

Strategic Supply Chain Knowledge Development in the Hamilton-Niagara Area

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Mark Ferguson

Angelo Pilla

McMaster Institute for Transportation and Logistics

McMaster University
Hamilton, Ontario

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mitl.mcmaster.ca

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TABLE OF CONTENTS	ii
Tables	iv
Figures.....	iv
EXECUTIVE SUMMARY.....	v
1.0 INTRODUCTION	7
1.1 Context.....	7
1.2 Supply Chain Definitions	8
1.3 Thinking in terms of regional supply chains	8
1.4 Structure of the Report	9
2.0 BACKGROUND.....	10
2.1 Prominent freight flows linked to the region	10
2.2 E-Commerce.....	12
2.2.1 Shifts in Goods Movement due to E-commerce.....	13
2.2.2 Consultation Insights.....	13
2.3 Exporting.....	15
2.3.1 Importance of Outward Foreign Direct Investment.....	15
2.3.2 Consultation Insights.....	18
2.4 Agri-Foods	19
2.4.1 Importance to Canada, Ontario and Region.....	19
2.4.2 Other Relevant Agri-Foods Notes	20
2.4.3 Consultation Insights.....	20
3.0 PERCEIVED NEEDS AND ISSUES.....	22
3.1 Infrastructure.....	24
3.1.1 Road.....	24
3.1.2 Feedback on a Mid-Peninsula Highway and a Twinned Peace Bridge	26
3.1.3 Rail, Marine and Air	27
3.1.4 Industrial Real Estate and Warehousing.....	31
3.2 Data	32
3.2.1 Supply Chain Visibility.....	32
3.2.2 Understanding the Customer.....	33
3.2.3 Better Communication of Data.....	34
3.2.4 Other Issues.....	34
3.3 Policy	36
3.3.1 Difficulties in Moving Big (or Even Smaller) Projects Forward.....	36
3.3.2 Supply Chain Labour Shortages.....	37
3.3.3 Excessive Regulation and High Taxes	38
3.3.4 Inter-Jurisdictional Issues.....	41
3.3.5 Municipal Reactions to Concerns of Local Residents.....	42
4.0 CONCLUSIONS	44
4.1 Infrastructure, Data and Policies	44
4.2 E-Commerce and Exporting.....	46
4.3 Technology	47
4.4 Challenges and Opportunities	48
5.0 REFERENCES AND FURTHER READING.....	50
Appendix A: Consultation Questions	54

Appendix B: Organizations Consulted	55
List of Acronyms	56

Tables

Table 1: Perceived Infrastructure Related Issues/Needs	31
Table 2: Perceived Data Issues/Needs	35
Table 3: Perceived Policy Issues/Needs	42
Table 4: Summary of Opportunities and Challenges	48

Figures

Figure 1: Goods Flows from Ontario (2015) including Exports and Inter-Provincial Trade.....	16
Figure 2: Geographically Referenced Aspects of Interest.....	23

EXECUTIVE SUMMARY

This summary offers the main results of a process that has been underway since January of 2019. The process has combined a literature review with in-depth consultations to yield insights on how to improve the functioning of supply chains linked to Hamilton-Niagara region. World-class supply chains are integral to regional competitiveness and there is thus considerable urgency to find the best answers to the questions posed in this study. A total of 24 consultations, carried out with a wide range of organizations linked to Hamilton-Niagara, were undertaken as part of the effort.

In terms of how government can help with solutions, three pillars were identified prior to the consultations as infrastructure, data and policy. It was not presumed that government can solve all, or even most, identified problems but results do suggest that the role for government is a prominent one. Associated with the three pillars were three thematic areas of interest for the region: 1) e-commerce; 2) increasing and diversifying exports and 3) the further potential of agri-foods. These themes have been prominent but others have emerged as well.

In terms of outcomes, it was clear that most stakeholders emphasize infrastructure as the pillar in need of the most attention in the region and one where government has a pivotal role to play. Highway infrastructure is on the minds of most. Reducing bottlenecks on existing routes is prominent but the need to plan a Mid-Peninsula route to add redundancy and improve connectivity for regional crossings is also top-of-mind. There was an underlying sense that the Queen Elizabeth Way might become more relatively tourist-oriented (which is of huge significance for Niagara Region) while a new corridor might have a greater relative focus on freight movements and more direct access to Buffalo via a potentially twinned Peace Bridge. Roads and highways emerge as themes for Hamilton International Airport in a local and regional sense and for the Port of Hamilton more so in the sense of local access. Multi-modal infrastructure at the Port of Hamilton has been emphasized with airport needs being focused on the two runways and more extensive, e-commerce oriented sorting facilities. A clear shortage of warehousing facilities in the region is an important theme with the potential being recognized that a new corridor could also assist in this regard along with increasing the multi-modal potential of places like Welland, Ontario.

The further development of the multi-modal potential of strategic goods movement infrastructure such as the Port of Hamilton, Hamilton International Airport and new infrastructure along the Welland Canal are welcome additions to the goods movement scene within the region. Productive use of rail and marine is a very important mechanism to reduce unnecessary longer distance movements by truck. This generally helps to reduce metropolitan traffic congestion and is good for the environment. Certainly, there are calls in these consultations to find ways to move more goods and people by marine.

The data pillar was oriented towards better end-to-end understanding about supply chains, given the admissions of several organizations that they knew their own pieces best but could benefit from knowing more about the complete picture to make better business decisions. There was some discontent with the state of data but several organizations believed that they were coping adequately to fulfill their role in the supply chain. A second major data theme was linked to understanding the profile

and the needs of the end-customer. There were examples where information on the end-customer for a given firm could only be accessed through other firms. Without exception, firms preferred knowing more about the end-customer than less since greater knowledge translates into better service. In the wine sector in Ontario, for example, domestic data about customers was seen as lacking compared to potentially available foreign data about foreign customers.

Related to the policy pillar, it was noteworthy that a primary focus was on ideas to expedite the development of infrastructure in the region from conception to completion. A focus on “funding to plan” was one such idea and the environmental assessment process was frequently identified as not sufficiently streamlined. Moving away from infrastructure, the second major area for attention was the supply chain labour force and having measures in place to support its maintenance and development. Recognition of driving as a skilled trade was recommended. Air cargo and foreign marine vessels require pilots and upcoming regulations for each were a concern. Air pilot shortages and higher labour force costs are a fear for air cargo while marine pilot shortages can already hold up a foreign vessel for several days. There was much concern with already high costs in the supply chain translating into expensive end-products. Labour force issues were certainly identified as a significant contributing aspect.

A final major policy matter is having governments, especially within Canada, working together as closely and seamlessly as possible. Feedback suggests that there is some room for improvement. The need was identified to remove or reduce inter-provincial barriers to trade and eliminate regulatory inconsistencies between jurisdictions in the North American sense. Achieving common daily driving hours for truckers was one example.

The intersection of agri-foods, exporting and e-commerce appears to offer considerable potential for local firms. It was heard the “Made in Canada” resonates well around the world and that a new generation of Canadian entrepreneurs in the agri-food and other sectors have the potential to capitalize on these opportunities. With regard to E-commerce in Hamilton-Niagara, there is a need to celebrate and publicize the success of such firms and make sure that the lessons are clearly communicated for the sake of those SMEs that may follow in the footsteps.

With regard to exporting, results from the process show that it requires an enormous commitment of time and resources for a locally-based firm to understand the nuances of each country-specific market. Such nuances make diversification of exports more challenging. In many cases, it requires company management to travel widely and frequently. Global 3rd party logistics firms that operate in Ontario may offer avenues for support and in helping to make new connections. The opinions of those who operate SMEs in the region on a global basis should be listened too closely since they have done what many in the region aspire to do.

Introduction

1.1 Context

This report is intended to be more of a starting point than an ending point. The goal is to assist in developing a dialogue about aspects needed to help grow the Hamilton-Niagara economy. In particular, the focus is on potential improvements in aid of supply chains that are tied to Hamilton-Niagara. Three important mechanisms to help in this regard are improvements to infrastructure, policies and data. These mechanisms are central to this report. In general, the field of economic development is a large one and generally too broad for the scope of this report but there is no denying that efficient supply chains are a core aspect of better performing economies.

To assist in the creation of a dialogue, this report utilizes two main approaches. One is that we have consulted with a range of relevant private and public organizations in the region and collected their opinions based on a set of basic but revealing questions. The second is that we have reviewed a wide range of literature both within and outside the region to develop a good understanding of important background aspects. The integration of primary stakeholder sources and material derived from a wide range of secondary sources leads to the fundamental insights of the report. From a sectoral perspective,

two that are quite important for this region are agri-foods and advanced manufacturing and, in fact, these sectors have been well-sampled in the consultation process.

One important note is that this process has been conceived with an underlying question of how governments can help with this region's supply chains. Consultations that took place did not emphasize any one level of government relative to another, irrespective of the fact that this report is federally sponsored. The nature of the consultation process is such that the content of this report may reflect viewpoints that are not necessarily supported by the best available evidence.

1.2 Supply Chain Definitions

The “Supply Chain” concept is central to this report, so it is useful to remind the reader of what is meant by this term. Two prominent definitions of the “supply chain” are:

- “the alignment of firms that bring products or services to market” (Lambert, Stock, & Ellram, 1998)
- “all the stages involved, directly or indirectly, in fulfilling a customer request. The supply chain not only includes the manufacturer and suppliers, but also transporters, warehouses, retailers and customers themselves” (Chopra & Meindl, 2015).

Supply chain management is defined as: “the coordination of production, inventory, location and transportation among the participants in a supply chain to achieve the best mix of responsiveness and efficiency for the market being served.” (Hugos, 2018). It is further stated by Hugos that supply chain management conceptualizes the organizations in the supply chain essentially as a single entity.

A participant in the consultations perhaps said it best when it was described that “everything is a supply chain” nowadays. Another noted that it is “amazing how connected the world” has become in terms of having the capability to exchange products and services.

While the focus of the report is in Hamilton-Niagara, the reality is that there are massive, often global-scale trends underway. The report seeks to take account of such trends while considering what they mean for Hamilton-Niagara. By the same token, there are important developments in the larger region, within Southern Ontario or beyond, that are salient for Hamilton-Niagara as well.

One mega-trend is the rise of E-commerce. It has certainly been playing a prominent role in the reconfiguring of supply chains to be more responsive to end-markets such as consumers. The pace of change is perhaps slower in supply chains associated with bulk goods (also very important for the region) but technological innovation is at the heart of many supply chain improvements, for example, to railroad efficiencies over recent years.

1.3 Thinking in terms of regional supply chains

It is true that the possibilities are endless to conduct commerce globally but actual data show (Baldwin & Lopez-Gonzalez, 2014; Yi, 2017) that international supply chains remain mostly regional and occur

within “Factory Asia”, “Factory Europe” and “Factory North America.” China, Germany and the US respectively act as the three main hubs in each region. Other points of interest from these authors are that:

- the global pattern for intermediate industrial goods is more regionalized than the pattern for intermediate services, with the pattern for raw materials being the least regionalized.
- Intermediate services are under-appreciated and account for 28% of world supply-chain flows.
- 11% of US exports to Canada are reimported but only 2% of Canadian exports to the US are reimported and this shows clear evidence of a hub-and-spoke pattern with the US as the hub.

Linked to this hub-and-spoke ¹pattern, Anderson (2012) notes five important points about Ontario and its border that remain relevant today: 1) Ontario has a trade intensive economy 2) Ontario’s international trade is highly focused on the United States 3) Ontario’s exports to the U.S. are mostly of manufactured goods 4) most of Ontario’s exports of goods to the United States go by truck 5) Ontario’s exports by truck are focused on a small number of border crossings. These statements do appear to apply well in Hamilton-Niagara.

Considering the most important crossing into the US, in 2017 there was \$39.1B (US) that was exported across the Peace Bridge (World City Inc., 2018). Motor vehicles accounted for 21% of the value of goods which was by far larger than any other commodity. Two categories were at 4%: petroleum and hydrocarbon gases and goods that were being returned to the US after value-added processing in Canada. Oil was at 2.5% of total value. Otherwise, cargoes crossing the Peace Bridge are very highly diversified.

1.4 Structure of the Report

Chapter 2 of this report offers background to help better understand supply chains in the region. Some of the content has been derived from our reviews of relevant literature and other content has been derived from the consultations. Particular themes of interest in this background chapter are e-commerce and exports, which are quite relevant to future growth in Hamilton-Niagara, as they are for other regions, and both depend on efficient supply chains. Chapter 3 is the main source in this report to enumerate pain points and opportunities that can be linked to Hamilton-Niagara supply chains. The focus is on infrastructure, data and policies and with a view to potentially generating benefits along each major dimension. The content of Chapter 3 is heavily based on the viewpoints derived from the consultations. Finally, a brief final Chapter 4 offers several concluding thoughts that arise from the integration of insights from the overall process.

¹ Hub and spoke patterns are quite common in freight contexts associated with the distribution of goods. Airline travel in the United States is also a prominent example associated with people movement. Airlines tend to have one or two important “hub” airports with a series of “spoked” connections to a large number of smaller airports.

