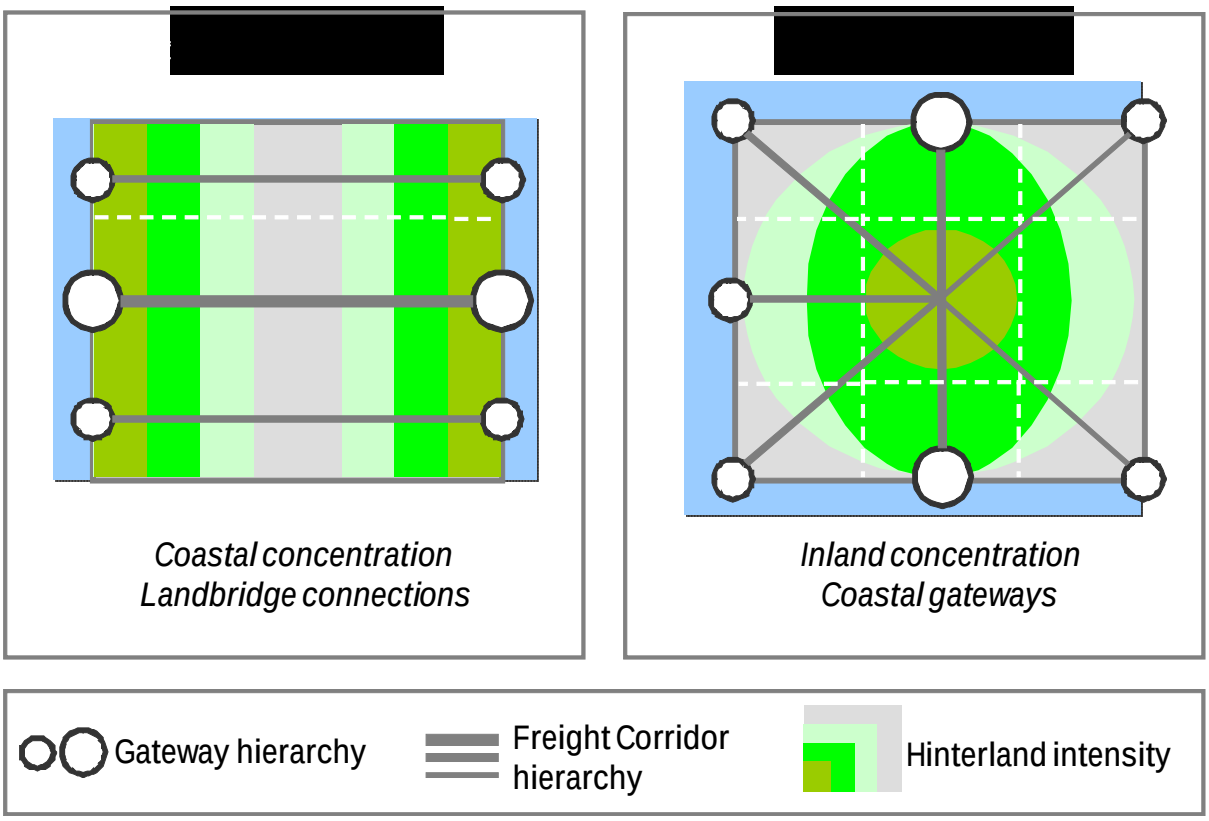
2. Gateways, Corridors and Hinterlands

2.1. Gateway port systems: New Agents for the Regionalism of Freight

Gateways represent the fundamental interface structure between regional and global transport systems (Van Klink and Van Den Berg, 1998). This interface can be impacted by several factors such as policies favoring specific ports of entry, but if left relatively unimpeded a natural gateway will be established based on the level of accessibility and economic activity of its hinterland. As globalization increased in scale and scope, locations enabling an efficient articulation between different systems of circulation became more relevant. Within global maritime shipping networks, hubs have emerged, connecting regional and global systems while creating functional regions on the maritime foreland (Rodrigue and Notteboom, 2009). For the maritime / land interface, gateways have become significant logistical clusters with the accumulation of terminal infrastructures, such as ports, rail terminals and freight distribution centers, but supply chain management activities as well, ensuring continuity within global supply chains. Yet, the role and function of gateways and their corridors vary according to the geographical setting, which has an impact on modal and operational considerations. Figure 1 provides a synthetic representation for North America and Europe.

Figures 2 and 3 provide comparative functional maps of North American and European gateways and corridors, notably in terms of the major gateway systems.

