

Study of Southern Alberta for Import and Export Opportunities Through West Coast Ports

Southern Alberta is a natural transportation and agriculture hub. This research highlights opportunity to grow and develop exports and key segments of the supply chain required to enable goods movement.



THE VAN HORNE INSTITUTE

In Collaboration
With:



JRSB
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Automotive
Distribution Centre
in Calgary Region

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Introduction

The automotive industry is a complex high value global market comprised of both finished vehicles and vehicle parts. This report aims to provide an understanding of automotive movements, both current and potential, from Asia to the North American market (Canada, USA and Mexico) and trade within the North American market. This report will detail the opportunities for the movement of automobiles and vehicle parts into the Calgary Region Inland Port market through the west coast ports.

The following factors are covered in detail:

- Overview of the automotive market as a whole
- Canada's automotive movement
- Summary of the automotive supply chain
- Automotive movement from the west coast by means of:
 - Ports
 - Rail
 - Trucks
- Movement of vehicle parts within North America
- Competitive analysis of points of entry to North American Market
- Opportunities for market growth

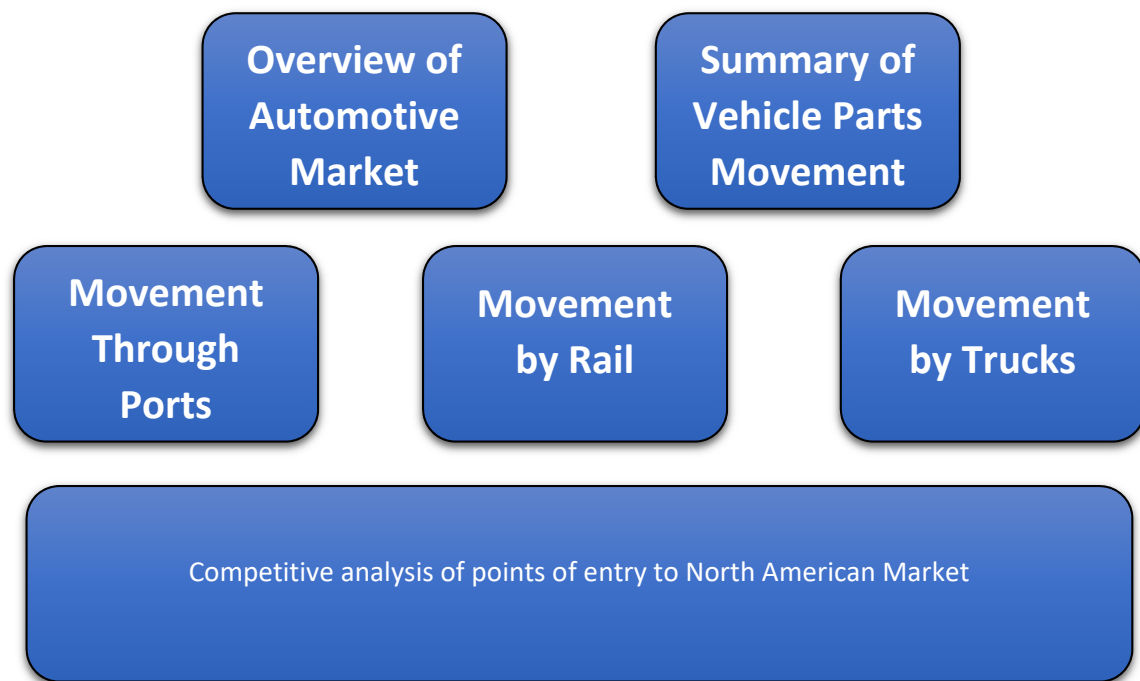


Figure 1: Report Overview

Overview of World Automotive Market

The automotive market worldwide achieved sales of nearly 73 million vehicles in 2015 (approximately \$9 trillion in value) across a global market covering every continent through an interconnected supply chain for both vehicles and vehicle parts.¹ For many countries, vehicle manufacturing makes up a significant portion of economic activity and is projected to employ approximately nine million people worldwide with each job creating five indirect associated jobs.² The automotive market is considered to be highly cyclical and fluctuations create difficulties when planning/forecasting operations. Historically Japan, South Korea, and Germany have led the market distributing vehicles globally. The largest automotive manufacturing and exporting countries 2011-2014 are detailed in the table below:

GLOBAL TOP VEHICLE PRODUCERS				
	2011	2012	2013	2014
1	China	China	China	China
2	USA	USA	USA	USA
3	Japan	Japan	Japan	Japan
4	Germany	Germany	Germany	Germany
5	South Korea	South Korea	South Korea	South Korea
6	India	India	India	India
7	Brazil	Brazil	Brazil	Mexico
8	Mexico	Mexico	Mexico	Brazil
9	Spain	Thailand	Thailand	Spain
10	France	Canada	Canada	Canada
GLOBAL TOP VEHICLE EXPORTERS				
	2011	2012	2013	2014
1	Germany	Japan	Japan	Germany
2	Japan	Germany	Germany	Japan
3	South Korea	South Korea	South Korea	South Korea
4	Spain	Mexico	Mexico	Mexico
5	Mexico	Canada	USA	USA
6	Canada	USA	Canada	Spain
7	USA	Spain	Spain	Canada
8	France	France	France	France
9	England	England	England	England
10	Czech Republic	Czech Republic	Czech Republic	Czech Republic

Figure 2: Global Vehicle Producers/Exporters ³

¹ <http://www.ibisworld.com/industry/global/global-car-automobile-sales.html>

² <http://www.oica.net/category/economic-contributions/>

³ <http://www.promexico.mx/en/mx/sectores>

Vehicles Parts Overview

Comprised of original equipment and aftermarket suppliers and with an estimated \$2 trillion in global value⁴, the vehicle parts industry is a key piece of the automotive industry. Demand for vehicle parts has been maintained by continuous growth in new vehicle sales as approximately two-thirds of automotive parts manufactured are original equipment.⁶ This substantial link between vehicle production and vehicle parts production draws suppliers closer to manufacturing facilities and large population markets. In 2016, the United States International Trade Administration ranked Canada as first and Mexico second for vehicle parts based on vehicle sales, imports/exports, and openness to trade.⁵ Market share in vehicle parts production is widespread with many small suppliers holding a small portion. The top four suppliers account for an estimated 5.1% of the industry with the top 75 firms accounting for 43.3%.⁵

Canadian Automotive Market

Vehicles and parts production are a key driver of economic activity in Canada making up approximately 8% of GDP⁶. Overall, Canadian auto sales have trended upwards while production has trended downwards. The increase in sales is due to population growth and beneficial buying conditions in Canada including ease of financing and stable debt-to-income ratio.⁷ Completed automobile production decreases are primarily caused by increased costs of production and labour in Canada. Conversely, vehicles parts manufacturing in Canada has remained strong and is anticipated to grow as vehicle technology complexity (automation/connectivity) continues to develop. Canada has a highly skilled workforce which will allow this country to remain competitive in the production of increasingly technical automobiles and auto parts.

On a provincial level, Ontario, British Columbia and Quebec lead vehicle sales growth with Alberta and Saskatchewan sales declined over the last two years attributable to the economic slowdown due to reduced oil prices. Total vehicle sales per province vary greatly and are detailed in the graph below, adjusted for population with an estimated vehicle growth of \$31,000:⁸

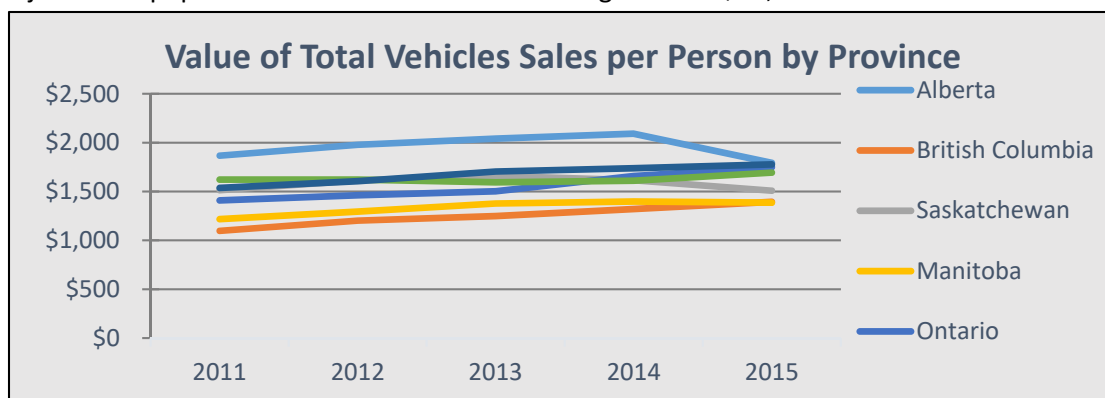


Figure 3: Canadian Vehicle Sales Value by Province

⁴ <http://www.ibisworld.com/industry/global/global-auto-parts-accessories-manufacturing.html>

⁵ http://trade.gov/topmarkets/pdf/autoparts_Top_Markets_Report.pdf

⁶ <https://aprc.mcmaster.ca/sites/default/files/pubs/sweeney-industry-profile-min-1.pdf>

⁷ https://www.td.com/document/PDF/economics/special/CanadianAutoSales_2016.pdf

⁸ <https://www.ic.gc.ca/app/scr/tdst/tdo/crtr.html>

Canadians spend approximately the same per person on vehicles, however the total expenditure per province is higher in Ontario and Quebec where the population base is much denser. The graph below shows the total sales (2015) in select provinces:

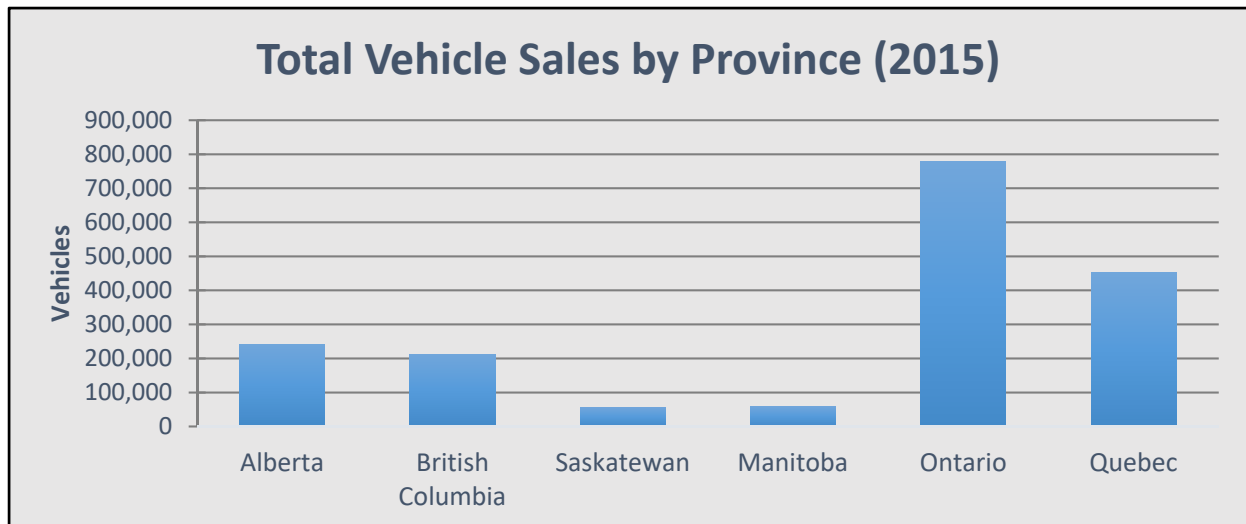


Figure 4: Total Vehicle Sales by Province (2015)

In the Canadian market, Japanese and South Korean manufacturers combined shared an estimated 61%.⁹ The graph below displays the sales of automobiles in Canada Jan to Oct 2016 by manufacturer:¹⁰

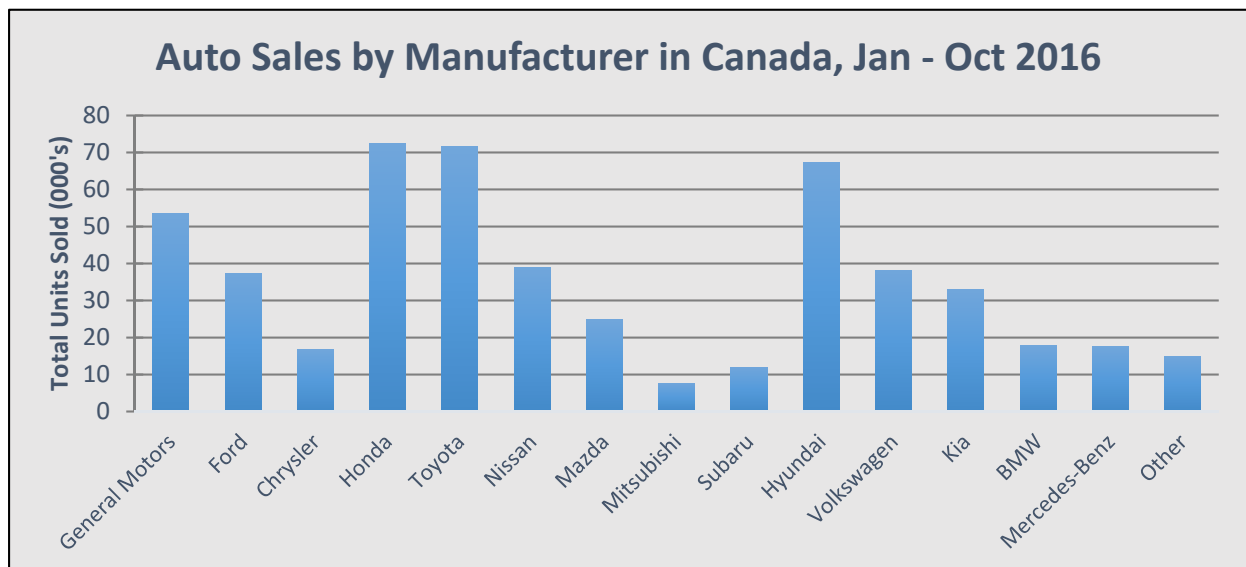


Figure 5: Jan to Oct 2016 Canadian Auto Sales by Manufacturer

Canadian Automotive Imports/Exports

Automotive exports from Canada are destined primarily to the North American market. While Mexico receives a sizable portion of vehicles parts from Canada, the majority of parts manufactured are

⁹ <http://theasiafactor.ca/ab#i0=3>

¹⁰ http://www.gbm.scotiabank.com/English/bns_econ/bns_auto.pdf

exported to the United States. The pie charts with data from ‘The Observatory of Economic Complexity’ outlines Canadian car and vehicles parts exports: ¹¹

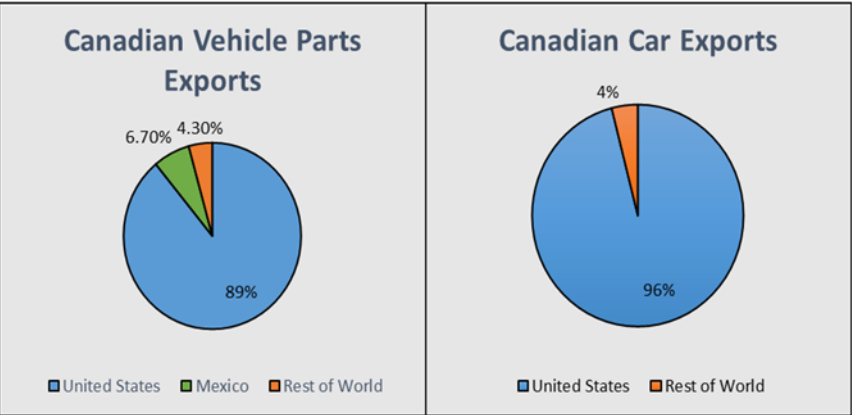


Figure 6: Canadian Automotive Exports

The United States currently dominates as the primary source of vehicle and vehicle parts imported into Canada with Mexico as the second largest source of both finished vehicles and parts. Canada’s reliance on the United States demonstrates the importance of the North American automotive market to the Canadian economy. The tree-maps below are a full breakdown from ‘The Observatory of Economic Complexity’ of Canadian imports of cars and of vehicle parts by country of origin in 2014:¹¹

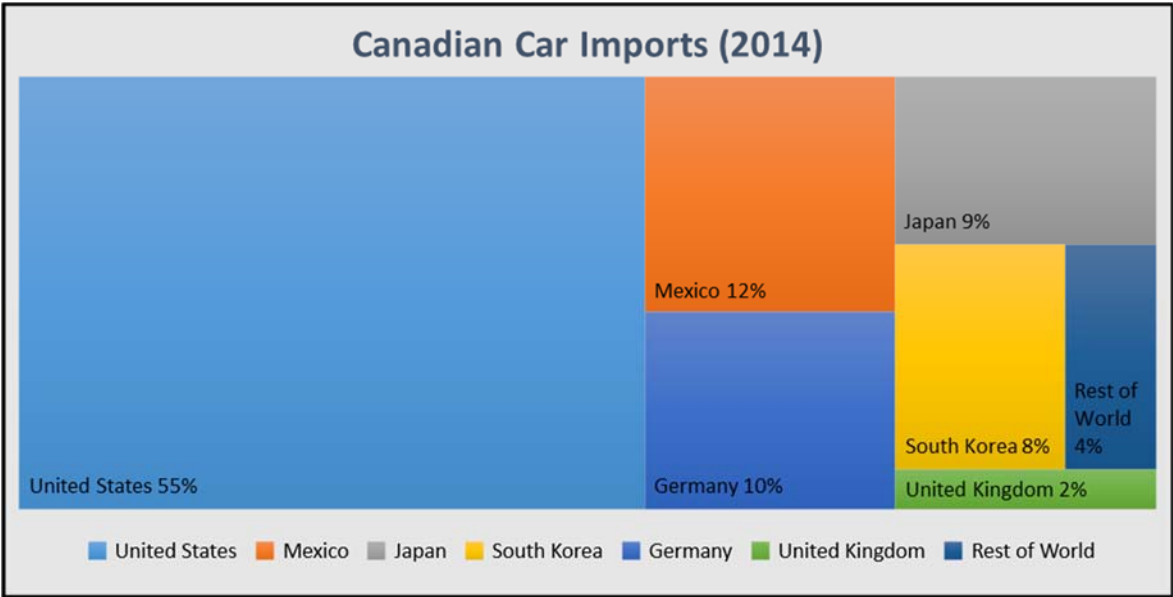


Figure 7: Canadian Car Imports (2014)

¹¹ http://atlas.media.mit.edu/en/visualize/tree_map/hs92/import/can/show/8703/2014/

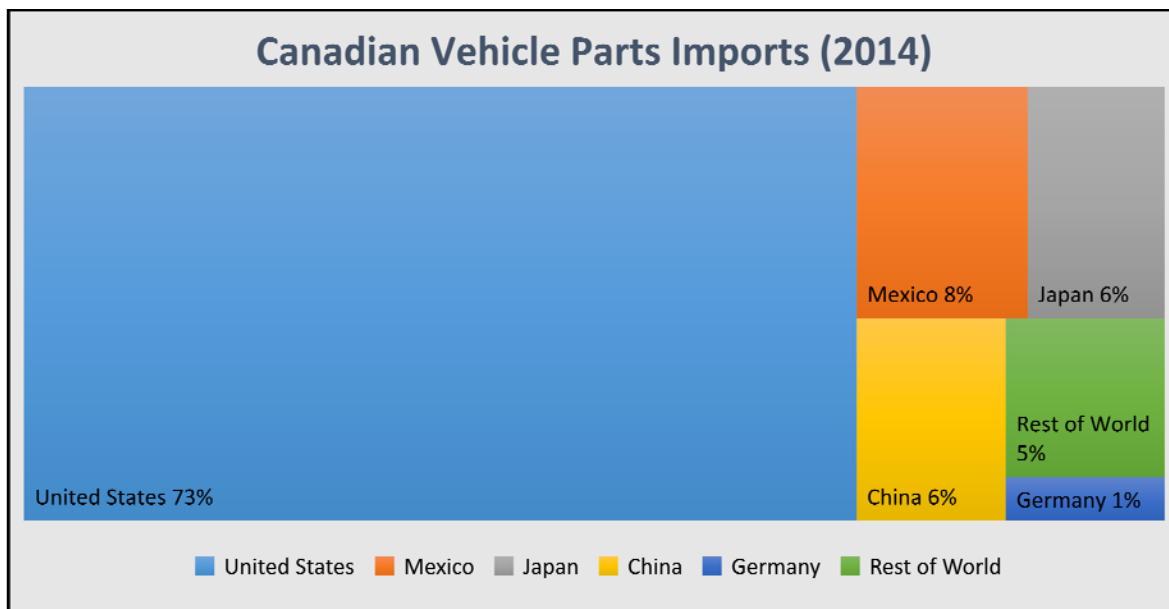


Figure 8: Canadian Vehicle Parts Imports (2014)

The Automotive Supply Chain

Overview of the Automotive Supply Chain

The automotive supply chain is a highly complex and competitive market with numerous stakeholders spread across many locations. For this study, focus will be on the downstream segment of the supply chain which follows the manufacturing processes. The activities here include transportation from port to hub/consumer, warehousing and distribution of vehicles, and vehicle parts movement. Analysis is included on each segment of this supply chain to identify opportunities for growth in the Calgary region.

