Challenges to North American Intermodal Rail Transportation

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North American Intermodal Rail

I refer to the rail system as North American, as opposed to Canadian or American, because it is an integrated system where the border is more a line than anything else. Although it would be an overstatement to say that the border does not matter, but what constitutes international trade (Canada/US) by rail is usually cargo carried within the same railway across its own system (Canadian National or Canadian Pacific).

The development of a high capacity integrated North American rail transport system is the outcome of a long history of expansion, capital investment, and more recently rationalization and technological changes. Attempts have been made to synchronize the interactions between large Class I rail operators for long distance trade with the setting of intermodal unit trains and transmodalism (interlining). Chicago is the largest interlining center in North America, a location at the junction of the Eastern, Western and Canadian rail systems.
With the setting of NAFTA in 1994 rail mergers resulted in the involvement of Canadian and American operators offering cross-border services. Canadian National and Canadian Pacific acquired lines in the United States enabling better connections with the Chicago hub as well as with New Orleans when CN purchased the Illinois Central Railroad in 1998. This underlines that CN is the only rail carrier in North America that has a tri-coastal strategy. In 1998 Kansas City Southern purchased Transportación Ferroviaria Mexicana to form Kansas City Southern de México, which links the port of Lazaro Cardenas to Kansas City and passes through the main economic centers of Mexico (Mexico City, Monterrey).

An Horizontal Past, A Vertical Future

Almost 25 years after NAFTA, the North American rail system is heading in two directions, one which is more reflective of the past and the other more reflective of the future:

- As mentioned earlier, mergers and acquisitions (horizontal integration) have been an ongoing characteristic of rail network development for the last century. It is however difficult to see further developments. Mergers between large carriers are unlikely to take place in the future because of monopolistic regulations, but several short line networks are subject to further forms of consolidation. The focus is now more on transmodalism (interlining, interface) with arrangements made between rail carriers to improve the interlining connectivity between major
networks. This is particularly a challenge in the United States and less so for Canadian railways due to their coverage and the configuration of their networks.

- The ongoing vertical integration of rail shows potential. Improved on-dock and near dock facilities have helped cope with the double pressures of maritime traffic growth and larger containerships. Railways have been actively involved in the setting of inland ports and logistics zones adjacent to their intermodal terminals, which has been another important development of the integration across modes. This is helping anchor their customer base and support regional development. Canada’s Gateways and Trade Corridors strategy put in place a decade ago recognized this paradigm of ongoing vertical integration. The process is now going even further with what can be called "digital intermodalism", enabling a closer integration of the large amounts of information that customers, carriers and authorities need to use and share to ensure effective intermodalism.

![Figure 2 The North American Intermodal Transport System](image-url)
Challenges to Intermodal Rail Supply Chains

In spite of these positive developments, rail transportation is facing several ongoing challenges, which the renewed Canada Transportation Act (CTA) is partially addressing.

The first that comes to mind is the amendment concerning the repositioning of empty containers allowing carriers irrespective of their flag to move empty containers between any Canadian ports, which is not permitted in the United States. Empty containers are an enduring issue in maritime shipping and this amendment would thus enable to improve the effective use of this assets, a benefit for both the carriers and traders. In my opinion, this is likely to impact more the west coast, enabling Vancouver and Prince Rupert (both exporters of empties) to further consolidate their roles of gateways to the North American market.

There are provisions in the CTA for railways to provide more information about their rates, service and performance. As an academic I can underline that it is difficult to have information about rail transportation, which limits research opportunities (I tend to focus my attention elsewhere because of that). The argument that I have often been told by the railways is that they are private entities and providing information could be a competitive risk, even if most of the time their competitors are well aware of their operations. This is therefore a welcomed development helping researchers provide better empirical analysis of the system, which indirectly will benefit railways.

Irrespective of the amendments, there are several drivers impacting the industry that the CTA cannot effectively address. The CTA looks like fine tuning an internal combustion engine while the technology is moving to hybrids. The outcome is more efficient but likely less than expected. The first disruptive change that comes to mind is the scaling up of maritime shipping because of larger containerships, which has pressured port operations and consequently railways to cope with higher volumes and lower frequencies of port calls. There are now large imbalances between the port and rail systems of the Canadian East and West coasts, not just because of larger volumes on the West coast, but because West coast ports have experienced a growth in ship size calls while East coast ports, particularly Montreal, have not. The exception is Halifax, but the port has been facing for many years a stable traffic. The expansion of the Panama Canal in 2016 is adding uncertainties since Montreal, a strategic rail hub, cannot handle post-panamax ships.

Intermodal transportation has a good propensity for automation, a trend that has been ongoing in the industry for many years, particularly for container ports. This trend is now diffusing to rail terminals, with automated gate access among the most promising. This will eventually lead to the adoption of semi-automated or fully automated widespan gantry cranes with network-wide upgrade of terminal facilities. We can even see automated drayage vehicles on the horizon. While the benefits of automation are difficult to assess in terms of capacity and efficiency, they consistently require less labor, which can be a controversial issue in an industry that is highly unionized and regulated.

In spite of the benefits of intermodal transport systems, processing and managing documentation can be burdensome. Therefore, an important component in improving the efficiency of intermodal transportation resides on its transactional dimensions; the setting of digital intermodalism. For instance, there has been recently a lot of attention put on the blockchain technology, which is a distributed electronic ledger. It could improve the transactional effectiveness of intermodal transportation both
from managerial (e.g. bill of lading), tracking (sensors) and settlement dimensions. Once the hype has been cleared, the true impacts of such digital technologies are likely to be felt across the industry.

Last and not least, NIMBY-ism about transportation infrastructures and operations is becoming close to pathological with disconnects between the perception of the population and the reality that carriers, terminal operators and logistics service providers deal with. It is becoming close to impossible to undertake transport infrastructure projects in North America without substantial opposition and undue delays. Residents see the congestion, hear the noise, smell the fumes, fear for their safety but have difficulties connecting these constraints (at times exaggerated and even invented) with the essential economic activities that transportation systems are supporting. They see store shelves full of goods, but do not understand how these goods are provided. Because of this cognitive dissonance projects are seen as high costs / no benefits endeavors in spite of notable efforts made by the industry to underline their economic importance and environmental compliance through trade groups such as the Railway Association of Canada.

For additional information:
- Rail transportation. https://transportgeography.org/?page_id=1759
- Rail Terminals. https://transportgeography.org/?page_id=3601
- Gateways and Transport Corridors in North America. https://transportgeography.org/?page_id=7652
- Inland Ports. https://transportgeography.org/?page_id=8139