Chartered Institute of Logistics and Transport

Trade/FDI and Transport

November 16, 2015

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Transportation and Economic Analysis
Transport Canada
Moving from gateway to a multimodal transportation and supply chain analytical framework

Stage 1: Canada’s gateway’s and corridor’s (2008)
- Monitoring of the transportation system – end to end approach
  - Fluidity indicators (exports and imports)
  - Port utilization indicators

Stage 2: Borders traffic – 15 strategic border points
- Measuring wait-times of trucks and its economic impact

Stage 3: Multimodal transportation and supply chain framework
- Demand and supply of transportation system (performance, utilization of the system)
- Multimodal
- Outlook/forecast
Transport analysis framework to support evidence-based decisions

What are the objectives?
- Provide authoritative and neutral information on transportation system issues
- Strengthen the evidence-based analysis on transportation issues, complemented with validation
- Increase transparency by reducing information asymmetry among the different stakeholders

What is required?

Data
- Demand data
- Supply data
- Current/future data
- National/Regional/Corridor/Modes data

Data analytics
- Monitor economic/transportation for key supply chains
- Forecast demand of transport and capacity pressures

Validation and engagement
- Within the Federal Government (e.g. Agriculture Canada, International Trade, NRCan, Industry Canada)
- Outside the Government including industries, provinces, and international (e.g. U.S. and Mexico)

Sharing and reporting
- Working through a number of forums to promote data cooperation
- Report on performance, capacity and transportation outlook
Policy Questions

System Analysis related to international trade: Utilization
• What is the modal flow of key commodities in a multimodal supply chain context?
• What is the current and projected system utilization of the multimodal transportation system?

System Analysis related to international trade: Performance
• Has the performance of Canada’s supply chains’ components improved or deteriorated over time?
• Supply chain performances for various commodities?
• Are there predictable trends in performance leading to potential bottlenecks?

Providing a diagnostics and advice on the Health of the Transportation System in an oversight capacity and Foreign Direct Investment context
Stakeholder Interests & Concerns

The framework is an attempt to address the following questions:

• What are the roles of each component of the transportation system on key commodity supply chains?
• What is the supply chain performance of respective sectors?
• What are the impacts on system utilization and performance, as a result of changes in key commodities’ demand?
• What are the impacts of a surge in one particular commodity on the transportation system and on the performance of the other commodities?
• What is the health of our transportation system?
International Trade
Performance and Outlook
## Canadian Export and Import Values (Millions Current $) Selected Countries