Below is a supply chain infographic of cars and parts in the automotive industry:

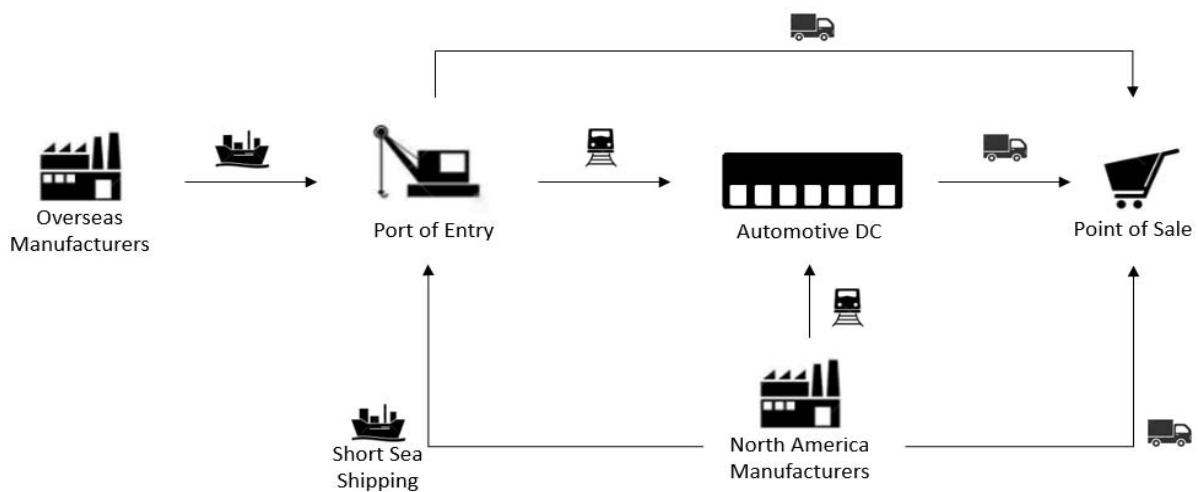


Figure 9: Overview Map of Automotive Supply Chain

Operational Challenges in the Automotive Supply Chain ¹²

- 1 Demand variations causing the bullwhip effect¹³; industry shift towards postponement
- 2 Lean manufacturing drives efficiencies but increases inventory/associated costs
- 3 Increased cost of sales from point of purchase incentives
- 4 Unreliable systems of information flow between manufacturers and suppliers
- 5 High inbound and outbound distribution costs
- 6 Product proliferation; increases in complexity and variety of products
- 7 Delays in ordering, scheduling, and distribution; long lead-time, with little ability to fluctuate

Figure 10: Operational Challenges in The Automotive Supply Chain

¹² http://www.iaeng.org/publication/IMECS2008/IMECS2008_pp1800-1806.pdf

¹³ Variations in orders to manufacturers compared to consumer sales; oscillates and increases up a supply chain.

Major International Vehicle Brands

The majority of automobile manufacturers operate facilities internationally and produce in several countries to maximize their output and product reach. Asian based companies and European companies have manufacturing plants across North America in an effort to maximize their market share. Below is a detailed list of the major international vehicles brands, where they are headquartered, and the scope of their manufacturing facilities:

COMPANY NAME	HOME COUNTRY	NUMBER OF COUNTRIES WITH MANUFACTURING PLANTS	MANUFACTURING PLANTS IN NORTH AMERICA
SUZUKI ¹⁴	Japan	19	Yes
NISSAN ¹⁵	Japan	24	Yes
HONDA ¹⁶	Japan	25	Yes
TOYOTA ¹⁷	Japan	28	Yes
FIAT-CHRYSLER ¹⁸	Italy/USA	14	Yes
FORD ¹⁹	USA	21	Yes
GENERAL MOTORS ²⁰	USA	19	Yes
VOLKSWAGEN GROUP ²¹	Germany	31	Yes
HYUNDAI ²²	South Korea	8	Yes
BMW GROUP ²³	Germany	9	Yes

Figure 11: Major Automotive Brands Manufacturing Scope

While scope of operations can be an indicator of the size of an organization, different manufacturing strategies will alter the range of countries the brand manufactures in. Largely, the majority of brands operate concentrated centres in three general areas: East/South East Asia, Western/Central Europe, and North America. This allows the companies access to large markets, with reduced cycle-times and moderate costs. Major brands often operate outlier manufacturing in smaller markets to maximize global product reach.

North American Production Facilities

Within the North American market, all major global brands hold a manufacturing presence with nearly every brand operating facilities in USA and Mexico. As of 2015, 11 manufacturing plants were operating in Canada between Fiat-Chrysler (2), Ford (1), General Motors (3), Honda (2), and Toyota (3).²⁴ While

¹⁴ <http://www.globalsuzuki.com/corporate/productionbase/headoffice/iwata.html>

¹⁵ http://www.nissan-global.com/EN/COMPANY/PROFILE/EN_ESTABLISHMENT/NORTH_AMERICA/

¹⁶ <http://world.honda.com/group/manufacturing-facilities/>

¹⁷ <http://www.toyota-global.com/company/profile/facilities/>

¹⁸ <https://www.fcagroup.com/en-US/Pages/home.aspx>

¹⁹ <https://corporate.ford.com/company/operation-list.html#s4f0>

²⁰ <http://gmauthority.com/blog/gm/gm-manufacturing/>

²¹ <http://www.volkswagenag.com/en/group/portrait-and-production-plants.html>

²² <http://worldwide.hyundai.com/WW/Corporate/Network/Manufacturing/index.html>

²³ <https://www.bmwgroup.com/en/company/production.html#-139390470>

²⁴ <http://www.autoalliance.org/auto-jobs-and-economics/auto-facilities>

these plants create a significant contribution to the North American market they pale in comparison to the output of the 44 plants in the USA, and the 18 plants located in Mexico.²⁵

Asian Automotive Exports to Canada

Japan and South Korea produce the majority of Asian vehicles exported to Canada. Collectively, both countries share an estimated 19% of the global export markets between 14 major automotive manufacturers. Many Asian companies operate manufacturing facilities in North America to obtain better continental market access. By comparison, the Chinese automotive manufacturers lead globally in production and sales volume with the majority of production consumed domestically. This currently leaves China as a significant player in the production of automobiles, but a small player in the global export market.²⁶

The Japanese Automotive Manufacturing Association reported an estimated 70% (2013) of Japanese brand vehicles sold in the U.S., are manufactured in North America contributing jobs, exports, and better service to the American market.²⁷ Toyota globally holds about 10% of the automotive market share and is one of the three largest automotive companies (Toyota, Volkswagen, General Motors) which together hold around 1/3 of the global market share. The South Korean automotive industry accounts for over 10% of that country's economy, valued at \$74 billion in 2013²⁸. South Korea is currently the fifth largest producer and third largest exporter of vehicles in the world. Below is a summary of the movement of vehicles in units by the largest South Korean brands:²⁹

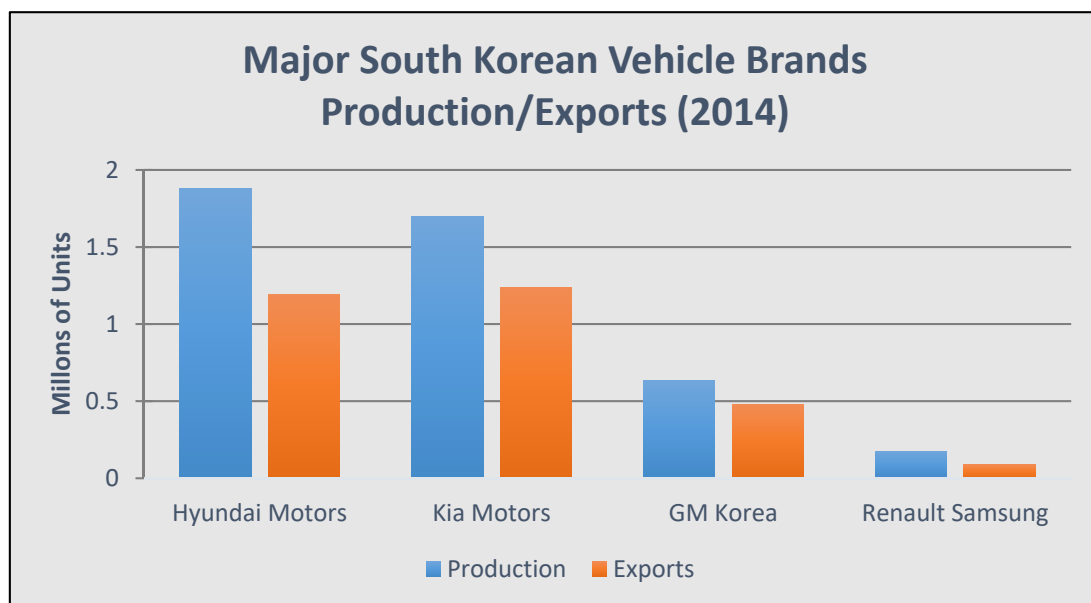


Figure 12: Korean Vehicle Brands Production/Exports

²⁵ <http://mexico.automotivemeetings.com/index.php/en/automotive-industry-in-mexico>

²⁶ <http://atlas.media.mit.edu/en/profile/hs92/8703/>

²⁷ <http://www.jama.org/wp-content/uploads/2013/11/Freer-Trade-Greater-Growth-More-Jobs-Publications-Contributions-Report-2013.pdf>

²⁸ <http://kama.or.kr/eng/PS/pdf/Total2014.pdf>

²⁹ <http://automotivelogistics.media/intelligence/south-korea-part-1-a-history-of-transformation>

Mexican Automotive Supply Chain

The Mexican automotive market has seen consistent yearly increases with car manufacturers interested in nearshoring to the American market. Utilizing the benefits of NAFTA and reduced labour/production costs of manufacturing in Mexico, automotive companies continue to invest in expanding the market. As of 2014, Mexico is the 7th largest vehicle producer and the 4th largest vehicle exporter in the world with the industry comprising 32% of total Mexican exports.³⁰ The automotive parts industry in Mexico contributed \$64.5 billion dollars of exports to that country's economy.³¹

The majority of Mexican automotive production occurs in the Mexican Bajío Automotive Corridor in the industrial triangle formed by Mexico City, Guadalajara, and Monterrey. The industry is serviced by two major railways, Kansas City Southern and Ferromex, which together service all of northern Mexico and connect the country to the American market. From automotive terminals in Guadalajara and Monterrey vehicles are easily distributed to foreign markets via port/rail. The automotive industry in Mexico is projected to increase from current exports of around 2.7 million vehicles (2015)³² to 4 million by 2018 and 5 million by 2020³³.

