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Tracks to Success:

Are Canadian rapid transit projects likely to generate TOD?

Thesis submission

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Dedicated to

Lee Chitty, who somehow didn't leave when I told him I wanted to cross the ocean to write about zoning, bikes, and trains. And who didn't leave me when I came back.

My family and friends who listened patiently as I talked non-stop about zoning, bikes, and trains for years before finally shipping me overseas. And who'll now have to deal with even more of it.

Alain, who's enabled and guided my fascination with zoning, bikes, and trains.

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Glossary of terms

ARTM	<i>Autorité régionale de transport métropolitain</i> (Montreal regional transport authority)
CDPQ	<i>Caisse de dépôt et de placement du Québec</i> (Quebec public pension fund)
CSF	Critical Success Factors (Thomas & Bertolini, 2015)
GGH	Greater Golden Horseshoe (Greater Toronto Area)
TOD	Transit-oriented development

Chapter 1: Research Proposal

1.1 Abstract

Canadian rapid transit networks are undergoing an unprecedented phase of expansion. These investments have been justified by federal, provincial, and municipal officials as a necessity in order to improve the sustainability of auto suburbs through transit-oriented development (TOD). However, TOD is difficult to implement and requires more than just transit infrastructure. This research aims to examine to what extent the institutional contexts of Canadian cities are likely to generate high-quality TOD. Through documented evaluation and interviews with local experts in a selection of case studies in Canada based on Bertolini & Thomas's 2015 framework, this paper aims to fulfill this objective and extract lessons which can inform the success of future projects in the Canadian context. The findings indicate that those cases with a greater integration of land use and transport planning score higher and are more likely to generate successful TOD.

1.2 Keywords

Transit-oriented development, Institutional analysis, Canada, Prospective Analysis

1.3 Introduction to research

During the latter half of the 20th century, North American cities produced large areas of urbanization characterized by car-oriented design (or auto suburbs). This phenomenon has not been the product of any one single policy but is the result of various policies, practices, and investments, including large-scale investments in automobile infrastructure capacity, the segregation of land uses, road design standards, and the demand for low-density settlements (Handy, 2002). This model of development has proven itself increasingly unsustainable, with significant externalities ranging from social isolation, sedentary lifestyles, and unaffordable infrastructure expenditures, to traffic congestion and increased greenhouse gas (GHG) emissions. Public transportation and transit-oriented development (TOD) are often touted as a solution to issues of congestion, lack of vitality, and environmental unsustainability in suburbs, following the principles of *Smart Growth* (Searle & Filion, 2011). The focus on these auto suburbs comes from the stated desires of all levels of government to improve the sustainability of these areas, as they are strongly correlated with high per-capita emissions and energy use. This has been particularly notable among Canada's major municipalities, all of which have adopted and pursued TOD policies in an effort to achieve sustainability objectives (Searle & Filion, 2011).

As part of an effort to address these increasingly pressing topics, the Government of Canada has set aside over \$60 billion to cover up to 50% of the costs of public transportation projects across the country between 2015 and 2028 as part of the Public Transit Infrastructure Fund (PTIF) (Infrastructure Canada, 2017). With provincial and municipal contributions factored in, over \$120 billion is expected to be spent in this timeframe. To put this amount in perspective, on an inflation-adjusted per-capita basis, this investment is roughly equivalent to the Eisenhower Interstate System, one of the most important factors in the creation of the modern American suburb (Duany, 2001). Like the latter, the PTIF has helped spur a wave projects in medium and large cities; from 2015 to 2026, the total length of Canadian rapid transit² is expected to nearly triple from a combined 318 km to over 835 km.¹ These projects are expanding the extent of rapid transit to distances as far as 60 km from city centres, reaching further into suburban fabric than ever before.

Tempting as it may be to extend the comparison between the Eisenhower Interstate System and the PTIF to the impact on urbanism going forward, it is important to remember that infrastructure does not, in itself, cause significant changes in the urban landscape. Just as the Interstate did not *cause* car-dependent urbanism on its own, Canada's dramatic push for public transport will not automatically generate TOD by the presence of infrastructure alone. TOD is notoriously difficult to plan and to implement, requiring not only infrastructure and service components, but also mutually supportive policies, incentives, regulation, attitudes, and practices from a number of actors (Tan, Bertolini, & Janssen-Jansen, 2014). As all levels of government embark on these projects, it is important to ascertain whether the context of the cities in which rapid transit projects are underway will, in fact, be able to translate infrastructure investments into more sustainable suburbs through TOD.

1.4 Problem Statement

Canada is currently undergoing a historic period of investment in public transit infrastructure in order to address the issues of unsustainability, notably in its auto suburbs. Canadian municipalities have identified TOD as the way to translate these infrastructure investments into gains in suburban sustainability (Searle & Filion, 2011). However, research has found that the implementation of TOD requires a range of supportive elements from a multitude of actors (Belzer & Autler, 2002). This project will examine the extent to which these supportive elements are present in Canadian cities.

1.5 Research Aim

This research aims to ascertain to what extent current Canadian rapid transit projects (CRTPs) are incorporating elements favourable to the emergence of TOD and what lessons can be learned for future projects in Canada.

¹ Calculated by the number of kilometres of rapid transit set for revenue service by 2028.

1.6 Research Questions

To what extent do Canadian rapid transit projects (CRTPs) provide the right conditions for transit-oriented development?

The main question aims to qualify the extent to which a selection of Canadian cities have the necessary enabling conditions required to translate recent investments in transit infrastructure into sustainability gains in auto suburbs through the generation of TOD. The methodology for arriving at an answer to the main question divides into three sub-questions:

1. *What are the favourable institutional conditions for TOD?*

This question's aim is to develop an analytical framework of conditions which can be applied to CRTPs. To arrive at this, this paper uses the meta-analysis from Bertolini & Thomas's 2015 paper, *Defining critical success factors in TOD implementation using rough set analysis*.

2. *To what extent do CRTPs present these favourable institutional conditions?*

Sub-question two aims to evaluate the likelihood of generating TOD in each of the chosen case studies. This was evaluated using the critical success factors identified in sub-question 1. These factors were used to develop an interview questionnaire used in interviews with local experts and practitioners, desk research, and in-person site visits for each of the three projects. The interviews were then analyzed to determine to what extent each project presents the favourable factors identified.

3. *What lessons can be learned for future CRTPs?*

Based on the identified success factors for TOD and their analysis in the case studies, this research identifies lessons which are applicable to future CRTPs, forming a series of practice recommendations for future use.

1.7 Scientific Relevance

As will be discussed in Chapter 2, TOD is a topic which has been widely studied. Most of the existing literature focuses on best practices and advocacy, TOD definition, and retrospective analysis (Thomas & Bertolini, 2015). Some studies have started to look beyond the immediate results, examining the underlying and transferable factors which contribute to the success of TOD (Cervero, et al., 2004).

Despite the number of retrospective analyses of built-out TOD projects which have evaluated the successes or weaknesses in their outcomes, there remains a lack of prospective literature. In short, The current literature can assess if a project is successful, but cannot evaluate the path to get there.

My research aims to further this type of prospective policy analysis in the Canadian context. Although only a first step, further follow-up research of the cases may help to test the predictive value of the literature used.

1.8 Societal Relevance

This study comes at a historic turning point in Canadian rapid transit. From 2015 to 2028, over \$120 billion will be spent in transit expansions, nearly tripling the total trackage of frequent, rapid public transport. These investments are justified largely on the promise of gains in sustainability, especially in the large post-war suburban areas surrounding Canada's major cities (Infrastructure Canada, 2017). Although transit infrastructure is a key ingredient in the desired shift towards more sustainable suburbs, it is not the only one. Canada's planning system and policies are largely based on principles from the 1950s and 1960s (Lewyn, 2010). These policies enabled and legislated the low-density high-mobility patterns that have contributed to problems of unsustainability in Canadian suburbs which these transit projects aim to remedy. This has helped lead to the "yawning gap between [...] the political discourse [and] the remarkably stubborn nature of urban development" (Filion, 2007). If municipalities are to be successful in their efforts, they must ensure that their wider practices are in line with their new goals.

This study aims to assess whether the enabling elements which are necessary to leverage these historic investments to produce sustainability are present in Canadian cities. The conclusions of this research can contribute to inform policy for current and future projects. Currently, institutional practices surrounding TOD are largely developed on a municipal level through rather haphazard modifications of current practices and limited transference between cases (Thomas & Bertolini, 2014). With the historic volume of projects underway, a more systematic approach is needed to evaluate which practices must be maintained, strengthened, or changed. This study can contribute to the development of a more systematic and targeted approach to institutional change, allowing this new infrastructure to be fully leveraged towards more sustainable cities.

Chapter 2: Literature and Framework

This chapter situates the research topic within the existing literature on TOD. Most of the academic literature relating to TOD either provides a definition of TOD concepts or a retrospective analysis of projects after completion. The objective of this paper is to develop the literature on prospective analysis. Prospective analysis aims to assess the trajectories of projects underway and to evaluate their likelihood of success. This chapter provides a brief overview of key research on TOD literature, with a special focus on literature which relates to prospective analysis.

2.1 TOD literature

There is great of interest in linking transit infrastructure and urban development. Since the first mention of the term “transit oriented design” in Peter Calthorpe’s 1993 *Next American Metropolis*, the concept has gained widespread recognition and interest, particularly in North America, Australia, and, to a lesser extent, Europe (Coolbaugh, 2016)². The concept has been linked to several different planning movements such as *Smart Growth* (Jenks, 2005) and *New Urbanism* (CNU, 2012); and has been touted for its benefits in terms of sustainability (Renne, 2009; Cerevo, et al., 2004) economic development (Jenks, 2005; Cerevo, et al., 2004), affordability (Cerevo, et al., 2004), and many other objectives. In its most basic definition, TOD is the linking of high-intensity uses and rapid transit in a pedestrian-centred environment (Cournoyer-Gendron, 2017). Although “*there is no universally accepted definition of TOD*” (Jenks, 2005), it is generally understood to be an area of medium- and high-density mixed-use development within an 800 metre (or 10 minute) walk of a rapid transit station (usually rail-based) (Jenks, 2005) (Cournoyer-Gendron, 2017).

The general enthusiasm around TOD has resulted in its widespread adoption as an objective by municipal planning bodies in Canada. Planning departments in all major cities make specific mention of it in their metropolitan planning documents (Filion, 2011). As mentioned in Chapter 1, the pursuit of TOD and its benefits has been one of the major motivators for the investment in rapid transit expansion projects across the country (Filion, 2011). The purpose of this paper is not to argue the benefits of TOD – there is a large body of literature which examines its effects on various levels – but rather, to test whether Canadian cities are likely to be successful in their stated objectives of generating TOD around their rapidly expanding transit systems.