Figure 1: Gateways, Corridors and Hinterlands

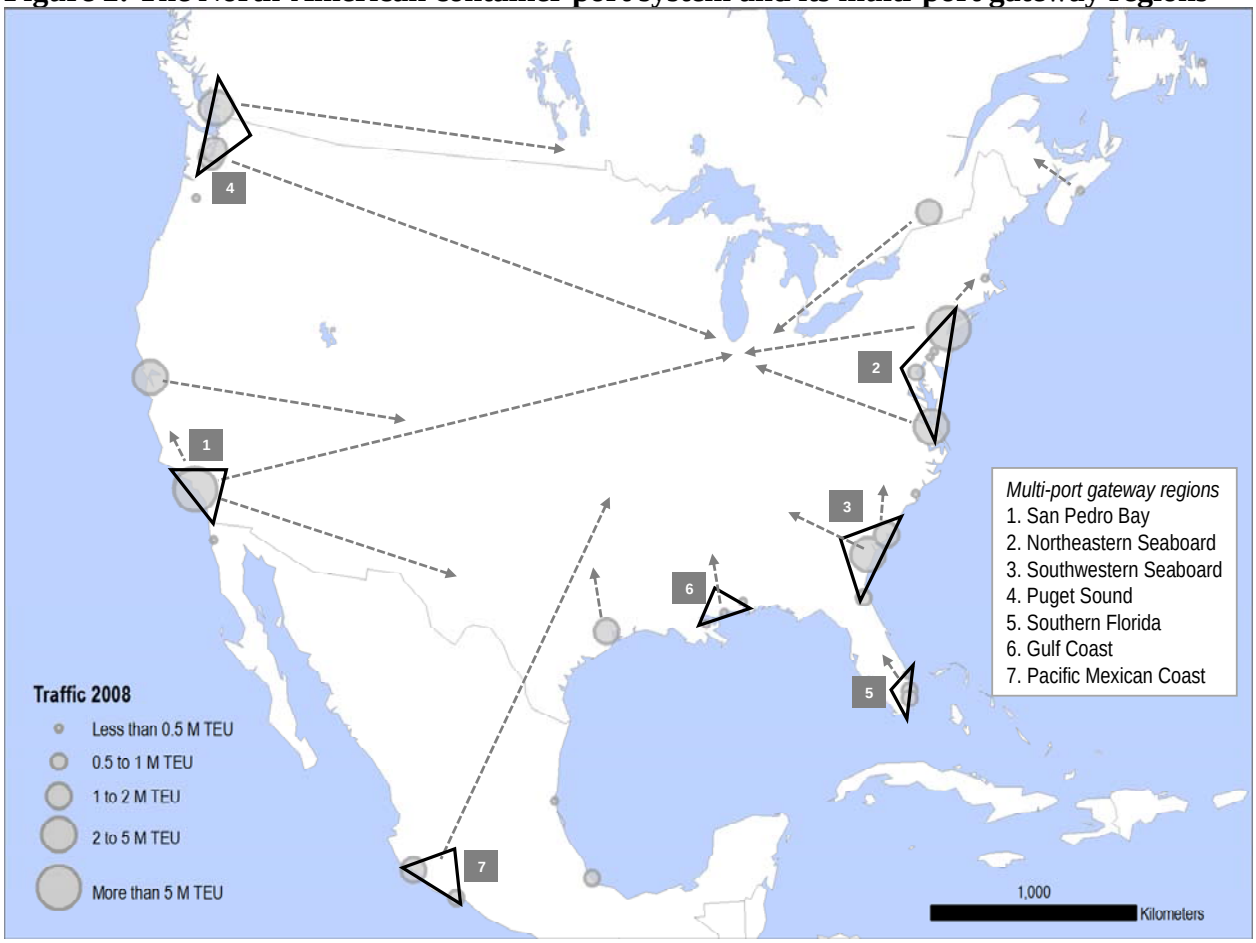


In North America, there is a high level of concentration of economic activities along coastal areas (East and West coasts) with significant resource and manufacturing hinterlands. Gateways tend to be the dominant markets and this for all the two major maritime facades, the East and the West coasts (the Gulf Coast plays a more marginal role, particularly for containers). From the start, it was mainly commercial considerations that shaped the setting of North American gateways and corridors, which have remained quite stable in time, albeit with an ongoing trend of traffic concentration. North America relies on a relatively small number of gateways and less developed port ranges have few chances to fully take part in international shipping networks, as demonstrated by the Gini Decomposition Analysis in Notteboom (2006). The observed cargo concentration levels in the North American container

port system are emanating from 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% (Marad, 2007). 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. North American container ports recorded an average negative growth rate of around 21% in the first half of 2009 compared to the same period in 2008 (based on figures of AAPA). The Eastern Seaboard is characterized by ranges each having their own divergence dynamics and connectivity level to their hinterlands (Rodrigue and Guan, 2009). The Eastern Seaboard can be divided into four major ranges. The St. Lawrence is a 'funnel' where all the traffic goes straight to bottleneck Montreal. The Upper Range handles a very low containerized volume. The two major ports of the range, Halifax and Boston, have shown very limited growth in traffic. The Mid Range shows a complex and rich hinterland corresponding to a large accumulation of economic activities, mainly along the Boston-Washington corridor. New York and Hampton Roads, the two leaders in this region, have experienced substantial traffic growth. The Lower Range is an emerging port range with a fairly uncongested access to the hinterland and centered around the Savannah / Charleston port cluster. The Southern Florida range has a much more limited hinterland, mostly servicing the immediate region.

Figure 2: The North-American container port system and its multi-port gateway regions