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>% of total</th>
<th>2014</th>
<th>% of total</th>
<th>Jan - June 2015</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exports</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>United States</td>
<td>299,075</td>
<td>74.9%</td>
<td>403,084</td>
<td>76.8%</td>
<td>196,723</td>
<td>76.8%</td>
</tr>
<tr>
<td>European Union</td>
<td>34,513</td>
<td>8.6%</td>
<td>38,772</td>
<td>7.4%</td>
<td>18,729</td>
<td>7.3%</td>
</tr>
<tr>
<td>China, P. Rep.</td>
<td>13,232</td>
<td>3.3%</td>
<td>19,388</td>
<td>3.7%</td>
<td>9,704</td>
<td>3.8%</td>
</tr>
<tr>
<td>Japan</td>
<td>9,195</td>
<td>2.3%</td>
<td>10,739</td>
<td>2.0%</td>
<td>4,689</td>
<td>1.8%</td>
</tr>
<tr>
<td>Mexico</td>
<td>5,008</td>
<td>1.3%</td>
<td>5,509</td>
<td>1.0%</td>
<td>3,015</td>
<td>1.2%</td>
</tr>
<tr>
<td>Brazil</td>
<td>2,563</td>
<td>0.6%</td>
<td>2,176</td>
<td>0.4%</td>
<td>1,189</td>
<td>0.5%</td>
</tr>
<tr>
<td>India</td>
<td>2,059</td>
<td>0.5%</td>
<td>3,225</td>
<td>0.6%</td>
<td>1,514</td>
<td>0.6%</td>
</tr>
<tr>
<td>Russia</td>
<td>1,190</td>
<td>0.3%</td>
<td>1,241</td>
<td>0.2%</td>
<td>238</td>
<td>0.1%</td>
</tr>
<tr>
<td>Other Countries</td>
<td>32,464</td>
<td>8.1%</td>
<td>40,893</td>
<td>7.8%</td>
<td>20,293</td>
<td>7.9%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>399,300</strong></td>
<td><strong>8.1%</strong></td>
<td><strong>525,027</strong></td>
<td><strong>7.8%</strong></td>
<td><strong>256,094</strong></td>
<td><strong>7.9%</strong></td>
</tr>
<tr>
<td><strong>Imports</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>United States</td>
<td>250,814</td>
<td>62.1%</td>
<td>278,050</td>
<td>54.3%</td>
<td>142,589</td>
<td>53.9%</td>
</tr>
<tr>
<td>European Union</td>
<td>40,500</td>
<td>10.0%</td>
<td>57,806</td>
<td>11.3%</td>
<td>30,583</td>
<td>11.6%</td>
</tr>
<tr>
<td>China, P. Rep.</td>
<td>26,190</td>
<td>6.5%</td>
<td>58,659</td>
<td>11.5%</td>
<td>30,255</td>
<td>11.4%</td>
</tr>
<tr>
<td>Mexico</td>
<td>13,881</td>
<td>3.4%</td>
<td>28,832</td>
<td>5.6%</td>
<td>15,273</td>
<td>5.8%</td>
</tr>
<tr>
<td>Japan</td>
<td>10,042</td>
<td>2.5%</td>
<td>13,295</td>
<td>2.6%</td>
<td>7,624</td>
<td>2.9%</td>
</tr>
<tr>
<td>Russia</td>
<td>2,765</td>
<td>0.7%</td>
<td>726</td>
<td>0.1%</td>
<td>530</td>
<td>0.2%</td>
</tr>
<tr>
<td>Brazil</td>
<td>2,484</td>
<td>0.6%</td>
<td>3,466</td>
<td>0.7%</td>
<td>1,711</td>
<td>0.6%</td>
</tr>
<tr>
<td>India</td>
<td>1,615</td>
<td>0.4%</td>
<td>3,182</td>
<td>0.6%</td>
<td>1,903</td>
<td>0.7%</td>
</tr>
<tr>
<td>Other Countries</td>
<td>55,459</td>
<td>13.7%</td>
<td>67,609</td>
<td>13.2%</td>
<td>264,439</td>
<td>12.8%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>403,750</strong></td>
<td><strong>13.7%</strong></td>
<td><strong>511,625</strong></td>
<td><strong>13.2%</strong></td>
<td><strong>264,439</strong></td>
<td><strong>12.8%</strong></td>
</tr>
</tbody>
</table>

Source: Statistics Canada
Emerging international and domestic trends will create challenges and pressures for the Canadian transportation system.

- **Changing demographics** and **urbanization** leading to growing urban congestion.
- **Shifting economic activity, trade and transportation patterns**, e.g., busiest world’s ports located in Asia, mega-ships/caller alliances, Panama Canal and Suez Canal expansion, etc.
- Commitments to **reduce environmental footprint** and address **Changing climate**.
- **Greater scrutiny on transportation safety and security**.
- **Accelerated pace of technological innovation**.
- **Unique transportation and infrastructure challenges in the North**.
The global economy will grow at a slower pace over the short term.

- The OECD revised its World economic outlook downward for the third time in September 2015 (3% from 3.7% in November 2014):
  - The outlook for China is now 6.7%, down from 7.1% in November 2014
  - Canada is expected to grow 1.1%, down from 2.5% in November 2014

- The slowdown of the economy in the short run will negatively impact demand for Canadian coal and crude oil:
  - However, demand for potash and wood products should record strong demand

- Mitigated growth prospects in the short term will ease pressure on the transportation system and create favourable conditions for planning and investments

Source: OECD Economic Outlook June 2015 and June 2015 and OECD Interim Economic Outlook, September 2015
World economic activity will grow in the 3% range annually over the next 10 years.

Emerging markets will remain the main poles of growth and drive world commodity demand:
- China’s share of global GDP will reach 21% in 2025, outsizing the United States as the biggest economy in the world.
- However, China will be outperformed by India between 2020 and 2025.

Despite the short-term slowdown, emerging markets will post the fastest growth to 2025.
- **U.S. Midwest:** growth barometer and one of North America’s largest container markets
- **Shift in traffic to this region** from North American East Coast & Gulf to West Coast ports
- **This shift** was mostly due to 67% of U.S. Midwest-destined containers coming from East Asia in 2013, vs. 58% in 2004
- **Most growth at Canadian ports** of Vancouver and Prince Rupert, while East Coast Canadian ports lost significant market share

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**Major destination in North America**

**Inbound Laden TEUs to U.S. Midwest by Port of Unload**

<table>
<thead>
<tr>
<th>Year</th>
<th>Port of Unload</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>US West Coast: 57%</td>
</tr>
<tr>
<td>2013</td>
<td>US West Coast: 51%</td>
</tr>
</tbody>
</table>

**Inbound Laden TEUs to U.S. Midwest by Port of Load Country**

<table>
<thead>
<tr>
<th>Year</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>China: 27%</td>
</tr>
<tr>
<td>2013</td>
<td>China: 44%</td>
</tr>
</tbody>
</table>

Source: U.S. customs data; Canadian customs data; Canadian Port Authorities
International Trade and Competitiveness
Higher logistics costs make goods more expensive, thereby reducing a country’s competitiveness and increasing the cost of consumer goods.