To that end, the following sections examine the literature on TOD, focusing on the elements which could best help answer sub-question 1 of this thesis, “*What are the favourable institutional conditions for TOD?*”. After reviewing TOD literature, works can be divided into three general categories:

1. TOD guidelines and advocacy;
2. TOD definitions; and,
3. Retrospective analysis.

2.1.1 TOD guidelines and advocacy

The literature about TOD guidelines and advocacy generally comes from non-academic sources such as municipalities, urban advocacy organizations, and professional organizations and is directed towards practitioners and other actors, often including the general public. A notable example includes the *Institute for Transportation and Development Policy (ITDP)* “TOD Standard” guidelines, which establishes and scores metrics for TOD (Institute for Transportation and Development Policy, 2017). Many Canadian municipalities and municipal actors have developed similar documents, such as Winnipeg’s *TOD Handbook*, Translink’s *Transit-Oriented Communities Design Guidelines* [for Metro Vancouver], and Ontario’s *Transit-Supportive Guidelines*. This TOD literature tends to be prescriptive in nature, drawing from local and international best practices. These works tend to contain specific recommendations which are intended for implementation by local actors. Indeed, one of easy ways to recognize documents in this category is the frequent use of the imperative tense (*locate, avoid, ensure*, etc.) and *should*, indicating an intent to prescribe. However, as many of these documents tend to focus on outcomes rather than processes, their recommendations tend to gloss over the institutional processes which underly them. In other words, they tend to detail objectives, but not how to get to them.

2.1.2 TOD definitions

The literature that discusses TOD definitions encompasses studies that take a more abstract approach to what TOD *should* be as a concept. These works tend to cover questions of ideal form or ideal metrics of success. The most well-known example is Calthorpe’s *The Next American Metropolis* (1993), widely credited with the creation of the TOD concept. In it, Calthorpe outlines what he considers to be a model TOD concept including geographic extent, layout, and land uses. There are parallels with other influential planning works such as Ebenezer Howard’s *Garden Cities of To-morrow* in their shared use of abstract ideal forms. What becomes apparent in reviewing the literature about defining TOD is that the concept encompasses a number of different definitions, and that the definition has evolved over time. The first definition was provided by Calthorpe in (1993) as: “*mixed-use community within an average 2,000- foot walking distance of a transit stop and core commercial area*” (Calthorpe, 1993). The definition of TOD has since been continually refined and modified. The proliferation TOD as a concept as well as its adoption and adaptation by other planning movements has had the effect of creating several slightly different definitions of TOD with different focuses:

This lack of clarity in the definition of TOD may exacerbate legitimate disagreements about what constitutes "good" TOD. Should TOD aim to maximize revenue to the transit agency through lucrative ground leases or seek to minimize the use of

automobiles? Should TOD be designed to maximize ridership or to help revitalize the station area? Should it try to maximize economic success or urban values? All of these are legitimate but sometimes mutually incompatible goals that may result in policies that work at cross-purposes to one another. And resolving them is made harder by the lack of a settled framework for assessment (Belzer & Autler, 2002, p. 19).

The literature which sets out to define TOD demonstrates that there is no single definition. Within a few years of Calthorpe's introduction of the term in 1993, researchers such as Bertolini, Cervero, and Renne contributed to further detail and adapt the concept. (Qvidström, 2019)

Some literature leans on a primarily spatial definition of TOD, using criteria such as the influential works such as Cervero & Kockelman's (1997) *3Ds of TOD*³ (and later Ewing & Cervero's [2011] *5Ds*⁴), seeking to offer theories about the spatial theories most conducive to successful TOD.

Throughout the literature some common elements emerge, including a frequent thread about the need to resolve the tension between TOD's transportation and land use components. Although this tension is described in several ways, it is most succinctly detailed by Bertolini's *Node-Place Model*. On the *Node (N)* side, the transportation-objectives of trying to be as effortlessly connected as possible, and on the *Place (P)* side, the land-use objective of being as intensely and efficiently used as possible (Gert-Joost, Bertolini, & De Jonge, 2006).

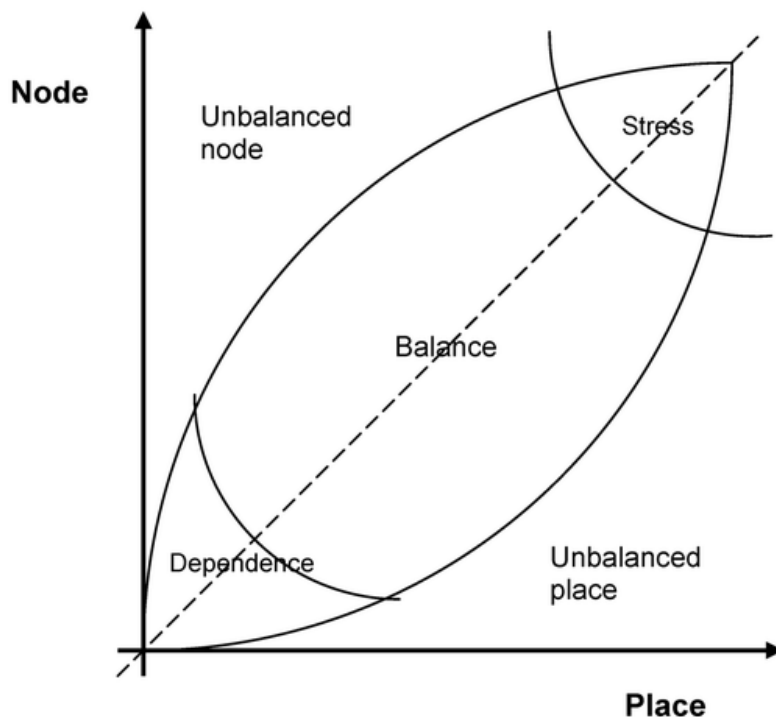


Figure 1: Node-Place Model (Gert-Joose, Bertolini, & De Jonge, 2006)

³ Density, diversity, and design.

⁴ Density, diversity, design, destination accessibility, distance to transit.

Bertolini's Node-Place theory proposes that the improvement of a station will occur by aiming for a balance between *N* and *P*; if a station is heavily bent on a transportation function, it would be improved by putting resources towards the intensification of its urban activities, and vice-versa.

When P dominates, the balance can be achieved by investing in/improving transit (e.g., increased frequency or demand-responsive access/egress solutions), limiting the place value (its land-use intensity and/or diversity), or a combination of both actions. When N dominates, land-use intensity towards more compact development and a high-quality pedestrian and cycling realm, where public space and green areas occupy a key role (as opposed to a wider regional catchment approach using transit services) is recommended (Olaru, et al., 2019)

This tension is particularly felt in the context of TOD, where both transportation and intense land use are integral to the concept. According to this model, a successful TOD project would therefore be one where a balance is achieved (Olaru, et al., 2019).

Ultimately, the concepts which emerge from TOD definition literature are not necessarily directly applicable per se as they often assume an idealized set of conditions, akin to economic models (Liscombe, 2004). Instead, their value comes from their definition of ideals to attain. These are necessary for evaluating the success or failure of TOD projects in retrospective analysis.

2.1.3 Retrospective analysis

Literature in the category of retrospective analysis encompasses the detailed examination of built-out cases, often in order to extract lessons regarding their success or failure. Publications such as Cervero, et al.'s (2004) *TOD in the United States: Experiences, challenges, and prospects*; Jacobson & Forsyth's (2008) *Seven American TODs*; and Curtis, Renne, & Bertolini's (2016) *TOD: Making it Happen*; provide valuable insights into the wide-ranging experiences of TOD around the world. These studies build upon definitions of success which have been identified in the literature, comparing and contrasting them with built-out projects in order to identify successes and failures.

As the number of built-out TOD projects continues to grow, so has the body of retrospective analysis. Belzer & Autler (2002); Marlon & Compin (1999); and Tan, Bertolini, & Janssen-Jansen (2014); examine the obstacles to TOD implementation through case studies of built-out projects, comparing the practices and results with ideal outcomes. These case studies generally point to institutional factors as a major determinant in TOD outcomes (Tan, Bertolini, & Janssen-Jansen, 2014). The *Transit Cooperative Research Program's* (TCRP) wide-ranging study, *TOD in the US: Experiences, Challenges, and Prospects*, one of the most comprehensive pieces of retrospective analysis with 10 separate case studies, put significant emphasis on the role of institutional factors in the attainment of TOD success (Cervero, et al., 2004).

In turn, the increasing availability of case studies and retrospective analysis has allowed for the meta-analyses of their findings. This draws from the existing but context-specific case studies and aims "to derive common elements from a series of completed case studies, often in order to identify transferable lessons" (Thomas & Bertolini, 2014). The use of meta-analysis is still very new to the study

of TODs; although, it has been used in the related fields of transportation planning and urban planning (Thomas, 2013). The only TOD meta-analysis study to date appears to be the research done by Thomas & Bertolini (2014), *Beyond the Case Study Dilemma in Urban Planning: Using a Meta-matrix to Distil Critical Success Factors in Transit-Oriented Development*. It contains a meta-analysis of 11 international case studies of TOD projects, analyzed through a statistical model to draw out the most important identified factors of TOD success, and validates them through practitioner interviews (Thomas & Bertolini, 2014).

The result is a relatively concise number of factors which, although specific enough to be evaluated, are intentionally made flexible enough to apply to a wide range of different contexts. The paper derives an evaluation matrix from these CSFs, combining qualitative and quantitative measurements intended to enable the transfer of lessons across projects. The framework includes the following measures, each to be evaluated on a scale of 1 (lowest) to 5 (highest):

<p>1. Plans and Policies</p> <p>Policy consistency</p> <p>Vision stability</p> <p>Government support</p> <p>Local stability</p>	<p>2. Actors</p> <p>Actor relationships</p> <p>Regional land-use/transportation body</p> <p>Intermunicipal competition</p> <p>Interdisciplinary implementation</p> <p>Public participation</p> <p>Public acceptance of TOD</p> <p>Key visionaries</p>	<p>3. Implementation</p> <p>Use of site-specific tools</p> <p>Regional TOD planning</p> <p>Certainty for developers</p> <p>Willingness to experiment</p>
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Retrospective analysis is valuable because it assesses the performance of the wide range of TOD policies and practices against the ideals proposed in the TOD definition literature. It does so by critiquing and evaluating built-out projects, and increasingly, there is a large enough body of these case studies to allow for meta-analysis. This has led to the beginning development of more transferrable lessons and indicators with predictive value.

2.1.4 The missing link: Prospective TOD evaluation

TOD literature has certainly evolved from its origins as a purely abstract concept to a well-studied project type. However, if definition literature establishes the ideal objectives, and retrospective analysis enables researchers to assess projects' attainment, what is missing is literature outlining how to get there. To use a dart analogy, definitions set the bullseye, retrospective analysis tells you if you've hit it, but what's missing is tips on how to throw.

This paper proposes that the next step for TOD literature be to develop a theory for prospective TOD evaluation. Prospective TOD evaluation measures the potential for the emergence of TOD in projects not yet completed. A theory for prospective analysis builds upon the findings from previous retrospective meta-analysis, which provided transferrable lessons about elements and factors which are most conducive to successful TOD projects. However, unlike retrospective analysis, prospective analysis will not focus on evaluating built-out projects. Instead it uses existing lessons in order to define modified or new indicators which can be used at an early stage in order to evaluate and predict TOD performance before build-out. This type of study is of particular interest as it can have a tangible impact on policy in order to affect the trajectories of projects before they are completed, rather than simply critiquing a project once it is a *fait accompli*.