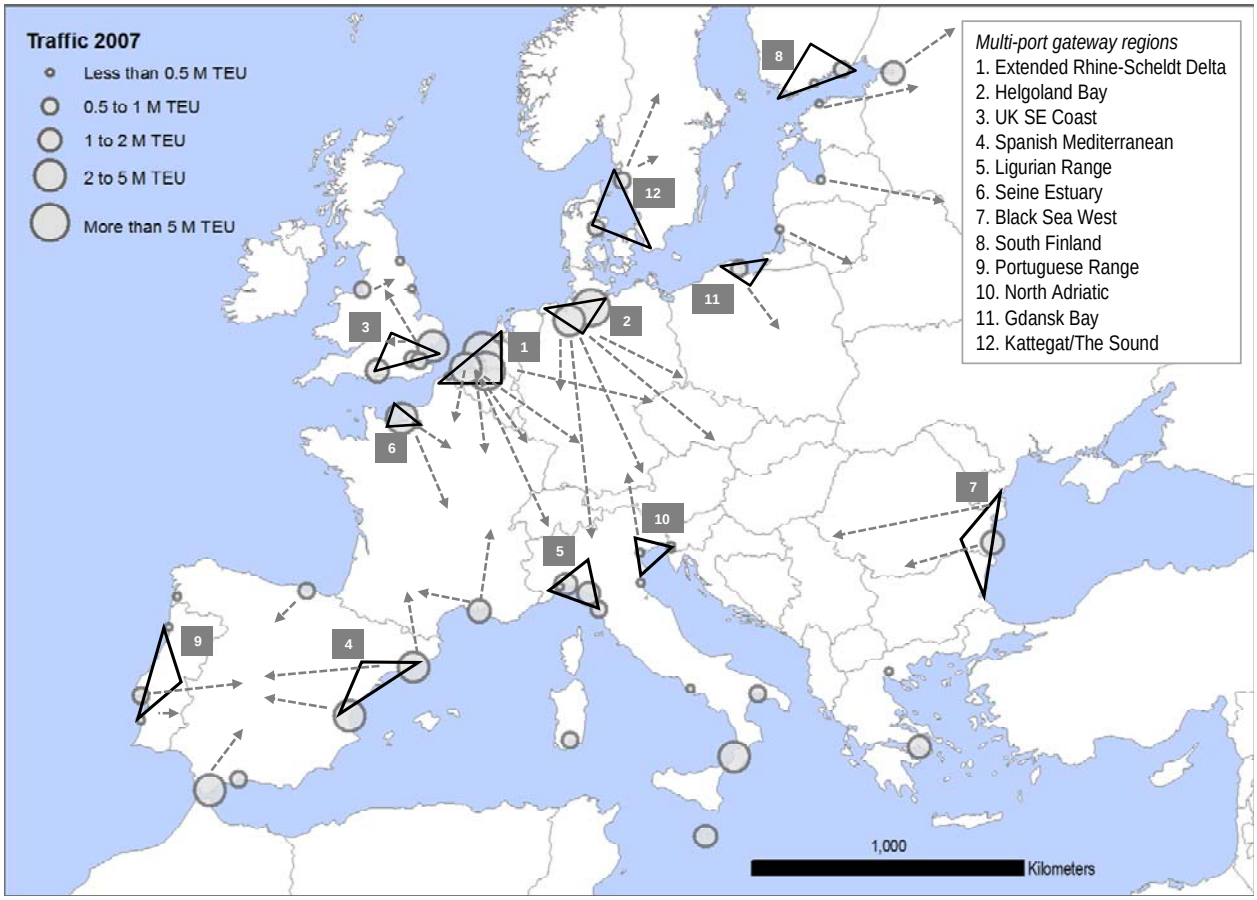


From coastal gateways longitudinal long distance rail corridors, often taking the form of a landbridge, are servicing a continental hinterland articulated by major transportation and industrial hubs such as Chicago and Kansas City. The double stack trains are having unit capacities of up to 400 TEU and a total length of well above 2 km. The large scale 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 two different coastlines. The major hinterland in North America changes, namely the decline of the industrial belt (which has been monitored for decades) and the industrialization of the "sun belt" are long term shifts that are reflected in the gradual reorientation of the traffic. NAFTA also favors the setting of natural gateways and corridors, namely through Canada (in particular Vancouver and Montreal) and Mexico (Lazero Cardenas) and a reorientation of traffic flows (Brooks, 2008).

This trend is however dwarfed by the restructuring taking place in Europe and its impacts on freight flows.

In Western Europe, the hinterland is not only intense along the coastline but also in the interior, notably along the Rhine river system and its tributary rivers (Main and Neckar), Bavaria in the South of Germany, the economics centers around Milan in Northern Italy and Madrid in central Spain and major markets in Paris, the Liverpool-Manchester-Leeds belt in the UK and the belt reaching from Austria to the growing production clusters in Hungary, the Czech Republic and Southern Poland. Moreover, a large part of the European economic centers are somewhat remote from the main shipping lines as is the case for the countries around the Baltic. European gateways are therefore not the only major markets, but often intermediary locations, even if many are important industrial centers (e.g. petrochemical industry). The hinterland is accessed from coastal gateways such as Rotterdam, Antwerp, Hamburg, Bremerhaven, Le Havre, Barcelona, Marseille and Felixstowe by medium distance corridors involving a variety of combinations of road, barge (where available) and rail services. Almost all the major European capitals are interior cities located along rivers. There is a particular disconnection between the nationality of the gateway and the nationality of the hinterland, an outcome of several decades of integration that have gradually let transport and supply chain considerations be the driving force for shaping hinterlands (as opposed to policies centered on national ports of entry). Thus, the role of gateways in shaping functional freight regions within Europe is much more recent and profound than in North America. Cargo concentration levels in the European port system are slowly declining, whereby nearly all port ranges fully participate in international shipping networks and whereby each port range consists of a unique blend of load centre ports and smaller facilities with a more local focus.

Figure 3: The European container port system and its multi-port gateway regions



Source: based on Notteboom (2009)

Europe and North America differ also at the level of the functional division of freight flows. The specialization degree of European gateways in specific foreland regions is typically lower than in the US. Asian cargo is mainly being handled in the Med and the Le Havre-Hamburg range. Cargo flows on secondary routes such as Africa and South America also find their way throughout the vast European container port system. The geography of North America has led to an elevated route specialization among gateways. The bulk of Asian cargo flows is handled in the West Coast ports, in particular Long Beach and Los Angeles. 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 TEU to circumnavigate the world via round-the-world

services, is expected to lower this geographical specialization. However, the European port system is expected to remain more diffuse.

A last feature relates to the existence of "memory effects" in the respective port systems. In Europe, containerization started in the Le Havre-Hamburg range and its link with trans-Atlantic trade. In 2008, the ports in this range (with main ports Rotterdam, Antwerp, Hamburg, Bremerhaven, Le Havre and Zeebrugge) handled more than 48% of total European container throughput. In the new millennium, the position of the northern range has even gradually improved while the Med ports and the UK port system lost market share. We argue that the observed dominance of the Le Havre-Hamburg range is a combined result of first mover advantages, scale advantages, a high operational performance (terminals and onward inland transport) and the economic density in the immediate hinterland. First mover advantages together with the history of commercial relations (i.e. the impact of the colonial past) and the national strategic interest of individual EU Member States (i.e. the national borders) also contribute to the observed regional traffic dispersion among European main ports. These effects play a lesser role in cargo dynamics in the North American port system.

2.2. Terminals and Regionalism

Although gateways are the fundamental structure of the maritime – land interface, terminals are the physical infrastructures through which functional regionalism is shaped. Port regionalization (Notteboom and Rodrigue, 2005) underlines the emergence of new relations between port terminals and their hinterland with setting of inland ports and distribution services. How port terminals establish their connections with the hinterland is influenced by regional characteristics such as density, economic function, but also the physical performance of terminal facilities, the capacity and modes of inland connections as well as of inland ports.

There are very few new ports in North America with the exception of Prince Rupert, exploiting a niche market of shorter transpacific 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 Lazero Cardenas (Randolph, 2008). 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. 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.

In Europe, there is a multiplication of terminals in new ports to cover the expansion of the EU as well as to take advantage of better hinterland accessibility. A prime example is the new eastern gateway of Constantza in the Black Sea. This implies the setting of entirely new distribution practices, such as inland barges and short sea shipping to complement and substitute trucking which has the dominant share. However, for rail terminals economies of scale are difficult to achieve because of the unavailability of double-stacking and of shorter unit trains (up to 95 TEU per shuttle train). Barge services are less impaired by such limitations with ongoing economies of scale where draft is permissible (Notteboom and Konings, 2004). While the European hinterland for a long time was marked by a temporal stability, the impacts of European integration and changes in hinterland access are having large impacts on the distribution of freight flows.

The enlargement of the European Union from 15 members in the 1990s to 27 members today reinforced trading links with countries in East and Central Europe. It has, however, also led some manufacturing activities to move from Western Europe towards the low-cost regions in Eastern Europe, with ever larger bi-directional East-West flows within the European Union of raw materials and consumer products. The East-West flows are giving impetus to the creation of extensive infrastructures including corridors and terminals. Germany, the Czech Republic, Poland, Slovenia and Hungary have strong rail networks while road networks in the East European countries are less well developed. The Danube and the Elbe are emerging as new barge corridors, although total barge volumes remain small compared to the Rhine river and its tributaries and the North-South axis (the Netherlands, Belgium and Northern France). Northern ports, in particular Hamburg, up to now have benefited the most from EU enlargement, whereas new development opportunities might arise for secondary port systems in the Adriatic and the Baltic Sea. The developments in East Europe are complemented by a strong development of trade flows in the Baltic area and the Latin arc (stretching along the coastline from southern Spain to northern Italy). At a policy level, the above developments have fuelled an intense discussion on distributional equity in the European port system. While market-related dynamics such as maritime and intermodal connectivity and scale considerations favor a concentration of European cargo flows on trunk lines between major (mostly north-European) container ports and the hinterland regions, some political forces at the European Union level advocate a more evenly distributed system with a larger participation of South- and East European ports in freight distribution systems. This tension between centralization and a decentralized port system is a key input for future inland infrastructure development in Europe via the TEN-T program (Trans-European Network – Transport).

