INNOVATION CORRIDORS AND THE GOLDEN HORSESHOE: TRANSPORTATION CHALLENGES AND THE EMERGENCE OF A SHARED REGIONAL VISION[1]

Jean Michel Montsion, York University

Introduction

The federal government's *National Trade and Corridors Fund* (NTCF) encouraged proposals for funding to support the movement of people and goods, especially for projects that could address congestion, efficiency, security, and economic development. With a focus on increasing international trade through improvements to ports, airports, roads, rails, multimodal facilities, bridges, and border crossings developments, the Government of Canada committed two billion dollars over eleven years, with four hundred million dollars dedicated to transportation infrastructure (Transport Canada 2017). The broad intent of such calls for funding fits conventional understandings of the need to invest in 'hard gateway' projects (i.e. infrastructure) to benefit directly affected communities in terms of access to distribution networks and being well integrated into economic processes. This round of funding also sets the stage for the development of 'soft gateway' initiatives, or business and economic development plans emerging from sectors of activity that benefit from the business of goods and people movement (Evans 2008; Montsion 2011).From the Canadian Global Cities Council to the Canadian Port Authorities and the Canadian Trucking Alliance, including the Association of Canadian Port Authorities (ACPA), the 2017 NTCF call for proposals was seen as helpful to fund transportation infrastructure that supports, facilitates, and expands international trade activities through Canada's freight corridors, especially in the Greater Toronto and Hamilton Area (GTHA) (ACPA 2016a, 2016b; CTA 2018).

This paper explores ways in which hard transportation infrastructure needs and challenges have allowed for the development of a shared regional perspective for the golden horseshow region (more broadly defined than the GTHA). Hard gateway and transportation infrastructure challenges shape possibilities for a regional positioning in global value chains, resulting in the emergence of a shared commitment to innovation corridors with key sub-regional differences. After exploring this link, the perspective of various urban stakeholders will be presented. The intent is to shed light on the city-region of Toronto as a gateway in order to understand how sub-regional locations serve as specific hubs, source nodes, sink nodes and saddle nodes, within a regional hierarchical network of actors that benefit from and are directly impacted by an increase in transit and mobility activity (Andersson 2000: 4). By focusing on urban stakeholders such as regional municipalities, sub-regional engagements with this shared regional vision show how they can serve as either building blocks or stumbling blocks to the achievement of the regional vision.

Hard Gateway Challenges

Transportation challenges in Ontario, especially the GTHA, include: the efficiency and reliability of trade corridors due to the amount of traffic (for local and international trade), constant increases in activity, the lack of integration of the transportation system across the region, and logistical problems relating to intermodal transitions and multimodality in general. The Ontario Chamber of Commerce has highlighted the ways in which road congestion is a significant impediment to the province's future economic growth. The lack of timely investment and coordination across jurisdictions have created deep-seated problems for the efficiency of the regional transportation system, and for improving the movement of goods and

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people (Crispino 2011).The population of Southwestern Ontario is estimated to reach 15.5 million by 2043.As such, past and current problems affecting the transportation system have increased significantly year after year, deepening chronic problems related to traffic congestion and access to multimodal facilities (City of Pickering 2017). By looking at the current situation and challenges related to transportation, a clearer picture emerges of the issues and obstacles that might become problematic to ensure sustained and future economic growth.

Airways

In the GTHA, air cargo has increased at a rate of 7% annually and international volumes by about 10% a year (GTAA 2018: 21). Despite past investments in corridor efficiency and improving multimodal access in the Peel region, where Pearson International Airport is located, the airport has experienced constant growth, especially in international passengers, for five consecutive years. This has resulted in problems meeting current demand and an inability to develop a more proactive approach to anticipated increases (GTAA 2018: 7-9). Nonetheless, an emerging division of labour can be seen between the airports of the GTHA, with the Munro Airport in Hamilton focusing on movement of goods (having become the largest overnight express freight airport in Canada), and Bishop and Kitchener-Waterloo airports emphasizing the movement of services (Metrolinx 2016: 12-14). Moreover, a proposal for an airport in Pickering with partial services in the Durham region east of the GTHA is also in development, partly to replace the executive airport of Oshawa, and partly to become an engine of growth for a future Pickering Innovation Corridor (City of Pickering 2018).