Considering the difficulties in translating case study findings into generalisable lessons, the ability to distil essential concepts, issues and tools that could be applied [...] in different contexts, may be of great interest to policymakers. (Thomas & Bertolini, 2014, p. 222)

For a complex topic such as TOD whose attempts have often been unsuccessful, this type of tool is even more significant. The goal of this paper is to be an early contributor to this category of literature, providing an evaluation of projects underway by using the lessons gathered from TOD meta-analysis.

2.2 Evaluation framework

In order to understand the potential of ongoing Canadian rapid transit projects (CRTPs) for TOD, it is necessary to develop an evaluation matrix. To answer the second sub-question (*to what extent do CRTPs present these favourable institutional conditions?*), it is necessary to identify or develop a framework consistent with prospective evaluation.

Generally, evaluation frameworks are not specific to this type of literature. Many TOD frameworks emerge from the literature in the preceding *Guidelines and Advocacy* and *TOD definition* categories. However, many TOD project evaluation frameworks in both of these categories rely heavily on the evaluation of the physical and land use elements. Two examples of frameworks which rely heavily on physical and land use elements are the DVRPC's *TOD Opportunity Evaluation* (Delaware Valley Regional Planning Commission, 2017); and (WestCOG, n.d); which both examine almost exclusively such characteristics as job-density, intersection density, length-of-cycle infrastructure, etc.

Additionally, academic literature such as Renne's (2009) *Evaluation of Perth's Network City* policies was similarly focused on land use and physical attributes in its matrices. Consistent with its design for a retrospective look at built-out projects where these types of measurements are possible. Renne's evaluation examined characteristics such as the number of new transit-supportive shops, transit ridership, and the number of rental units, elements requiring a substantial build-out of a station area before they may be studied. These measurables are keeping with their objective of scoring existing projects, which can be useful in identifying what aspects of a project are lacking (Renne, 2009). Unfortunately, as many of the metrics in these frameworks can only be measured several years after construction, they are not applicable in the study of current or future projects.

A prospective TOD evaluation takes a different temporal approach to these frameworks, measuring the trajectories of projects before or while they materialize. This type of analysis therefore depends on factors which can be evaluated in the earliest phases of a project, drawing strongly from the literature on "highly transferable lessons". As such, any prospective TOD evaluation frameworks will likely rely on institutional factors, as these can give an early insight into the likely future outcomes of a project.

Bertolini & Thomas's evaluation (2014), as the only meta-analysis on TOD focused on transferable indicators, provides a distilled set of institutional factors. Their resulting evaluation framework has several concepts helpful to developing a prospective evaluation framework. Drawing on a wide range of knowledge regarding TOD, the authors were able to synthesize and validate a concise number of critical success factors (CSF) which could be generalizable across contexts.

This broad analysis, comparing several different contexts on the same basis, resulted in a list of critical success factors with a high external validity and transferability. This said, the generalizability of the framework can also be seen as a weakness. Any framework that focuses on transferability across contexts means it will be less tailored to any one context, meaning the questions in the evaluation matrix are likely to be quite broad. As a result, internal validity risks being diminished by the use of a broad framework. Generalizability creates a risk inherent to all multi-case studies, which must balance internal validity along with the need for a uniform evaluation across different contexts (Seawright & Gerring, 2008). However, the use of a generalizable evaluation framework is not a fatal flaw. It merely creates a caveat which must be considered in the interpretation of its results.

In this study, all of the cases are Canadian, which made it was possible to slightly modify the wording of the imported CSFs in order to better reflect their context. These modifications will correct for some balance between internal validity and uniform evaluation. As an example, "National Political Stability" was changed for "Upper-level Stability", reflecting the federal nature of Canada in which both the federal and especially the provincial governments may influence land use and transportation objectives.

Using a prospective evaluation framework based on Thomas & Bertolini's evaluation framework, with minor adjustments to the Canadian context, is a good fit for answering sub-question 2, *"To what extent do CRTPs present these favourable institutional conditions?"*.

This framework provides a set of tested indicators for favourable TOD conditions which are flexible enough to be used to evaluate projects in progress in many different contexts (cities, provinces, etc.) in order to give an indication of their possible chances of success.

Chapter 3: Methodology

3.1 Research strategy

As discussed in chapter 2, this project aims to qualify the extent to which a selection of Canadian cities have the necessary enabling conditions required to translate recent transit infrastructure investments into sustainability gains for car-dependent suburbs through the generation of TOD. This question is answered by applying a modified evaluation framework proposed by Bertolini & Thomas (2015), which requires a detailed evaluation of the institutional practices surrounding land use planning and transport planning in the context of the selected case studies. The high level of contextual analysis required in each case necessarily imposes a restriction on the number of cases which are possible in this review.

The first step of the research project was the identification of case studies to be reviewed. The multi-case study has been proposed *“as a way to test [...] comparison of cases for more generalized theory-building”* (Thomas & Bertolini, 2014). A number of cases were selected, providing sufficient breadth and representativity for the conclusions to be extrapolated to other Canadian transit projects in the works, while also being detailed enough to arrive at substantive conclusions. A table of Canadian rapid transit projects currently underway or at an advanced level of planning and funding was compiled. The identification of key characteristics made it possible to select a representative sample based on a *Diverse* case selection (Gerring, 2006) (See Chapter 4). A diversified sample allowed a response to the third sub-question, enabling for the extrapolation of the conclusions to Canadian projects more generally across various types of projects.

Secondly, the selected cases were evaluated using Bertolini & Thomas’s (2015) matrix. A matrix was compiled several times for every case from interviews with practitioners in land use, practitioners in transportation planning, and local experts from the academic sector. Additionally, a researcher evaluation, backed up by evidence from desk research and site visits was included, helping to control for variability in the interview assessments. As with Bertolini & Thomas’s (2015) original research, the final result was determined from an averaging and rounding of the scores from these various interviewees and the researcher evaluation. This helps to answer the first and second sub-questions, identifying and evaluating the presence of elements favourable to the emergence of TOD.

3.2 Research methods / data collection / analysis

The research methods are based on the original methods used by Bertolini & Thomas (2015), consisting of a combination of a documented qualitative researcher evaluation, as well as interviews with local experts and practitioners using the five-point evaluation matrix. The evaluation of the practitioners and local experts provide the first-hand insights necessary to determine the working relationships between land use and transportation planning, as well as the intricacies of local policy. The researcher evaluation, based on the available documentation, helps to control the former. Interviews were recorded for rough transcription in order to code answers using the criteria identified in the evaluation matrix.

As questions related to working relationships and the research depends on honest assessments and candid answers, the recordings and verbatim transcripts are not included in the final submission, nor are the names or titles of the interviewees. This is consistent with Bertolini & Thomas's (2015) framework validation methodology. The finer logistics of the interview were guided by Turner's (2010) *Qualitative Interview Design Guide*. The interview data and data found in the written documentation on each of the transportation projects are translated into the quantitative weighting (on a scale of one to five) based on criteria which have been found in to contribute to successful institutional structures, as well as TOD outcomes.

3.3 Validity and reliability of research

As the goal of the research is to develop lessons which are generalizable to Canadian cases, particular attention was paid to external rather than internal validity. The chosen framework assisted this objective, leading to findings which are directly transposable and comparable between different projects, cities, and contexts. This objective requires a generalization of the findings, indicating a need for a higher degree of external validity (Druckman, 2011). The internal validity of the cases themselves are important insofar as they provide insights and recommendations for future cases. In order to control for potential variations in personal assessment by the interviewed experts, at least three assessments were made in each case. The researcher assessment was based on primary documentation where possible and provides justification in order to provide further control against variability.

Chapter 4: Case Selection and Context

This chapter provides the rationale and walk-through of the case selection and provides background on the selected projects.

4.1 Case selection

Once the research question and methodology had been defined, it became necessary to identify a sample of TOD projects which could be analyzed. In doing this, it was necessary to identify a sample which would be small enough so that each of the cases can be looked at with enough depth to ensure internal validity; yet large enough to generate insights which are generalizable to several different project types. This section will outline the process of establishing both eligibility (section 4.1.1.) and diversity (section 4.1.2).

	City	Project Name	Status	Urban context	Planning context	Final Selection	
	1 Quebec City	Réseau Structurant	Preliminary				
	2 Gatineau	Train léger Ouest	Preliminary				
	3 KW	ION	Completed	Core			
	4 Calgary	Green Line	Advanced Planning	Auto Suburb	Municipal		
	5 Edmonton	Valley Line	Construction	Auto Suburb			
	6 Ottawa	LRT Phase 1/2	Construction	Auto Suburb			Ottawa LRT
	7 Montreal	REM	Construction	Auto Suburb	Private	Montreal REM	
	8 Montreal	Ligne Bleue	Advanced Planning	Transit Suburb	Regional		
	9 Mississauga	Hurontario LRT	Construction	Auto Suburb			Mississauga LRT
	10 Toronto	Crosstown	Construction	Transit Suburb			
	11 Toronto	Finch	Advanced Planning	Auto Suburb			
	12 Toronto	TYSSE	Completed	Core			
	13 Hamilton	LRT	Advanced Planning	Core			
	14 Vancouver	Broadway Skytrain	Advanced Planning	Active Core			

Figure 2: Case Selection Table

4.1.1 Eligibility (First pass)

In order to arrive at a case selection with relevant and analyzable candidates, it was necessary to formulate initial eligibility criteria. Projects underway in Canada were assessed according to two key criteria: 1) they needed to be current projects and 2) they needed to have the potential to generate TOD in auto suburbs. These criteria are outlined below.

- *Current projects*: This paper defines ‘current projects’ as rapid transit projects which are at an advanced level of planning, or construction. An advanced level of planning includes projects which have received capital funding, as this is an indication that they have alignments, station placements, and detailed plans which are highly unlikely to change. Preference was given to projects already under construction, as this allows for contemporaneous examination of *Implementation* CSFs in the evaluation framework.
- *TOD in auto suburbs*: The eligible cases had to be located primarily in *Auto Suburbs* and *Transit Suburbs*, as defined by the Density Method of Gordon’s classification of Canadian urban typologies (Gordon, 2016) and using the number of stations as the metric. Both of these classifications indicate areas of low- to medium-density which are likely to see significant improvements in sustainability outcomes through TOD. Tracts defined as *Active Core*, on the other hand, are existing high-density areas where additional density related to TOD would produce a more marginal gains in sustainability outcomes such as mode share. A comprehensive list of recent and current transportation projects in Canada was developed, and these were analyzed to determine the status and the urban context of the project. The findings of this analysis are outlined in the table below.
- Using these criteria, the list of eligible cases was reduced from fourteen to eight. The cases highlighted in green were those which most closely conform to the criteria, and these were prioritized over the yellow cases in the subsequent case selection passes. Note that the projects marked with an asterisk (*) were under construction at the start of this case selection but have since been completed.