Canada’s logistics costs comprise about 9% of GDP, which is lower than developing countries but higher than both the U.S. and Japan.

<table>
<thead>
<tr>
<th>Exports</th>
<th>2014 GDP (Millions of current USD)</th>
<th>Logistics (GDP %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>European Union</td>
<td>18,114</td>
<td>9.2%</td>
</tr>
<tr>
<td>United States</td>
<td>17,420</td>
<td>8.2%</td>
</tr>
<tr>
<td>China, P. Rep.</td>
<td>10,360</td>
<td>18.0%</td>
</tr>
<tr>
<td>Japan</td>
<td>4,770</td>
<td>8.5%</td>
</tr>
<tr>
<td>Brazil</td>
<td>2,244</td>
<td>11.6%</td>
</tr>
<tr>
<td>India</td>
<td>2,048</td>
<td>13.0%</td>
</tr>
<tr>
<td><strong>Canada</strong></td>
<td><strong>1,794</strong></td>
<td><strong>9.0%</strong></td>
</tr>
<tr>
<td>Mexico</td>
<td>1,296</td>
<td>12.0%</td>
</tr>
<tr>
<td><strong>TOTAL – all countries</strong></td>
<td><strong>78,220</strong></td>
<td><strong>11.7%</strong></td>
</tr>
</tbody>
</table>

The World Bank’s Logistics Performance Index is a benchmarking tool to help countries identify challenges and opportunities in trade logistics and performance.

As of 2014, the LPI compared 160 countries based on a worldwide survey of global freight forwarders and express carriers.

Canada’s overall LPI ranked 12th best in the world in 2014, down slightly from 10th in 2007, but up from 14th in 2010.
Canada’s Maritime Trade Connectivity

A high transport connectivity provides a competitive advantage in the global market

Liner shipping connectivity index rankings

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Singapore</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>China, Hong Kong SAR</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Korea, Republic of</td>
<td>9</td>
<td>10</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Malaysia</td>
<td>12</td>
<td>6</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Germany</td>
<td>7</td>
<td>4</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>United States</td>
<td>3</td>
<td>9</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Netherlands</td>
<td>5</td>
<td>5</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>6</td>
<td>7</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Belgium</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Canada</td>
<td>17</td>
<td>22</td>
<td>34</td>
<td>35</td>
</tr>
</tbody>
</table>

Source: United Nations Conference on Trade and Development

However, Canada’s liner connectivity has been deteriorating over the past decade and now ranks 35th in the world

- Countries such as Denmark, Poland, Sweden, and Vietnam now surpass Canada

Possible factors behind this deterioration include:

- A decrease in the number of shipping lines offering services to/from Canada
- Low global market share of import/export; and
- Small volumes
Toronto Pearson International Airport’s top six countries by air cargo capacity are routinely over 65% of total capacity.

- The top 5 destination countries are stable, with China’s capacity nearing Germany’s.

### Toronto Pearson International Airport - Air Cargo Capacity by Country

<table>
<thead>
<tr>
<th>Destination Country</th>
<th>Cargo Capacity per week (tonnes)</th>
<th>Proportion of Total Capacity (%)</th>
<th>Destination Country</th>
<th>Cargo Capacity per week (tonnes)</th>
<th>Proportion of Total Capacity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>3196</td>
<td>28%</td>
<td>Canada</td>
<td>3617</td>
<td>29%</td>
</tr>
<tr>
<td>United States</td>
<td>2500</td>
<td>22%</td>
<td>United States</td>
<td>2075</td>
<td>16%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>712</td>
<td>6%</td>
<td>United Kingdom</td>
<td>1096</td>
<td>9%</td>
</tr>
<tr>
<td>Germany</td>
<td>511</td>
<td>5%</td>
<td>Germany</td>
<td>590</td>
<td>5%</td>
</tr>
<tr>
<td>China</td>
<td>472</td>
<td>4%</td>
<td>China</td>
<td>577</td>
<td>5%</td>
</tr>
<tr>
<td>Italy</td>
<td>378</td>
<td>3%</td>
<td></td>
<td>444</td>
<td>4%</td>
</tr>
</tbody>
</table>