Background

This chapter offers some important background on themes that are important for this study. One is that results from the consultations are used to outline some important freight movements linked to the region. The topic of e-commerce is assessed generally and also from the perspectives of those consulted. Exporting is an important key to economic growth and acts as the fuel for many international supply chains. This topic is also examined for what it could mean to the region including complementarities between e-commerce and exporting. Finally, the chapter concludes with an overview of some aspects relevant for the agri-foods sector, which is highly important for the Ontario economy and for Hamilton-Niagara.

2.1 Prominent freight flows linked to the region

A large number of supply chains, with varying characteristics, are linked to Hamilton-Niagara. It is worth quickly reviewing a sampling that have been described through this consultation process:

- Ontario farmers from a large surrounding area have their outputs (e.g. soybeans, corn) trucked to Hamilton. A large number of trucking organizations are involved. Origins for these movements include points as far north as New Liskeard which is about 150 km north of North Bay. These cargos are aggregated on-site at the Port and then loaded onto vessels which are destined largely for Europe. The past year was unusual in that China received significant Port of Hamilton exports via the Panama Canal as a result of trade tensions with the United States.

- In special circumstances, unit trains of grains have travelled from Western Canada to arrive at the Port of Hamilton before leaving for overseas by vessel. More commonly, Western Canada grain may arrive by truck or rail at Thunder Bay and proceed by marine through the region via the Welland Canal.
- Pillitteri Estates exports wines to 39 countries using combinations of truck, rail and vessel to move temperature-controlled containers. Their wines are warehoused in foreign locations to allow quick delivery to their end customers.
- Parrish and Heimbecker has a new flour mill at the Port that serves bakeries in the region (e.g. Canada Bread). Wheat comes in by vessel, is processed on-site at the mill, and is trucked to the end destination. When the Seaway is closed, wheat is instead trucked into the flour mill for processing.
- Fox40 manufactures and distributes a whole range of products that are generally linked to sports and recreation. Their extensive product line was developed around the first pealess whistle. For manufacturing, components sourced from Asia arrive via container and are moved to rail at Vancouver and trucked to Hamilton from Toronto. Some components arrive via air freight into Hamilton while packaging for their products is generally trucked into Hamilton.
- Steel coils move by truck and also by rail from CPs Transcare facility near the McMaster Innovation Park (coils are not well-suited to intermodal). Canadian steel originating from Hamilton is destined for many North American locations. Transcare also handles diversified cargo and plastics.
- Steel coils from Arcelor Mittal are generally moved out by truck if the destination is 300 miles or less and by rail for longer distances that involve destinations in the US or Mexico. Similar dynamics are at play for Stelco which is more domestically oriented at this time.
- Large volumes of cargoes such as iron ore and coal are processed at the Port and/or make their way through the Seaway.
- A lot of goods pass through the Hamilton-Niagara region. For example, there is a double stack intermodal route from Montreal that travels through the region into the US. These are very significant movements.
- For rail, Hamilton-Niagara itself is prominent for carload traffic not intermodal (with carloads being fairly commodity oriented). For example, some cargoes may arrive at the Port, be moved to rail and proceed to Chicago or elsewhere. However, some intermodal containers are unloaded at Transcare and trucked to the CP Vaughn intermodal facility.
- For CP, the Niagara crossing into the US is very significant for high-value cargo which can be quite time-sensitive for customers. This is one of the 3 most important crossings for CP with the others being the Windsor Tunnel and a crossing at Portal, North Dakota

- It is noteworthy that cargos such as peas, beans and lentils that are grown in the Prairies have been increasing and are headed for export markets primarily in Europe and the Middle East via the Seaway.
- From November through spring, salt is brought into the Port of Hamilton and trucked out in preparation for winter weather.
- Bunge Corporation, which is an American multi-national, buys canola and soya from farmers in Ontario and Western Canada. The processing plant in Hamilton turns these inputs into animal feed and edible oils. The outputs are shipped to Oakville for value-added processing including packaging (Moro, 2015).

2.2 E-Commerce

The rise of e-commerce in all of its forms and in all its enabling power is probably the most significant change to impact upon supply chains in the last two decades. According to Turban et al (2018), e-commerce refers to using the internet and other networks (e.g. intranets, extranets) to purchase, sell, transport or trade data, goods, or services. Three major activities associated with e-commerce are ordering/payment, order fulfilment and delivery (shipment). They note that all three of these activities can be done physically or digitally which makes for eight possible combinations. Ordering and downloading a software product over the internet is pure e-commerce because all 3 elements are done digitally. Purchasing a household item from Amazon is partial e-commerce because the item must be physically transported. Many organizations are involved in more than one of these eight combinations.

Turban et al (2018) recommend a fairly broad definition of e-commerce which can also be referred to as e-business. They point out that e-commerce can be considered as being much more than the just the buying and selling of goods and services. It can include servicing customers, collaborating with business partners and other aspects. Two dominant forms of e-Commerce are business to consumer (B2C) and business to business (B2B). While the former has attracted more attention, the latter is actually larger. They note that B2B transactions account for 85% of ecommerce volume. To further reinforce this point, in 2014 e-commerce accounted for 60% of sales from all U.S. manufacturing activities, 22% of merchant wholesaling and 6.4% of retailing. Each of these shares will have increased since then.

Data from PayPal Canada (2018) indicates that Canadian SMEs that leverage e-commerce are growing faster than those small and medium firms that do not. Those that use e-commerce grew 22% on average in 2017 which is considerably higher than the general growth rate for SMEs. These results come from the analysis of 4000 Canadian SMEs that use the PayPal platform. Significantly, the analysis reveals that 63% of these Canadian SMEs export their products and services. The data also reveal that SMEs in non-urban, outlying areas are showing good growth when E-commerce is utilized.

As a counterpoint to the success that SME's are having with e-commerce is the fact that approximately half of Canadian small businesses do not yet have a web site (let alone e-commerce capability) to help sell their offerings (Mohammad, 2018). Note that Amazon has an arm in the U.S. called "Amazon

Business” which is seeking to have a big impact on B2B e-commerce in a manner similar to what they have accomplished with B2C commerce. Apparently this arm of Amazon business already has over one million business customers (Beron, 2018), many of them SMEs.

2.2.1 Shifts in Goods Movement due to E-commerce

Because so much of e-commerce is partial (as noted in the prior section), it manifests itself in the form of physical goods that have to be moved and some of the patterns associated with these movements are shifting from what has been experienced in the past and are introducing new stresses.

According to a recent report by the ATRI (Hooper & Murray, 2019), e-commerce is having a dramatic effect on goods movement and distribution in the United States. Average truck trip lengths have decreased 37% since 2000 while urban vehicle miles travelled have increased. New regional distribution hubs, well-located relative to key markets, have been emerging (e.g. Cincinnati and Indianapolis). These hubs have important infrastructure like ports, airports, interstates and rail and sufficient industrial developable land. Similar dynamics are at play in Canada and in this region.

Brick and mortar stores remain essential, but retailers are becoming more flexible in their interaction with customers. An omni-channel model is developing where interactions between retailers and customers can take different forms. Expectations are getting higher with, for example, the rise of same-day deliveries in some cases. The net result is that distribution/fulfilment networks are bringing inventory closer to customers. E-commerce has also been associated with the rising importance of reverse logistics. More and more than before, items are returned, and this reality serves to generate further stresses on the system.

While much of B2C E-commerce is linked to smaller parcels, this is quite often not the case. Because people are also ordering much larger items via e-commerce, less than truckload (LTL) carriers are increasingly being forced to deliver directly to consumers (Morris, 2016). It is estimated that e-commerce represents 10 to 20% of deliveries in the LTL industry segment. Large trucks used to move easily between commercial loading docks, but are now forced to deal with the vagaries of residential neighbourhoods such as cul-de-sacs and overhead wires. Big shippers, such as Home Depot, tend to mix big items with small because such an approach makes shipping easier for them. Some items that are delivered to homes are hundreds of pounds and such deliveries are reported to be very time consuming. In consultations, the Ontario Trucking Association noted that larger trucks are more often having to go to places like this that they didn’t before.

2.2.2 Consultation Insights

The wide range of organizations that were consulted, generated a wide range of responses as it related to e-commerce. Perceptions certainly varied by organizational context. Some of the main points are as follows:

- Organizations were fairly matter-of-fact about B2B e-commerce or in some cases may not have thought of B2B processes as being defined as e-commerce. There was a sense from many that

associated processes had been in place for some time whether it related to technologies such as electronic data interchange (EDI) or Enterprise Resource Planning Systems (ERP). For the most part, it was acknowledged that B2B processes have enabled streamlining, cost savings, fewer errors and overall greater efficiency.

- For the City of Hamilton, the main e-commerce linkage of concern was available industrial/warehouse space although there was secondary mention of associated deliveries clogging some City streets. Even peak population densities in Hamilton-Niagara do not approach those of the core of the GTA, so there was not that same sense of urgency in this latter regard that might have been encountered from stakeholders in downtown Toronto. In Hamilton, there is a strong sense of big changes in the last 18 months where there are many more inquiries about industrial land and there is a sense that the Airport Employment Growth District is beginning to gather momentum. It is speculated that an e-commerce fueled need to get closer to the customer and cater to the needs of rising expectations (e.g. fast delivery) is behind much of this new momentum.
- For some organizations consulted, e-commerce has been absolutely central to their growth. One excellent example is Cargojet, which has prospered by efficiently serving the “middle mile” and doing so in such a way that the likes of Purolator and FedEx prefer to outsource to them. The partnership of Cargojet with Amazon was portrayed as a fundamental growth driver. A second example is Fox40 which is in the business of manufacturing and distributing patent-protected whistles for sports, recreation and other uses to many countries around the world. The firm notes massive increases in e-commerce sales from their own web site and also via Amazon.
- For rail companies, it became clear through our CP consultation that B2B capabilities have been very important in assisting growth, though it has not been considered as the most important technological improvement in the rail context. But it was also noted that e-commerce had caused some dislocations in their clientele. For example, the former Sears Canada used to be a customer and it was suggested that the shifting needs of the Hudson’s Bay Company had affected business done with CP. On the other hand, some test shipments have taken place with Amazon and Purolator.
- For supply chains associated with marine, there was perhaps not the same sense of e-commerce prominence although there was acknowledgement of many improved processes over time. Agri-foods tenants at the Port of Hamilton noted that many of their business relationships were “a few to a few” with not a large number of parties involved. There was a perception that a lot still gets done over telephone and individualized e-mails. It was described that a single vessel might contain \$10 million in value of goods and that associated transactions tend to be more personal than impersonal.
- From a 3PL perspective, it became clear from DSV that a mastery of technologies, including those associated with e-commerce, is central to maintaining their competitive advantage as a

facilitator for the efficient movement of goods for all of their clients. DSV has become intimately involved in the e-commerce supply chains of major retailers.

- For IKEA, e-commerce has introduced change into an historically thriving business and it has been a question of how best to prepare for the future. They note that e-commerce has fueled the rise of new types of customer interactions involving different combinations of store visits, ordering in advance, pick-up of goods (stores/lockers), and home deliveries and/or assembly. The multi-channel perspective was obvious. It was noteworthy that IKEA also very consciously caters to a clientele segment, more often seen in denser urban settings, that may not operate a household vehicle.
- A significant concern linked to e-commerce and raised by both Fox40 and Agri-Foods Canada was essentially counterfeit products. In agri-foods, this would generally be known as “food fraud.” Many counterfeited products are produced in China and it is often North Americans who are profiting from the mis-representation. The problem is difficult to catch quickly and the feedback is that new policies are required to help with the enforcement of patents and trademarks. Agri-foods Canada noted that the punishment, at this stage, is not fitting the crime and suggested appropriate penalties to assist with deterrence.

2.3 Exporting

The total value of goods exports from Ontario was \$197B in 2017 with the vast majority being manufactured goods (according to CANSIM data from Statistics Canada -- Table 12-10-0098-01). This showed an increase from \$160B in 2013. In 2017, about \$24B in exports was destined for Europe, nearly \$10B for Asia, \$3B for Mexico and \$2B for the Middle East. Most Ontario exports have a North American destination with 79% destined for the US and about 81% if all of North America is considered. Data available for Niagara region (Niagara Economic Development, 2017) indicates that nearly 90% of the region’s exports, from 613 firms in the region, are destined for North America. So Niagara Region is less diversified in export terms than is Ontario as a whole, which might be expected given the close proximity of the region to the border.