	City	Project Name	Status	Urban context	First Pass
1	Quebec City	Réseau Structurant	Preliminary		
2	Gatineau	Train léger Ouest	Preliminary		
3	KW	ION	Completed	Core	
4	Calgary	Green Line	Advanced Planning	Auto Suburb	Calgary LRT
5	Edmonton	Valley Line	Construction	Auto Suburb	Edmonton LRT
6	Ottawa	LRT Phase 1/2	Construction	Auto Suburb	Ottawa LRT
8	Montreal	REM	Construction	Auto Suburb	Montreal REM
7	Montreal	Ligne Bleue	Advanced Planning	Transit Suburb	Ligne Bleue
9	Mississauga	Hurontario LRT	Construction	Auto Suburb	Mississauga LRT
10	Toronto	Crosstown LRT	Construction	Transit Suburb	Crosstown LRT
11	Toronto	Finch LRT	Advanced Planning	Auto Suburb	Finch LRT
12	Toronto	TYSSE	Completed	Core	
13	Hamilton	LRT	Advanced Planning	Core	
14	Vancouver	Broadway Skytrain	Advanced Planning	Active Core	

Figure 3 Case selection: First Pass

4.1.2 Dimensions (Second pass)

Having narrowed down the potential case studies to eight, an effort was made to ensure that the diversity between projects could lead to findings which are sufficiently generalizable. The *diverse case selection* method was most relevant to the needs of this paper, defined as “*the achievement of maximum variance along relevant dimensions*” (Seawright & Gerring, 2008). This method requires the identification of the relevant dimensions, then the pass-by-pass identification of the most optimal typical cases for each set: “*If all variables are deemed relevant to the analysis, the selection of diverse cases mandates the selection of one case drawn from within each cell.*” (Gerring, 2006)

For this research, the *Planning Context* dimension was selected. As urban infrastructure projects are almost always delegated to local or regional authorities in Canada, there can be variations in how their planning and execution are undertaken by those institutions. The eligible case studies were reviewed to ensure that they represented each of the project planning contexts in Canada. These planning contexts can largely be divided as follows;

- **Regional**
Projects undertaken by regional transport planning authorities. There are only three such bodies in Canada (ARTM in Greater Montreal, Metrolinx in Greater Toronto, Translink in Greater Vancouver) in metropolitan regions which encompass a number of large, separate municipalities. Projects planned in this context contend with a two-tier planning system, whereby transportation and land use planning are often dealt with on different levels (Sancton, 2001).
- **Municipal**
Projects undertaken by individual municipalities. These tend to be in medium and small cities where one municipality dominates the urban area of the metropolitan region and is enabled to plan and enact both transportation and land use objectives directly (Sancton, 2001).
- **Private**
This is a new form and present in only one project currently (*Montreal: REM*). In this case, the planning and delivery of a project is provided by a private entity (a pension fund, in the case of Montreal), which unlike other Public-private partnerships (PPP or P3) in Canada, make significant determinations regarding the overall shape of the system, including alignments, station locations, and service areas. Although it is only present in one project, it is being touted as a potential new form of project delivery which could be applied to future projects (Larocque, 2019). As a potentially emerging context, it was deemed a relevant category.

In order to arrive at conclusions which could be generalizable across several contexts, eligible cases were classified by according to the planning contexts identified above. The results of this classification are presented in the table below.

	City	Project Name	Planning context	Final Selection
1	Quebec City	Réseau Structurant		
2	Gatineau	Train léger Ouest		
3	KW	ION		
4	Calgary	Green Line	Municipal	
5	Edmonton	Valley Line		
6	Ottawa	LRT Phase 1/2		Ottawa LRT
8	Montreal	REM	Private	Montreal REM
7	Montreal	Ligne Bleue	Regional	
9	Mississauga	Hurontario LRT		Mississauga LRT
10	Toronto	Crosstown LRT		
11	Toronto	Finch LRT		
12	Toronto	TYSSE		
13	Hamilton	LRT		
14	Vancouver	Broadway Skytrain		

Figure 4 Case selection: Final pass

In the *Regional* projects, all but one of the projects (Mississauga LRT) were flagged as partial matches in the previous selection pass. As such, Mississauga was prioritized as the representative case for that category. In the *Municipal* projects, both Ottawa and Edmonton's projects were equally eligible. Ottawa was ultimately chosen, as its geographical proximity made it more readily analyzable compared to Edmonton. Finally, Montreal's REM, as the only project of its type, was selected to represent *Private* projects.

4.2 Case contexts

This section introduces the selected cases, providing the necessary background on the analyzed transit projects to properly interpret Chapter 5.

4.2.1 Ottawa Context

4.2.1.1 Introduction to transportation project

Ottawa's LRT project is one of largest expansions in Canada, extending over 56 km and 38 new stations. Like many of its project equivalents (such as Calgary's Green Line), it will connect suburbs on either end, running through the downtown core. The service concept is metro-like, offering fully grade-separated right-of-way, headways below 15 minutes in both directions throughout the day and evening, and a high capacity.

The project was approved in 2012 and is expected to be fully operational by 2025, with an initial central phase opening in 2019. Ottawa's LRT largely replaces the city's bus rapid transit (BRT) trunk line. Opened in 1984 and expanded through the 1990s, the Transitway's passenger capacity had been outstripped by the demand, leading to bus congestion and passenger crowding at stations (Whitney, 2011). The 1974 Official Plan set out the hybrid "Satellite and corridor" approach which identified 13 target growth centres along the Transitway corridors (Judy, 2007) which are now set to be converted to LRT. These centres have developed to various extents and remain areas of focus to this day (City of Ottawa, 2014).

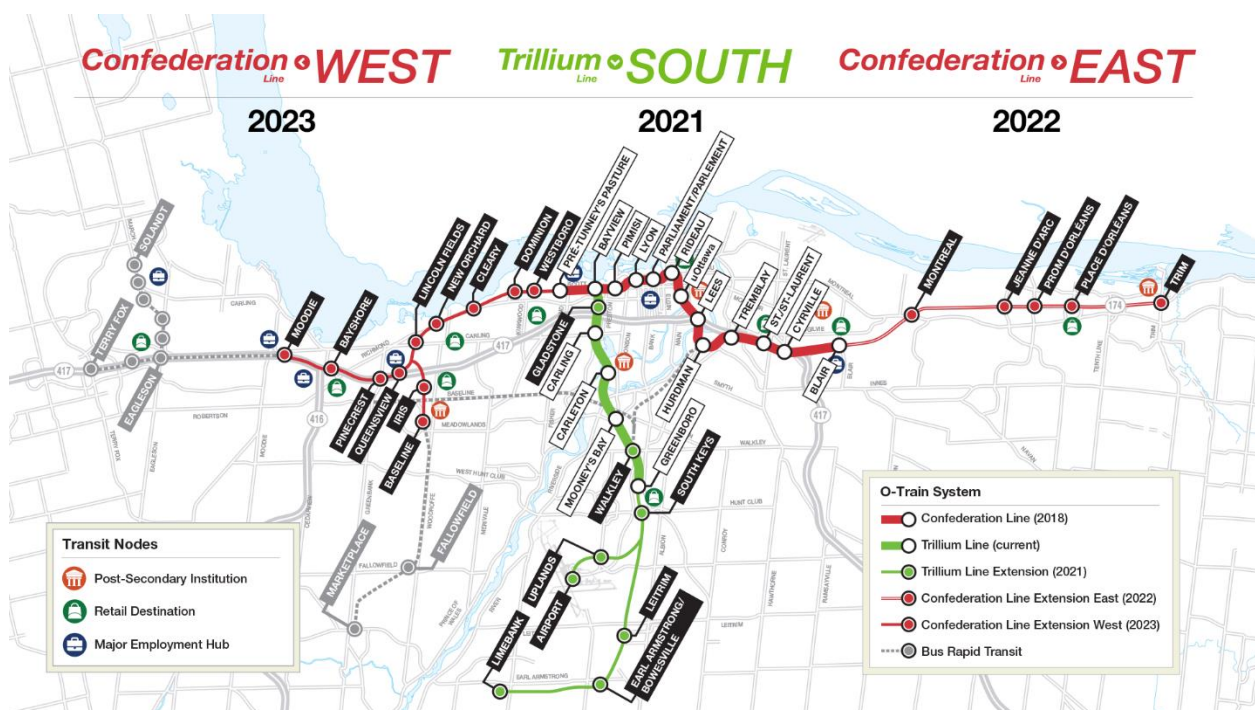


Figure 5 Ottawa LRT map (City of Ottawa)

4.2.1.2 Transportation planning context

In Canada, municipal and intra provincial transport are constitutionally defined as areas of provincial jurisdiction. As such, Ottawa's transportation planning falls under the jurisdiction and practices defined by the province of Ontario. The Ontario *Planning Act* mandates all municipalities to produce a long-term Official Plan. Although occasionally amendable, the plans are meant to lay out the long-term directions of growth of each city. Transportation projects such as LRT are required to be included in the Official Plan. Transportation projects are also subject to study and approval by the Province of Ontario in the context of the mandatory environmental assessment (EA) which evaluates the impacts of a project on its surroundings. (TCRP, 2008)

The federal government plays a smaller role in transportation planning generally. However, its role has been substantially increased since the early 2000s as the Government of Canada has moved to provide increasing financial support for capital projects. Whereas projects in the late 20th century had been almost entirely funded by provincial and municipal governments, the federal government now provides up to 50% of the costs of new infrastructure through various programs such as the aforementioned PTIF. However, beyond some basic eligibility requirements for the program such as "improving efficiency, accessibility, and/or safety of public transit infrastructure" (Infrastructure Canada, 2017), the federal government programs do not interfere with the planning of the transport projects themselves. This said, the City of Ottawa finds itself in a unique position with regards to the role of the federal government in terms of project planning because, as being the nation's capital, the federal government is both a major employer and landholder in the region (mostly in the form of parkland). When the City has planned interventions along its lands, the federal government has made demands along those stretches. The most salient example came in 2014 when the National Capital Commission (NCC) – the agency responsible for most federal lands in the region – required the City of Ottawa to bury the LRT alignment it intended to run along one of the NCC's parkways (Pearson, 2014). Unlike most other properties, the City of Ottawa cannot legally expropriate federal lands due to the former's constitutional status as a "creature of the provinces". However, these situations of active federal involvement are the exception rather than the norm, even in Ottawa.

Transportation planning is planned within the City of Ottawa's planning structure as a unit under the department of *Planning, Infrastructure, and Economic Development* (City of Ottawa, n.d.). This unit is responsible for the elaboration of the *Transportation Master Plan* (TMP) which establishes the infrastructure priorities which will eventually be studied, evaluated by the Province of Ontario, and submitted for funding by the provincial and federal governments. The TPM identifies many of the larger principles of the future transit network, including corridors, approximate station placement, type of transit infrastructure, scope, and approximate cost.

The dominant mode of execution for large transport projects in Canada is the *Public-private partnership* (PPP or P3). Under this arrangement, private consortia bid for projects on the basis of the output specifications established for a given project. In the case of Ottawa's LRT, the *Design-Build-Finance-Maintain* (DBFM) P3 model allows the City to define roughly 30% of the systems eventual design, leaving 70% to the bidding consortia in the hopes of allowing for innovation and cost savings (City of Ottawa (02), n.d.). The private bidders are therefore responsible for many of the finer elements of design of stations and right-of-way.

4.2.1.3 Land use planning context

Land use planning in Ontario, much like transportation planning, is a municipal activity under provincial jurisdiction. The Official Plan mentioned in the previous section includes a large land use planning component. This establishes the long-term direction and framework on which zoning and other detailed planning decisions will be based. Ottawa's planning regime is typical of Euclidian zoning, restricting and prescribing development by uses, lot dimensions, and building envelope. (City of Ottawa (03), n.d) If a development satisfies all the zoning by-law provisions, it can be built as-of-right. Derogations to by-laws is possible with the approval of the elected municipal council so long as it does not conflict with the Official Plan (Thomas E. M., 2016).