Roads & Trucking

Road congestion is a main concern that impacts the regional transportation system as a whole. The Toronto Region Board of Trade (BOT) has demonstrated that it costs more than $500 million annually in higher prices for Canadian consumers across the country because of road congestion (Toronto Region BOT 2017a). To address this problem, the favoured approach has been to protect and expand the 400highways, to better coordinate at the United States (US) border crossing, and to plan urban freight and goods movement in more efficient ways, especially when it comes to access to intermodal facilities (Metrolinx 2016: 21). From the perspective of the trucking and urban freight industries, improving access to intermodal freight facilities is key, notably by developing freight hubs such as in the Peel region where Pearson Airport interfaces with rails from Canadian National (CN) Railway and Canadian Pacific (CP) Railway; and in the Milton region where the 401 meets the CP intermodal terminal (Metrolinx 2016: 20). Such measures are hard to implement to the extent that expansion plans cannot hinder current activities and growth. They must account for the importance of balancing investments in more efficient movement of urban goods with increases in other types of activity, including various means of commuting such as public transit needs and bicycle lanes (Metrolinx 2018; TCSA 2010).

Railways & Intermodality

One of the key elements in reducing road congestion is improving the connectivity to and coordination with the railway system. With operations estimated at two million containers a year, intermodal facilities are key to managing rail traffic. Specifically, the success of CN's and CP'srail activities depends on the efficiency of intermodal facilities; for example, CN Brampton Intermodal Terminal is responsible for 60% of CN's system-wide activities (Metrolinx 2016: 18). As it is nearing capacity, the region also depends on the activities of the CP Vaughan Intermodal Terminal and the CP Milton Expressway Terminal, which now includes the CN proposal for a new intermodal facility and logistics hub in Milton (Metrolinx 2016: 20). It is also important to note the role of the Toronto Terminal Railways (TTR), a joint subsidiary of CN and CP that coordinates and plans rail operations in the GTHA, and which includes seven railways in the GTHA and plans to increase ownership along the Barrie and Lakeshore corridors (TTR 2019).The main challenges are not only the capacity of intermodal facilities to accommodate what is transported in an efficient way but also the sheer amount of traffic on the rails, especially in the Union Station Rail Corridor. With freight traffic continuing to pass through Union Station and major construction projects along the corridor, TTR, which is responsible for operating railways, must find the right balance between urban goods movements and renewal, while also accommodating commuters and passengers and waiting for infrastructure investments that will address anticipated increases of activity.

Waterways

In terms of maritime freight, the GTHA's largest ports are Hamilton, Toronto, Mississauga-Clarkson, and Oshawa, with activities largely integrated in the Great Lakes and St. Lawrence Basin (Metrolinx 2016: 14). Road and rail connections to the GTHA's port infrastructure are key through specific intermodal facilities, but it is the expansion of the use of marine freight activity that is seen as a solution to addressing some of the GTHA's congestion issues (Metrolinx 2016: 14). Ports have challenges in balancing recreational boaters with transport and storage of cargo; nevertheless, Hamilton remains the most active port due to its location and integration into industry activities, while the Port of Toronto is a key entry point for the City of Toronto, with 2.2 million metric tons passing through in 2017 alone (Ports Toronto 2019). In order to optimize the use of waterways, a relatively recent initiative entitled *Highway H2O* was launched to alleviate the dependence on trucking and railways for urban freight (Highway H2O 2016).While most of the port activity has remained stable throughout the region over the last 10 years, the Port of Hamilton's economic activity increased to six billion dollars in 2016. This is explained by a proactive approach by the Port of Hamilton, which was the first GTHA port to join the *Highway H2O* initiative and to market its role in short sea shipping between Hamilton and Montreal in a competitive and socially and environmentally sustainable way (HPA 2016).

Soft Gateway Considerations

In the GTHA, various stakeholders depend on an efficient regional transportation system for the pursuit of their activities. Some of these actors have participated in a regional discussion of what is needed to address the above-mentioned problems and challenges and, in recent years, of the development of a shared vision for the GTHA as a soft gateway to position the city-region in global value chains. Through these discussions, a shared vision has emerged of an efficient hard gateway infrastructure that supports various sectors of activity and super clusters and that can best position the golden horseshoe in global value chains through the concept of innovation corridors.