The following map from Ferromex website displays the current locations of vehicle production facilities in the industrial triangle by brand along with connecting Ferromex rail lines associated to each manufacturing plant:³⁴



Figure 13: Ferromex Network Map with Automotive Plants

³⁰ <http://geo-mexico.com/>

³¹ <http://www.promexico.gob.mx/documentos/folletos-sectoriales/automotive.pdf>

³² <http://www.promexico.gob.mx/documentos/revista-negocios/html/2014-10/english/10-2014/guest-opinion.html>

³³ <http://mexico.automotivemeetings.com/index.php/en/automotive-industry-in-mexico>

³⁴ <http://www.ferromex.com.mx/ferromex-lo-mueve/automotriz.jsp>

Automotive Parts Distribution – Mexico

With Mexican prominence in the global automotive industry increasing, their output of vehicles parts for manufacturing and for aftermarket vehicle has greatly increased for domestic use and exports. Many top auto-industry suppliers have invested millions over the last few years in production hubs in Mexico signalling anticipated industry growth and market confidence.³⁵ Currently Canada sources about half the volume of vehicle parts from Mexico (about \$1.6 Billion) than it does from all Asian sources combined (about \$3.2Billion).

Since 2010 the Mexican vehicle parts industry, local production, and exports have consistently risen. As of 2014, the gap between local production of parts and exports has decreased as Mexico secures itself as a vehicle parts distribution centre for North America. See Figure 14 below:³⁶

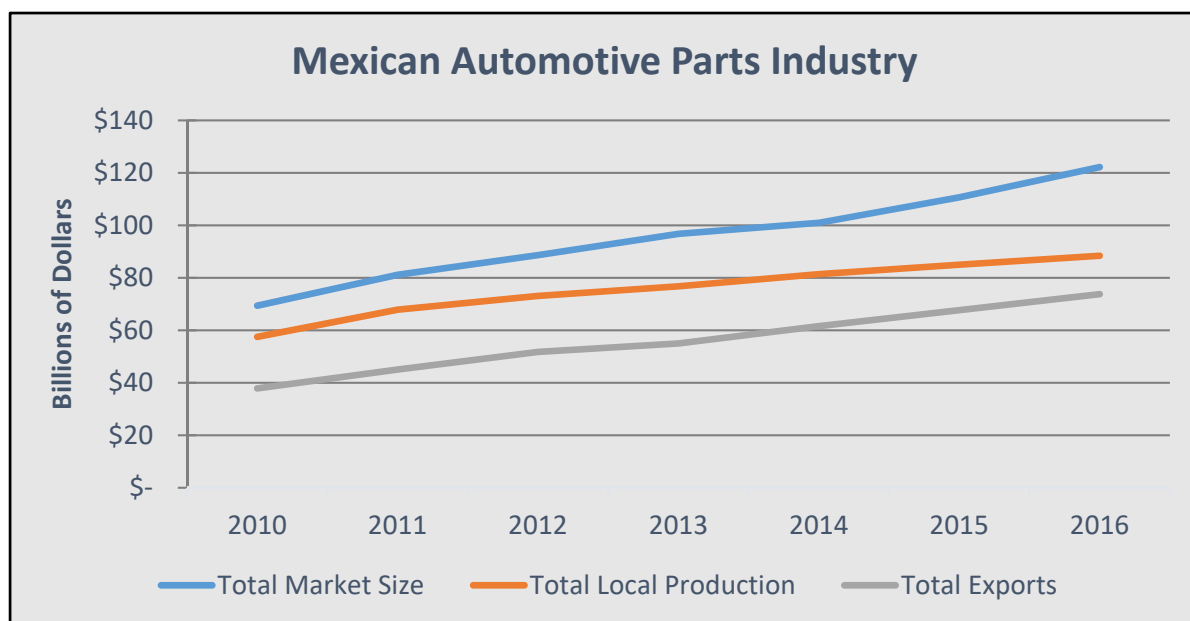


Figure 14: Mexican Automotive Industry Timeline

Air Freight: Automotive Parts

The principal means of moving automotive parts in Mexico remains intermodal. Industry experts cite however a global rise in the use of air freight as a means of expediting vehicle parts to customers³⁷. While air freight has always been available as a distribution option, it was mostly used for emergency movements to ensure no backlogs occurred in production or to service centres for vehicle repairs. While globally, the use of air freight has seen increases and will likely continue to see increases, 'Automotive Logistics' reports that the use of the aviation mode approximates only about 1% of volume of shipments due to high cost associated to this mode of transport.⁵³

³⁵ <http://www.wsj.com/articles/auto-parts-makers-invest-in-mexico-china-on-production-strength-1465502842>

³⁶ <https://www.export.gov/article?id=Mexico-Automotive-Parts-and-Supplies>

³⁷ <http://automotivelogistics.media/intelligence/prepared-for-take-off>

Overview of North America West Coast Auto Port Terminals

The North American import and export market through the west coast is currently served through approximately 10 major ports along the west coast from Canada to Mexico. These ports serve as primary hubs for global trade flows with each moving an average of 250,000 units. Wallenius Wilhelmsen Logistics (WWL), a key transporter in global vehicle shipping, reports a typical movement of two to three ships a month through the Asia-North American route and three to four ships a month coming from Europe³⁸. Full route maps from WWL are available on their website.

These routes connect the regions through a spread of major ports and is marked by greater flow to North America than from. The following table examines all 10 major west coast ports that import cars, the automotive companies they primarily work with, and the port throughput for 2015:³⁹

PORT	TERMINAL OPERATORS	TOP CARMAKERS	IMPORTS (UNITS)	EXPORTS (UNITS)	TOTAL (UNITS)
SAN DIEGO, CA	Pasha Automotive Services	Volkswagen Group, Mazda, Hyundai-Kia	361,738	63,836	425,574
VANCOUVER, BC	WWL VLS Canada	Hyundai, Kia, Mazda	384,305	169	384,474
LAZARO CARDENAS, MC	Amports, SSA	GM, Mazda, Nissan	251,693	106,110	357,803
HUENEME, CA	BMW, Glovis America, WWL VSA	BMW, Hyundai, Kia	308,285	30,388	338,388
LONG BEACH, CA	Mercedes-Benz USA, Toyota Logistics	Toyota, Lexus, Mercedes-Benz	331,128	4,071	335,199
PORTLAND, OR	Toyota Logistics, American Honda Motor Co., Auto Warehousing Co.	Toyota, Honda, Hyundai	213,593	49,281	262,874
NORTHWEST SEAPORT ALLIANCE, WA	Auto Warehousing Co., Glovis America	Kia, Mazda, Mitsubishi, BMW	183,305	0	183,305
VANCOUVER, WA	Auto Warehousing Co.	Subaru	90,183	311	90,494
GRAYS HARBOR, WA	Pasha Automotive Services	Chrysler	7,677	69,090	76,767
ACAPULCO, GR	OSS Port Logistics Solutions	Chrysler, General Motors, Nissan	0	48,593	48,593

Figure 15: Overview of Automotive Volumes Through North American Sea Ports

³⁸ <http://www.2wglobel.com/global-network/route-maps/route-maps-list/#.WD3yReYrJPY>

³⁹ <http://automotivelogistics.media/intelligence/ports-get-extra-lift-rise-imports>

Trade Volumes & Outlook

Stimulated by emerging trends in shortening cycle times to counteract forecasting difficulties, the Port of Vancouver projects slower growth for vehicles imported from Asia as manufacturers shift focus to production in North America.⁴⁰ The Port of Vancouver moved approximately 400,000 units in 2015 and currently acts as the sole point of entry for Asian originated vehicles imported directly to Canada.⁴¹ Within the 2015 vehicle imports, nearly 295,000 originate in Japan and South Korea. A full overview of imports into the Port of Vancouver with the country of origin is shown below:⁴²

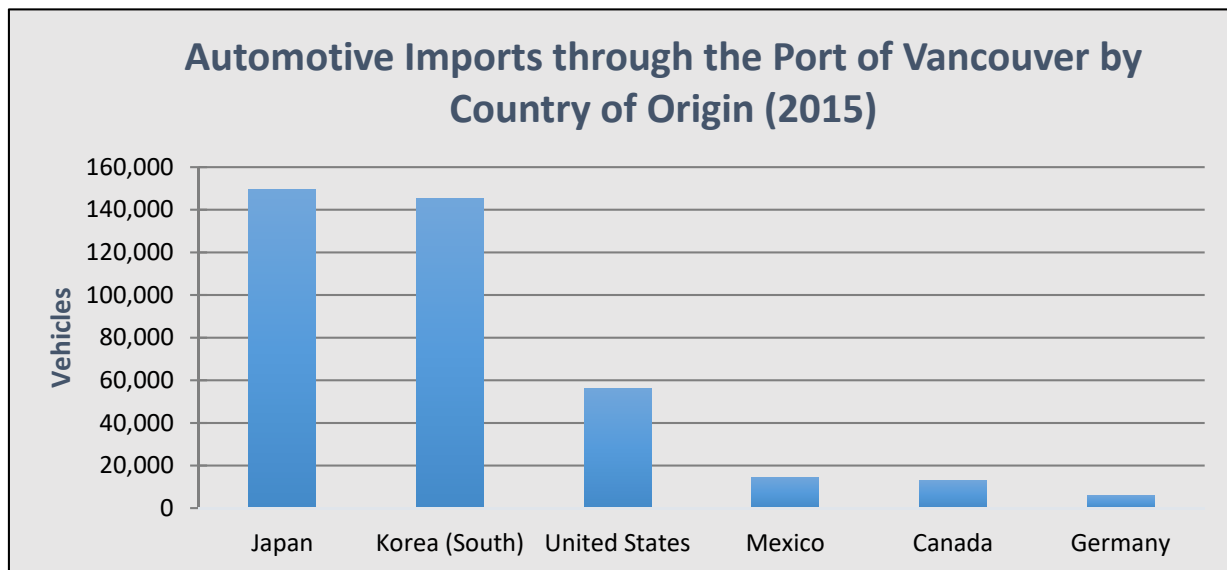


Figure 16: Automotive Imports through the Port of Vancouver by Country of Origin

In the northwest US, the primary ports for automotive imports are Portland, followed by the Northwest Seaport Alliance and the Port of Vancouver USA. Subaru has recently signed a lease extension of its partnership with the Port of Vancouver USA until 2030. In 2015, Subaru's imports through the port totaled 90,183 - a 10% growth from 2014. The Port of Vancouver USA has also recently completed a \$275 million project (West Vancouver Freight Access Project) to improve rail movement at the port.⁴³ The Northwest Seaport Alliance is experiencing sustained growth (9% up through April) after a record year in 2015 with 183,000 units being handled through the port.