In the context of its LRT project, the City has created a new zoning designation – TOD – which allow for high density, mixed use development around its stations (City of Ottawa, 2014).

4.2.1.4 Route Alignment Characteristics

The LRT infrastructure, as with the Transitway which preceded it, has an alignment along many existing transport corridors, such as former and existing rail rights-of-way, and limited-access highways. Indeed, some 42 km of the 56 km (75%) corresponds to one or both of those categorizations⁵. Of these, 29 km (over 50% of total) are immediately beside either Highway 417/174 (informally known as *The Queensway*) or the Airport Parkway highway. This is an outcome of one of the original objectives of the transitway, which aimed for completely grade-separated ROW outside of the downtown area (TCRP, 2008). Existing transportation corridors provided an attractive option from that perspective, as they benefited from a reduced number of crossings, allowing for high schedule speeds (Judy, 2007).

However, from a land use perspective, the proximity to these large transportation corridors – notably highways – proves undesirable for pedestrians and development (Diaz, 1999). The surrounding land uses reflect this through a concentration of light industrial lands in proximity to the existing BRT (and future LRT) stations beside highway rights-of-way. Although none of the stations in proximity to highways have yet been able to overcome the unfavourable urban environment, the easy road access has attracted a number of large shopping centres which line the Queensway. In fact, 6 of the 19 highway-adjacent stations serve large shopping centres (Place d'Orleans, Blair, St-Laurent, Greenboro/South Keys, and Bayshore) which serve as important trip generators for the system while also benefiting greatly from the transit access; as an example, despite its suburban appearances, over 30% of the St-Laurent shopping centre's clientele arrives by transit thanks to the underground LRT station (TCRP, 2008).

⁵ As measured using Google Earth

4.2.2 Montreal Context

4.2.2.1 Introduction to transportation project

Montreal's REM is currently the largest transit project underway in Canada, stretching over 67 km, running from the extremities of the metropolitan region through the centre of Montreal with high all-day frequencies, much like Ottawa's LRT project. The project is unique in its funding and planning arrangement, being planned, built, and operated by a semi-private pension fund, the *Caisse de dépôt et de placement du Québec* (hereafter CDPQ or the *Caisse*), enabled by provincial legislation. In exchange for a guaranteed financial return and value-capturing, CDPQ will contribute about half of the \$5.9B capital cost of the project. (BAPE, 2016)

The project has been the topic of often heated public debate. Whereas many hold up the project's ambitious scope and its promise to bring frequent rapid transit to some of the furthest reaches of the metropolitan area, others object to the project's private nature and its subversion of transport and land use planning mechanisms.



Figure 6 Montreal REM Map by alignment type (CDPQ)

4.2.2.2 Transportation planning context

The transportation planning context of metropolitan Montreal was developed recently through the 2016 *Loi modifiant principalement l'organisation et la gouvernance du transport collectif dans la 27^e région métropolitaine de Montréal* (Act to modify mainly the organization and governance of shared transportation in the Montréal metropolitan area, or *Loi 76*). Historically, Montreal's many municipalities have conducted transportation planning and operations separately, with often conflicting services and long-term visions. *Loi 76* instituted a regime of coordinated transport planning through the Autorité régionale de transport métropolitain (ARTM), an arm's-length planning authority created to coordinate the fractured transportation service landscape and to define the transportation needs and priorities for the entire region. These priorities may subsequently be presented to the provincial government for capital funding. Although the projects themselves are ultimately undertaken by the individual transit agencies, the larger questions of transportation planning and interagency coordination are undertaken by the ARTM. (Gouvernement du Québec, 2019)

The transportation planning of the REM is largely separated from the existing public planning authorities in the region of Montreal. Through the *design-finance-build-maintain-operate* (DFBMO) PPP arrangement as well as its enabling provincial legislation, the CDPQ is not required to coordinate its transport services, schedules, or fares with other providers, nor is it subject to the ARTM's authority in terms of long-term transportation planning. The *Caisse's* operational independence would also allow it to modify service without public oversight (such as abandoning unprofitable lines or stations). Despite assurances from CDPQ that the REM will endeavour to coordinate its fare structure and services with the other transport operators, its position beyond the reach of the regional transport planning authority has caused many municipalities and transport operators to qualify the REM as a potential "wild card" around which transport planning will always be potentially uncertain (BAPE, 2016).

4.2.2.3 Land use planning context

Land use planning in Quebec, like in Ontario, is a municipal activity under provincial jurisdiction. There are several levels of municipal planning, with each requiring to concord with its more regional equivalent. As an example, Greater Montreal's land use planning is established by the *Communauté métropolitaine de Montréal (CMM) Plan métropolitain d'aménagement et de développement* (PMAD or Metropolitan land use and development plan), which identifies general land use characteristics such as areas of intensification, areas of development, protected areas, and general categories of use. Most relevant for the purposes of this paper, the PMAD also both identifies TOD zones and defines their minimum residential densities according to their level of transit service. The constituent regional municipalities and municipal agglomerations of the metropolitan area must then prepare a more detailed *Schéma d'aménagement et de développement* (SAD or Land use and development plan), translating the larger PMAD objectives into more specific local visions. Finally, the local municipalities are required to prepare a *Plan d'urbanisme* (PU or Land use plan) which translates the SAD into concrete and spatialized objectives in terms of zoning, municipal regulation, and infrastructure (Gouvernement du Québec, 2019). The "nesting dolls" of land use plans is meant to ensure that the plans and policies are consistent on all levels of planning. However, the process of sequentially writing and update land use documents requires several years. This has proven problematic with the rapid pace of the REM, whose construction has advanced faster than the municipalities' ability to integrate the project into their land use plans and policies (Lévesque, 2019).

4.2.2.4 Route Alignment Characteristics

The REM's route is a combination of new and existing rights-of-way stretching from three branches in the far northwest of the city to one trunk through the city centre and towards the southern extremity of the metropolitan area. The full length of the right of way will be entirely grade-separated through a series of protected level sections, tunnels, and elevated sections. The stop placement will be wide with an average of 2.5 km between stations in order to facilitate faster speeds and long-distance trips within the metropolitan area. (BAPE, 2016)

Of the four branches, one already exists; The main portion of the line between Deux-Montagnes and Gare Centrale already exists as a commuter rail line, providing semi-frequent all-day service between the City Centre and the generally high-income, low-density residential suburbs to the north-west of Montreal. The REM will replace this line as well as adding two major stations in the City Centre at both Université de Montréal as well as McGill University.

The main portion of the line between Deux-Montagnes and Gare Centrale already exists as a commuter rail line, providing semi-frequent all-day service between the City Centre and the generally high-income, low-density residential suburbs to the north-west of Montreal. The REM will replace this line as well as adding two major stations in the City Centre at both Université de Montréal as well as McGill University.

Three new branches are also being built;

- The West Island Branch will run above an old rail spur which runs through a low-rise industrial area immediately to the south of the Autoroute 40 (A40) as well as along the A40 itself. On both sides of the A40 industrial/transportation corridor are several low-density auto suburbs such as Pierrefonds, Pointe-Claire and Kirkland.
- The Airport branch will run through the Technoparc high tech industrial park as well as serving the Pierre Elliott Trudeau International Airport, one of Canada's busiest airports.
- The Rive-Sud Branch will run from Gare Centrale and Rive-Sud. Although not an existing corridor, it will follow existing rail ROWs as well as running through the median of the A10. This corridor is largely surrounded by low-density auto suburbs and anchored by the large DIX30 'lifestyle commercial centre' at Station Du Quartier. (BAPE, 2016)

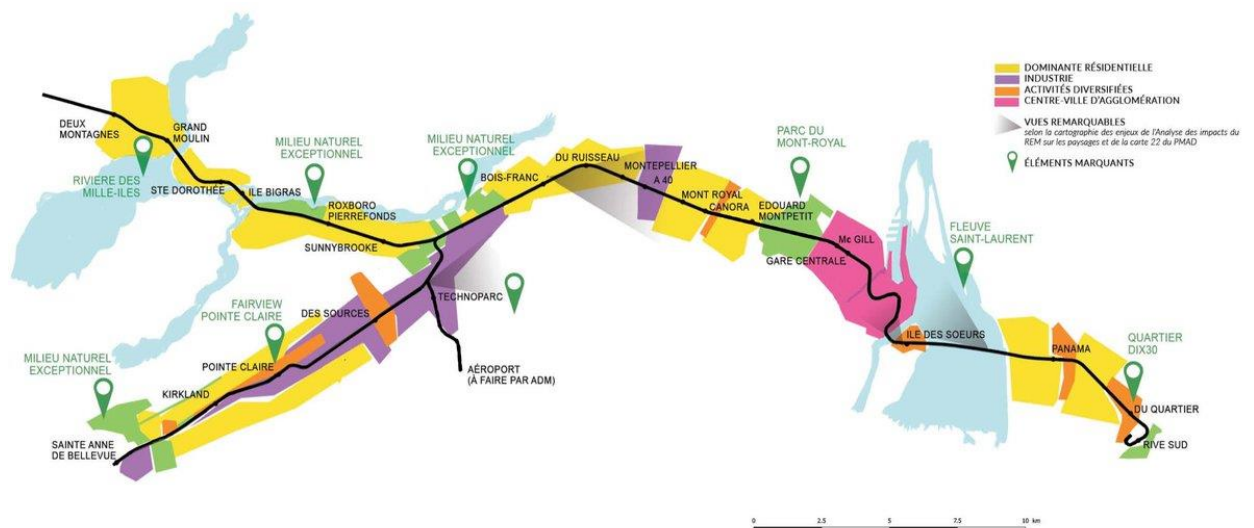


Figure 7 Montreal REM: Surrounding land uses (CDPQ)⁶

4.2.3 Mississauga Context

4.2.2.2 Introduction to transportation project

Mississauga's Hurontario Corridor project is an integrated plan, involving both the introduction of surface LRT and an urban corridor down the centre of the quintessentially (but evolving) suburban municipality. The project emerged from the provincial metropolitan plan for the GGH, *Places to Grow Act's Growth Plan for the GGH*, which established Mississauga City Centre as an *Urban Growth Centre (UGC)* requiring the attainment of minimum density quotas and identifying the Hurontario corridor as a transit priority corridor. However, the implementation of these provincial directives is left to municipalities. In Mississauga's case, implementation was done through a corridor master plan, which defined both the detailed land use, urban design, and transportation vision and objectives (City of Mississauga (02), 2014).

⁶ Yellow: Residential, Purple: industrial, Orange: mixed , Pink: Downtown



Figure 8 Hurontario LRT Map with rapid transit connections

4.2.3.2 Transportation planning context

Transport projects in Mississauga are subject to the same provincial legislation as Ottawa, notably with regards to the necessity to go through an EA in order to receive provincial funding. In Mississauga's case, the province is funding the entirety of the project's capital costs. As an additional consequence, the federal government has very little role in the project.