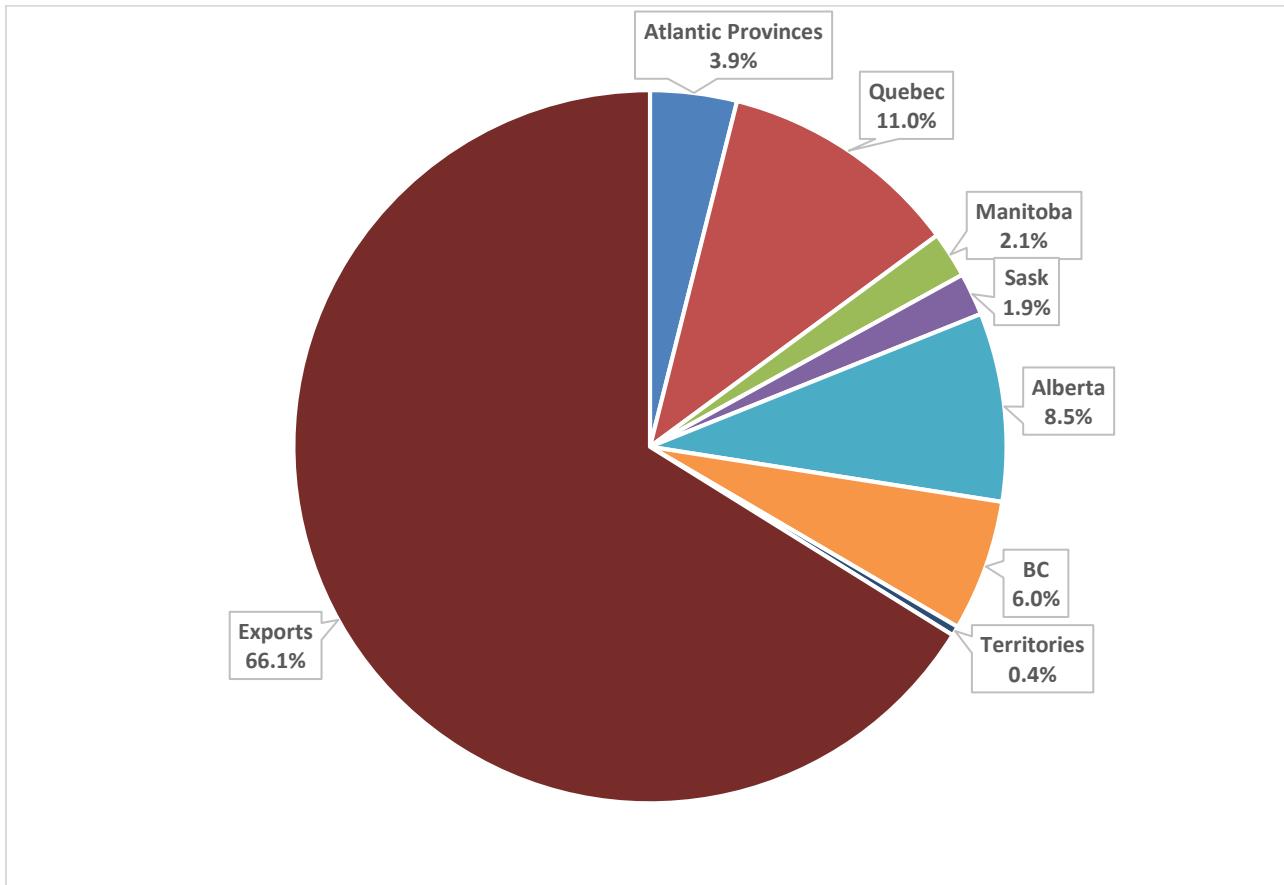
Figure 1 below gives a good sense of how export flows from Ontario to other countries compare to flows to other provinces and territories. It can be seen that international trade linkages (with the U.S. of course being very prominent) are far more important to the Ontario economy than linkages to the other provinces by a 2 to 1 ratio. The flows to Quebec, Alberta and British Columbia are nevertheless very significant and in excess of the value of exports that flow to Europe. Total dollar flows associated with Figure 1 are \$384 billion.

2.3.1 Importance of Outward Foreign Direct Investment

The Conference Board of Canada (2012) notes that Foreign Direct Investment (FDI) is a key driver of globalization, global economic growth and global value chains. FDI promotes deeper integration between countries. In their ranking exercise for 2011, Canada received a “C” grade in this regard in contrast to countries such as Switzerland and Belgium, which received an “A” grade. It was noted that

Canada is improving in diversifying its FDI given that the US share of Canadian FDI declined from 66% in 1987 to 40% in 2011.

Figure 1: Goods Flows from Ontario (2015) including Exports and Inter-Provincial Trade



Source: Statistics Canada, Interprovincial and international trade flows 2015, Catalogue 15-F0002-X

Researchers from the Institute for Competitiveness and Prosperity in Toronto conducted a series of in-depth structured interviews with a sample of Canadian exporters which indicated that there are few short cuts to successful exporting and that successful firms, in this regard, are often successful at home before they are able succeed abroad (Boothe & Smith, 2017). Venturing abroad required considerable in-house due diligence and did not rely on outside consultants. The sample seemed to focus on companies from the advanced manufacturing sector.

Among local cases, Fox40 confirmed in consultations that the path to exporting took a great deal of time and effort but that the fruits of the labours have turned out to be absolutely integral to the growth of the company. They advised that ensuring a thorough understanding of customs and best practices in the area of export is integral to the success of the venture.

While the literature review process has not come across many exporting case studies in the Hamilton-Niagara area, one from nearby is instructive. The Chief Executive of Miovision Technologies Inc. in

Kitchener, a firm that focuses on solutions for traffic congestion, notes that their plan from the start was to become an exporting company and currently their offering serves over 50 countries (Israelson, 2017). The firm made a choice to physically locate in Germany with a staff of five. It is noted that in order to grow business in other countries, language and cultural barriers must often be overcome, and it was this reality that motivated their foreign investment in Germany.

Beer Exporting Case

While some wineries handle their exporting for themselves, others rely on a distributor to do it. The same is true with craft beer. The story of Pacific Rim Distributors (Tenpenny, 2018) illustrates how a small distribution company worked with local craft beer breweries in BC to forge distribution partnerships around the world. The firm started small beginning with Thailand, which was viewed as a very attractive market for craft beers, and they expect to be in 25 countries by the end of 2019. Pallets of beer are sent via reefer container to Asia. To get to Europe the product is shipped by rail to Montreal and consolidated there with larger shipments. One of the wineries consulted in Niagara had relied on a partner, with similarities to Pacific Rim Distributors, to export their product to Asia.

It was heard in consultations that “Made in Canada” is a powerful term that resonates well in many countries. One of the main selling points for Pacific Rim Distributors in the Chinese market is the fact that Canadian water is used in the beer.

CETA

The Comprehensive Economic and Trade Agreement (CETA) between Canada and the European Union came into effect in 2017. It is a free trade agreement that has eliminated most of the tariffs that existed between Canada and the EU. The deal certainly appears relevant for Hamilton-Niagara in that there is a considerable flow of exports to Europe from the Port of Hamilton alone and this is just one example. Overall statistics for CETA showed that one year into the deal, EU countries seemed to be doing a better job of taking advantage of the deal than Canadian firms (McGregor, 2018). In the first year, EU exports to Canada were up 12% while Canadian exports to the EU increased only by 1%.

In an interesting analysis, Allee et al. (2017) used an algorithm to compare the text of CETA with past trade agreements to assess the originality of CETA. Using heat maps, it was found that CETA has only 7% language overlap with prior trade agreements. The findings suggest that CETA contains a significant amount of innovation and that this might potentially bode well for the deal to be an effective one (Allee, Elsig, & Lugg, 2017).

Although the comment was not specific to CETA, Stelco argued that in aggregate, trade deals have not been beneficial for the Canadian steel industry. Despite the 25% North American tariffs that have been in place since 2018, they note that steel generally trades around the world as a zero tariff commodity already. Trade deals have also tended to make concessions on minimum levels of domestic content that would go into manufactured products and these concessions were not seen as generally being in the interests of Canadian steel.

On the other hand, Parrish and Heimbecker stated flatly that CETA had been beneficial and that the elimination of tariffs on corn had caused an increase in shipments to Europe. It was also interesting to hear accounts of how global frictions had ultimately generated new opportunities. Both P&H and Richardson International benefitted from China refusing to purchase soybeans from the US. More recently, the news from China for Richardson International had been far less favourable. P&H noted that the conflict in Crimea, leading to its annexation, caused a closure in the Black Sea at some point and large shipments from Canada ensued. Business relationships were formed that persist to this day although at smaller volumes than originally.

2.3.2 Consultation Insights

Exporting did emerge as a prominent theme in the consultations and there was a question in the script that was dedicated to asking about exports. There was a subset of firms consulted whose line of business was to facilitate exports for clients. One of the firms, which has offices all over the world, actively gets involved in generating export opportunities for its clients. There is a business development process that takes place and is involved with making/leveraging international connections. The firm is able to profit from its upfront investments as goods start to flow between the connected parties. These types of services are available for Hamilton-Niagara businesses with products to export.

Another firm specializes in “North-South” movements between Canada and the US (and vice versa) and profits from its efforts to streamline North American trade and have it appear relatively seamless to its customers. They note that some trepidation about exporting, even within North America, is well-placed. It is not seen as being a straightforward process or for the faint of heart.

A subset of firms were shippers and had a product to share with North America and overseas. Pillitteri Estates colourfully described the exporting process as “sending a piece of Niagara to the World.” At last count, this had been done in their case for 39 countries. The firm is particularly noted for ice wine products that account for approximately 50% of its production (Bonnyman, 2016). The proprietor’s approach to exporting involves travelling intensively. Some figure approaching 100 trips to Asia in past years was mentioned. Setting foot in the country that you wish to do business with was seen as paramount. He noted: “If you don’t go, you won’t know.” Extensive knowledge was communicated about how reactions by destination country would vary if the product was not able to survive the shipping process in pristine condition. These insights hinted at the nuances in exporting to many countries.

But this highly involved approach was not the only one that we came across. For Harbour Estates, a relationship with a business partner had been established who mainly handled the international arena and associated logistics. Periodically, a 40-foot container of product would be picked up, trucked to Toronto and railed to Vancouver before a transfer to vessel for the trip to China. Exporting into China had been accomplished but the prospects of diversifying further into other countries seemed rather risky to the proprietor of this firm. Certainly, with this business model, new business partners linked to other countries might need to approach the winery in order to diversify exports.

While bearing the last two cases in mind, a challenge that was identified for exporting from Niagara wineries is their predominant small size and the difficulty that would be incurred in filling a container, or even a good proportion of one, for shipment. Generally, exporting was seen as somewhat less viable for a small winery.

DSV, the third party logistics provider, noted that they really emphasized exports in their Canadian activities. It was suggested that with this focus, there was more control of the process, and there was the potential for more lucrative returns.

The topic of Foreign Trade Zones came up several times in the consultations as a topic of interest. Canada's suite of programs are quite export-oriented, relative to US programs, and assist businesses in dealing with the extra costs associated with duties and tariffs. The Duties Relief Program is the most significant and allows firms to avoid paying duties on imported goods that are subsequently exported after processing. Niagara Region is fairly advanced in increasing the knowledge about such programs which are also being investigated by the City of Hamilton.

2.4 Agri-Foods

2.4.1 Importance to Canada, Ontario and Region

According to the federal government, the agri-food industry is the largest manufacturing sector in Canada and contributes \$110 billion to national gross domestic product (GDP) while employing 2.3 million people (Government of Canada, 2018). In Ontario, agri-foods contributes \$39.5 billion to GDP and supports 822,000 jobs (Government of Ontario, 2018). The importance of the agri-food sector to Ontario's economy is underestimated by many and Campbell et al. (2015) note that Agri-foods compares quite favourably to the automotive sector in terms of its size and impact and, by its nature, is also somewhat more stable and less vulnerable to economic shocks.

The Golden Horseshoe Food and Farming Alliance (2012) reinforce the importance of Agri-foods in their action plan and note important gaps/issues faced by the Agri-food community such as: intense competition between land uses, lack of public awareness about the food and farming cluster, and disjointed regulations and policies and others. Other issues noted include congestion and its impact on the movement of goods, the increasing cost of energy, and gaps in infrastructure that prevent seamless integration of the supply chain.

Within Hamilton-Niagara, there are several prominent examples of how agri-foods is thriving within the region. The growth of grain exports at the Port of Hamilton is an important story (Hamilton Port Authority, 2019; Moczulski & Atkins, 2016; Moro T., 2015) and related tenants at the Port have been making significant investments in alignment with the trend. G3 invested approximately \$50M to open their state-of-the-art terminal in 2017.

In 2015, the Ontario wine and grape industry contributed an estimated \$4.36 billion of overall economic impact (Frank, Rimerman and Co., 2017) which is about 11% of the overall contribution to Ontario's agri-

foods GDP. When direct, indirect and induced effects of the wine sector in Ontario are taken into account, it is estimated that \$3.95 of GDP is generated for every dollar spent on Canadian wine in Ontario.

In essence, the production of wine generates and supports many types of economic activity. Demand is created for bottling and labelling, for example, and a whole range of induced effects are generated when workers in sectors related to wine spend to fulfil their own needs for goods and services. The wine sector and tourism in Niagara are quite intertwined. A recent report indicates that 12.95 million visitors came to Niagara in 2017 generating same-day visit expenditures of \$686.4 million and \$1.7 billion for overnight visits (Niagara Region, 2019). Significantly, 8.0M of the visits are same-day suggesting that aspects such as excessive traffic congestion need to be taken into account for the future.

2.4.2 Other Relevant Agri-Foods Notes

At the intersection of E-commerce and Agri-foods, a case from China (Jin, Li, & Li, 2017) could be instructive for this region. While the sales of agriculture-related products increased on Alibaba about ten-fold between 2010 and 2015, sales specifically of fresh produce on the Alibaba platform lagged far behind. More recently, as this gap has been increasingly recognized, “fresh produce portfolios” have emerged. These are designed to meet the needs of a family for the typical week and contain an appropriate range of fresh produce to make that possible. Meat and dairy are typically not prominent in these portfolios. The study concludes that Chinese consumers feel comfortable with the food products purchased through an e-commerce platform because they can accurately trace the source of those products and are even willing to pay a premium for certified products (e.g. organically grown).