The main Port for automotive distribution (imports and exports) on the western coast of Mexico is the Port of Lazaro Cardenas. The port has recently experienced contamination problems and safety issues including theft and vandalism during rail transport to the port, which has led to a slight loss in market share to the Port of Acapulco. A new automotive terminal is expected to be completed within two years at the Port of Lazaro Cardenas, with Audi expected to be a primary user for exports into Asia and potentially into the US west coast.

⁴⁰ <http://www.portvancouver.com/wp-content/uploads/2015/11/2015-Financial-Report-final-WEB.pdf>

⁴¹ <http://www.portvancouver.com/cargo-terminals/automobiles/>

⁴² <http://www.portvancouver.com/wp-content/uploads/2016/02/2015-statistics-overview.pdf>

⁴³ <http://www.portvanusa.com/news-releases/port-begins-final-phase-west-vancouver-freight-access-rail-projects/>

Short Sea Shipping

Short sea shipping has been traditionally used to transport excess export volumes in times of high demand where rail capacity was not available. Wallenius Wilhelmsen Logistics (WWL) estimates that approximately 80% of auto exports from Mexico to the US and Canada went by rail with the rest moving by ship⁴⁴. Short sea shipping for automotive has been mostly used on the east coast although recent activity, detailed below, suggests that this trend is changing.

The dramatic increase of automobile manufacturing in Mexico has led to rail capacity constraints for exports into the US and Canada. Another important factor there is lack of rail lines in Mexico that can support Gross Rail Load (GRL) 286 cars (286,000-pound gross rail load railcars), which allow for higher efficiencies as they can carry heavier loads. There are currently only three GRL 286 mainlines connecting Mexico with Texas and New Mexico, creating bottlenecks and further congestion.⁴⁵ Rail companies operating in Mexico (Ferromex and Kansas City Southern de Mexico), have begun to make investments into infrastructure and railcars to secure capacity for future growth.

Car manufacturers in Mexico are evaluating the possibility of increasing short sea shipping as a way to overcome challenges faced by strained rail capacity. Recently, Honda, Ford and Toyota have started to use short sea shipping for exports from Mexico to the west coast of the United States. NYK Line has a once to twice a month service exporting from Lazaro Cardenas to various west coast ports for several automobile manufacturers.

Revenue Potential

One factor in the assessment of the viability of entering into the market for automotive port services is the potential for revenue generation. By looking at the total auto throughput of west coast Canadian ports, and the total revenue generated by auto services, revenue potential may be calculated. Below is a table comparing the revenue potential based on estimated volumes through west coast Canadian ports:

COMMODITY	TOTAL UNIT VOLUME	TOTAL REVENUE	REVENUE PER UNIT
AUTOMOTIVE⁴⁶	384,474	\$ 6,776,000	\$17.62
INTERMODAL CONTAINERS	1,770,364	\$ 116,478,000	\$65.79

Figure 17: Revenue Potential Comparison

The relatively low revenue generated per vehicle means that large volumes are required to make a meaningful impact towards a port's total revenue. While the Port of Vancouver, which is the only current west coast port of entry for automobiles has the second largest volume of automobiles on the North American west coast, the total revenue generated from this sector only represents 3% of the

⁴⁴ <http://automotivelogistics.media/intelligence/mexico-short-sea-services-evolve-as-volume-increases>

⁴⁵ <http://www.fleetfinancials.com/blog/market-trends/story/2016/09/expansion-of-auto-manufacturing-in-mexico-will-create-rail-constraints-impacting-fleet-otd.aspx>

⁴⁶ <http://www.portvancouver.com/wp-content/uploads/2015/11/2015-Financial-Report-final-WEB.pdf>

Port's total revenue. In comparison, intermodal containers for the Port of Vancouver represent 49% of total revenue. The revenue for intermodal containers at the Port of Vancouver is greater for two reasons: first, total volume is far higher at 1.8 million containerized units (3.1 million TEUs) in 2015. Second, the estimated revenue per container is also higher. By comparing volume to total revenue, the average revenue is \$65.79 per container vs. \$17.62 per vehicle. This average revenue calculation per vehicle would potentially apply to the shipment of vehicles through any Canadian west coast port.

Rail Access & Automotive DC Capacity and Capabilities

Automotive transportation by rail is the dominant mode in Canada due to the large distances between ports and major cities. The Canadian rail industry transports on average 4 million vehicles per year. The graph below from the North American Railroad Association shows average weekly automotive and auto parts car loads by month for Canada:⁴⁷

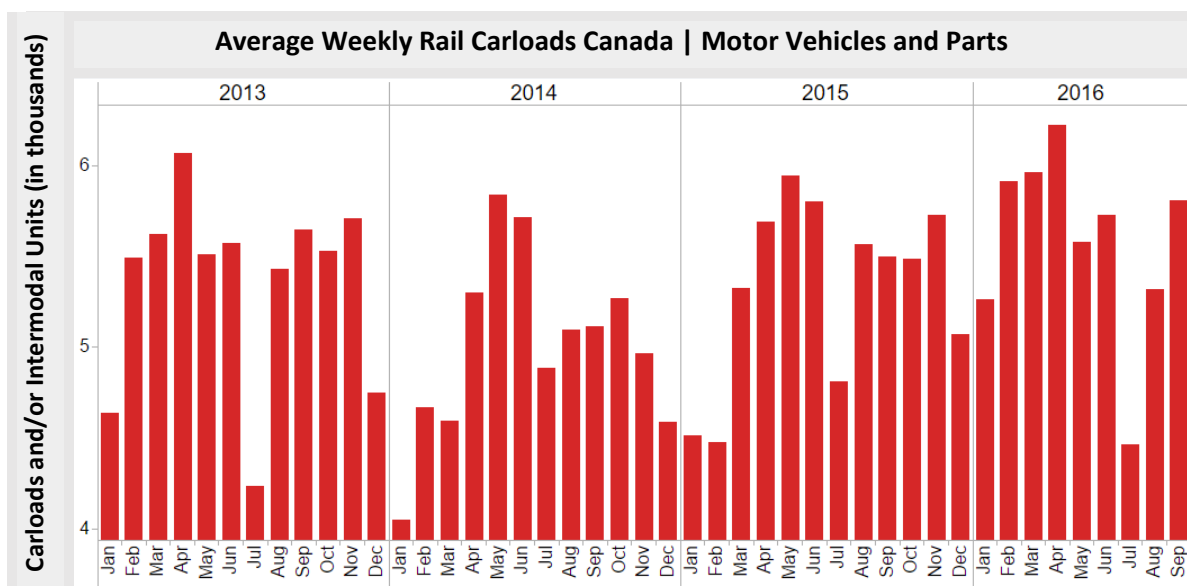


Figure 18: Average Weekly Rail Carloads Canada

A lower Canadian currency, increased North American production and strong sales, have resulted in automotive shipments via Canadian rail increasing since 2013 with over \$1 billion in combined revenues in 2015. CN holds a dominance in the market and anticipates continued growth while CP has trended downward in their automotive market share. The following table displays revenue for CN and CP since 2013 ^{48 49}:

⁴⁷ <https://www.aar.org/todays-railroads/what-we-haul?t=automotive>

⁴⁸ <https://www.cn.ca/-/media/Files/Investors/Investor-Annual-Report/2015-CN-Annual-Report-en.pdf?la=en>

⁴⁹ <http://www.cpr.ca/en/investors-site/Lists/FinancialReports/cp-ar-2015.pdf>

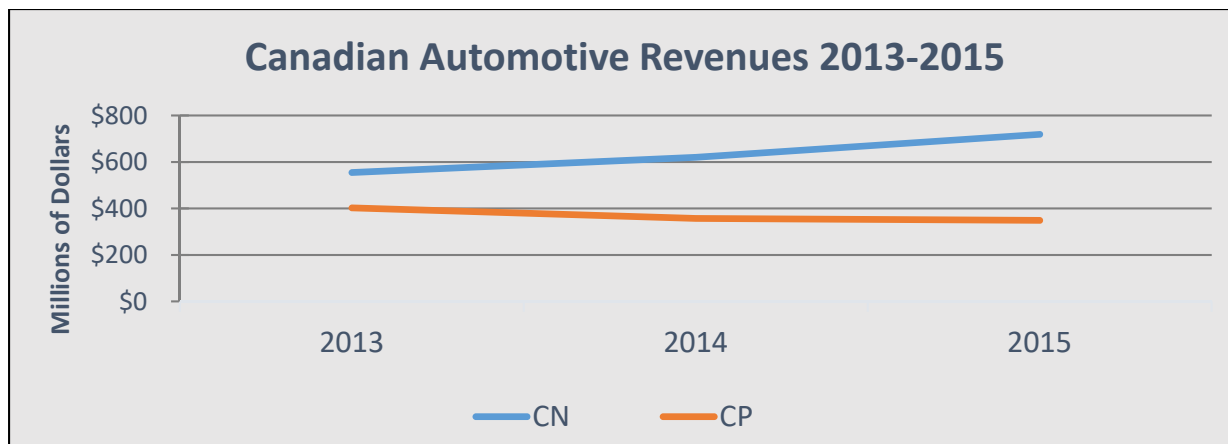


Figure 19: Canadian Automotive Revenues 2013-2015

CN reports that 93% of its automotive revenues are represented by finished vehicles with 7% by auto parts. CN moved 241,000 carloads of vehicles in 2015 across its network through auto terminals in all major markets in Canada, as well as locations in the US including Detroit, Chicago, Memphis and Jackson.⁴⁸

CP operates a total of 9 automotive distribution centres across Canada in Vancouver, Calgary, Edmonton, Regina, Winnipeg, Windsor, Agincourt (near Toronto), Montreal, with access to terminals in Quebec City and Saint John.⁴⁹ The 2015 carload share for CN and CP is shown in the pie chart below:

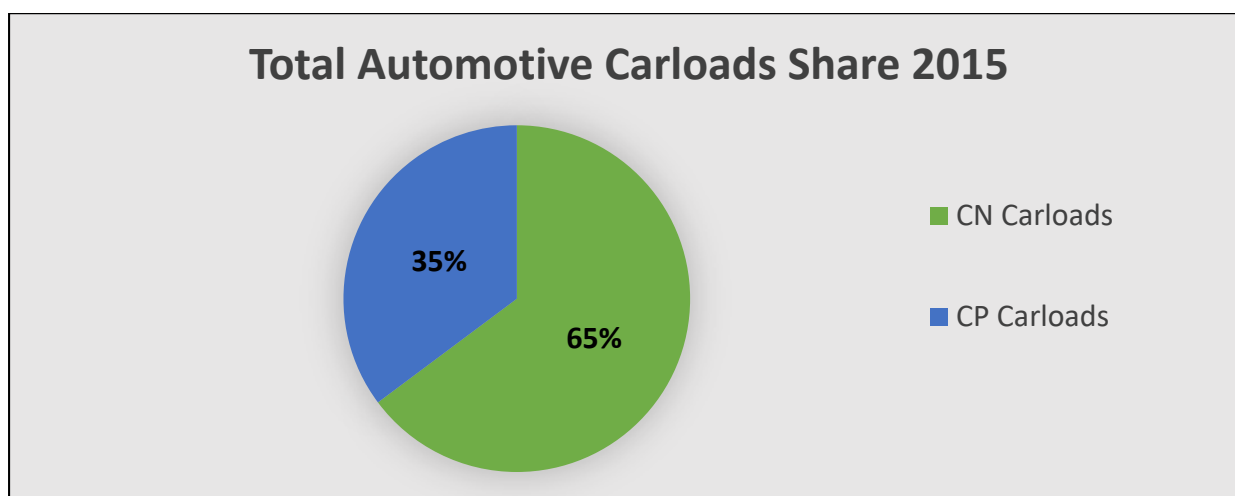


Figure 20: Canadian Automotive Carload Share 2015

Rail Rates & Cycle Times

Examining transit times from West Coast Ports to Inland Ports is important for understanding of movement once products reach Canada from international markets. Competitive advantages can be achieved through faster movement of goods to consumers. The table below shows data from CN on transit times between the Port of Vancouver to major inland ports:

CITY	PORT OF VANCOUVER*
CALGARY, AB	7 Days / 151 hours
EDMONTON, AB	5 days / 102
SASKATOON, SK	6 days / 133
REGINA, SK	8/9 days / 179/203 hours
WINNIPEG, MB	6 days / 139 hours

Figure 21: Transit Times from Canadian West Coast Ports to Inland Ports

*(STCC/Commodity: 3711120/Autos Passenger)

In addition to transit times, railcar rates are a key piece of movement once products reach the Canadian market and can be leveraged for competitive advantage. The table below shows automotive railcar rates for the Port of Vancouver and Port of Prince Rupert to major inland ports:

CITY	PORT OF VANCOUVER	PORT OF PRINCE RUPERT
CALGARY, AB	\$ 5,512.00	\$ 6,091.00
EDMONTON, AB	\$ 4,845.00	\$ 5,424.00
SASKATOON, SK	\$ 5,814.00	\$ 6,393.00
REGINA, SK	\$ 7,017.00	\$ 7,292.00
WINNIPEG, MB	\$ 7,283.00	\$ 7,559.00

Figure 22: Automotive Railcar Rates from Canadian West Coast Ports to Inland Ports

Railcar tariff rates and transit times from CN suggests that Edmonton is the lowest cost and fastest route (5 days) out of the Port of Vancouver. Saskatoon and Winnipeg have estimated transit times of 6 days while Calgary is estimated at 7 days. This difference is due to the fact that Saskatoon and Winnipeg are both on the CN mainline, whereas Calgary is not. Railcar tariff rates for any city are estimated to be higher out of Port of Prince Rupert than the Port of Vancouver.

Regional Demand

The data below outlines total volumes of new car sales for western Canada by province for 2015: ⁵⁰

PROVINCE	TOTAL AUTO SALES (UNITS)	NORTH AMERICAN MANUFACTURED TOTAL SALES (UNITS)	OVERSEAS MANUFACTURED TOTAL SALES (UNITS)	ASIAN IMPORTS AUTO SALES (UNITS)*
ALBERTA	241,918	201,988	39,930	29,342
BRITISH COLUMBIA	211,044	156,744	54,300	39,902
SASKATCHEWAN	55,128	48,034	7,094	5,213
MANITOBA	57,971	49,590	8,381	6,159

⁵⁰ <http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/trade36i-eng.htm>

Figure 23: Canadian Regional Sales Demand

**Estimated by comparing overseas manufactured sales with imports volumes from Canadian sea ports.*

The western Canadian domestic market for Asian manufactured cars is heavily weighted towards British Columbia (see chart below). Given the proximity of the Port of Vancouver to the majority of the population in BC, the port is ideal for movement of vehicles from Asian origin to this primary sales market. While a significant portion of commodities move inland before being distributed, vehicles are a finished good with no further value adding required and proximity to markets are a key driver of distribution.

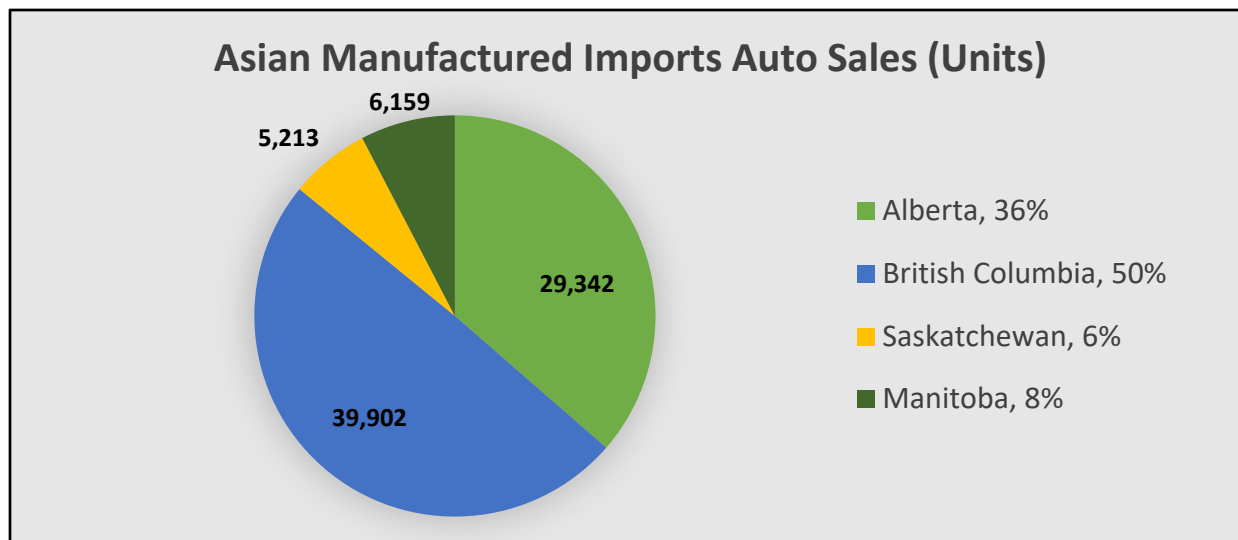


Figure 24: Asian Manufactured Imports Auto Sales

The volumes of Asian auto import sales for Alberta, Saskatchewan and Manitoba totalled 40,714 vehicles in 2015. From a port perspective, the prairie destined automobile market is worth approximately \$717,380 on an annual basis. The majority of auto imports are shipped east to larger markets in Ontario and Quebec. Asian manufactured import sales in Ontario and Quebec are 119,489 and 98,420 vehicles respectively.

Overview of Automotive Distribution & Market Access by Truck

Trucking plays a vital role in the Canadian vehicle distribution network. Rail shortages and delays have lead automobile manufacturers to consider distribution models that are more flexible, creating a shift towards a heavier use of auto carriers versus rail.

Distribution of automobiles by truck represents the final leg before vehicles are distributed to their retail location. An analysis of trucking rates and cycle times was carried out for the main population centres in western Canada to assess the viability of a centralized distribution model versus a decentralized distribution model in western Canada.

Automotive Trucking Companies in Canada

L. Hansen's is Canada's largest car hauler, handling 450,000 units in 2015, 90% of which was within Canada. Other large Canadian haulers include Keewest, Transportation Car-Fré and CTT Auto Trans. Based in the US, Jack Cooper and United Road are two of the largest players who have operations in Canada.

Trucking companies generally distribute within a 250 mile radius from auto distribution centres. Fiat Chrysler Automotive (FCA) states that approximately 70% of deliveries are within 200 miles with some delivery locations being more distant. As an example of auto distribution from Asia into Canada, Kia in 2015 shipped 58,000 units through the Port of Vancouver and then moved these units by rail to Edmonton, Saskatoon, Winnipeg, Toronto, Montreal, Quebec City and Halifax, from there vehicles are distributed by truck to local and rural markets.