Unlike in Ottawa, public transportation planning in the GGH is shared by the regional transportation planning authority, Metrolinx, and municipalities. Generally speaking, municipalities are responsible for local transit, and Metrolinx is responsible for regional transit planning, operations, and procurement (Province of Ontario, 2006). As a regional transit project designated in the *Growth Plan*, Hurontario LRT falls under the umbrella of Metrolinx, which manages the project

conjointly with the municipality's project office in order to ensure coordination with municipal actors such as land use planning (City of Mississauga (02), 2014).

Mississauga's transportation planning in the case of Hurontario LRT was done conjointly with land use planning actors, forming the Hurontario corridor master plan. As such, the transportation planning included not only transportation objectives, but also numerous land use and urban design objectives such as "a positive contribution to the "beautiful street" component of the Vision" (City of Mississauga (02), 2014).

4.2.3.3 Land use planning context

As they are both subject to the same provincial planning act, the land use planning context of Mississauga is fundamentally the same as Ottawa's. However, some specific provisions apply to the former as part of the GGH. As part of the metropolitan region's growth plan, laid out in the provincial *Places to Grow Act* of 2006, the constituent cities are required to meet regional planning objectives with regards to intensification in certain nodes, known as *Urban Growth Centres* (or UGCs). This piece of provincial legislation established minimum density targets in the UGCs it identified, as well as the corridors in which rapid transit would be funded and implemented. These include minimum employment and residential density quotas which must be met in Mississauga City Centre and along a portion of Hurontario (200 residents and jobs combined per hectare) in order to conform to the provincial directive (Ministry of Energy and Infrastructure, 2008). This was translated into the regional transportation master plan, *The Big Move*, in 2008, and the detailed land-use and transportation *Hurontario/Main Street Corridor Master Plan* in 2010 (City of Mississauga (02), 2014).

As with the land use objectives embedded in the project's transportation planning, transportation concerns were integrated in the land use planning of the corridor, notably the linear nature and location of the density, lining up with planned station locations (City of Mississauga, 2010).

4.2.3.4 Route Alignment Characteristics

The route consists of 18 km of at-grade light rail, crossing Mississauga from north to south along Hurontario Street. As a large arterial with a wide right of way, spanning 30-50 m, light rail will run in dedicated median lanes.

The current conditions of the corridor combine high-rise residential areas and low-density commercial uses in an auto-oriented urban fabric developed in the 1960s-1980s (City of Mississauga, 2010). Increasingly, high-density residential projects are appearing along the corridor, notably in Mississauga City Centre, which had been designated for more intense uses prior to the corridor master plan (City of Mississauga, 2010)

Chapter 5: Case Study Results

The three transportation case studies, Ottawa, Montreal and Mississauga were analyzed using Thomas & Bertolini's (2015) meta-analysis matrix. As per the evaluation validation methodology used in the paper, the analysis comprised of a review of primary documents, as well as interviews with land use practitioners and transport practitioners involved in each of these projects, as described in Chapter 3.

These factors have been analyzed for each of the three case studies, based on both the available primary documentation (researcher evaluation) and on interviews with knowledgeable practitioners involved in the project at both the land use and the transport levels. For brevity, the summaries of the answers from the transport and land use experts are located in Annex 1.

The results are presented in three sub-categories;

Factors relating to Plans and priorities: Policy consistency, vision stability, upper level support, upper level stability and local stability.

Factors relating to Actors: Actor relationships, Regional land-use/transportation body, Intermunicipal competition, Interdisciplinary implementation, Public participation, Public acceptance of TOD and the presence of Key visionaries;

Factors relating to implementation: Use of site-specific tools, Regional TOD planning, Certainty for developers, and Willingness to experiment.

5.1 Plans and Policies

5.1.1 Policy Consistency

This section describes how coherent transport and land use planning practices have been over time. As an example, a consistent policy might see few changes in terms of the alignment of the infrastructure, the designated station area land use, or density.

5.1.1.1 Ottawa

Ottawa	Policy Consistency	1	2	3	4	5
		Major changes over time	Lots of changes over time	No clear consistency or inconsistency	Few changes over time	No major changes over time
	Researcher					
	Land Use practitioner					
	Transport practitioner					

Ottawa's policy consistency regarding TOD has been largely consistent since the 1974 Official Plan (Judy, 2007). The major areas of TOD policy focus remain intact. However, policies have evolved with the thinking regarding TOD zones, moving from a near-exclusive focus on employment and shopping to a much greater emphasis on high density residential development, as evidenced by the 2014 TOD Plan (City of Ottawa, 2014). A new emphasis is also being put on pedestrian and cycling conditions, an aspect identified as a major weakness in the Transitway's ability to generate significant TOD in the past (Judy, 2007) .

A notable exception to this consistency occurred in 2004-2008, when a different LRT concept had reached an advanced level of planning before being cancelled in favour of the current iteration. The previous plan had planned surface-level LRT along a corridor from Downtown to the south of the city, including through a new greenfield TOD subdivision – Riverside South – which was planned along with the line. Development occurred despite the cancellation and continues to this day. Recently, southward extensions of a less expensive diesel light rail line were announced, helping to salvage some of the planned TOD aspects of Riverside South (City of Ottawa, 2019).

Despite a series of reversals in relation to TOD policy to the south of the city in relation to the 2004-08 LRT plan, as well as an evolving understanding of what constitutes TOD, the current TOD areas in Ottawa are remarkably consistent with the target growth centres identified almost a half century ago.

5.1.1.2 Montreal

Montreal	Policy Consistency	1	2	3	4	5
		Major changes over time	Lots of changes over time	No clear consistency or inconsistency	Few changes over time	No major changes over time
	Researcher					
	Land Use practitioner					
	Transport practitioner					

Both the land use and the transport practitioners provided valid accounts, but from different perspectives. From a land use perspective, the unpredictability of the REM's alignment is very problematic, since these changes may have significant impacts on the wider land use concept. From a transportation perspective, the availability of consistent metropolitan TOD density objectives may appear sufficient. Although it may add an element of consistency, the changing alignments constitute a significant change in TOD policy, defined not only as targets, but as a spatialized plan.

5.1.1.3 Mississauga

Mississauga	Policy Consistency	1	2	3	4	5
		Major changes over time	Lots of changes over time	No clear consistency or inconsistency	Few changes over time	No major changes over time
	Researcher					
	Land Use practitioner					
	Academic expert					

Mississauga's TOD policies have been characterized by consistency, both in terms of targets and location. Its present vision as an axis for public transit and densification dates from the mid-2000s, with the elaboration of the 2006 *Places to Grow Act*, identifying the corridor as a key transit spine to link several activity nodes (UGCs) (Ministry of Energy and Infrastructure, 2008). Being provincially legislated, the policies regarding densification and transit investment has remained remarkably consistent. However, there have been modifications in the scope of the LRT project. In 2015, the Brampton city council voted to reject the proposed alignment along Main Street but has committed to finding an alternate parallel routing for the northernmost 5.6 km of the project (Grewal, 2015). Another modification in scope came in 2019, when the recently elected provincial government forced the elimination of 2 km of the project in order to cut costs (Spurr, 2019).

However, as the essential portions of the project have remained intact and protected by the *Places to Grow Act*, it is possible to evaluate that there have been relatively few changes in overall policy.

5.1.2 Vision Stability

This CSF aims to determine whether there the transport and land use plans are guided by a long-term regional planning concept. Ren Thomas (2014) cited some well-known models such as Copenhagen’s Fingerplanen and Vancouver’s Regional Growth Strategy as examples of long-term regional plans which have remained constant and adhered to for several decades.

5.1.2.1 Ottawa

Ottawa	Vision stability	1	2	3	4	5
		Major changes over time	Lots of changes over time	Some degree of change over time	Few changes over time	No major changes over time
	Researcher					
	Land Use practitioner					
	Transport practitioner					

The “Satellite and corridor” vision from the 1974 Official Plan, much like the ensuing policies, has been relatively stable over the past decades in terms of location (Judy, 2007) . They are closely related, since City of Ottawa policies are legally required to concord with its official plan. This is not to say that there have not been changes. As with policies, Ottawa’s TOD vision has changed over the past 45 years with changes as the concept itself has shifted from employment and shopping nodes to more mixed-use, pedestrian/cycling-oriented, and dense station areas.

5.1.2.2 Montreal

Montreal	Vision stability	1	2	3	4	5
		Major changes over time	Lots of changes over time	Some degree of change over time	Few changes over time	No major changes over time
	Researcher					
	Land Use practitioner					
	Transport practitioner					

The REM may boast a rapid planning and execution timeline which may be necessary in a heavily politicized and term-focused transport planning environment, but it comes at the cost of a stable, predictable land use and transportation vision for the region. Although the transport practitioner and many others have lauded the REM's ability to be planned and to begin construction within an electoral cycle (BAPE, 2016) its sudden planning, disconnected from the larger metropolitan exercises, reflects the absence of a stable overall vision.

5.1.2.3 Mississauga

Mississauga	Vision stability	1	2	3	4	5
		Major changes over time	Lots of changes over time	Some degree of change over time	Few changes over time	No major changes over time
	Researcher					
	Land use practitioner					
	Academic expert					

The regional land use and transport vision for the GGH is defined in the 2006 *Places to Grow Act*, which defined the target areas for development and transit investment. Mississauga City Centre and Downtown Brampton have been identified as a UGCs and the Hurontario/Main corridor has been designated as a Priority Transit Corridor (PTC) (Ministry of Energy and Infrastructure, 2008). This vision has been elaborated under two different governments since the late 1990s and has remained in effect and respected under the current provincial government. Although not as old as other regional plans such as Copenhagen's *Finger Plan*, the ability of the plan to remain largely intact and adhered to under successive provincial governments over nearly 15 years is a significant achievement.

5.1.3 Upper-level Support

This CSF describes the extent to which the upper levels of government (provincial and federal governments in the Canadian context) provide either assistance or obstacles to the construction of rapid transit infrastructure and the establishment of TOD. This may take the form of density-supportive policies, infrastructure funding, or legislative requirements for transport and land use planning.

5.1.3.1 Ottawa

Ottawa	Upper-level support	1	2	3	4	5
		No support, policies, or funding	Very little support, policies, or funding	Some degree of support, policies, or funding	Good support/some policies and funding	Very good support/ extensive policies and funding
	Researcher					
	Land use practitioner					
	Transport practitioner					

Support from the provincial government for TOD appears to be relatively meagre in the City of Ottawa. Unlike the GGH and its provincial planning agencies and legislation under the *Places to Grow Act* and the 2006 *Metrolinx Act*, the provincial government has interfered relatively little in Ottawa's TOD or transportation planning.

The federal government has played a greater role in Ottawa's TOD efforts in terms of the location of its employment centres. As the single largest employer at nearly 20% of the region's workforce, the federal government wields a great influence in trip generation (Statistics Canada, 2011). Starting with the original Transitway, the city of Ottawa negotiated an end to free employee parking and to stagger work hours (Judy, 2007). To this day, the federal government's policy on federal employment lands prioritizes sites accessible by rapid transit (LRT or BRT). These policies have helped to drive ridership on Ottawa's transit system.

However, despite their proximity to rapid transit stations, not one of the non-downtown federal employment nodes provide adequate pedestrian connections between the transit stations and the actual buildings, contrary to the principles of TOD. A number of existing federal employment campuses along the LRT project (notably Tunney's Pasture and Confederation Heights) are in the process of being redeveloped with a mix of uses and a better integration with transit (National Capital Commission, 2015).