In a paper focused specifically on co-ordination in Agri-food Supply chains, Handayati, Simatupang and Perdana (2015) note that there are four essential co-ordination mechanisms to help supply chains function better: 1) the supply chain contract at a basic level can manage the supplier-buyer relationship and also risk, 2) information sharing between organizations (perhaps via information technology) can improve performance, 3) joint decision-making may help to avoid conflicts among the actors and 4) collective learning can be employed to help solve knowledge gaps across organizations. These concepts are relevant, and could be considered and implemented in the study region.

2.4.3 Consultation Insights

Several organizations related to agri-foods were consulted as part of this process. Prominently associated with the marine export story were Parrish and Heimbecker and Richardson International. These firms have significant Canadian operations and are prominent tenants at the Port of Hamilton. Associated with the wine sector we consulted with the Ontario Grape Growers Association, Pillitteri Estates Winery and Harbour Estates Winery. In the meat sector, we consulted with Maple Leaf Foods. We also consulted with Agri-Foods Canada which offered useful perspectives across a range of agri-foods sectors. 3PL firm DSV also commented on agri-foods aspects. Material from these consultations is noted widely across this report.

Some additional consultation notes on agri-foods are as follows:

- Agri-foods has been identified through this process as well-suited to e-commerce. The sector was identified as one of opportunity for entrepreneurs comfortable working with technology and savvy with the use of social media.
- Cheesemakers, for example, were identified as relying on e-commerce though it was noted that the passing of a federal inspection is required in order to sell direct to consumers in other provinces.
- Maple Leaf described their state-of-the-art production facility in Hamilton, near the Red Hill Valley Parkway that is a main location for the production of wieners and sliced meats. While Maple Leaf as a whole conducts a lot of business with Asia, the Hamilton facility is more oriented to serving North American markets. This is done mostly by truck. While primary processed products predominate for Asia, North American markets emphasize further processed products (consumables).
- DSV noted that it used to be easier to move agri-food commodities across the border at the Queenston-Lewiston crossing as there was a Canadian Food Inspection Agency presence at this crossing. With new technologies, the advantage for that crossing in this respect no longer applies.
- It was mentioned in Niagara Region that there is a lack of comprehensive broadband coverage to allow the operation of precision agriculture to enhance farming practices. However, there was also feedback that new seed technologies are gradually increasing yields.
- Based on recently observed shipping volumes, there is evidence that Cannabis has become a prominent cargo moving through the region and has generated a lot of momentum in the agri-foods sector.

Perceived Needs and Issues

In this section of the report, participants provided input on problems that were perceived in preventing the smooth operation of supply chains in the region and they considered potential actions that could improve matters. Overall, it is perhaps easier to identify when something is not right than it is to come up with the best solution to address it. This section seeks to be sensitive to aspects with perceived problems but definitive identification of the best solutions is beyond the scope of this report. The main general avenues for improvement, as described in the consultations, relate to infrastructure, data and policy. These are three “pillars” that were identified before the start of the consultation process that can help improve the situation for supply chains.

Tabular summaries are provided in Tables 1, 2 and 3 in this Chapter for results relating to infrastructure, data and policy, respectively. While mostly focused on infrastructure issues, Figure 1 provides a visual overview of the region and gives a good sense of spatial context for the main issues that have been identified by those consulted. Highway related issues are certainly prominent. On a west to east basis, the map covers the Morriston Bypass issue, which has prevented a smooth funneling of truck flows into Hamilton, and it extends to the Peace Bridge which is a focal point of a potential mid-peninsula highway gateway into Buffalo and the nearby Interstate 90.

Figure 2: Geographically Referenced Aspects of Interest



3.1 Infrastructure

Relating to infrastructure, many bottlenecks have been identified, with the majority having to do with roads, highways and associated traffic congestion. It is generally recognized that the best solutions to congestion problems are not always to add new lanes or build new roads. Advanced public transit infrastructure can play an important role as well as pricing policies that can charge for the use of infrastructure, especially at the most highly congested peak times. Solutions are not always easy to identify or achieve but the focus here is on the outputs of the consultations. For the purposes of this report, issues of congestion across the modes are largely captured in this infrastructure section.

It is instructive to consider Canada's largest current infrastructure projects to gain a sense of context. The Hamilton-Niagara region hosts only one of the 100 largest current infrastructure projects in Canada (ReNew Canada, 2019) and that is the \$1 billion Hamilton LRT which has not yet commenced construction. Nationally, there is a clear emphasis on public transit with associated projects accounting for 27 of the top 100. There are 12 major highway infrastructure projects taking place across Canada, with three of them in Ontario and in particular all three are within/near the Toronto Metropolitan Area (Gardiner Expressway, Hwy 407 East extension, and Hwy 427 upgrades).

3.1.1 Road

Some organizations consulted, especially those that are quite focused on interactions with the GTA, have referred to the situation with traffic congestion as "general gridlock." While there is acknowledgement that congestion gets worse the closer that one gets to Toronto, congestion in Hamilton-Niagara is seen by those consulted as a serious problem in its own right. The INRIX Traffic Scorecard identifies Hamilton as the 10th most congested city in Canada, with an inner-city last mile speed of 19 MPH (31 Km/h). INRIX estimates that the average driver in Hamilton lost 50 hours to traffic in congestion in 2018. On average, the average Toronto driver had an inner city last mile speed of 10 MPH (16 Km/h) with the average driver losing 164 hours in congestion in the year. (INRIX, 2018). While the overall averages appear considerably worse for Toronto, Hamilton and Niagara are associated with specific highway corridors and interchanges that create serious localized problems and negatively impact the smooth functioning of supply chains. Those consulted have identified their main concerns below.

Their largest amount of attention was allocated to the QEW. It has been noted that peak time traffic congestion on large sections of the QEW from Burlington to Niagara are getting progressively worse. Burlington-Oakville stretches of the QEW are also quite relevant for Niagara and are notoriously congested. There is considerable concern as well about high levels of weekend congestion on the QEW leading to and from St. Catharines-Niagara, which has the capability to seriously hamper the movements of tourists that are critical to the economy of the region. Some feedback has noted that a Toronto-based recreational day trip to Niagara, on certain weekends, may include 3 hours of travel to get there. There is also a strong sense that excessive traffic on the QEW is leading to spillovers of traffic and trucks on to local roads that are not intended to accommodate such flows.

Adding to the QEW problems, based on feedback from multiple sources, is that there is a further decentralization of GTA workers into Niagara due to the high price of housing in the GTA. With more people undertaking longer commutes, it translates into higher levels of congestion on the QEW.

In terms of interactions between air freight and regional traffic congestion, DSV made the point that if congestion can be better managed, it will generate new economic opportunities. For example, they noted that there is a lot of goods moving just on the other side of the border relative to Niagara Region. With reduced congestion, they saw an opportunity for more cargo, and therefore more economic activity to be fed to either Hamilton or Pearson airports.

Highway 6 was mentioned for both the north and south of Hamilton. North of Hamilton, Hwy 6 runs between Hwy 401 and Hwy 403. Connections to the latter from Hwy 6 have immensely improved within recent years as have some Hwy 6 stretches closer to Hwy 401. A major bottleneck remains at Morriston, Ontario which Hwy 6 bisects to get to the major interchange. As has been pointed out, this is an improvement that has been discussed for the better part of 40 years. Planning seems to be at an advanced stage but the bypass remains unimplemented. It is worth noting that this route into Hamilton-Niagara is heavily used by the agri-foods sector.

In terms of Hwy 6 south of Hamilton a big focus is on the section quite near to Hamilton International Airport. From an air freight perspective, many truck movements are typically taking place during hours when it is dark. As a result, there is feedback that appropriate lighting of Hwy 6 to Hwy 403 would assist greatly. A lot has been invested already in overpasses so that the flow on Hwy 6 is not interrupted and these overpasses have clearly been built with expansion in mind. The intersection of Hwy 6 with Book Road is an exception where no overpass has been built. Also, with respect to Hwy 6 south is feedback that the routes that trucks must take to access Lake Erie from Hamilton are really not of adequate quality. For movement east of the Hamilton International Airport, Hwy 6 is essentially truncated as it intersects the corridor defined by Upper James Street. A Mid-Peninsula highway would permit further eastbound movements to Niagara. Upper James Street itself was identified by one prominent stakeholder as a problematic corridor in connecting the airport with Hamilton.

Two other prominent Hamilton bottlenecks mentioned are Hwy 403 at the Lincoln Alexander Parkway and the Red Hill Valley Parkway at the QEW. For the former, there is space for lane expansions on Hwy 403 both eastbound and westbound from this interchange. The eastbound lane expansion can potentially help speed movements from the Hamilton International Airport into the GTA, which is the main market.

In the case of Hwy 407, the infrastructure is excellent but it is perceived as essentially inaccessible for freight due to high usage costs. Typically, decisions about the use of Hwy 407 are left in the hands of the carriers, who most often choose to avoid it. It was striking that a significant number of those consulted had quite strong views on Hwy 407, which only just touches on Hamilton-Niagara. It is perceived as a very important travel corridor for access to nearly the entirety of the GTA and beyond but high costs loom large. It is noted (Sandham, 2018) that, Hwy 407 is absolutely a natural corridor for freight movements – there is unfortunately no other “replacement” corridor that could be devised to

play that specific role. The effective loss of this corridor for most trucks movements seems to generate a sense of regret and dismay among many stakeholders, even in Hamilton-Niagara.

In regard to themes with local roads, a prominent issue deals with access to the Port of Hamilton from the west. If exiting from Hwy 403 at Main Street, a truck trip to the Port almost certainly involves passing through or very near the downtown. From a quality-of-life perspective, heavy trucks are not seen as desirable in these heavily-populated areas and there were was a call for trucks to avoid the downtown entirely and instead access the Port from the east via the QEW. Such alternate routes would be less direct for truckers. The issue is a delicate one but there appears to be a significant seasonal component to it – truck traffic to the Port of Hamilton is at its largest during and after the Autumn harvest.

A final road infrastructure issue has to do with roundabouts. These are becoming increasingly popular but in many cases they are not being made sufficiently large so that large agricultural equipment (e.g combines) can navigate the intersection. In agricultural areas, which are plentiful in the region, this is becoming an increasing matter of concern.

3.1.2 Feedback on a Mid-Peninsula Highway and a Twinned Peace Bridge

The most prominent infrastructure gap identified through the consultations has been the absence of a Mid-Peninsula Highway. This prospective route is sometimes referred to generically as the “Niagara-GTA trade corridor” (although that might apply well also for the QEW) but for the purposes of this report we will use the short form “MidPen” for a route that might connect to Highway 6 adjacent to the Hamilton International Airport, connect also to Hwy 406 or near Welland before finally connecting to the QEW near Fort Erie. Such a route would be the most direct between Hamilton International Airport and Buffalo. In terms of making an actual new connection with the GTA, it is worth noting that a new piece, one that would connect Hwy 401 (somewhere between Cambridge and Milton) and Hwy 403 (perhaps near Ancaster) did not actually feature prominently in the consultations. Historically, it has been this piece that has been most contentious due mostly to the sensitive lands that it might cross.

The existence of the MidPen would certainly provide trucks that are eastbound on Hwy 403 from London/Woodstock/Brantford a more direct route to Buffalo without the need to descend the Niagara Escarpment in Hamilton or access the heavily used Lincoln Alexander Parkway/Red Hill Valley Parkway which are municipal routes. Perhaps most significantly, it could provide an important layer of redundancy to take pressure off the QEW on the south shore of Lake Ontario. In 2014, a rogue dump truck caused serious damage to the Burlington Skyway that shut down Toronto-bound travel on nearby sections of the QEW for four days. With the redundancy provided by a MidPen alternative, the negative impacts would have been far less. The Nipigon Bridge failure in January 2016 was another quoted example of a failure without redundant infrastructure and this crippled the Trans-Canada Highway. The bridge was fully inaccessible for nearly two months and all four lanes did not open until November 2018 (CBC News, 2018). There has been feedback also that the MidPen could be conceived as a particularly important route for truck thru-traffic to help better distribute truck flow across the Niagara Peninsula,

with less of it having to traverse more heavily populated areas near Lake Ontario that are also natural tourist areas.

Interestingly, feedback from the Ontario Trucking Association (OTA) indicates that members do not see the QEW as being particularly friendly to truckers in certain respects. It is noted that congestion within the Greater Toronto Area is so severe that truckers would like to rest somewhere adjacent to the QEW before timing their entrance into the heavy congestion zones. However, the OTA notes a significant shortage of appropriate facilities for truckers. In the reverse direction, such facilities would offer a rest for truckers, who have managed to traverse the GTA, before embarking on a border crossing. In this sense, the role of the Niagara corridor as a “staging ground” is important to take into account.

Among other serious considerations, there could be advantages in tailoring the MidPen to the needs of truckers and perhaps contemplating some exclusive truck infrastructure as part of the conceptualization. Having the route stand out as trucker-friendly could assist in diverting more trucks from the QEW, which is something that some stakeholders would advocate given the importance of tourism. Some concepts were shared about better separating flows of private passenger vehicles and trucks on a new route.