Trucking Rates & Cycle Times

Trucking rates for origin destination pairs and cycle time information has been collected for the main population centres in western Canada, rates on a per unit/car basis were obtained from Shiply.com:

		ORIGIN					
DESTINATION		Calgary, AB	Edmonton, AB	Vancouver, BC	Saskatoon, SK	Regina, SK	Winnipeg, MB
	Calgary, AB	\$ 115.00	\$ 187.00	\$ 429.00	\$ 345.00	\$ 426.00	\$ 704.00
	Edmonton, AB	\$ 174.00	\$ 115.00	\$ 510.00	\$ 320.00	\$ 443.00	\$ 701.00
	Red Deer, AB	\$ 115.00	\$ 115.00	\$ 463.00	\$ 321.00	\$ 426.00	\$ 699.00
	Lethbridge, AB	\$ 119.00	\$ 286.00	\$ 469.00	\$ 336.00	\$ 383.00	\$ 670.00
	Medicine Hat, AB	\$ 180.00	\$ 288.00	\$ 557.00	\$ 240.00	\$ 286.00	\$ 597.00
	Fort McMurray, AB	\$ 419.00	\$ 250.00	\$ 676.00	\$ 384.00	\$ 516.00	\$ 708.00
	Grande Prairie, AB	\$ 362.00	\$ 256.00	\$ 454.00	\$ 539.00	\$ 652.00	\$ 866.00
	Vancouver, BC	\$ 425.00	\$ 512.00	\$ 115.00	\$ 702.00	\$ 760.00	\$ 996.00
	Kelowna, BC	\$ 264.00	\$ 376.00	\$ 178.00	\$ 575.00	\$ 641.00	\$ 877.00
	Kamloops, BC	\$ 287.00	\$ 368.00	\$ 166.00	\$ 592.00	\$ 663.00	\$ 898.00
	Regina, SK	\$ 430.00	\$ 443.00	\$ 760.00	\$ 155.00	\$ 115.00	\$ 351.00
	Saskatoon, SK	\$ 348.00	\$ 320.00	\$ 702.00	\$ 115.00	\$ 155.00	\$ 451.00
	Winnipeg, MB	\$ 707.00	\$ 700.00	\$ 995.00	\$ 451.00	\$ 351.00	\$ 115.00

Figure 25: Per Unit/Car Rate Comparisons for Different

The table below shows distance and driving time between the city pairs list below. Driving time and distance have been estimated using PC Miler:

		ORIGIN (KM / HOURS)					
DESTINATION		Calgary, AB	Edmonton, AB	Vancouver, BC	Saskatoon, SK	Regina, SK	Winnipeg, MB
	Calgary, AB	0 / 0	301.8 / 3.2	974 / 9.6	623.5 / 7	761.1 / 7.7	1330.3 / 13.5
	Edmonton, AB	301.9 / 3.2	0 / 0	1159.7 / 11.5	524.8 / 5.4	782.5 / 8	1352.2 / 13.8
	Red Deer, AB	148.7 / 1.6	156.7 / 1.7	1109.8 / 11	675.4 / 7	889.3 / 9	1458.5 / 14.8
	Lethbridge, AB	221.1 / 2.3	516.8 / 5.3	1197.2 / 11.8	660 / 7.1	631.8 / 6.5	1201.1 / 12.3
	Medicine Hat, AB	325.9 / 3.4	608.3 / 6.3	1291.3 / 12.7	497.1 / 5.3	469 / 4.8	1038.2 / 10.5
	Fort McMurray, AB	746.3 / 8.1	440 / 4.9	1592.3 / 16.3	858.6 / 9.2	1116.1 / 11.9	1685.8 / 17.7
	Grande Prairie, AB	755.7 / 7.7	459.1 / 4.7	1191.2 / 12.1	977.4 / 9.9	1235 / 12.5	1804.7 / 18.3
	Vancouver, BC	975.6 / 9.6	1159.4 / 11.5	0 / 0	1677.7 / 16.7	1727 / 17.1	2296.2 / 22.9
	Kelowna, BC	604.1 / 6.1	890.3 / 9.1	397 / 3.8	1211.8 / 12.9	1355.7 / 13.7	1924.9 / 19.4
	Kamloops, BC	621.8 / 6.3	802.3 / 8.1	359.7 / 3.4	1320.6 / 13.3	1373.2 / 13.8	1942.5 / 19.6
	Regina, SK	763.5 / 7.8	782.6 / 8	1728.9 / 17.1	258.6 / 2.7	0 / 0	572.6 / 5.9
	Saskatoon, SK	623.6 / 7	525.1 / 5.3	1678.4 / 16.7	0 / 0	259.4 / 2.7	829.1 / 8.5
	Winnipeg, MB	1328.5 / 13.5	1352.8 / 13.8	2294 / 22.9	828.8 / 8.5	572.3 / 5.9	0 / 0

Figure 26: Time and Distance Comparison for Different Canadian Origins/Destinations

Population Centres & Vehicle Sales Volumes

The table below estimates annual total and Asian manufactured vehicle sales volumes by city.

CITY	POPULATION (INCLUDES METROPOLITAN AREAS)	ESTIMATED TOTAL AUTO VOLUME	ESTIMATED ASIAN IMPORTS AUTO VOLUME
CALGARY, AB	1,439,756	82,999	10,068
EDMONTON, AB	1,363,277	78,590	9,533
RED DEER, AB	100,807	5,811	705
LETHBRIDGE, AB	94,804	5,465	663
MEDICINE HAT, AB	63,018	3,633	441
FORT MCMURRAY, AB (WOOD BUFFALO)	81,948	4,724	573

GRANDE PRAIRIE, AB	68,556	3,952	479
VANCOUVER, BC	2,504,340	112,857	21,340
KELOWNA, BC	124,378	5,605	1,060
KAMLOOPS, BC	89,995	4,056	767
REGINA, SK	241,422	11,740	1,110
SASKATOON, SK	304,975	14,831	1,403
WINNIPEG, MB	730,018	35,563	3,778

Figure 27: Automotive Sales Volume for Canadian Cities

Centralized Distribution Costing Model Analysis

This section will construct two distribution cost models (centralized and decentralized) to analyze the opportunity of southern Alberta as a distribution hub for automobiles to western Canada.

Centralized distribution involves centering your products in one location before distributing to all markets from the one location. Decentralized distribution involves the use of many smaller hubs for distribution to local customers. An example of the two distribution models is shown below:

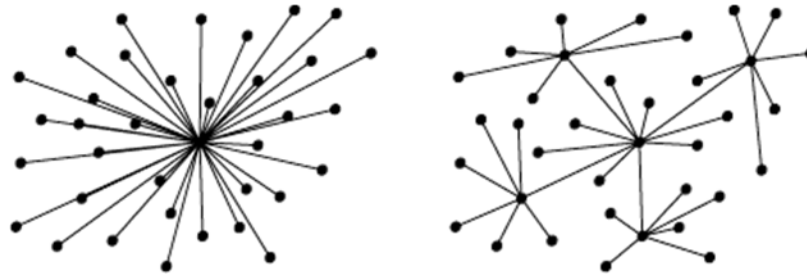


Figure 28: Centralized and Decentralized Distribution Models

The rail/truck costs per vehicle and total costs are shown in the chart below:

	RAIL COST	TRUCK COST	TOTAL COST
PRINCE RUPERT - CALGARY - VANCOUVER	\$ 609	\$ 429	\$ 1038
PRINCE RUPERT - VANCOUVER	\$ 555	\$ 115	\$ 670
VANCOUVER - VANCOUVER	N/A	\$ 115	\$ 115

Figure 29: Transportation Costs for Automotive Distribution by Route

The centralized distribution model compares inland ports assuming their location is a central point for distribution to western Canada. Figure 29 above, outlines the estimated cost of distribution by an inland port using this model. Total costs have been calculated by multiplying freight costs by automotive sales volume in each city. The calculated costs include a rail leg from the Port of Vancouver to the inland ports, and a second leg by truck from the inland ports to the destination cities. Figure 30 outlines the combined cost of both legs (rail and truck) by city.

CALGARY, AB	EDMONTON, AB	SASKATOON, SK	REGINA, SK	WINNIPEG, MB
\$ 22,575,469	\$ 20,801,654	\$ 26,000,411	\$ 31,330,540	\$ 37,934,948

Figure 30: Centralized Distribution Cost Model

Decentralized Distribution Costing Model

The decentralized distribution model below reflects current distribution practices with vehicles shipped by rail to inland ports and then distributed to local markets. The table below outlines the most economic distribution from inland port to destination city:

INLAND PORT	DESTINATION CITY	RAIL COST	TRUCKING COST	TOTAL COST
CALGARY	Calgary	\$ 1,157,823.58	\$ 5,549,498.78	\$ 6,707,322.36
CALGARY	Lethbridge	\$ 78,891.33	\$ 365,419.34	\$ 444,310.67
CALGARY	Medicine Hat	\$ 79,321.84	\$ 242,901.10	\$ 322,222.94
EDMONTON	Edmonton	\$ 1,096,320.67	\$ 4,618,846.65	\$ 5,715,167.32

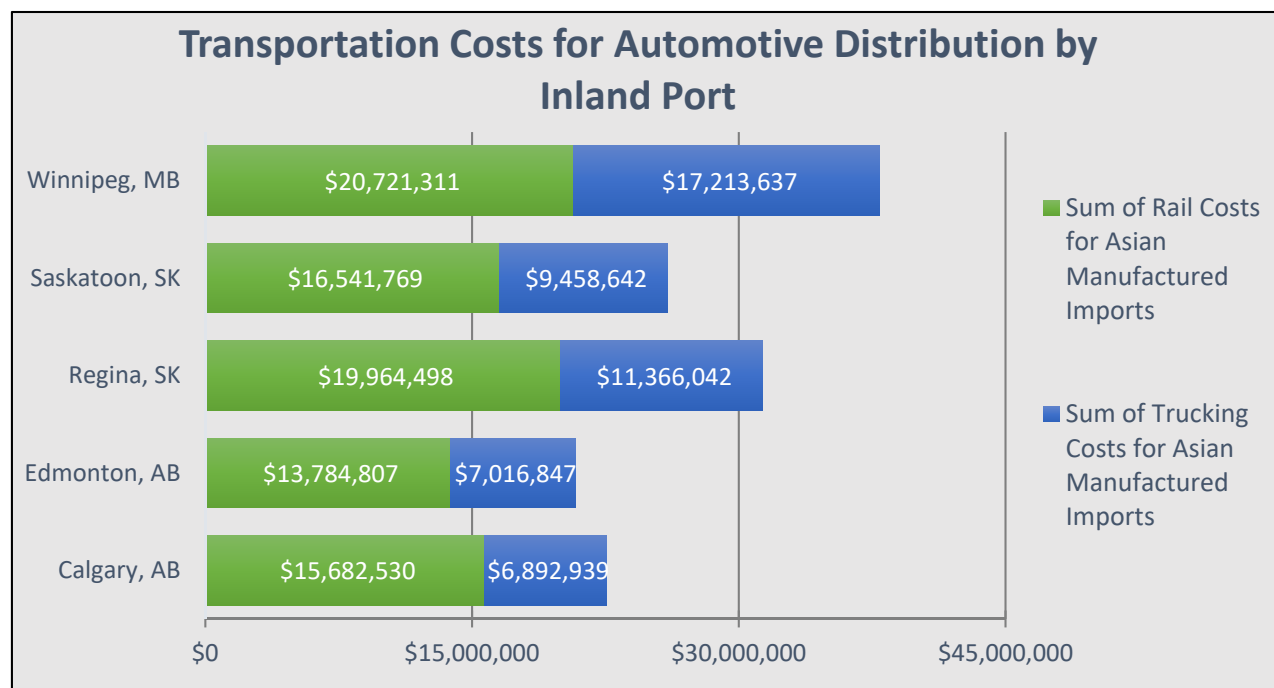


Figure 31: Transportation Costs for Automotive Distribution by Inland Port

EDMONTON	Red Deer	\$ 81,067.02	\$ 341,538.86	\$ 422,605.88
EDMONTON	Fort McMurray	\$ 143,262.99	\$ 277,643.68	\$ 420,906.67
EDMONTON	Grande Prairie	\$ 122,727.27	\$ 232,270.96	\$ 354,998.23
SASKATOON	Regina	\$ 172,093.65	\$ 645,517.71	\$ 817,611.36
SASKATOON	Saskatoon	\$ 161,294.06	\$ 815,446.66	\$ 976,740.72
WINNIPEG	Winnipeg	\$ 399,798.26	\$ 2,531,939.77	\$ 2,931,738.04
				Total: \$ 19,113,624

Figure 30: Decentralized Distribution Cost Model

When comparing both cost models, it has been found that the decentralized model has the lowest cost at approximately \$19 million (see total from figure 31). This is followed by Edmonton as a central distribution hub at \$21 million (see Edmonton total on figure 30) and then Calgary at \$22 million (see Calgary total on figure 30). The primary reason for Edmonton's advantage is the lower rail cost versus Calgary, with a difference of around \$667.00 per rail car. The centralized model does not take into account the cost savings that would result from the consolidation of automotive distribution centres in the region. Although this is an indirect cost to car manufacturers, it may enable railways to price their services more competitively thus benefiting both parties.