5.1.3.2 Montreal

Montreal	Government support	1	2	3	4	5
		No support, policies, or funding	Very little support, policies, or funding	Some degree of support, policies, or funding	Good support/some policies and funding	Very good support/ extensive policies and funding
	Researcher					
	Land use practitioner					
	Transport practitioner					

The REM as an infrastructure has received unprecedented governmental and legislative support, as the transport practitioner pointed out. The provincial government has had a tendency to be bullish on infrastructure without paying much heed to the impacts it might have on land use considerations. The REM, with its unforeseen alignment and extremely rapid approval and construction is a particularly illustrative example.

5.1.3.3 Mississauga

Mississauga	Government support	1	2	3	4	5
		No support, policies, or funding	Very little support, policies, or funding	Some degree of support, policies, or funding	Good support/some policies and funding	Very good support/ extensive policies and funding
	Researcher					
	Land use practitioner					
	Transport expert					

The provincial government has demonstrated a significant amount of support for the Hurontario project, both in the transportation infrastructure and the land use intensification. The *Places to Grow Act* established development zones around transit corridors, and the *Big Move* transportation master plan identified priority transit corridors which subsequently received provincial capital funding. These documents have served as both impetus and guarantee of provincial support.

However, the complete reliance of the project on provincial funds has also had a downside. The newly elected Conservative government has called for cuts to the route in order to shrink the project costs. Despite this, the project has remained largely intact, and the overarching goals of the Act remain in effect and largely uncontroversial.

5.1.4 Upper-level stability

Upper-level stability describes the consistency of provincial and federal government support for transit and TOD over time. This may include elements such as the stability of infrastructure funding arrangements and provincially controlled plans or planning legislation.

5.1.4.1 Ottawa

Ottawa	Upper-level stability	1	2	3	4	5
		Very unstable political agenda on TOD	Mostly unstable political agenda on TOD	Some degree of agenda change over time	Few changes to the political agenda supporting TOD	Very stable political agenda supporting TOD
	Researcher					
	Land use practitioner					
	Transport practitioner					

Provincial and federal support for TOD has been relatively unchanging in Ottawa. The provincial framework has been consistent through its relative lack of intervention in the city of Ottawa's transportation and land use planning. Federally, the long-term plans for federal lands and employment centres have remained largely unchanged, having been planned and executed on an administrative level, rather than a political one.

5.1.4.2 Montreal

Montreal	Upper-level stability	1	2	3	4	5
		Very unstable political agenda on TOD	Mostly unstable political agenda on TOD	Some degree of agenda change over time	Few changes to the political agenda supporting TOD	Very stable political agenda supporting TOD
	Researcher					
	Land use practitioner					
	Transport practitioner					

Montreal's TOD designations do indeed rest with the local and provincial planning bodies, as the practitioners indicated. However, it is worth noting that the provincial government has tampered with those plans indirectly by launching the REM project; as Montreal's metropolitan land use plan requires that rapid transit station areas be zoned for a prescribed density, the addition of a new line by provincial authorities has required additions to the TOD plans. However, the overall policy remains largely intact.

5.1.4.3 Mississauga

Mississauga	Upper-level stability	1	2	3	4	5
		Very unstable political agenda on TOD	Mostly unstable political agenda on TOD	Some degree of agenda change over time	Few changes to the political agenda supporting TOD	Very stable political agenda supporting TOD
	Researcher					
	Land use practitioner					
	Transport expert					

The Hurontario LRT project has received strong provincial support, being entirely funded by the province (Kitts, 2018), a strong indication of support which has carried over from the previous Liberal government to the subsequent Progressive Conservative government. However, the scope of the project has indeed been curtailed in 2019 in order to fit a more restricted budgetary envelope (Mitchell, 2019). At present, there do not appear to be indications that further changes will be warranted, with several governmental statements continuing to support the project, and the regional plan from which it emerged.

5.1.5 Local stability

This CSF describes the consistency of political support for transit and TOD plans on a municipal or local level.

5.1.5.1 Ottawa

Ottawa	Local stability	1	2	3	4	5
		Very unstable local political agenda on TOD	Mostly unstable local political agenda on TOD	Some degree of local agenda change on TOD	Few changes to the local political agenda supporting TOD	Very stable local political agenda supporting TOD
	Researcher					
	Land use practitioner					
	Transport practitioner					

The local political and institutional context is relatively stable in its vision and support for the current transportation plan. The key elements have received unanimous support by Ottawa's elected city council, including the *Transportation Master Plan* (TMP) 2013, and the approval for the construction of phases 1 and 2 of LRT in 2012 and 2019 respectively. The question of investment in rapid transit has been relatively uncontroversial, with strong public and political support for the project; in the 2014 and 2018 mayoral races, the pro-LRT candidate, Mayor Jim Watson, garnered large majorities exceeding 70% of the vote (Global News, 2018). With some \$5.7B committed to the current rapid transit project and construction well underway, it appears unlikely that major changes should occur.

5.1.5.2 Montreal

Montreal	Local stability	1	2	3	4	5
		Very unstable local political agenda on TOD	Mostly unstable local political agenda on TOD	Some degree of local agenda change on TOD	Few changes to the local political agenda supporting TOD	Very stable local political agenda supporting TOD
	Researcher					
	Land use practitioner					
	Transport practitioner					

Although it is true that the fundamental TOD policy has remained constant in metropolitan planning documents in its treatment of rapid transit stations (Communauté métropolitaine de Montréal, 2018), the instability in terms of their location constitutes a significant source of instability. Having stable density targets for stations remains abstract so long as it is not applied to actual stations because the plans are likely to change.

5.1.5.3 Mississauga

Mississauga	Local stability	1	2	3	4	5
		Very unstable local political agenda on TOD	Mostly unstable local political agenda on TOD	Some degree of local agenda change on TOD	Few changes to the local political agenda supporting TOD	Very stable local political agenda supporting TOD
	Researcher					
	Land use practitioner					
	Academic expert					

Looking at local news coverage and opinions on the project, it appears that the project is well-supported, or at least not opposed, even during municipal elections. Indeed, the most vocal opponents has been from a community group near the alignment which has been campaigning in favour of an extra station in their vicinity (Newport, 2018).

5.2 Actors

5.2.1 Actor relationships

Actor relationships describe the extent to which the various actors responsible for the planning and implementation of the transit/TOD plans are aligned in their objectives and actions, communicative between each other, and coordinated in their roles.

5.2.1.1 *Ottawa*

Ottawa	Actor relationships	1	2	3	4	5
		Poor/no communication, overlap in goals, unclear roles	Very little communication, overlap in goals, unclear roles	Average communication, overlap in goals, unclear roles	Good communication, overlap in goals, clear roles	Very close communication, overlap in goals, clear roles
	Researcher					
	Land Use practitioner					
	Transport practitioner					

The City's land use and transportation departments are unified by Official Plan, a document prepared by the municipality every five years outlining the large objectives and priorities of the city in terms of policy. This ensures a high-level overlap in terms of goals and vision, which is then supposed to translate down to specific policies. However, these specific policies are managed and enacted by separate departments. Although there is an overlap in goals and clearly defined roles between departments, the lack of integrated operations may impact the quality of communication between them.

5.2.1.2 Montreal

Montreal	Actor relationships	1	2	3	4	5
		Poor/no communication, overlap in goals, unclear roles	Very little communication, overlap in goals, unclear roles	Average communication, overlap in goals, unclear roles	Good communication, overlap in goals, unclear roles	Very close communication, overlap in goals, unclear roles
	Researcher					
	Land Use practitioner					
	Transport practitioner					

It is clear that the relationships between actors are exceptionally poor in this project, even being the subject of media attention (Lévesque, 2019). The enabling legislation, *Loi concernant le Réseau électrique métropolitain*, has largely exempted the project from municipal oversight, and intellectual privacy provisions have incentivized the CDPQ to avoid divulging more information than necessary to the other actors involved. As a result, the infrastructure developer has neither an incentive nor an obligation to collaborate with municipal authorities.

5.2.1.3 Mississauga

Mississauga	Actor relationships	1	2	3	4	5
		Poor/no communication, overlap in goals, unclear roles	Very little communication, overlap in goals, unclear roles	Average communication, overlap in goals, partially clear roles	Good communication, overlap in goals, mostly clear roles	Very close communication, overlap in goals, clear roles
	Researcher					
	Land Use practitioner					
	Academic expert					

The actors involved with the planning of the project appear to have collaborated closely in the production and implementation of the Hurontario Corridor project, both in terms of transport and land use. However, it does appear that the MTO's objectives are not as well-aligned with the project as a whole, requiring modifications to the transit and land use plans where they intersect highway onramps.

5.2.2 Regional Land Use/Transport body

This CSF evaluates the presence of a body which establishes coordinated land use and transportation plans, as well as its geographic jurisdiction, and the extent of its authority to enforce plans.

5.2.2.1 Ottawa

Ottawa	Regional Land-use/Transport body (LUTB)	1	2	3	4	5
		No LUTB	Non-regional LUTB	Informal inter-municipal LUT coordination	LUTB with an advisory function	LUTB with a regulatory function
	Researcher					
	Land Use practitioner					
	Transport practitioner					

The City is responsible for both transportation and land use planning but does not have an integrated body. The municipal government elaborates a unified vision incorporating both in the form of an Official Plan. Land use and transportation decisions will then be made in concordance with the plan, but they remain in separate departments.

As a land use/transportation body coordination mechanism, the Official Plan has several real and potential weaknesses. As a high-level vision document, the Official Plan does not actually provide for the coordination of the fine design details which are so important to quality TOD. Elements such as the immediate station area require careful connection between the transport infrastructure (detailed placement of the station and egresses, permeability of the right-of-way, etc.) and the surrounding land use (uses, placement of entrances to buildings, parking policy, etc.). This level of detail goes beyond the abilities of the Official Plan, which only lays out elements such as large areas of mixed use and the general location of transportation corridors. Although the larger scale is unquestionably necessary to the success of TOD, the finer points of design and coordination are one of the essential differences between successful TOD and its unsuccessful cousin, Transit-adjacent development (TAD) (Renne, 2009). TAD appears much like TOD on a larger scale (density, mix of uses, transit infrastructure), but lacks the successful integration of their detailed design into an adequate pedestrian realm, resulting in what Renne (2009) describes as “*little more than an office building [...] that happens to be near a train stop*”. Indeed, Ottawa suffers from a great deal of these in places like Heron/Mooney’s Bay Station; despite a high density of employment within a walkable radius, the lack of integration between the buildings and the transit infrastructure has left them isolated from each other.

The City of Ottawa does not currently have a mechanism to handle this finer level of transportation and land use integration. Although it does fulfill the role of high-level LUT coordination through the Official Plan, the lack of coordinated implementation has resulted in more TAD than TOD.