Regional Transportation

The main responsibility for the GTHA's regional transportation concerns falls on Metrolinx, a provincial agency that coordinates transport for the GTHA. Metrolinx's mandate explicitly mentions the importance of coordinating, planning, financing and executing plans for an integrated transportation network and a more efficient multimodality, for both passengers and goods (Government of Ontario 2006).Although the organization's emphasis has been on the transport of people, Metrolinx's (2008) regional transportation plan, entitled *The Big Move*, involved the movement of goods as well, with a key interest in the integration of management programs and improved multimodal transitions. This plan set the stage for the development of Metrolinx's 2011 *Urban Freight Strategy*, which presented concrete steps to facilitate the movement of goods in the GTHA, in complement to federal efforts around the Continental Gateway (Salsberg 2012).Despite the sustained efforts of cross-sectoral coordinating groups such as the *GTHA Urban Freight Forum*to carry through on these action items, implementation problems emerged, especially when it came to building collaborations across jurisdictions, relieving congestion, and reducing the environmental impacts of moving goods (Kriger and Gill 2016: 2, 13).

Building on *The Big Move*, Metrolinx's (2018) 2041 *Regional Transportation Plan* is built along similar strategic priorities of reliability, efficiency, regional connectivity, and integration, as well as anticipating demographic and economic growth. The implementation of such priorities is of particular interest to myriad actors, notably the Toronto City Summit Alliance (now the Greater Toronto Civic Action Alliance), created in 2002as a coalition of local leaders. This organization aims at addressing issues impeding the growth of Toronto and its development as a node in the global knowledge-based economy. In its 2010*Time to Get Serious* report, the alliance argued that the GTHA's main problem is a lack of funding to implement the recommendations of *The Big Move*(TCSA 2010: 6).Many other local stakeholders have positioned their priorities and activities based on the successful implementation of Metrolinx's regional transportation plan. For instance, CreateTO (2019), a municipal agency created in 2017 and composed of Build Toronto (the city's real estate agency) and Toronto Port Lands, depends on an efficient implementation of the regional transportation plan to ensure local economic development and

better land use. CreateTO builds on the advocacy efforts of the Mayor's Economic Competitiveness Advisory Committee and Build Toronto to work towards better agreements between municipalities in order to improve regional transit coordination, planning, and implementation, hence putting the responsibility on the shoulders of the City to lead this initiative (CreateTO 2008).

Regional Economic Vision

In light of these regional efforts to plan and implement solutions to transportation challenges, a rationale for such improvements and how they will help the golden horseshoe become more competitive on the global stage has also been consolidating. One vision that is gaining momentum is advocated by the Toronto Region BOT, which envisions for the GTHA a series of innovation corridors integrated in a way that stimulates high technology and financial, food, and health industries, thereby attracting the necessary capital, talent, and economic activity to the GTHA in a synergic fashion. In its recent *Annual Report*, the Toronto Region BOT(2016) indicates: "we are steadfast in our belief in the transformative effect of connected innovation corridors, and their potential to build collaborative super-regions that power all industries." This perspective takes shape in the broad plan for the *Toronto-Waterloo Innovation Corridor*. In collaboration with other public and private actors that transcend the traditional boundaries associated with the GTHA (to speak of the golden horseshoe more broadly), the Toronto Region BOT's argument for the development of the "country's first global innovation supercluster" is based on the existing critical mass of high technology professionals and businesses of the region (Toronto Region BOT 2017b: 10).

Beyond the GTHA, this innovation corridor is also meant to support the development of *Quantum Valley* in Waterloo, based on existing computer and artificial intelligence expertise from the private sector, and building on existing links to higher education institutions. As the Toronto Region BOT (2017b: 11) states:

> Many of the ingredients required to build a supercluster are already in place, including world-leading tech research and access to sources of capital in Toronto— Canada's global financial centre. There's no shortage of world-class universities and research centres turning out top talent and innovation to lead the charge on what's been billed as the next tech revolution: quantum computing.

With echoes of the corridor between San Francisco and San Jose, California, the GTHA is said to benefit as much as the Waterloo region in this collaboration, by pooling their local resources and making transportation infra structure a key component of the success of this innovation corridor (City of Kitchener 2018).

The positioning and development of Toronto in global value chains is directly linked to the GTHA's ability to remain competitive through efficient use of its transportation infrastructure. The success of any innovation corridor depends on improvements in transportation infrastructure, not only because congestion adds costs to various sectors of activity, but also because the movement and transportation of goods account for one third of the region's economy (Toronto Region BOT 2017a). Beyond hard gateway needs, efficiency in the network will greatly improve through soft gateway priorities, including better connectivity between cities through smart technology, better integration of small and medium enterprises to international trade networks (especially Asian markets), and a closer collaboration between private and public partners in land-value capture to increase residential and commercial property value.