The possibility of economies of scale at terminals, linked with operational (e.g. double stacking, unit train size, maximal truck load unit) and land availability constraints, is imposing a notable differentiation between North American and European inland terminals. While in both cases gateway systems tend to be similar, it is on their respective hinterlands that differentiation is taking shape. In a European setting, a larger number of inland terminals are required to handle a similar volume than their North American counterparts.

North America and Europe follow different paths when in comes to the inclusion of intermediary port terminals in maritime networks. The geography of the Mediterranean Sea and the Baltic Sea offered the right conditions for the emergence of transshipment terminals. In the Mediterranean, extensive hub-feeder container systems and shortsea shipping networks emerged since the mid 1990s to cope with the increasing volumes and to connect to other European port regions. Quite a number of shipping lines rely on a hub-and-spoke configuration in the Med with hub terminals located close to the main navigation route linking the Suez Canal with the Straits of Gibraltar. Major “pure” transhipment ports in the region are Algeciras, Taranto, Cagliari, Marsaxlokk and Gioia Tauro. These hubs with a transhipment incidence of 85% to 95% can only be found in the Med. Northern Europe does not count any pure transhipment hub. Hamburg, the North-European leader in terms of sea-sea flows (mainly in relation to the Baltic), has a transhipment incidence of about 45%, far below the elevated transhipment shares in the main south European transhipment hubs (Notteboom, 2009). A third major transhipment market has emerged on the link between the UK and the mainland. Many of the load centres along the southeast coast of the United Kingdom faced capacity shortages in recent years. Quite a number of shipping lines therefore opted for the transhipment of UK flows in mainland European ports (mainly Rotterdam, Zeebrugge, Antwerp and Le Havre) instead of calling at UK ports directly.

North America does not count any transhipment hubs, in spite of expectations from some port to capture this role (e.g. Halifax). 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. In the US, many impediments in American shipping regulations gravitating around the US Merchant Marine Act of 1920 (also known as the Jones Act) have favored a process of limited (feeder) services between American ports. The Jones Act, which basically states that cargo may not be transported between two US ports unless it is transported by vessels owned by citizens of the US, built and registered in the US, and manned by a crew of US nationals, implies that the potential of domestic shipping in North America remains underutilized (Brooks, 2009).

In Europe, the restrictions to maritime cabotage have been lifted. At the end of the 1990s, the liberalization of cabotage services in Europe was virtually complete (only the Greek market remained partially protected till 2002). At present, an EU-flag ship is eligible to participate in the cabotage trades of any other EU state. This liberalization made it possible for short sea to start competing effectively with land-based transport. The European Commission is supporting the development of short sea shipping in view of a modal shift from road to other transport modes and a reduction of the environmental footprint of EU transport activities. The EC's shortsea policy is supported by the creation of Motorways of the Sea (MoS) and funding mechanisms like the Marco Polo Program. The EC has set a clear policy objective to remove any remaining administrative and customs obstacles towards the creation of an EU maritime space (European Commission, 2009).

3. Regulatory Framework and Governance

3.1. Regulatory Changes in Inland Distribution

In terms of the regulatory framework there is an unfolding convergence between North America and Europe. Liberalization, lowering barriers of entry in modal and intermodal activities, and privatization, where the ownership structure is transferred to the private sector, has taken place across modes and regions both in Europe and North America. Yet how policy implementation took place differs significantly. The North American approach commonly takes shape as a paradigm shift where after the enactment of new policies, changes are sudden and profound (e.g. Motor Carrier Act, Staggers Act), but reflect the anticipation and participation of major market players. In Europe, policy development is more incremental as a consensus/compromise must be reached between various Member States that naturally tend to put their respective interests first. The division of powers between the EU-level and the national level is guided by the subsidiarity principle as defined in Article 5 of the Treaty of Maastricht. It is the principle whereby the European Union does not take action (except in the areas which fall within its exclusive competence) unless it is more effective than action taken at national, regional or local levels. The action by the EU must bring added value over and above what could be achieved by individual or member-state government action alone (the benefit criterion). The European Union, however, has a call for an ever-closer union, which could eventually lead to major constitutional clashes. Europe has a tradition of national and regional policy where various public actors are shaping the outcome, which is less present in North America as many regulations fall within federal jurisdiction.

Policy views on transport system development differ. Most North American and European rail systems still operate passenger and freight services. In Europe the national rail systems and

various levels of government have prioritized passenger service as a strategy for interurban mobility and indirectly as a way to mitigate the growth of road traffic. Significant investments have occurred in improving the comfort of trains and in passenger rail stations, but the most notable has been the upgrading of track and equipment in order to achieve higher operational speeds (e.g. high speed rail network). Freight transport has tended to lose out because of the emphasis on passengers. Because of their lower operational speeds, freight trains are frequently excluded from day-time slots, when passenger trains are most in demand. Overnight journeys may not meet the needs of freight customers. This incompatibility is a factor in the loss of freight business by most rail systems still trying to operate both freight and passenger operations and of the prevalence of trucking.

It is in North America where the separation between freight and passenger rail business is the most acute. The private railway companies could not compete against the automobile and airline industry for passenger traffic, and consequently withdrew from the passenger business in the 1970s. They were left to operate a freight only system, which has generally been successful, especially with the introduction of intermodality and the productivity it permitted. The passenger business has been taken over by public agencies, AMTRAK in the US, and VIA Rail in Canada. A major problem is that they have to lease trackage from the freight railways, and thus slower freight trains have priority.

In Europe, the two markets are being separated, which resulted in changes in intermodal services at the management and ownership levels (Debrie and Gouvernal, 2006). The liberalization of the railway system that has been imposed by the European Commission is resulting in the separation of passenger and freight operations and since 2003 the possibility for private operators to lease slots on publicly owned rail systems. Maritime shipping

companies have particularly been involved by setting, as subsidiaries or parent companies, private rail operators offering shuttle services from ports to inland terminals. This process had already taken place in the UK when British Rail was privatized as well as in Germany. The Dutch have already sold the freight business of the Netherlands railway (NS) to DB, and having opened up the freight business to other firms. Entry in the inland terminal market is more open and the extensive fluvial network permitted a wide variety of actors to establish terminal facilities, from municipalities to global terminal operators. Deregulation in the rail sector permitted a similar process with several actors able to set their own inland terminal facilities along the same rail corridors. The move towards high speed passenger rail service necessitated the construction of separate rights of way for the high speed trains. This has tended to move passenger train services from the existing tracks, thereby opening up more daytime slots for freight trains.