Related to the completion of the MidPen, it was suggested in one consultation that the twinning of the Peace Bridge should seriously be considered. Parallels were drawn with the overly-extended central role that the Ambassador Bridge has played between Windsor-Detroit and especially with the Gordie Howe Bridge not being scheduled for completion until 2024. It was stated that from a trucking perspective, the Peace Bridge corridor is superior and more cost-effective for access into the US relative to Queenston-Lewiston where there is considerable built-up area to pass through and significant bridges permitting the crossing of Grand Island in order to access Buffalo. Significantly, the main population centre is at Buffalo as well as the most direct access to the important Interstate 90. These arguments may lead to an emphasis on the Peace Bridge crossing and even a potential twinning of this crossing.

In concluding this section, note that a recent federal report (House of Commons Canada, 2019) has identified Hamilton-Niagara as one of Canada’s truly important trade corridors. One recommendation of this report is that the Government of Canada should co-operate with the Province of Ontario and relevant municipalities to consider the creation of the MidPen. A primary objective is to establish redundancy in relation to the QEW. More locally, Welland’s Mayor Frank Champion stated that the MidPen would very likely benefit Welland by increasing the potential for multimodal transportation. The area is seen to already have good rail connections and access to the Welland Canal. With the MidPen potentially passing nearby and greatly improving trucking connectivity, the possibility for a new port along the canal seemed promising (Johnson, 2018).

3.1.3 Rail, Marine and Air

In discussing infrastructure within the region, connections between the modes are quite important. As such it is difficult to discuss each mode in isolation. In what follows, there are brief discussions which emphasize each mode but are not solely focused on that mode.

Rail-focused

CP painted a favorable picture of their operations in Hamilton-Niagara and stated generally that there is excess capacity in their Eastern Canada operations. For CP as a whole the last decade has been a good one with greatly improved efficiencies and financial results (Stephens, 2018). To achieve such results, the rail firms must maintain their own infrastructure and they invest heavily in that regard. Nevertheless, the consultations revealed evidence that there have been periods where service levels have fallen for the two major rail companies with noteworthy impacts on Hamilton-Niagara. Maple Leaf, for example, noted some very recent capacity and service issues with CN.

Winter weather has been a supply chain problem for rail (Binkley, CN, CP stepping up to meet the needs of the sector; Winter weather remains a preoccupation for the railways, 2018) and there can be cascading effects which affect performance in Hamilton-Niagara (insufficient rail cars) even though problems might originate in Western Canada with the movements of major commodities. Within a consultation, Stelco stated that these types of incidences are evidence that the rail companies seek to balance the needs of too many customers and as a result, the steel firm has recently been undertaking the expense to lease their own rail cars. When it is considered that there are times during winter that feature a combination of Seaway closure, rail car shortages and driver shortages, it becomes apparent why Stelco has taken such measures to ensure access to rail.

With regard to rail infrastructure in the region, CP stated that the most pressing issue for them was finding ways to improve rail connections within the Port of Hamilton. They believe that these types of improvements could help to attract other shippers to locate in the vicinity. The Port of Hamilton itself noted that rail comes into the port and “dead ends” -- implying that there are opportunities for improved connectivity. An interesting rail infrastructure example provided by Stelco was the identification of a single CN bridge on the route to their Nanticoke operation. They noted that this bridge had a reduced weight limit and that this single aspect limited the carrying capacity for the entire rail corridor of interest to them.

Concerns were raised by CP with proximity issues relative to important rail infrastructure. Near the Port of Hamilton, the location of new condominium developments near important rail and port infrastructure was identified as a potential issue. Also, near the western boundaries of the Port, CN’s busy Stuart Street yard, where train cars are classified for local delivery, has been associated with proximity issues for decades and the yard itself has been operating for over a century. This important area for rail infrastructure no doubt intrudes on the possibility to re-develop these prime waterfront lands for residential/recreational uses. There has been speculation that the yard could be relocated to Aldershot, closer to Burlington, or to areas further east such as surplus Stelco lands (Paddon N. , 2018). Combined with feedback about negative externalities associated with truck movements to access the western port lands, there is an overall concern in the vicinity with how freight movements/infrastructure affect livability in important central areas of Hamilton. There was, in fact, one suggestion already noted in Section 3.1.1 that the Port of Hamilton should generally be accessed from the east, irrespective of whether this might be the shortest path for carriers.

One other proximity issue that was mentioned, though not apparently as a major concern in this region, was the fact that freight and passenger rail operate in very close quarters in that they share the same rail infrastructure. The existence and potential for delays was noted.

Marine-focused

The Port of Hamilton has been seen through the consultation as a very busy place where marine, truck and rail converge. It is particularly busy in the Autumn with movements related to agri-foods taking place up to seven days a week. Overall, the Port of Hamilton handled 11.6 Million metric tonnes of cargo in 2018 which was the highest in a decade and 647 vessels were processed. Exports from the Port were up 64% over 2017 (Hamilton Port Authority, 2019).

In discussions with port tenants, truck was generally emphasized over rail in terms of current patterns but the suggestion was made that there is the potential for rail to move more cargo, and over relatively short distances. Feedback from the steel sector and agri-foods was consistent in this regard. The need for improved rail infrastructure at the Port seems clear along with finding ways for rail movements not to slow trucks.

The Westport Modernization Project (Paddon N. , 2018) has been recently announced and will focus on 115 hectares of western port lands. Multi-modalism is a prominent theme in this new initiative. The lands involved were assembled piece by piece and contain some dated infrastructure so the project is very much emphasizing the optimized use of existing space which is actually effectively generating some new space in functional terms. Transport Canada and the Port Authority are working together with other stakeholders on a project where the port will be equipped with RFID technology to assist in better managing truck traffic. In addition, the Hamilton Port Authority aims to expand by managing vacant industrial properties along the Welland Canal. This is aligned with recent recognition of Hamilton-Niagara as being host to an important National Trade Corridor (McNeil M. , 2019).

For the St. Lawrence Seaway, locks are a natural focus for infrastructure discussion since they impose a limit on the size of vessel that can pass through the Seaway. There is recognition that there is ongoing competition with the Mississippi River basin, which is North America's other major inland waterway. The Seaway competes with the Mississippi especially for some flows from the Upper Great Lakes but Mississippi tonnages are much larger. Valentine (2013) puts forward the proposition that extending the length of navigation locks at selected locations over the Seaway system could make a big difference in increasing the cost competitiveness of tug-pushed ship-size barges that could contain either bulk cargo or containers. The Seaway noted in discussions that the topic to increase lock size has come up in the past, most recently within the last decade for the Welland Canal, but it has not since then been a main topic for conversation. There has been more emphasis instead on maximizing the potential of employment lands and facilities that are adjacent to the Welland Canal.

Vessels themselves require infrastructure in order to traverse the Seaway. This has been in the form of fittings that allow the vessel to be stabilized by wire as locks fill up or empty. Hands Free Mooring, which the Seaway describes as its most important innovation in recent memory, removes the need for wires and for vessels to be outfitted for the Seaway. It was estimated that of about 8000 vessels in the

global fleet, only about 800 had the proper fittings. Hence, the implications of hands free mooring are that 1) the Seaway is open to a much large fleet of global vessels, providing that they can fit in the locks and 2) the system is much safer than the use of wires. One remaining bottleneck, which is significant, is that there remain two US locks in the lower Seaway that have not implemented hands free mooring as yet. It was noteworthy that one tenant consulted at the Port of Hamilton wondered if Hands Free Mooring might have application at their site.

A final significant marine infrastructure issue relates essentially to availability. Winter was raised in the prior section as a significant issue for rail and it is certainly significant for marine due to the winter closure of the Seaway. The conclusion from the process was essentially that the winter closure is an unavoidable necessity as the locks require significant annual maintenance that cannot be done while the Seaway is in operation. There was feedback, however, that minimizing the duration that the Seaway is closed is an important objective because the time of the closure is a time of increased pressure on related supply chains. It is recognized that some significant strides have already been made in this direction. Having the Seaway available offers options and there is the potential to reduce the negative impacts of stored inventories and tied-up cash flows. It was noted, for example, that the Bunge plant (a soybean and canola processing facility) could run at a higher capacity if a steady supply of canola were possible. As it stands, the plant must store for the winter and as such, a reduced closure period would be of some assistance.

Air-focused

The air mode, best represented for the region at Hamilton International Airport, sees appropriate road infrastructure as an important priority to ensure especially that air freight makes its way towards the major Toronto market in a timely fashion, preferably prior to the AM rush. As it was described, roads ranked highly, in terms of importance along with the two main runways that are operated at the Airport. Public transit was also noted as a significant aspect of interest at the airport. In the past, it had been conceptualized that light rail transit might run from the airport to the Hamilton Waterfront – but this idea has lost momentum in recent years. Lack of transit infrastructure, or service, connecting the airport to the populated areas of the City has led to increased interest in ride-sharing solutions such as Uber to help solve this connectivity problem. Getting people to the airport on Sundays, in particular, has been an issue.

With regard to infrastructure at the airport, it was noted that the two runways are aging, that the airfield is in need of rehabilitation, and that it is costly. Larger planes that land at Hamilton such as the Boeing 767 put quite a bit of pressure on the runways. This observation echoes the burden that heavy trucks are known to exert on roads and highways. Cargojet emphasized that more sorting facilities will be needed at Hamilton International Airport to keep up with e-commerce-driven increased demands in business. There was a stated desire from Cargojet for a higher degree of partnership and collaboration in finding ways to make these strategic investments that did not just depend on funding from private sources. With regard to their fleet infrastructure, Cargojet noted that expansions into Asia (that would facilitate export diversification for Canada) will require investments in aircraft to meet the needs of those longer routes.

Table 1: Perceived Infrastructure Related Issues/Needs

Congestion	<ul style="list-style-type: none"> Pervasive QEW problems including weekends Hwy 403 Eastbound Highway 6 North – Morriston Bypass Highway 6 South – lighting issues and poor truck route to Lake Erie Hamilton Parkways and connection with QEW/403 Substantial traffic spillovers onto local roads Cost Inaccessibility of Hwy 407 Vessels waiting for berths at the Port (peak season)
Land Availability	<ul style="list-style-type: none"> Inability to expand due to geographical constraints Inability to expand due to right of way/encroachment constraints Increasing real estate cost Inability to expand Port of Hamilton due to land availability Meat sector warehousing shortage
Lack of a Mid-Peninsula Highway	<ul style="list-style-type: none"> Direct route for trucking to Peace Bridge and Buffalo Improve Connectivity for Hamilton International Airport Alleviate traffic on QEW and better accommodate tourist trade Improve redundancy of major routes
Connectivity	<ul style="list-style-type: none"> Lack of rail connectivity to Airport Employment Growth District Lack of adequate GO Train service to Niagara Transit service to Hamilton International Airport, especially on Sundays
Winter Operations	<ul style="list-style-type: none"> Seaway winter closure and thus fewer modal options Seaway closure and resulting tied up cash flows Burlington Lift Bridge being lowered for all winter months Periodic winter problems with rail service
Border Crossings	<ul style="list-style-type: none"> Periodic long border crossing wait times Potential twinning of the Peace Bridge
Roundabouts	<ul style="list-style-type: none"> Not large enough for trucks or large agricultural vehicles Problems with high curbs
Rest Facilities	<ul style="list-style-type: none"> Lack of rest facilities along QEW corridor to support trucking
Asphalt	<ul style="list-style-type: none"> Periodic poor condition of asphalt

3.1.4 Industrial Real Estate and Warehousing

Transportation and Logistics is of course quite interdependent with land use, so shortages of industrial land in the region are very much an issue. A general trend in North America and Europe, with Canada being no exception, is that the industrial market is extremely active (Avison Young, 2018). There is an increasingly strong link between the industrial market and the retail market which is being fueled by a push to find cost-effective solutions for same-day or next-day delivery. Vacancy rates are reaching historic lows in many markets, rental rates are increasing and so are the real estate assets. The vacancy rate in 11 Canadian industrial markets in Q1 2018 was at a record low of 3.3%. Large format

distribution/fulfilment space is scarce and meanwhile there is a backdrop of rising land costs, including development charges (Avison Young, 2018). Multi-storey facilities of this type, intended to maximize the use of available, are being considered increasingly. It is noteworthy that the cap rates associated with warehousing space have gone very low (Levitt, 2018), which is a sign of a very tight industrial real estate market.

Feedback from the City of Hamilton indicated that the market for industrial real estate was very tight with a great deal of interest and activity. Meanwhile, Niagara region had \$518 million in investments in commercial and industrial building construction in 2017 which was a 107% increase over 2015 (Forsyth, 2018).

It was also noted, in the agri-foods (meat sector) context, that a significant gap in the region is capacity to warehouse and that this hinders exports and hampers processors. The problem is magnified because some foreign markets are growing quite quickly in terms of meat consumption. Central to the problem is that the facilities of some beef and pork facilities have become landlocked with no room to expand. As such there is a need to build satellite warehouse facilities to store product. To a large extent, this is a regulatory issue linked to the rules of the receiving country. Some destination countries will permit the use of a warehouse that is external to the main processing facility and others will not. In some cases, a satellite warehouse can be used to free up space for “main facility warehousing” linked to “less flexible” countries. For exporting to the US, satellite warehouses are permissible and could be located relatively close to the border. With a general shortage of space for warehousing in Hamilton-Niagara, there is some concern that satellite warehousing might simply cross the border and locate on the US side, leading to a leakage of economic activity.