Sub-regional Hubs & Related Visions

A gateway can be defined as a "multi-hub node," and thus, the GTHA can be understood as a combination and juxtaposition of transportation hubs (Andersson 2000: 5). Various sub-regional actors, such as regional municipalities, are using hub functions available in their territories to strategically position themselves within this shared and broad vision of innovation corridors. They all have significant, but to a certain degree, distinct, gateway functions in the regional transportation grid, while being hierarchically dependent on one another. As such, gateway functions are three-fold, with source functions associated with generating activity; sink functions linked to the consumption and use of products; and saddle functions, which transport, direct and transform incoming flows to various sinks (Andersson 2000:

4). Whereas the City of Toronto serves mostly as a source and sink node, the five GTHA regional municipalities and the City of Hamilton are distinguishing themselves through specific combinations of the three types of nodes, especially achieving key saddle functions within the regional gateway.

City of Toronto

A series of public consultations in 2014 entitled *Feeling Congested?* confirmed that road and maritime congestion are especially difficult for a wide array of local stakeholders, which led to an investment of more than ten billion dollars by the City of Toronto (City of Toronto 2014). In order to improve the efficiency and connectivity of the various trade and transport corridors that run through the City of Toronto, the favoured approach has been to support the movement of goods through the protection of the 400 highways and reliable freight distribution, while working with key stakeholders to ensure compatibility in land use. As such, there have been more systematic efforts to develop a collaborative approach, which started with the Southern Ontario Gateway Council but found other expressions with the creation of an inter-governmental freight committee in 2013 (City of Toronto 2016). Moreover, the City of Toronto targeted the improvements made to the Gardiner Express (Highway 427) to complement investments made by the City of Hamilton in all roads connecting the US border crossing through the network of Ontario's 400 highways (City of Hamilton 2010).The City of Toronto also worked with Toronto-based agencies such as Waterfront Toronto, which relies on the movement of goods in and out of the Port Lands. In this case, the emphasis was on improving truck access to transportation corridors through dedicated trucking routes (City of Toronto 2017).

Such investments and the collaborative approach to dealing with hard gateway realities were made to support the City of Toronto's emphasis on innovation and a knowledge-based economy, which requires an efficient and coordinated regional transportation system for the mobility of goods and people through its ports of entry and at the US border crossing. Caught in a balancing act, the City of Toronto must meet the needs of pro-business stakeholders, such as Toronto Global, which can better attract investment by relying on improvements to transport infrastructure for international trade purposes, while meeting the concerns and issues raised by transit advocacy groups such as CodeRedTO, and not-for-profit associations like Toronto Civic Action, which aims to support a more integrated and affordable and accessible regional transportation system (CodeRedTO 2019; TCSA 2010; Toronto Global 2019). The talent, expertise, investment, and businesses that are needed locally to sustain any clustering of activity in a knowledge-based economy make the city a key node in reconciling tensions between the requirements of transport efficiency and reliability for commercial purposes and international trade, on one hand, and the need for local commuting, quality of life, and social development that attracts professionals, on the other.

City of Hamilton

In itscurrenteconomic development plan (2016-2020), the City of Hamilton (2016) makes the case for a trade-facilitation agenda that directly supports its local economic activity, as its transportation infrastructure is the key connector between the city and the GTHA's global connectivity. An historical competitor to the City of Toronto, Hamilton benefits from many advantages in terms of geographical location and transportation assets (Phillips and Bouchier 2014; Terpstra 1985). This gives the city a de facto status of gateway to the golden horseshoe, equipped with a port and an airport and located between the US border crossing and the GTHA, with direct access to the 400 highways and Canada's two national railways. The recent focus on improving multimodality, increasing freight-friendly land use, and compatibility with the transportation systems of other GTHA jurisdictions demonstrate that the favoured approach is one of complement to gateway and transportation activities of other hubs in the GTHA (City of Hamilton 2018). Whereas the City of Hamilton developed a truck route action plan in 2014 to complement Metrolinx's *Urban Freight Study* and the findings of the Ontario-Quebec Continental Gateway group, the Port of Hamilton has focused on increasing its role in the distribution networks of the Great Lakes region, and the Munro Airport – which was Canada's fastest growing airport in 2017 –found a niche by focusing on domestic cargo and affordability (City of Hamilton 2010, 2018; HPA 2017). The city's plans are also supported by the McMaster Institute for Transportation and Logistics (MITL), which has provided a roadmap for using improved transportation infrastructure and multimodality to facilitate

the clustering of specific knowledge-based and manufacturing activities. In this case, MITL argues for the development of a freight village, or hub of transportation logistical skills, expertise, and training, to target the clustering of smaller firms that need shared facilities, equipment, and services to prosper (MITL 2011).