Due to the scale of its jurisdictions, a large share of movements counts as international trade while in North America the same scale would simply be labeled as interregional movements. Outside the statistical anomalies this creates for international trade figures, it played an important role for the operational characteristics of short sea shipping (SSS). In Europe it became easier to establish short sea shipping services because most concerned international trade which permitted various actors to be involved, even maritime shipping companies through their liner service networks. A similar network structure could not be established in North America, mainly because the Jones Act forbids foreign involvement in domestic maritime shipping (see discussion earlier).

3.2. Governance: A variety of private and public roles

Governance also differs notably in terms of ownership, particularly in the rail sector. The North American transport market is dominantly private. For rail, both infrastructures and operations are of private scope which has led to large segmented market areas with some interconnectivity issues (e.g. Chicago). The rail market is essentially oligopolistic with most large load centers being serviced by at least two intermodal terminals belonging to separate operators. Some load centers interconnecting different systems of circulation may have three or more rail operators present, namely Chicago where all the seven North American operators have terminals. Even for the few load centers that are serviced by only one rail operator, rail remains a private business where customer service is fundamental to secure cargo. Undue application of the monopolistic advantage would be counterproductive for long term business prospects and would trigger regulatory interventions. Additionally, since both the infrastructure and the terminals are owned by rail operators they are the locational decision makers implying terminal location is undertaken to maximize revenue along load centers where at least one competitor is present. The intermodal rail market thus remains a highly competitive one, but this competitiveness has regional variations according to the presence of other rail operators in vicinity, regional trucking services, and the characteristics of regional cargo demand and supply.

In Europe there is a separation between infrastructure management and operations following European rail liberalization that started in 1991. The separation between infrastructure managers and rail operators opened up former national railway networks, operated by national railway companies, to newcomers. However, coordination problems exist due to a lack of synchronization and harmonization between the public sector responsible for the infrastructures and several private rail operators (some being ventures of maritime shipping

companies) responsible to provide services. In North America and Europe, global logistics service providers and real estate companies own and control large freight distribution assets. For port operations, the North American and European models are quite similar with the paradigm of the landlord port authority and private terminal operators being prevalent. Since the mid 1990s global terminal operators such as DP World from Dubai, PSA from Singapore, APM Terminals from Denmark (AP Moller group) and Hutchison Port Holdings from Hong Kong have entered the European container handling business. These operators each manage between 5 and 10 container terminals spread out over the main European gateway regions. This has not happened to the same extent in North America for three reasons: political (e.g. when DP World acquired P&O Ports in 2006, the company was not allowed to take over the terminals of P&O Ports in the US because of concerns about national security), a historically higher involvement of shipping lines in terminal operations and a higher interest of financial groups in terminal operations (e.g. AIG).

Land availability and ownership also impacts governance. Where land availability is an issue and there is a high level of competition of scarce real estate assets the outcome tends to be a higher level of public involvement. This particularly applies to gateway regions where large volumes, congestion and the use of real estate resources have favored the setting of planned logistical zones with a level of integration with intermodal assets. Concomitantly, land pricing is linked with economic and supply chain characteristics. Import-oriented economies have to take the intrinsic value of land as basis for pricing. Terminal and logistical activities thus pay a market price for real estate, which applies both to Europe and North America. For export-oriented economies, transport infrastructure at gateways is seen as strategic assets for economic development with land being offered below intrinsic value to generate multiplier effects that are backed by a positive balance of payments. The implications for this strategy

are that for export-oriented economies supply chain infrastructure might be subsidized below market price. Special economic zones are a notable example where activities that focus on exports are given an array of advantages.

As underlined, governance may diverge concerning the functional character of freight regions versus the formalism of jurisdictions. This is less an issue in North America because jurisdictional size commonly encompasses the functional regionalism of freight distribution, but there are still issues with the expansion of networks through transnational mergers and acquisitions. Both Canadian rail operators, CN and CP, operate infrastructures in the United States as an outcome of various acquisitions. One of the most significant took place in 1998 with the purchase of Illinois Central by CN, effectively giving it a rail corridor between Chicago and New Orleans and transforming CN into a pan-American railway linking the East Coast, the West Coast and the Gulf of Mexico. In 1999, an attempt to merge CN and BNSF was thwarted by anti-monopolistic regulations by the Surface Transportation Board of the American government, an indication that the functional integration was taking place at a scale too vast for the comfort of regulatory agencies. Still, both CN and CP were able to acquire smaller railroads (e.g. Wisconsin Central and Dakota, Minnesota and Eastern Railroad) to expand their holdings and provide better connectivity within their system and with other rail systems. On the Mexican side, Kansas City Southern (KCS) was able in 1997 to expand a network up to the port of Lazero Cardenas on the Mexican Pacific Coast, achieving dominance in rail freight volumes between Mexico and the United States. What remains an important issue is transborder truck traffic where security concerns are creating delays and compliance costs.

Territorial borders between states, provinces and even municipalities/cities have a large impact on the spatial and functional interactions among logistics regions. In most cases, territorial borders make the pursuit of a common goal far less feasible. Instead of benefiting from a functional integration of logistics activities in a cross-border logistics growth pole, regional/local authorities typically try to promote their own regions without fully taking advantage of existing synergies with neighboring regions. At the same time, borders can increase the cost distance in transport operations due to administrative and transaction costs. Particularly in Europe, the lowering of border-induced impediments to a functional integration of logistics regions still has a long way to go. Such impediments in Europe do not relate to trade barriers (the internal market is a fact) but to economic regulation, regional marketing efforts, labour mobility and the transfer modalities for innovation.