3.2 Data

Reliable data is important in making business decisions, and in understanding marketplaces and potential opportunities. The consultations dealt specifically with whether organizations perceived data gaps that hampered the ability to make such decisions. Perspectives on the need for further data varied between organizations. Many organizations stated that they basically had what they needed whereas a handful identified larger gaps and more urgency. Some said that data was not easy to get or readily available in their context. Probably the overall consensus was that organizations are getting by, but that there are gaps in need of attention. Referring to data gaps, one respondent said: “it is not a chasm but it’s not a crack in the floor either.” Another respondent said that data were sufficient to operate but absolutely not sufficient to make truly well-informed strategic decisions. There may be an issue with some organizations generally “minding their own business” and focusing only on what they need to do. Another theme is a sense that disparate data sources are perhaps hard to access and are perceived as esoteric or not user-friendly.

3.2.1 Supply Chain Visibility

A recurring theme was that private firms, shippers or carriers, do not have a complete picture of their supply chains and this could lead to sub-optimal decision-making. Often, the primary origin and/or the final destination of goods is not known. Carriers may be aware only of their contribution to a movement

within the supply chain. This was noted by both the rail and marine modes. The Port of Hamilton stated that if goods were transshipped at Quebec ports, for example, that knowledge of the final destination would be elusive.

While shippers were obviously clear about origins, this clarity did not extend to destinations. Stelco estimated that a significant percentage of their output went to service centres that would “slice and dice” steel and ship to end-customers that Stelco would not have knowledge about. This lack of knowledge was considered to be a disadvantage in terms of understanding available end-markets. In scraping together valuable data points, Stelco described a process of seeking information from the “customers of customers” or in some cases “shooting blind” and making do with a real lack of data on which to base decisions. Arcelor Mittal described rail “blind spots” in the US when they were essentially unaware of a shipment’s location. Ensuing delays might only be discovered or assessed after the fact.

Agri-Foods Canada noted, with issues such as food fraud becoming more and more of a problem, that data to facilitate traceability was a big issue. Supply chain visibility in this sense is paramount.

There was also a point of view that the more an organization is willing to spend money on data, the more knowledge gaps that could be filled. This observation might apply more to the types of data that would define market sizes and characteristics in certain sectors.

There are some useful data sources that could benefit the general community in better understanding potential supply chain bottlenecks but funding could well be required. The Ontario Trucking Association noted that extensive GPS data assembled by the American Transportation Research Institute (ATRI) also contains movements that take place on the Canadian side of the border. ATRI uses such data to conduct useful bottleneck studies in the US. The thought was that if a funding source could be identified, the same process could be utilized to better understand bottlenecks on the Canadian side of the border.

3.2.2 Understanding the Customer

There was an emphasis on better understanding what organizations were attached to the end points of supply chain movements, but a significant theme that also emerged was a need to understand a lot more about customers. Speaking about the availability of end-customer data about Ontarians from the LCBO, one winery noted that there is “not enough data to create opportunity.” While the LCBO does do some reporting for the wineries, the data that was shared was considered inadequate to answer questions such as: who would be most likely to switch from French to Ontario wine? It was not just the wineries that had questions. The Ontario Grape Growers stated that knowledge about wine inventories at the wineries was not at all clear and especially with complications due to the aging of wine. Both the Grape Growers and the wineries were interested in more detailed customer data from the LCBO.

In some contexts, the customers themselves share data and the benefits can be substantial. As a carrier, Cargojet noted that they do not have a large number of customers that they deal with directly. The most important customer is Amazon and it was described how the web retailer’s mastery of data and their sound planning acumen lead to a great deal of predictability for Cargojet and their operations.

Maple Leaf described their interactions with certain retailers noting that some were able to share quite detailed customer data sets and others were not. For those customers that were able to share, Maple Leaf noted that it was easier to better service needs.

3.2.3 Better Communication of Data

Feedback was communicated that there are opportunities to communicate “short-run” data, leading to better decisions in the supply chain. For example, in movements linked to the marine mode, CP stated that information regarding vessels arrival times could help them to make better decisions about what to do with “Train A versus Train B.” They felt “data rich” about their own operations but not for partner organizations. The Hamilton Port Authority believed that more data on multi-modal aspects could help them to optimally configure new infrastructure improvements being considered.

More generally, the recent *Interim Report on Establishing a Canadian Transportation and Logistics Strategy* stated that increasing and facilitating the sharing of information across the supply chain would improve the flow of goods across all networks. The report emphasizes the government’s role in sharing data and the potential positive impacts of sharing supply chain information in the context of new technologies (House of Commons Canada, 2019).

One for Freight noted that, in principle, the flow of information (in the form of data) ought to be faster than the flow of freight. At the border, this should translate into an effective clearance ahead of the truck’s actual arrival at the border. It is stated that too often, however, the freight is moving faster and trucks must wait significant periods (perhaps 90 minutes or more) at the border before they are cleared to cross. Human intervention that is required in the form of the customs brokerage was identified as the primary culprit. While two-hour processing of the required administrative work is promised, in actual practice there are a lot of occasions apparently where several hours longer are required. Trucks are being sent to the border assuming a maximum of two hours but if this time span is exceeded the truck will sit. When all processing is done in time, border crossings are seen to be working smoothly otherwise. At a time when the specific length of a driver’s shift is more and more defined, excess time at the border is just adding more stress to the system. The issue of whether there was a way to better deal with the “middle man” role of the customs brokerage, perhaps through increased automation, was raised.

3.2.4 Other Issues

Not surprisingly, the theme that some data are sensitive and proprietary certainly arose. One specific agri-foods example that was given was that if one firm knows that another’s inventory position on corn or soybeans is low, then the first firm could trade in the marketplace to raise the price to the disadvantage of the second firm.

Table 2: Perceived Data Issues/Needs

Supply Chain Visibility	<ul style="list-style-type: none"> • Unknown primary origin and/or final destination of goods • Lack of proper understanding of end-markets • Shipping delays identified after the fact • Emphasis on traceability to combat “food fraud” • Potential ATRI bottleneck studies
Understanding the Customer	<ul style="list-style-type: none"> • Wine sector: hard to “know” the Ontario customer; lack of LCBO detail • Easier to service retailers who can share knowledge/data on customers • Amazon data, knowledge and planning acumen boosts supply chain
Better Communication of Data	<ul style="list-style-type: none"> • Better use of data across modes to gain efficiencies • Flow of communication faster than the flow of freight • Concerns with efficiency of customs brokerage “middle man”
Other Issues	<ul style="list-style-type: none"> • Dealing with proprietary, sensitive data • Implementing a “clearinghouse” for data • Adequate human resources to deal with data • Insufficient quality of certain trade data sources

As was noted in the consultations, the preferred model is for some entity to act as a clearinghouse and an aggregator for data and information. The soon to be launched Smart Freight Centre, is a prototype organization in this sense, though it was not prominently mentioned in the consultations. One respondent indicated, in general principle, that an association would not be suitable for such a role. Another organization noted that the prospect to truly leverage data for the benefit of the region gives stakeholders an important opportunity to work together.

The theme of having adequate human resources to somehow deal with data and related matters was a significant theme. The issue of “bandwidth” came up more frequently with participants who have an outward facing role that connects with many other organizations. It seemed that roles that relied more on people skills led to these same people expressing more concern about the nuances of data and the difficulty in harnessing the power of data.

But even within large organizations and private firms, there was feedback on the struggles of getting the most out of data and in some cases this was further complicated by the vast quantities involved. Arcelor Mittal noted the presence of “lots of data, but not enough analysts.” Apart from volume there were concerns about its quality in some contexts. Stelco noted that trade data that it used was inconsistent, not done diligently by importers and hard to correct, despite the best efforts of government.

3.3 Policy

Before summarizing the policy results, it is interesting to consider how Canada ranks in terms of competitiveness with countries around the world. The 2017-2018 Global Competitiveness Report, produced by the World Economic Forum, offers information that perhaps sheds light on links between the policy environment and supply chain performance. The results are certainly not specific to Hamilton-Niagara but related impacts are felt there as well. The results indicate that the most competitive country in the world is Switzerland, followed by the United States. Canada is ranked 14th out of the 137 countries considered.

Elements stated that have reduced Canada's ranking include: inefficient government bureaucracy, high tax rates, insufficient capacity to innovate, inadequate infrastructure, tax regulations and policy instability. It was also identified that government debt, gross national savings and government budget balance were hindering factors (Schwab, 2018). These results suggest that policy-related aspects appear prominent in explaining why Canada does not appear in the top 10. The ranking overall is reasonable, likely indicating adjustments as opposed to radical change. Some such potential adjustments emerge through these consultations.

3.3.1 Difficulties in Moving Big (or Even Smaller) Projects Forward

Among both private and public stakeholders, there is a theme of frustration with the time it takes for projects to be approved and implemented. Those that have spent a lot of time in other countries, most notably in Asia, believed that there are lessons to be learned in conceiving of big, worthwhile projects and then moving them forward. One interesting piece of feedback noted that infrastructure projects proceed too much in spurts linked to government change. The need for long-term and well-conceived strategic planning, less susceptible to the whims of particular governments, was a stated wish.

There was a line of thinking that there is a collective need for more of a "Just do it" mentality or a mentality of "thinking big" that in the end would translate into faster approvals, more streamlined processes and simply more significant work on infrastructure getting done. There is another significant line of thinking that the world is becoming an increasingly competitive place and that Hamilton-Niagara, Ontario and the rest of Canada risks getting left behind if more is not done to ensure that our supply chains function at a world class level. Certainly, there was feedback of a need to move much more towards "proactive" and away from "reactive." There is worry that in some cases, projects that are really needed will not take place until long after the situation grows critical. Some Niagara stakeholders suggested that ideally, the Mid-Peninsula highway would have been in place years ago.

The massive US Interstate System, which was developed in a short time starting during the Eisenhower Era, was mentioned as a model in some sense for the thinking required, with a note that completion of such a project today in the US or Canada would be very difficult indeed. From the grandiose to a more parochial counter-example, the forty-year time duration associated with the Morriston Bypass is one local case that was quoted along with the realization that there may still be a significant wait before construction is complete. There was an example relating to the continuing difficulties in constructing a

second entrance to the Ancaster Business Park. Concern about an endangered bat species has apparently delayed proceedings. These latter cases are portrayed as symptoms of an underlying problem.

With regard to process, and in more specific terms, one particularly sensitive issue associated with moving projects forward is environmental assessments, which were mentioned several times. An aspect of the feedback from Niagara Region was very specific in this regard and related to “Part 2 orders.” These are a mechanism by which individuals or collectives with concerns about a project can have a process escalated so that the Provincial Minister must get involved. Delays can be a year or more depending on different factors and projects may move ahead or not depending on decisions. It was noted that sometimes this approach is used on an aspect which is not even directly related to the project at hand.

One other potential insight with regard to ultimately moving projects forward is putting a greater emphasis, most likely at the federal or provincial level, on the provision of funding specifically for infrastructure planning purposes or “funding to plan.” This feedback is linked to the idea that having detailed plans in place is an important first step, which potentially can act as a springboard to subsequent implementation.

Also, with respect to planning, important feedback from IKEA indicated that we need to consider the wants and needs of future generations in our planning. Can it be assumed that they will want the same things as current generations that are making important policy decisions? What might be the implications of evolving generational needs on supply chains?

3.3.2 Supply Chain Labour Shortages

A labour shortage in an industry can be a very difficult problem and this theme is heard frequently as a factor affecting the smooth operation of supply chains and one where policy actions taken have probably made problems more acute. It was identified frequently that there is a perceived near crippling shortage of truck drivers. Fluke Transport was of the opinion that the driver shortage was probably a worse problem for them than metropolitan traffic congestion because the former problem is one that actually prevents them from getting the trucks on the road. It was noted that ten trucks could have been added the day of the consultation if drivers could be found. In recognition of the severe problem, Fluke Transport had partnered with driving schools to help make it clear that there is an opportunity in freight transport. It was further suggested from multiple parties that truck driving, which after all is a very responsible position, should be recognized as a skilled trade.

Issues surrounding e-logs, which are being required by regulation to track the activities of trucks in detail, were prominent. There was general agreement that e-logs will improve safety but their introduction is no doubt making an already tight labour market tighter. It is suggested that there is an effect of effectively reducing fleet sizes. E-logs do help to better regulate smaller firms to prevent unsafe driving durations and they do allow for the types of record-keeping that would indicate shippers are potentially causing unwelcome delays to carriers in terms of loading and unloading. Some concern,

however, was expressed with unloading delays being included in the allotment of driver hours. On a related note, large carriers have reported that drivers spend on average 6.5 hours driving out of an available potential 11 driving hours per shift (Ontario Trucking Association, 2017).

Anecdotal evidence collected from tenants at the Port of Hamilton suggests that the increasing presence of e-logs could be playing a role in reducing the amount of overnight truck unloading that is taking place during the peak season as drivers increasingly comply with driving time quotas. Driver shortages were certainly noted as affecting operations at the Port and with its tenants. One important note about the driver shortage issue is that no real hint was detected from this process that autonomous truck technology was a viable solution to the problem in anything less than the long term.