Halton & Peel

Both Halton and Peel are regional municipalities located between Toronto and Hamilton, which links their development to saddle functions of transporting, re-directing, and transforming incoming flows. They are both well integrated into the GTHA's road, rail, and air transportation networks. Whereas Halton includes significant agricultural lands and activities, it also includes municipalities such as Burlington, which depends on manufacturing, and others like Oakville that try to develop higher-value industries, notably in the fields of digital media and biosciences (Halton Region 2019). In the Peel region, which is where the Pearson International Airport is located, cities such as Mississauga have seen major economic growth and industrial activity, and they support this growth by advocating for and implementing a smart transportation system (Region of Peel 2016). Halton and Peel have focused on attracting manufacturing and investing in smart transportation technology in order to benefit from industrial and transportation projects and businesses (Halton Region 2019; Region of Peel 2016).

North of Toronto

The regional district of York has changed rapidly in recent years. Its manufacturing and construction sectors of activity have encountered the need for residential space to support Toronto. This translated into a mixed approach to transportation for both commercial and residential uses. Besides its industrial base, like in Newmarket and Vaughan, the new focus for economic growth has been to attract global firms like KPMG and GM, and to develop innovation hubs and research-intensive spaces, with the support of higher education institutions (York Region 2017). As with the intense growth of many of its municipalities like Aurora, Markham, Newmarket, Richmond Hill, and Vaughan, the North of Toronto has not only focused on developing niche innovation hubs but also on investing in reorganizing its road management system. It has done this by emphasizing collective and active transportation options for commuters and developing alternative roads for trucking to connect to the broader region more efficiently (York Region 2016).

Durham & Niagara

At both ends of the GTHA, regional municipalities are building their own plans for economic development based on their role in the regional networks. They are doing so through a transport corridor mentality. On the one hand, the Durham region in the East is focused on developing new transportation corridors that are more effectively connected to existing regional systems in the GTHA. Although this is mostly linked to road infrastructure due to the high dependence on the trucking industry, Durham also has one airport in Oshawa and plans for another one in Pickering. Most municipalities, like Ajax, Brock and Whitby, are betting on better management of road congestion, including diversification of means of transportation and better integration into the regional systems in place, to support a new economic development vision embodied in the *Pickering Innovation Corridor* (City of Pickering 2017, 2018). On the other hand, the Niagara region is the closest to the US border. Niagara's focus has been on mitigating border delays affecting the overall efficiency of the transportation and distribution networks. With the development of a *Niagara-Greater Toronto Area Corridor*, it offers an alternative route to the Queen Elizabeth Way (Niagara Region 2018).

Conclusion

When looking at Toronto as a city-region, it becomes clear that the challenges relating to transportation infrastructure have shaped how a possible shared positioning in global value chains emerged in recent years. With practical problems such as increased congestion at a time of growing activity and demography, systemic conditions such as a chronic lack of investment in transportation infrastructure and problems of coordination across jurisdictions are complexifying how solutions can be put forth. The development of a soft gateway vision in terms of a series of innovation corridors that builds on local

strengths and a critical mass of talent, investment, and competitive firms in a specific sector of activity, leaves room for the development of sub-regional positionings by each district.

Within the GTHA, urban stakeholders like regional municipalities envision what their contribution will be and what kinds of competitive advantages this vision will bring the region, while also recognizing how hierarchically dependent they are on each other. With their own combination of sink and saddle functions to support the source hub that is Toronto, we see the development of initiatives such as Hamilton's freight village, as well as Durham and Niagara's corridor initiatives, as complements to the *Toronto-Waterloo Innovation Corridor* and other world-class activities of the City of Toronto. Similarly, the manufacturing and transportation hubs developing in Halton and Peel, as well as the niche innovation hubs emerging in the North of Toronto, depend heavily on economic activities shaped by and from the City of Toronto. Similar to the idea of "coopetition" in business and management, each of these urban stakeholders is competing with one another to drive economic activity to their territory, while relying on each other to fulfill a broader regional positioning in global value chains (Bengtsson and Kock 2000).

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