A good example of the impact of such institutional elements can be found in the Rhine-Scheldt Delta, the main gateway port region in Europe. The ports in the Delta (Rotterdam, Antwerp, Zeebrugge, Amsterdam, Ghent, Zeeland Seaports and Ostend) have become the main drivers of a large logistics pole covering the Benelux, northern France and western Germany. The existing geographical concentration of logistics sites has stimulated the development of inland terminals in these areas. While the Rhine-Scheldt Delta forms a functional unity from the perspective of logistics development, the different administrative regions (Northern France, Wallonia, Flanders and the Netherlands) in the Delta have not developed a strong cross-border perspective. The policy in the Netherlands primarily consists of extending the position of Rotterdam as a European gateway through the development of logistics corridors towards Germany supported by trunk line infrastructures such as the Betuweroute, a new rail freight corridor. This territorial policy undervalues the existing strong functional interaction with the port of Antwerp in Belgium (see Notteboom, 2009b for a more detailed discussion on complementarity and competition in the Rhine-Scheldt Delta). In

Flanders, the northern half of Belgium, the Extended Gateway project initiated by the Flemish Institute for Logistics (VIL) aims at developing logistics sites and inland cargo centres in the Flemish hinterland as part of an integrated multimodal hinterland network in Flanders (Van Breedam and Vannieuwenhuyse, 2007). The Extended Gateway idea can be considered as a practical application of the port regionalization concept of Notteboom and Rodrigue (2005). Following the introduction of the Extended Gateway concept for Flanders in 2006, several regional studies have been carried out to analyze the logistics potential of each of the provinces in Flanders. The spatial definition of the Extended Gateway concept has an important political dimension. A major point of attention is the artificial restriction of the extended gateways to Flanders, involving only Flemish ports and Flemish inland centers. In reality, many of the logistics zones and inland terminals in Flanders also have strong cargo links with the Dutch gateway Rotterdam, while many logistics zones in Northern France, the southern part of the Netherlands and Wallonia (the southern French-speaking part of Belgium) rely heavily on Flemish gateway ports. Confining the port regionalization process to Flanders thus creates blind spots and neglects the logistics dynamics in the wider Rhine-Scheldt Delta. In the US and Canada, such institutional dynamics primarily play at the level of the administrative borders between states. Also there, it might lead to governance structures that do not really reflect the functional geography of freight distribution and logistics systems.

4. Value Chains and Labor

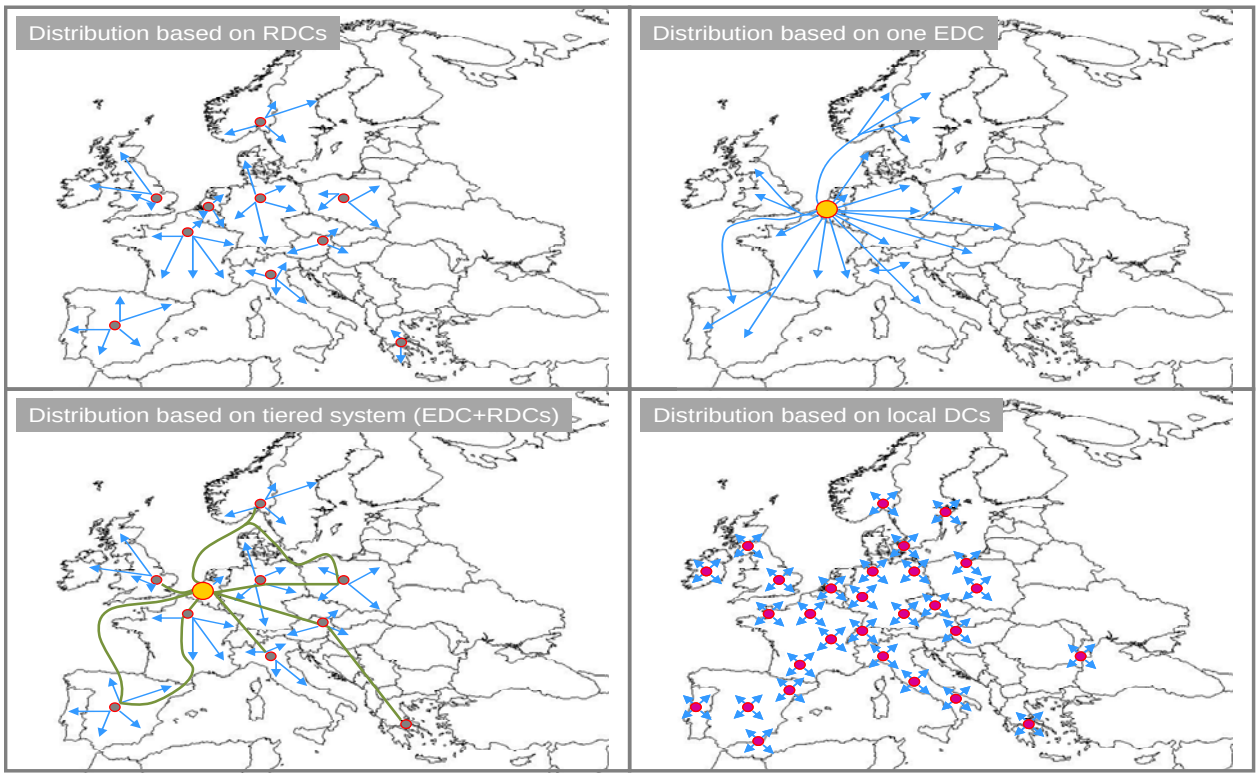
4.1. The added value of freight regionalism

Supply chains are being redesigned to respond to varying customer and product service level requirements. Value chains reflect the specific economic processes of the North American and European markets. The question is where added value functions are performed along supply

chains and which form it takes. Again, regionalism results in different strategies. In North America, longer distances and the availability of a load unit greater than the standard forty foot maritime container, has favored an active transloading function at gateways. The equivalent of three forty foot maritime containers can be transloaded into two domestic fifty-three footers. Maritime containers after being transloaded can be brought back to the port terminal and the maritime shipping network. 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. In Europe, inland distances are more limited, so maritime containers tend to move directly to their bound distribution centers through inland ports.

When it comes to the distribution of overseas goods, a general distribution structure does not exist. The differences in economic geography of North America and Europe have led to specific characteristics in inland distribution networks as depicted in figures 4 and 5.