Results

Current Performance and Productivity
2014 System Utilization*

Content suppressed due to confidentiality.
2014 Commodity Utilization Rate\(^1\)
Intermodal (Container)

Legend

- CN & CP Rail Network
- Commodity Utilization - Intermodal Container
  - < 1%
  - 1% - 10%
  - 10% - 25%
  - 25% - 50%
  - > 50%

\(^1\) Based on number of rail cars
The rail system could be facing near term and medium term constraints in these areas – depending on commodity surges/growth. Further validation and refinement of methodologies and assumptions will improve our understanding of rail operations and related issues in these areas.
## Container Scorecard

### Volume

<table>
<thead>
<tr>
<th>Indicator</th>
<th>August 2015</th>
<th>YTD 2015</th>
<th>August 2014</th>
<th>YTD 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly Volume - TEU</td>
<td>133,087</td>
<td>988,538</td>
<td>119,450</td>
<td>941,589</td>
</tr>
<tr>
<td>Number of vessel calls – container ships only</td>
<td>41</td>
<td>299</td>
<td>34</td>
<td>316</td>
</tr>
</tbody>
</table>

### Performance August 2015

**Volume August 2015 / August 2014 = 11.4%**

**YTD August 2015 / August 2014 = 5.0%**

Note: All KPIs now include temporary operations at Viau as of April 2015.
Challenges

Challenge example: Intermodal pressure points

- Intermodal transfers are now pressure points for freight transportation:
  - Low coordination, information-sharing between modes and within supply chains
  - Ports impacted, as marine vessels, terminals, railways and trucks all intersect; urban rail yards also challenged

When average container dwell times are above 3 days, this is usually an indication of operational inefficiencies somewhere in the supply chain
Container Terminal Capacity Utilization

Source: Transport Canada and Port of Prince Rupert
Performance

Competitiveness

Total Transit Time: Shanghai to Chicago
Supply Chain 1: Via Various Ports

Days

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
2012

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
2013

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
2014

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
2015

Los Angeles/Long Beach
PMV
Prince Rupert
Seattle/Tacoma
2014 Commodity Utilization Rate\(^1\)

Grain

Legend

CN & CP Rail Network

Commodity Utilization - Grain

- < 1%
- 1% - 10%
- 10% - 25%
- 25% - 50%
- > 50%

\(^1\) Based on number of rail cars
GRAIN SUPPLY CHAIN PERFORMANCE METRICS

September 15, 2015

Chart 1: Port Metro Vancouver Grain Vessel Waiting and Loading Time

Chart 2: PMV Grain Vessel Waiting off Gulf Islands

Chart 3: Port Metro Vancouver Grain Vessel Loading

Chart 4: Wheat Vessel Voyage Charter Freight Rates

Chart 5: PMV Grain Vessel Berth Visits 2014-2015 Crop Year

Chart 6: Port Metro Vancouver Rail Unloads - 2014-2015

Chart 7: Grain Stocks and Total to Move at Prairie Elevators - 2014-2015

Chart 8: Grain Shipments at Prairie Elevators - 2014-2015

Chart 9: Western Grain Rail Movements

Monthly updates as of September 15, 2015
Great Lakes – St. Lawrence Seaway Grain Terminals

Sources: Transport Canada, Canadian Coast Guard Innav Data, Canadian Grain Commission, Toledo Port Authority, Duluth Seaway Port Authority
Though depending on the border, overall truck crossings increased by 3.1% from 2014 to 2010.

- The 95th percentile (i.e. 95% of trucks wait less than this) is often considered to be a good measure of the average wait time during congested periods.
- Border crossings to the U.S. are generally fluid; only 5% of trucks wait more than 30 or 40 minutes.
Border crossing times to the U.S. are generally very fluid; only 5% of trucks wait more than 30 or 40 minutes.
Northern Canada Infrastructure
Transport Canada is looking forward to further enhance its evidence-base capability

- Continue developing an understanding of the challenges and opportunities of supply chains to provide solid information to the policy process
- Continue engaging with industry, provincial, and federal stakeholder for the validation of the information
- Strengthening TC’s forecasting and scenario development capacity
- The urban issue will likely become a focus and a challenge
  - Positioning of the freight questions in a system approach
- What we found thus far:
  - Each transportation mode performs well on an individual basis
  - Efficiency and performance issues are more challenging in an intermodal context – when freight is transferred between modes and often in an urban environment
  - Issues, such as coordination among modes, visibility of supply chains, and infrastructure challenges are often raised
  - Issues often most apparent at ports, where vessels, port terminals, railways and trucks all intersect
  - Need to define the first-mile/last-mile concept in a Canadian context