While driver fatigue issues are being addressed with e-logs, new federal regulations have been developed to address the issue of pilot fatigue and these are scheduled to come into effect in January 2021. Cargojet is concerned about these regulations which will impact air cargo as well as passenger services. Their pilots are generally working at night and overnight, but it is estimated that monthly flying time is approximately 40 hours per month. Passenger pilots will work day or night and it was estimated that they tend to average 80 hours per month. There is a suggestion that the fatigue rules for cargo pilots should be devised separately from passenger pilots. Without modifications, the expectation is that approximately 160-170 new pilots will need to be hired by Cargojet simply to stay within the new rules. Ultimately, more costs will be added into the supply chain and the competition for pilots will increase since there will be more demand also for passenger pilots under the new proposed rules.

Pilots can also be in short supply in the marine context. One of the important reasons that foreign vessels can sit at anchor for perhaps three days in Hamilton-Niagara is that a pilot cannot be sourced in a timely manner. The high cost of pilotage has also been noted leading some to wonder if there is a technological solution whereby the role of the pilot could perhaps be undertaken remotely. Another labour shortage that was identified at the Port of Hamilton was that of stevedoring services.

Within supply chains, labour force shortages extended beyond drivers and pilots. In relation to Hamilton International Airport, it was mentioned that there are shortages that might hinder the development of an aerospace sector at the Airport Employment Growth District and a shortage in security screening personnel was noted also. Labour shortages to do with the Agri-foods sector were mentioned also by multiple parties. Maple Leaf specifically mentioned a problem in this regard with their prepared meats distribution centre near Hwy 6 and 401 at Guelph.

3.3.3 Excessive Regulation and High Taxes

Wine Sector

Matters of regulation and high taxes were prominent but feedback varied with the type of organization. The wine sector was well-represented in the consultations and the calls for reform were sharp. Broadly, there are concerns with the regulatory environment and with the Liquor Control Board of Ontario

(LCBO)² being too prominent an element in the functioning of the supply chain. At the core of the concerns is that Ontario wineries find it difficult to compete in their own province and the regulatory environment is perceived as central to the problem. The system is such that to sell in Ontario, other than at the winery itself, the involvement of the LCBO is very prominent, but the perception is that these Ontario wines receive no special treatment. The effect is apparently for some wineries to feel like foreign operators in their own land. The feedback is that other jurisdictions around the world give their own wines preferential treatment in the domestic market and the same should be the case in Ontario. Meanwhile, the LCBO offers guaranteed payment to foreign vendors and works to streamline the process of getting product into Ontario.

There were concerns about a heavy tax burden for selling wines into Ontario via the LCBO. Pillitteri Estates noted that the cost of taxes to sell into Ontario was 58.7% of revenue. In contrast, it was costing only 48% of revenue to sell into China. There are zero taxes on exports from the Canadian side (not a matter of concern) so this is a natural strong incentive to pursue exporting. Pillitteri Estates notes that only a quite small percentage of their sales is done via the LCBO. It was also noted that it can take a very long time to get a new wine onto LCBO shelves and in many cases, it is much faster to get wine onto new shelves in export destinations. Other feedback noted that partners need to be chosen carefully in jurisdictions such as China as there is no guaranteed payment analogous to what the LCBO offers to foreign firms.

A contrast made between exporting into China and exporting into the United States was an interesting one in showing the impact of regulations. No doubt the wine tariff for China is a high one but it was noted that the ability to access the Chinese market was good given that this tariff is paid. There are not tariffs associated with exporting into the United States but the process had so many layers and involved so many jurisdictions that the US market is considered a very hard one to penetrate. “US-first” type policies were perceived as a barrier as well. Such policies were also blamed in consultations for the demise of the use of Ontario grapes in fruit juices. A grape juice bottling plant was lost to Niagara in 2007 and the main Welch’s plant is now in New York state and does not source Niagara grapes.

There are other regulatory constraints that were seen to hamper wine sales. The most important were obstacles that interfered with the free inter-provincial movement of wine. Technically, individual wineries are not generally allowed to ship their products to other provinces although this seems to be a grey area in practice. Provincial liquor control boards are generally involved and this prevents or slows direct to consumer movements that cross provincial borders.

It is very hard to market, through the important method of wine-tasting, outside the LCBO framework (e.g. at farmers markets) as there is no warehousing of wines outside the winery. Basically, wines need to be back at the winery by the end of the day and this effectively limits the geographic scope of wine tasting. A heavy licensing burden is another sticky aspect for the wine sector in Ontario. Licenses are needed to: 1) manufacture 2) have a store, 3) to serve by the glass and 4) to have people walk on site at

² Note that the LCBO was not consulted as part of this process meaning that potential counter-arguments are not captured.

a winery. It was suggested that perhaps there is an opportunity for some streamlining in this regard. Furthermore, irrigation is often a significant issue in Niagara linked to the growth of grapes. There was a perception that important man-made irrigation ditch systems are being treated too much like natural waterways from an environmental/heritage perspective and that this could cause problems in the future.

The net result of consultation feedback is that the Ontario regulatory environment is perceived to hamper the growth of the Ontario wine sector. There was a comment that “the supply chain is clogged with regulation.” With respect to Ontario wines being enjoyed in Ontario or elsewhere in Canada, there is a perception of fewer winery and related jobs and less scale and economic activity (through direct, indirect and induced effects) than there could be.

Other Sectors

The wine sector painted the most vivid picture of regulatory difficulties but issues with other sectors did emerge. With regard to the air sector, the perception is that higher Canadian taxes and fees relative to other jurisdictions lead to a significant leakage of passengers or air freight to Buffalo. The upcoming pilot fatigue regulations were prominent and were covered in the prior section.

The steel sector noted a very high sensitivity to the regulatory environment on a whole host of aspects such as trade, market dynamics and especially energy policy. Regulatory aspects linked more specifically to logistics might actually be seen as minor in the scheme of things. It was suggested that there may be an opportunity to relax weight restrictions on trucks. If three steel coils can travel on a truck rather than two, it will make a difference in terms of the number of trucks that must travel. This is relevant in environmental terms and also offers a partial answer for problems associated with driver shortages.

In a related theme, CP noted that the Federal Transportation Modernization Act (Bill C-49) had provided certainty to make long-term investments into a new grain hopper fleet that would help facilitate longer, higher-capacity trains. The rail sector did bring up issues related to constraining revenue regulations for export grain but these were not linked to Hamilton-Niagara per se.

Expressed concerns about the regulatory environment in the marine sector were perhaps less than might have been expected based on past research such as Ferguson and Lavery (2012). For example, no major concerns were expressed about aspects such as cabotage which restricts the free-flow movement of goods between Canadian and US Ports depending on the flag of vessels. For the most part, there seemed to be acceptance about the nature of the “playing field” and the need to operate within the rules as defined. One minor concern was that market restrictions might hinder competitive bidding processes for marine projects but there was not strong dissatisfaction expressed about the status quo.

There was some concern expressed by a tenant at the Port of Hamilton that Transport Canada processes involved in preparing a vessel at berth for loading and departure could be seen as excessive. It was suggested that there was potential for streamlining.

3.3.4 Inter-Jurisdictional Issues

A host of issues that emerged where free movements are hampered due to inter-jurisdictional dynamics. There are aspects related to level of government in Canada, inter-provincial aspects and also interactions with foreign countries.

One aspect of this is a potential perceived need for levels of government to continue to find ways to work most effectively together. There were comments at the municipal level that there is potential to improve interactions with the provincial government. This was seen as important because there is so much provincial road infrastructure that is intertwined with the smooth flow of goods and people at the municipal level. The main thrust of the comments was a need for better communication about planning processes given the mutual common interests in the aspects being planned. On the other hand, it was noted that the City of Hamilton and Niagara region appeared to be working well together to advance their common interests.

Also related to this theme was a perceived lack of involvement of the Province in the marine sector. The Port of Hamilton noted that there are important opportunities linked to both the movement of goods and people in the region and that increased provincial involvement would be beneficial.

As second inter-jurisdictional theme was the existence of barriers to trade across jurisdictions, whether international or inter-provincial. In the latter context, the Senate of Canada (2016) offers a good overview of the issues. Three categories of internal trade barriers are identified in this report: 1) prohibitive barriers that directly prevent trade (e.g. shipping alcoholic beverages direct to consumer); 2) technical barriers which are sector-specific regulations that differ between provinces/territories and 3) regulatory/administrative which are additional administrative burdens experienced by businesses that operate in multiple provinces/territories.

In the current set of consultations, the inter-provincial experience of the wine sector seemed most prominent with restrictions on Niagara wineries shipping their product to other provinces. Another recent example is concern, within the agri-foods sector, on new policies that are prohibiting inter-provincial movements of calves or piglets into Ontario. Overall, inter-provincial barriers were not spoken about in detail and with great precision but it was considered a general area in need of improvement.

In the international domain, issues of reciprocity between countries arose on multiple occasions with Canada/Ontario generally perceived to be granting more access to foreign entities than the reverse. For the wine sector, this has already been outlined with regard to the LCBO and its efforts to give good foreign access to the Ontario market. In contrast, the perception is that Ontario wines are not treated nearly so well abroad. It was noted that flows of Canadian wine into Australia are heavily taxed while that country also supports a substantial marketing fund to help sell Australian wines abroad. The layers of obstacles associated with the entry of alcoholic beverages into the US market offer another example of how it is made difficult for Canadian firms. Fox40 noted that US protectionism hampers their business in the United States. In the air freight context, Cargojet noted difficulties in gaining approval to fly into Mexico that they doubted would apply in the reverse context.

A final inter-jurisdictional aspect was associated with various aspects essentially being “out-of-synch” across boundaries. For example, driving hour regulations differ between the US and Canada and this was seen to generate some difficulty that could be removed via harmonization. Maple Leaf Foods noted that there are border protocols associated with the meat sector that hampered the cross-border movement of goods. There was a question as to why the driver licensing process would differ between provinces given that drivers travel all over these same provinces. It was noted that previous efforts to standardize driver training across Canada through the Canadian Trucking Human Resources Council had been unsuccessful.

Table 3: Perceived Policy Issues/Needs

Moving Projects Forward	<ul style="list-style-type: none"> • Require truly long-term thinking that foresees needs of future • Infrastructure projects completed in reactive waves or “spurts” • Thinking proactive rather than reactive • Emphasize a need to compete with the rest of the world • Streamline the Environmental Assessment process • Emphasize concept of “funding to plan”
Supply Chain Labour Shortages	<ul style="list-style-type: none"> • Perceived serious shortage of truck drivers • Must evaluate additional system strain due to E-logs • Recognize truck driving as a skilled trade • Marine pilot shortages and high cost • Constricting effects of upcoming federal pilot fatigue regulations
Excessive Regulation/High Taxes	<ul style="list-style-type: none"> • High taxes to sell Ontario wine in Ontario • Constraining Regulatory impacts of LCBO • Air passenger/ Freight taxes higher than competing jurisdictions • Potential to relax weight restrictions on trucks (steel sector need) • Potential to streamline Transport Canada regulations on vessel prep
Inter- Jurisdictional Policies	<ul style="list-style-type: none"> • Enhancing planning co-ordination between levels of government • Inter-provincial trade barriers (e.g. shipping from a winery) • “Out-of-sync” regulations between jurisdictions (e.g. driver hours) • Reciprocity in market access between countries (e.g Canada-Australia wine; Cargojet access to Mexican market)
Municipalities and Local Resident Concerns	<ul style="list-style-type: none"> • Concerns over resident complaints about tourists • New resident proximity to supply chain infrastructure

3.3.5 Municipal Reactions to Concerns of Local Residents

On more of the local level, there is some concern with what municipal government might do in the face of concerns expressed by local residents. The best example is in wine country where wineries host events in order to help generate interest in their wines. Having people actually taste the wines is an important part of the winery business model. Residents who live close to wineries or who are bothered

by heavy volumes of tour buses have tended to express displeasure through various means. There was a request for municipal government to be cognizant of the important economic aspects associated with tourist activity at wineries and otherwise. The related concern with residents, as noted near the Port of Hamilton, is when new residential developments are located so closely to important goods movement infrastructure that has been there much longer.

Conclusions

The picture that emerges of Hamilton-Niagara from this process is one of increasing prosperity and opportunity. Road, rail, marine and air are well-represented in the region, which also plays host to important strategic infrastructure that serves the needs of the region and far beyond. Niagara and the region possess world-class tourist destinations that attract visitors widely. More and more, people are choosing to live and work in the region for its commercial opportunities and for its excellent quality-of-life. Participants in this process see the growth opportunities and the potential and they seek forward-looking solutions that will allow future commerce and the standard-of-living to flourish. World-class supply chains are certainly seen as an important enabler of the positive scenarios that are envisioned for Hamilton-Niagara.

4.1 Infrastructure, Data and Policies

Of three pillars that were identified at the outset of this process (infrastructure, data, policy), it is the infrastructure pillar that those consulted appear to emphasize and highways are seen as most central to infrastructure. And in fact, with regard to policy, one of the main pre-occupations is pursuing changes that would streamline processes associated with the development of new infrastructure.