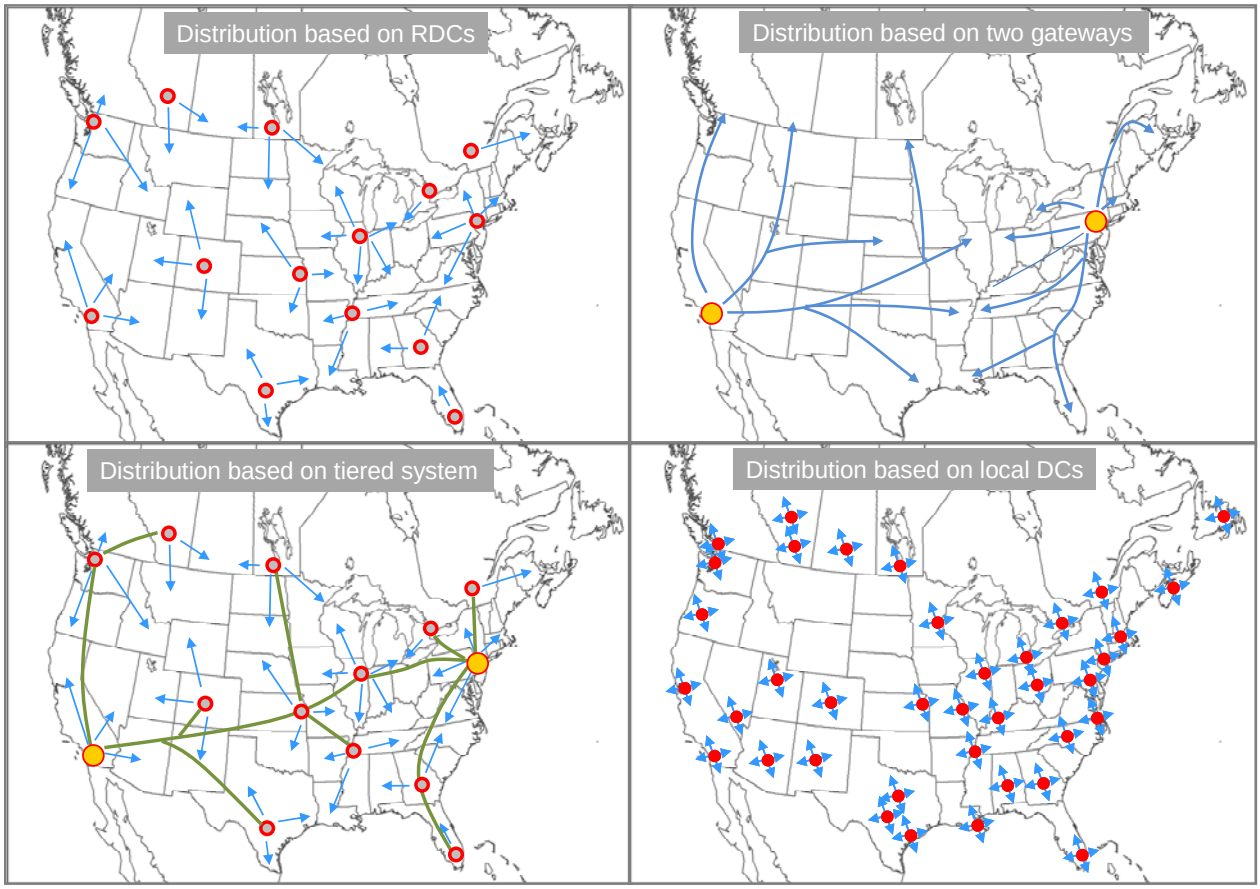
Figure 4: Distribution network configurations for containerized import cargo (retail) in Europe



Note: RDC = Regional Distribution Center, EDC = European Distribution Center

Source: based on Notteboom (2009)

Figure 5: Distribution network configurations for containerized import cargo (retail) in North-America



Note: RDC = Regional Distribution Center, DC = Distribution Center

In Europe, companies can opt for direct delivery without going through a distribution centre, distribution through an EDC (European Distribution Center), distribution through a group of NDCs (National Distribution Center) or RDCs (Regional Distribution Center) or a tiered structure in which one EDC and several NDCs/RDCs are combined to form a European distribution network. The choice between the various distribution formulas depends on among other things the type of product and the frequency of deliveries. In the fresh food industry for example, worldwide or European distribution centres are unusual because the type of product (mostly perishables) dictates a local distribution structure. In the pharmaceuticals industry, European distribution centres are common but regional or local distribution centres are not present, because the pharmaceutical products are often manufactured in one central plant and

delivery times are not very critical (hospitals often have their own inventories). However, in the high tech spare parts industry, all of the distribution centre functions can be present because spare parts need to be delivered within a few hours and high tech spare parts are usually very expensive (which would require centralized distribution structures). Before the creation of the EU, the distribution structure of most companies was based on a network of national distribution centers in the major countries in which they were present. Over the last 15 years many barriers for cross-border transactions between countries within the EU have decreased. As a result many companies consolidated their distribution operations into one central EDC covering all European Union countries. The rise of EDCs meant longer distances to the final consumers and in some market segments local market demand has led companies to opt for RDCs. More recently, a certain degree of decentralisation of European distribution structures has taken place. At present, the tiered structure consisting of one EDC in combination with some smaller local warehouses, ‘merge in transit’ concepts or ‘cross docking’ facilities offers the best results for many companies in terms of high level of service, frequency of delivery and distribution cost control. Companies today often opt for a hybrid distribution structure of centralized and local distribution facilities. For instance, they use an EDC for medium- and slow-moving products and RDCs for fast-moving products. These RDCs typically function as rapid fulfillment centres rather than holding inventories. The classical or multi-country distribution structures are being replaced by merge-in-transit, cross-docking or other fluid logistics structures actively linked with inland ports. At present, the majority of EDCs is still opting for a location in the Benelux region or northern France, but more and more regions are vying for a position as attractive location for RDCs and potentially EDCs.

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% of its merchandise using a cross-docking system. This structure takes advantage of the massification of shipment along long distance rail corridors and a decomposition of shipments at a regional warehouse / cross-docking facility servicing an array of stores within daily trucking services. This retailing structure is more dominant in North America, although Europe has also several large players (e.g. Carrefour) but tends to involve more locally-based companies (cultural market differentiation).

Customization is also an important aspect where different regionalisms impact freight distribution. Since Europe is a grouping of different cultures, implying a variety of tastes, preferences and languages, it leads to a higher need for customization for each specific market. Some added value customization functions (labeling, power supplies, manuals, etc.) must thus be performed in proximity of final markets (distribution centers) as market fragmentation renders source-based (factory) prohibitive for many ranges of goods (e.g. a change from ISO-pallet to a Europallet or a change in packaging to meet local tastes and language).

The North American market is much more homogenous culturally (or at least linguistically) so there is less culture-based customization, so the matter resides in distributional efficiencies. Customization can thus be performed at the source (e.g. Chinese free trade zone) or in the early stages of the supply chain. For instance, for a variety of consumption goods such as

shoes, price ticketing is even done in China as the last step of the production process before being shipping to North American distribution centers. For European markets, the customization at the source (China) is also a growing business, but it primarily involves more generic products.