In summary, given the marginal cost differential found in the models it is unlikely that higher automotive DC capacity in the Calgary region would result in a competitive advantage for distributors to western Canada.

Additional Distribution Channels

Access to Chicago from Ports

Distributing to inland locations within the US presents access to new markets and the opportunity to increase automotive volumes and other cargo through Canadian west coast ports. Historically, Canadian rail has proven to be a cheaper alternative with high reliability providing a good distribution channel for volume from the west coast to Chicago.⁵¹ Shippers have quoted prices indicating an average savings of \$300 – \$400⁵² moving goods through west coast Canadian ports to North American markets. Using cost, time and reliability benefits, both Ports of Prince Rupert and the Port of Vancouver have progressively increased their market share of Pacific Northwest imports. See Figure 32 below:

⁵¹ http://www.joc.com/port-news/us-ports/us-importers-moving-more-containers-through-vancouver_20150618.html

⁵² http://www.joc.com/port-news/us-ports/port-tacoma/tacoma-seattle-focus-intermodal-protect-expand-market-share_20141201.html

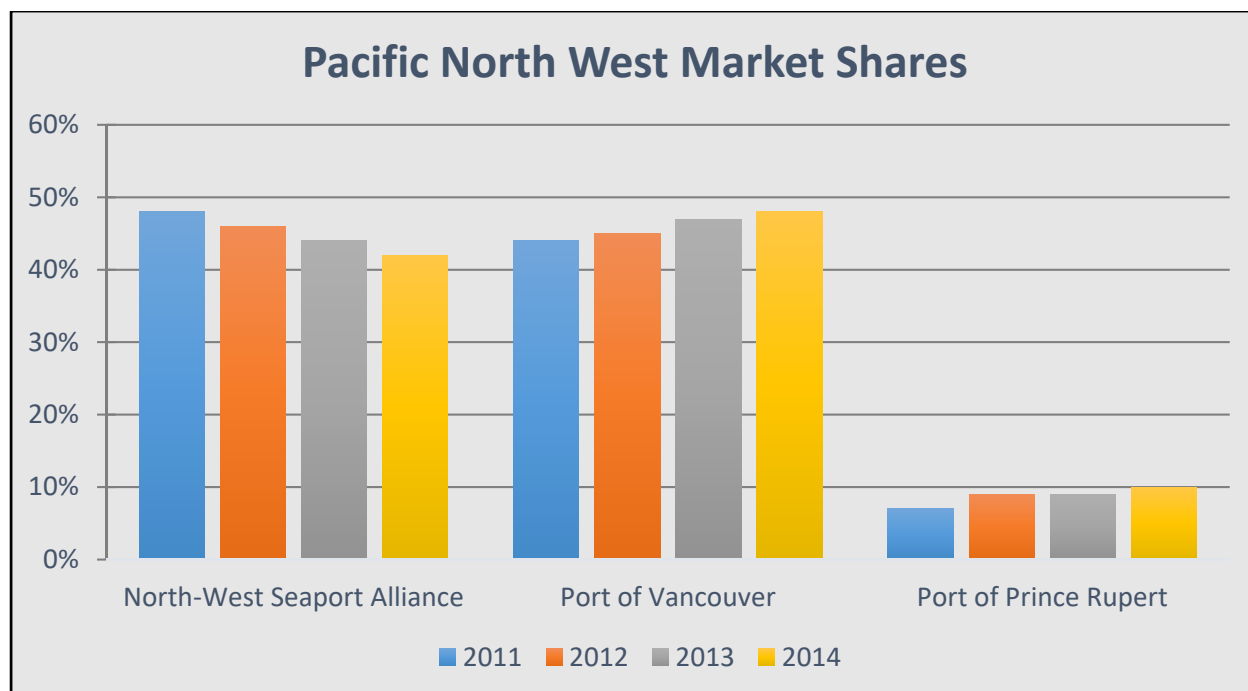


Figure 31: Pacific Northwest Port Market Share

While Canadian ports have utilized their advantages well over the last few years, American ports have been making headway in securing strategic alliances with rail companies to improve reliability and communication. This will increase competition for Canadian ports into the market Chicago from the west coast. Prince Rupert, which has a limited local market to serve, has the capability of offloading and building trains for direct freight to the American market. Information on transit times and available information on costs from west coast to Chicago are in the chart below:

PORT	TRANSIT TIME	COST PER RAILCAR
PORT OF PRINCE RUPERT	<i>Not Available*</i>	\$ 7,357.00 USD
PORT OF VANCOUVER	10 days / 227 hours	\$ 7,129.00 USD
NORTHWEST SEAPORT ALLIANCE	12-14 days / 292-340 hours ⁵³	Not Available
PORT OF VANCOUVER USA	13-15 days / 316-364 hours	Not Available
PORT OF PORTLAND	13-15 days / 316-364 hours	Not Available

*Data not available for transit times from Port of Prince Rupert and rates not available for US Ports.

Figure 32: Transit Times and Cost from Major Ports

Innovative Technology Adaptations

Incoming technology changes will likely have a significant impact on automotive transportation. For example, CTM Worldwide manufacturers auto hauler trucks that can easily be converted into flatbeds to carry freight. This can create opportunities to reduce empty miles and increase economic viability of

⁵³ <http://www.bnsf.com/bnsf.was6/goaltp/cntrl>

auto transporting. The company states that 42% of auto transport miles are logged with empty trailers⁵⁴ presenting an area of inefficiency with high potential for revenue generation.

Opportunities

Opportunity Type	Calgary Region	North America
Domestic Market Growth	A1. Regional growth in demand for Asian manufactured vehicles	A2. North American growth in demand for Asian manufactured vehicles
Inland Transportation	B1. Truck/rail	B2. Rail
Sea Transportation	C1. Short sea shipping	

Figure 33: Opportunity Matrix

A1. Domestic Growth in Demand for Asian Manufactured Vehicles

Alberta is the largest market in the prairies for automotive sales. The proportion of Asian manufactured vehicles sold in Alberta is 12% of total sales. Domestic growth will have a relatively small impact on the overall auto imports from Asia. Alberta's Asian manufactured car sales are approximately 30,000 units per year. A 5-10% increase on this figure would have a small impact on the 400,000 units being currently imported into Canada through west coast ports.

A2. North American Growth in Demand for Asian Manufactured Vehicles

Automotive sales have been strong in Canada and the US through 2014 and 2015, with several west coast ports handling records levels of automobile volumes, including the Port of Vancouver in BC. Ports have identified the sector as a growth area as they have started to invest into increased capacity to handle demand.

B1. Increased Distribution from Centralized Location

The review of the car hauling industry has found that finished automobiles are moving towards a distribution model that emphasizes trucking over rail. The increased flexibility and reliability of car hauling has led to an increase in distances travelled from auto DCs. The analysis of distribution costs found that trucking costs are very similar for Calgary when compared to Edmonton. However, total costs are lower for Edmonton as CN provides more competitive rates out of Vancouver BC in comparison to other Western Canadian cities.

A more centralized distribution model is likely to benefit car haulers as demand for their services will increase. More centralized distribution may also benefit the railway companies as they find new efficiencies by consolidating aspects of their operations. For example, using one larger distribution centre instead of two smaller ones, may help to reduce overhead and administrative costs.

B2. Increased Volumes through Rail Access Advantage in to North American Markets (Chicago)

Reviewing benefits of movement to Chicago from Canadian ports presents an opportunity to leverage current capabilities. This provides both cost and time advantages (especially if direct shipped) and Chicago destined volumes may realize increases.

⁵⁴ <http://www.convertibletrailers.com/benefits/>

C1. Direct Automotive Trade with Mexico through Short Sea Shipping

Vehicle manufacturing in Mexico is expected to grow significantly in the next 5 years. Increased automotive volumes are expected at west coast ports in the United States and Canada for imports originating in Mexico. Although Short Sea Shipping volumes will represent a smaller proportion of total imports, it may still be an important contribution and a potential area for growth.

Summary

This chapter assessed the automotive industry in North America to help create an understanding on the opportunities available for transportation related activities, from the perspective of the west coast ports and the southern Alberta region.

A review of current market trends found that there has been sustained growth in automotive sales in North America. The proportion of overseas manufacturing is also shifting as automobile manufacturers are increasingly moving these operations to North America.

Ports on the west coast have growth potential with projected auto volumes in the coming years, with several seeing record figures for 2015. Another growing area is short sea shipping on the west coast as northbound rail capacity is strained in Mexico.

Of the class 1 railways in Canada, CN has the largest network, giving automotive access to most major cities in Canada as well as some in the US. This extended network may enable auto traffic moving from Asia through the Port of Prince Rupert to have an advantage against based on superior rail access to certain markets as well as shorter marine transit times.

Additionally, the study determined that although Calgary is an important market for western Canada, an emphasis on distribution to eastern Canada and parts of the US is required in order to achieve meaningful volumes.

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Triskele Logistics Ltd.

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JRSB Logistics Consulting Ltd.

Jim Brown is a private Logistics Consultant. Born and educated in Montreal, Quebec he began his transportation career with C P Rail in Montreal 1969 and transferred to Calgary in 1977 with C P Ships. Joined DB Schenker of Canada Ltd (International Freight Forwarder & Customs Broker) Calgary in 1984 and retired in 2012. An extensive background in Projects for the Oil & Gas Industry, as well as an understanding of the current Geographic constraints of ports and the proposed Port Gateways being considered for future development.