If there is one point that those consulted would like to get across to policy-makers, it would be that the highways and major roads of this region (existing and envisioned) are so absolutely central to the current and future prosperity of Hamilton-Niagara. With few exceptions, other modes would be ineffective without quality road connections. Roads and highways are on the minds of everyone regardless of freight mode or whether an organization is public or private. The value that these corridors offer for a local and regional economy is enormous. There is a consensus among participants that a new major corridor for highway travel is required to offer an alternative route to the QEW and to provide a host of other benefits.

There is a significant theme in the region (and for the whole GTA) of a shortage of warehousing. Stresses due to the needs of e-commerce are certainly playing a role in this regard as there is a major trend to stage goods closer to end-customers. Given that the competition for land near the QEW corridor has been intense, a new corridor could help create the proper circumstances to host warehousing and other functions. The corridor could help improve, for example, the accessibility, connectivity and multi-modal potential for much of Hamilton's greenfield industrial land which is located near Hamilton International Airport. A potential need for more warehousing, in proximity to the border in Niagara, was communicated for the meat sector.

A theme that was repeated several times was the great importance of maintaining a long-term, strategic view which should not waver depending on the particular governments in power. There is a theme of being more proactive and less reactive so as not always being in a situation of having to play "catch up". It was pointed out that it is very difficult when large highway construction projects, which themselves cause considerable congestion stress, are layered onto already congested corridors. Planning for infrastructure must do the best job possible of foreseeing needs for the future. "Funding to plan" emerged as an important theme. The Federal and the Ontario governments are being asked to provide reliable sources of funding to this end that can be used towards long-term plans. It was noted that achieving significant change and development cannot happen overnight but the process has to start. Planning was seen to be at the core of starting.

Another important element of feedback on the policy front is that to the extent possible, policies should be well-aligned with "growing the pie" by creating the conditions under which economic growth can thrive. Potentially mobile aspects that are too heavily taxed will not thrive and may depart for other jurisdictions. As a general philosophy, there was a call for all things that create and support jobs to be assisted.

Driver shortages are severely hampering the movement of goods by road and are playing a significant role in driving up supply chain costs. Solutions to nurture and develop a healthy labour force of skilled drivers is paramount irrespective of developments in autonomous technologies. To this end, the consultation process featured input to have truck driving recognized as a skilled trade.

In terms of links made to the data pillar during the process, two primary themes emerged focused on: 1) data sources that might improve supply chain visibility and 2) data sources that help to better understand the customers whose requirements generate demand. Data needs in many cases are quite

industry-specific. While it was not specifically mentioned by those consulted, it is possible that a Canada-based framework along the lines of a Commodity Flow Survey (Government of Canada, 2015) could do the best to address the most needs.

4.2 E-Commerce and Exporting

This process has captured insights from several firms, associated with Hamilton-Niagara, where e-commerce plays a central role in the interactions between firm and customer. In some cases the participating organization developed the product and in other cases, firms played integral roles within e-commerce oriented supply chains. There was a sense of excitement associated with being able to use this avenue to develop new customer relationships all over the world. It is interesting to note that B2B e-commerce came across as being better established at this stage and was reported on in a more "matter-of-fact" manner. There was not a lengthy list of prominent Hamilton-Niagara e-commerce cases to choose from for participation in this process. Perhaps this is a sign of significant untapped potential for the region. No doubt there are many smaller, local firms that are using new technologies such as e-commerce and social media to grow their business. There is a need to celebrate and publicize the success of such firms and make sure that the lessons are clearly communicated for the sake of those SMEs that may follow in the footsteps.

With regard to exporting, results from the process show that it requires an enormous commitment of time and resources for a locally-based firm to understand the nuances of each country-specific market. Feedback certainly indicated that such country-specific insights and investment are a prerequisite in order to diversify exports over many countries. While there are few shortcuts to such advanced outcomes, new e-commerce technologies are playing an important facilitating role. Those who have been involved in exporting for some time and have spent a lot of time in the countries to which they export, also have important perspectives on how supply chains and infrastructure perform in other jurisdictions relative to Hamilton-Niagara. It is important to seriously consider the viewpoints of such people in formulating policy. Insights from this consultation are testament to the quality of these viewpoints.

One aspect of interest was a potential greater facilitating role for global-scale third party logistics (3PL) firms that operate in the region such as DSV and others. A lot is made of the good work that Export Development Canada (EDC) does in facilitating exports for Canadian firms, mostly with respect to financing. But based on the descriptions of DSV, it sounds as though this firm and similar counterparts, with their global reach, are capable to do a lot to forge connections between Canadian firms and potential foreign customers. They do so recognizing that the long-term generation of significant shipping volumes overseas is in the firm's best interests. It is not hard to imagine that many Hamilton-Niagara SME's have only scratched the surface in terms of their exporting potential and that there are untapped resources to help define the path forward and to make it a more diversified one. Other elements, such as Hamilton-Niagara Foreign Trade Zones were seen to be helpful in educating entrepreneurs about the possibilities.

The intersection of agri-foods, exporting and e-commerce appears to offer considerable potential for local firms. It was heard the “Made in Canada” resonates well around the world and that a new generation of Canadian entrepreneurs in the agri-food sector have the potential to capitalize on these opportunities. Hamilton-Niagara hosts such entrepreneurs and there is the potential for many more to be developed.

4.3 Technology

A final significant item to be considered is technology. Looking into the future, respondents to this process are most attuned to the potential implications of autonomous technologies for supply chains, particularly in the trucking context. The consensus among most participants was that widespread use of these technologies are many years away in the trucking context and thus there is not room for complacency with the driver shortage issue. There is curiosity among participants on the infrastructure implications of autonomous vehicles/platooned trucks in the supply chain along with regulatory aspects. There is concern about security – could autonomous trucks be “hacked”? It was noted that agri-foods may stand out as a sector that has earlier impacts from these new technologies in the form of applications such as food service or grocery delivery. While e-logs have been extensively noted as being likely to improve safety in the trucking industry, there are concerns that the newly-emerging Uber Freight might undo potential safety gains.

If anything, there was more potential optimism in the shorter run, about the prospects for remote pilotage of marine vessels, where an on-shore pilot might control the navigation of potentially multiple vessels. In some winter navigation contexts on the St. Lawrence Seaway there is a need for two pilots – so it is a significant and costly issue. The other costly element is when no pilots can be quickly sourced.

A second major technology topic that arose was drones and their potential impact. Again, regulation was an element of concern. There was interest from the Hamilton International Airport on whether drones might ultimately offer a means to completely bypass road congestion on the ground to more quickly access the major Toronto market. While it was noted that new drone technologies are capable of carrying cargos that weigh in the tonnes, the steel sector predicted that their movements would always be ground-based on land or on water.

A third theme is that technology lifts all sectors. Improved technology, for example, is at the heart of efficiency improvements seen in the rail sector. In agri-foods, it was heard that technology helps to mitigate the concerns of food safety, offers a means to deal with labour shortages in the sector, and enables the use of new forms of precision agriculture. There are many other examples that could be discussed.

A fourth major technology theme was that quite simply, things are moving very fast in the world nowadays. Respondents said that governments need to keep up with this high pace of change and regulations have to keep up as well. There was interesting feedback that governments themselves need to be very tech-savvy and that governments in certain European countries may be more advanced than

governments in Canada in leveraging technology to help ensure that goods move smoothly. Better use of technology by government to efficiently assess the potential risk of incoming goods, for example, was advocated. It was not stressed that governments needed to be on the cutting edge, in terms of supply chain technologies, but simply that they needed to make effective use of existing technology. Overall, the theme of “keeping up” is quite prominent in these consultations and it is one that applies beyond technology alone.

4.4 Challenges and Opportunities

This brief concluding chapter ends with Table 4 which offers a summary of opportunities and challenges that have emerged from this overall process.

Table 4: Summary of Opportunities and Challenges

Opportunities	<ul style="list-style-type: none">• Better aligning policies with “growing the pie”• Increasing co-operation between stakeholders in Niagara Region and City of Hamilton• Informing SME’s of resources and the potential to export• Leveraging the enabling capability of e-commerce for the region• Educating about promising supply chain careers in Hamilton-Niagara• Drawing more business from Niagara-Buffalo NY with fluid supply chains• Learning from the cases of those who conduct business internationally• Pursuing the Mid-Pen to “open up” the Niagara Peninsula and bring NY state effectively closer• Testing elements of exclusive trucking facilities on a MidPen• Pursuing a “Commodity Flow Survey” for Canada• Leveraging “Made in Canada” in other countries• Attracting even more passengers to Hamilton International Airport to allow more freight connections when combined with a lower cost airport• Realizing the full multimodal potential of the Port of Hamilton• Further harnessing the potential of our universities and colleges for the betterment of Hamilton/Niagara
Challenges	<ul style="list-style-type: none">• Shifting more from reactive towards proactive on infrastructure• Linking Hamilton-Niagara fluidity to the greater good of the wider region• Controlling excessive costs in the supply chain• Streamlining environmental assessments• Developing a wider societal appreciation for the importance of freight movements and employment lands• Overcoming high costs and scarcity of drivers/pilots• Reducing excessive tax burdens where needed

In closing, there is no doubt great value in focusing on the supply chain contexts of specific regions as this report has done. This study has also made clear, through many examples, that these supply chains often extend widely beyond the boundaries of Hamilton-Niagara. Most frequently, there are important linkages with the Greater Toronto Area and also there are very large flows of goods, with external origins/destinations, that pass through Hamilton-Niagara – perhaps moving to or from the border and far beyond. Many of the issues that were brought up through this process essentially transcend the relatively small geography of Hamilton-Niagara but have substantial influence on the performance of supply chains there. In planning for the future, it is important to remind of the need to consider deeply the interdependencies between regions and also between governments of different levels and the smaller regions that they may influence through policy and regulations.

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Appendix A: Consultation Questions

- 1) Can you describe the nature of the supply chains on which your organization depends? Consider aspects such as modes, goods, partner organizations, geography, and other elements as you see fit.
- 2) Do your supply chains suffer from "bottlenecks" in any way? Please comment. To what extent do these issues reside in the Hamilton-Niagara region? Can you comment also on "capacity for expansion" as it relates to your supply chains. What will happen if business increases by a significant percentage?
- 3) Associated with your supply chains and considering current/future, does your organization perceive significant gaps in infrastructure between what is ideally needed to stay competitive versus the current situation? If so, can you comment on these main gaps?
- 4) Please describe the importance of exporting to your organization in terms of current and future plans. If applicable, identify countries in addition to the United States. What are some of the challenges that make exporting more difficult?
- 5) If applicable, can you discuss the role of e-commerce (B2B, B2C or others) in your organization? Can you describe changes/challenges associated to e-commerce that have taken place in your organization/supply chains over time and others that are expected for the future?
- 6) Does your organization have sufficient access to all the data it needs to properly support business decisions (e.g. supply chain visibility, distribution channels)? If not, can you provide organizational perspectives on how governments/associations/academia could help?
- 7) What government policies, if any, excessively constrain the efficient operation of your organization's supply chains? Accordingly, are there new policy directions that your organization would support?
- 8) Can you provide organizational perspectives on
 - A) any emerging industry disruptive technologies,
 - B) important sustainability initiatives/considerations and
 - C) new ways of doing business that are relevant and potentially should be considered in formulating future policy?

Appendix B: Organizations Consulted

Shippers	<ul style="list-style-type: none">• Fox40• Maple Leaf Foods• Stelco• Arcelor Mittal Dofasco• Ikea• Pillitteri Estates• Harbour Estates• Richardson International• Parrish and Heimbecker
Carriers/3PL	<ul style="list-style-type: none">• CP (Canadian Pacific)• CargoJet• One for Freight• Fluke Transport• DSV
Freight Hubs	<ul style="list-style-type: none">• Hamilton Port Authority• John C. Munro Hamilton International Airport• St. Lawrence Seaway Management Corporation
Government	<ul style="list-style-type: none">• AgriFoods Canada• Niagara Region• City of Hamilton• Niagara FTZ
Associations	<ul style="list-style-type: none">• Ontario Grape Growers• Ontario Trucking Association• Hamilton Chamber of Commerce

Note that 24 organizations, as listed above, were consulted. 16 consultations were done over the telephone and 8 were in-person.

List of Acronyms

3PL	Third Party Logistics
ATRI	American Transportation Research Institute
B2B	Business to Business e-commerce
B2C	Business to Consumer e-commerce
CANSIM	Statistics Canada Data Set
CETA	Comprehensive Economic and Trade Agreement
CFIA	Canadian Food Inspection Agency
CFS	Commodity Flow Survey
CN	Canadian National Railway
CP	Canadian Pacific Railway
E-Logs	Electronic Logs
EDI	Electronic Data Exchange
ERP	Enterprise Resource Planning Systems
FDI	Foreign Direct Investment
FTZ	Foreign Trade Zone
GDP	Gross Domestic Product
GTA	Greater Toronto Area
HIA	Hamilton International Airport
HPA	Hamilton Port Authority
LCBO	Liquor Control Board of Ontario
LINC	Lincoln Alexander Parkway
LRT	Light Rail Transit
LTL	Less than truck load
MidPen	Mid-Peninsula Highway
OTA	Ontario Trucking Association
P&H	Parrish and Heimbecker
QEW	Queen Elizabeth Way
RFID	Radio Frequency Identification
RHVP	Red Hill Valley Parkway
SME	Small and Medium-sized enterprises