4.2. Labor flexibility and mobility

The North American and European labor markets have fundamental differences impacting logistical activities. In terms of labor mobility, while it is more limited in Europe in spite of very few restrictions within the European Union, it is much less so in North America. In Europe lower labor flexibility is mainly attributed to labor laws (hiring and laying of, flexible working hours and the impact of labour unions) and trans-regional language barriers. The United States, particularly, is traditionally characterized by a more flexible and mobile labor market where migration tends to alleviate disequilibrium in terms of labor surplus and shortages. In Europe, labor shortages in one region will not easily be solved by labor migration, which may undermine the future development of some logistical clusters. These clusters are dominantly the outcome of different agglomeration economies and policies setting large gateway regions, many of which are within a definite nation (e.g. Rotterdam and Antwerp). If those gateways were to decline in regard to existing or new gateways, it would be difficult to relocate labor and transfer expertise, while in North America this process would be much more straightforward.

Labour costs remain a significant cost in freight distribution. In spite of containerization, labour costs still represent a major share in total terminal operating costs (about 40 to 60% of total operating costs of container terminals). Labour costs in trucking represent about 25% of transport costs in the US. In Western Europe the relative share of truck driver costs typically

ranges between 30 and 35%, but it has been affected a lot by recent fluctuations in diesel prices. Other significant cost components include fuel costs and amortization. Both in Europe and North America cheap labour is being brought in to lower the cost structure in the trucking industry: Mexican drivers in North America and Romanian, Czech and Polish drivers in Europe. Guihéry (2008) reports that the wages associated with one driving hour amount to 28.4 euro for France, 28.8 euro for the Netherlands, 25.9 euro for the western part of Germany, 15.4 euro for the eastern part of Germany and only 10 euro for Poland. The gap is not only the result of the absolute wage differences. It is also associated with the weekly working time and the ratio between driving time and working time. In the European barge industry, labour costs are being affected by stricter social regulation for family-run barges (e.g. when husband and wife operate the same vessel in shifts they both need to be registered as official employees) and a growing shortage of experienced skippers.

In both US/Canada and Europe there is an increased interest in measuring labour productivity and performance and in upgrading education and training in the logistics area. The logistics industry in the United States provides a lot of jobs for people with a lower educational level to execute low-end logistics activities (such as transloading, packaging, labeling, sorting, order picking, etc.). Most of the training is done in-house. European distribution centres typically also provide higher-end value-added logistics linked to the ‘customizing’ and ‘localizing’ of the import products to meet local market requirements. This poses specific requirements on the educational system.

5. Conclusion

Gateway logistics evolve continuously as a result of influences and factors such as the globalization and expansion into new markets, logistics outsourcing and integration,

containerization and advances in information technologies. Service expectations of customers are moving towards a push for higher flexibility and reliability. As a result international supply chains have become complex and the pressure on gateway logistics is increasing, not just in terms of infrastructure and capacity, but in more efficient regional freight distribution strategies. Most market players have responded by providing new value-added services in an integrated package, through a vertical integration along the supply chain. Entire freight distribution systems including gateways, corridors and inland centres are adapting to the new realities. In spite of powerful converging forces, namely containerization, information technologies and globalization, geographical, political and cultural characteristics tend to convey a significant regionalism to freight distribution.

Table 1: A schematic comparison of gateway logistics in North America and Europe

	North America	Western Europe	Trend
Gateways – location and function	Near major markets	Coastal gateways linked to logistical platforms. Combination of gateway and transhipment function. Some 'pure' transhipment hubs	In general status quo Convergence at level of logistical platforms: increased development of inland logistical platforms in North America
Gateway system	Concentrated Concentration level increasing Limited number of gateways	Fairly concentrated Concentration level slightly decreasing More gateways and entry of new gateway regions	Divergence in concentration level Future EU concentration level partly subject to policy debate on infrastructure / corridor development.
Corridors	Long distance rail	Short and medium distance barge and truck. Medium-distance rail	Some convergence, but no 'double stack' and landbridges in EU
Hinterlands	Economies of scale at terminals Large hinterlands both for gateways and inland ports	Economies of scale at gateways. Inland ports more constrained (thus more of them)	Convergence (more contested hinterlands, inland ports) Convergence hindered by ownership regulations (cf. EU: split between infrastructure/operations)
Regulation	Paradigm shift ('big bang' approach)	Incremental	Status quo, but both increasingly incremental (cf. impact of NAFTA and more EU Member States)
Governance	Private ownership and operations	Public ownership	Convergence towards PPPs Reassessment of facilitating role

	Low impact of administrative borders	Private operations Higher impact of administrative borders in gateway logistics development	of governments in gateway logistics Increased cross-border initiatives in Europe (?)
Value Chains	Distributional efficiencies Low-end value-added logistics in distribution centres	Customization Low-end and high-end value-added logistics in distribution centres	Status quo Joint threat of some value-added logistics moving to source (e.g. China)
Labor	More flexible and mobile	Less flexible and mobile	Some convergence, but slow process in EU

Table 1 summarizes the outcomes on the comparative analysis of North American and European gateway logistics. In many fields, regionalism is expressed by different logistical practices relying on various modes and terminals and providing added value. It has become highly relevant to assess to what extent existing practices in both regions are converging, or alternatively, diverging. Evidence underlines that although there is a convergence in terms of the setting of a hinterland logistics based on a higher level of integration between gateways and inland ports, North American and European gateway logistics will likely remain significantly differentiated by regionalism. Among the most significant elements of this regionalism the function and operation of freight corridors is salient. North American rail densities (double stack and multiple tracks) and governance (ownership of right of way and terminals) are unlikely to be achieved in Europe, at least on the medium term. The corresponding observation also applies to barge shipping where there is limited potential in North America, but a well developed system in parts of Western Europe. This results in different massification strategies within the setting of large inland port complexes in North America that involve co-located rail terminals and logistics zones (e.g. Kansas City, Chicago, Columbus). In Europe, massification is operated at a lower level, which involves more dispersed and numerous inland ports. The relative cultural and linguistic homogeneity of North America, as opposed to the complex landscape of Europe is also likely to be an enduring factor in retailing logistics, anchoring customization around gateways.

This paper does not claim to provide a comprehensive and detailed view on all aspects of regionalism in gateway logistics. There is scope for further research in the area, namely the impact of regionalism on the relevance of performance measurement and benchmarking. Setting up measurement systems for the logistics performance of gateways, corridors or even entire freight distribution systems is useful, but regional differences have to be considered when benchmarking key performance indicators across regions. A more detailed investigation of the linkages between regionalism and comparability in assessing gateway logistics performance goes beyond the scope of this paper. There are also a variety of factors that have not been covered specifically and that could provide a richer picture of the comparative regionalism of freight distribution. They include agility (to what extent is the system able to adapt to changes in the logistics environment), reliability (e.g. to what extent do gateway logistics practices guarantee on time deliveries), vulnerability (e.g. to what extent is the gateway logistics system sensitive to a disruption in one of the gateways or corridors), time, as well as environmental regulations.

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