5.2.2.2 Montreal

Montreal	Regional Land-use/Transport body (LUTB)	1	2	3	4	5
		No LUTB	Non-regional LUTB	Informal inter-municipal LUT coordination	LUTB with an advisory function	LUTB with a regulatory function
	Researcher					
	Land Use practitioner					
	Transport practitioner					

As mentioned in 4.2, Montreal's metropolitan planning system consists of a number of "nesting dolls", with local plans needing to concord with the larger plans in which they fit. As a result, there are indeed regional plans for both land use (*Plan métropolitain d'aménagement et de développement*, PMAD) and, more recently, transportation (*ARTM plan stratégique*). However, both practitioners were correct in pointing out that, although these documents take the other into account, there is no coordinated mechanism for land use and transportation planning, much like in Ottawa.

5.2.2.3 Mississauga

Mississauga	Regional Land-use/Transport body (LUTB)	1	2	3	4	5
		No LUTB	Non-regional LUTB	Informal inter-municipal LUT coordination	LUTB with an advisory function	LUTB with a regulatory function
	Researcher					
	Land Use practitioner					
	Academic expert					

The *Places to Grow* Act is a legislative document which coordinates transport and land use on a regional scale, and which has the "teeth" to enforce their implementation by municipalities. It is not a planning body per se, but it manages to play the role of one through the provincial Ministry of Municipal Affairs and Housing's authority to oversee municipal planning.

5.2.3 Intermunicipal competition

Intermunicipal competition describes the extent to which municipalities in a same metropolitan area compete for governmental funding and/or private development. A high competition environment is one in which local governments undercut regional plans in order to attract development or funding. A low competition environment is one in which regional plans trump the interests of any one local component.

5.2.3.1 Ottawa

Ottawa	Intermunicipal competition	1	2	3	4	5
		Very intense competition / very unequal distribution of funding and development	Intense competition / unequal distribution of funding and development	Some competition / unequal distribution of funding and development	Little competition / equal distribution of development and funding	No competition / very equal distribution of development and funding
	Researcher					
	Land Use practitioner					
	Transport practitioner					

The Ottawa-Gatineau census metropolitan area (CMA) is a unique case in Canada.

- Ottawa-Gatineau is the only twin city region in Canada; unlike the more common city-suburb dynamic, the twin cities are both of significant size (995k in Ottawa, 285k in Gatineau) and are both highly integrated. Both cities contain a downtown area, directly across the Ottawa River from each other.
- Both cities are the results of municipal amalgamations in the early 2000s. Between the two of them, Ottawa and Gatineau house approximately 92% of the region's 1.3 million inhabitants, with only a small number of satellite municipalities, most of which represent less than 1% of the region's population.
- The region is crossed down the centre by a provincial boundary, the only CMA in Canada to do so. As municipalities, their practices, and regulation are under provincial jurisdiction, no municipality can cross a provincial border, nor can the normal metropolitan planning mechanisms on either side bound the planning of the other. Funding for infrastructure projects is also managed by the respective provinces.
- There are strong linguistic distinctions between the two sides of the border. Whereas 78% of Gatineau's residents have French as a mother tongue, only 15.8% of Ottawans do. Almost half (44.8%) of the region's population does have knowledge of both English and French (Statistics Canada, 2011). As such, migration from side of the metropolitan region to the other, although not uncommon, is more limited than in most other single-province metropolitan areas without similar significant linguistic and administrative differences and barriers.

In terms of intermunicipal competition, Ottawa enjoys a stable position. Between 2011 and 2016, its population grew at a rate of 5.8%, higher than the metropolitan average (5.5%), aided by the large area of the post-amalgamation City.

Despite being in a twin city region, Ottawa does not face significant competition for funding; As infrastructure and program funding for municipalities are managed on a provincial basis, projects in Gatineau and Ottawa are each funded from separate sources.

5.2.3.2 Montreal

Montreal	Intermunicipal competition	1	2	3	4	5
		Very intense competition / very unequal distribution of funding and development	Intense competition / unequal distribution of funding and development	Some competition / unequal distribution of funding and development	Little competition / equal distribution of development and funding	No competition / very equal distribution of development and funding
	Researcher					
	Land Use practitioner					
	Transport practitioner					

Greater Montreal is comprised of several large municipalities as well as smaller satellite suburbs. The jurisdictional fragmentation puts it at greater risk of competition. Before the 2017 *Act to modify mainly the organization and governance of shared transportation in the Montréal metropolitan area (Bill 76)*, this was the case, with each municipality submitting its own projects and priorities to the provincial government for evaluation and funding decisions, leading to a zero-sum game. Bill 76 established a regional transportation planning body to make unified plans and funding recommendations, the ARTM (Communauté métropolitaine de Montréal, 2018). However, the new provincial government has indicated that it would not be beholden to the ARTM's recommendations, putting the coordinated planning exercise in question, and prompting a return to direct appeals for funding from individual municipalities (Bergeron, 2019).

5.2.3.3 Mississauga

Mississauga	Intermunicipal competition	1	2	3	4	5
		Very intense competition / very unequal distribution of funding and development	Intense competition / unequal distribution of funding and development	Some competition / unequal distribution of funding and development	Little competition / equal distribution of development and funding	No competition / very equal distribution of development and funding
	Researcher					
	Land Use practitioner					
	Academic expert					

The current arrangement of regional planning and funding through Metrolinx has ensured a certain level of coordination and assuaged competition between the many large municipalities in the GGH. However, the arrangement appears to have been somewhat destabilized by the incoming government, which seeks more expensive projects without a proportional increase in funding availability.

5.2.4 Interdisciplinary implementation teams

This CSF describes the extent to which the detailed plans of transit infrastructure and station land use are either siloed or shared amongst the various actors responsible. For example, a low score might indicate that station placement and station area TOD are planned separately and are therefore at a greater risk of not aligning optimally. A high score might indicate that both the transportation and land use elements are executed in coordination with one another.

5.2.4.1 Ottawa

Ottawa	Interdisciplinary TOD implementation teams	1	2	3	4	5
		Sector-specific teams	Mostly sector-specific teams	Some sector specific, some interdisciplinary teams	A good number of interdisciplinary teams	Widespread presence of interdisciplinary teams
	Researcher					
	Land Use practitioner					
	Transport practitioner					

During the interviews within the City of Ottawa's Planning Policy department (land use), and its Transportation department, they were both clear that, in the implementation of zoning by-laws and the planning of transportation infrastructure, most of the work is accomplished in sector-specific teams. However, on certain questions, practitioners from the other discipline may be invited to contribute or liaison on an ad-hoc basis. This collaboration is voluntary on both sides, with no institutional obligation to either invite or participate. Both practitioners noted that, despite the lack of obligation, informal collaboration is common on specific questions, and both qualified the working relationship between both departments as entirely satisfactory. Considering the lack of formal policies or mechanisms for interdisciplinary cooperation on questions of TOD, it is difficult to independently confirm the extent to which informal participation occurs. However, the implementation of TOD elements remains less of a multidisciplinary effort, and more of a sector-specific approach with informal multidisciplinary input on request.

5.2.4.2 Montreal

Montreal	Interdisciplinary TOD implementation teams	1	2	3	4	5
		Sector-specific teams	Mostly sector-specific teams	Some sector specific, some interdisciplinary teams	A good number of interdisciplinary teams	Widespread presence of interdisciplinary teams
	Researcher					
	Land Use practitioner					
	Transport practitioner					

As mentioned in CSF 2.1, the REM's planning model places the infrastructure's planning solely in the hands of the CDPQ, and its enabling legislation exempts it from having to comply with municipal planning and approvals mechanisms. Its private nature also disincentivizes the developer from working with outside actors, such as planning agencies. As such, the planning is exceptionally siloed, with CDPQ teams formulating decisions about the infrastructure and only *informing* the municipal land use planning bodies.

5.2.4.3 Mississauga

Mississauga	Interdisciplinary TOD implementation teams	1	2	3	4	5
		Sector-specific teams	Mostly sector-specific teams	Some sector specific, some interdisciplinary teams	A good number of interdisciplinary teams	Widespread presence of interdisciplinary teams
	Researcher					
	Land Use practitioner					
	Academic expert					

Although it is true that the *Growth Plan* (which identified the Hurontario corridor as an intensification and transportation corridor) was primarily a land use planning exercise (White, 2007), the execution of the project through the HuLRT Project Office does appear to integrate land use and transportation practitioners in a single unit for its execution.

5.2.5 Public participation

This CSF evaluates the extent to which the public was given opportunities to meaningfully engage and affect plans for transit and TOD.

5.2.5.1 Ottawa

Ottawa	Public participation in land use-transport (LUT) planning	1	2	3	4	5
		No public participation, engagement, or interest	Very little public participation, engagement, or interest	Some degree of public participation, engagement, and interest	Good level of public participation, engagement, and interest	Very high level of public participation, engagement, and interest
	Researcher					
	Land Use practitioner					
	Transport practitioner					

Public participation in relation to TOD is not particularly strong in Ottawa, notably because TOD is not treated as a unified project. Instead, it is divided into several different components – street design, transit infrastructure, zoning changes, etc. – all of which do include some measure of consultation. Although the Ontario *Planning Act* does require public meetings in a small number of cases (Official Plan updates and certain zoning changes), the municipality is not bound to the outcomes of the meetings, nor is it required to go further than providing information to the public. According to the Arnstein's ladder of public participation, this is considered the most basic level of public participation (Arnstein, 1969), presenting a near-final decision or design to the public and requiring no changes or retroaction based on citizen input. Although the City does have a series of public participation guidelines which encourage more advanced forms of engagement, the level of consultation remains unevenly applied between departments and projects.

5.2.5.2 Montreal

Montreal	Public participation in land use-transport (LUT) planning	1 No public participation, engagement, or interest	2 Very little public participation, engagement, or interest	3 Some degree of public participation, engagement, and interest	4 Good level of public participation, engagement, and interest	5 Very high level of public participation, engagement, and interest
	Researcher					
	Land Use practitioner					
	Transport practitioner					

Both practitioners, although disagreeing on the admissibility of the BAPE process, highlight the lack of meaningful public input in the REM project. CDPQ was not given any responsibilities to consult the public on the infrastructure in its enabling legislation (Bill 137) (Assemblée Nationale du Québec, 2017). Despite this, CDPQ did conduct public meetings in several areas affected by the project. However, as the BAPE (2016) commission noted, these consultations were held “*in a perspective of informing the public [...] rather than an effort of co-creation*”. The highly siloed nature of the planning has precluded any combined consultation on the subsequent land use implications. The one opportunity for meaningful consultation came from the BAPE, whose eventual recommendations were rejected by the provincial government. Although there appear to be bits and pieces of consultation, the piece-meal approach does not allow for meaningful public input.

5.2.5.3 Mississauga

Mississauga	Public participation in land use-transport (LUT) planning	1 No public participation, engagement, or interest	2 Very little public participation, engagement, or interest	3 Some degree of public participation, engagement, and interest	4 Good level of public participation, engagement, and interest	5 Very high level of public participation, engagement, and interest
	Researcher					
	Land Use practitioner					
	Academic expert					

Public participation in this project appears to have been a mixed bag. It is important to note that the combined transport-land-use nature of the *Hurontario Corridor Master Plan* did allow for the public to comment on both the infrastructure and the land use components of the overall project at the same time.

5.2.6 Public acceptance

This CSF describes the extent to which there was general public support or opposition around transit and TOD projects.

5.2.6.1 Ottawa

Ottawa	Public acceptance of transit and intensification	1	2	3	4	5
		Public disapproval	Very little public approval	Some degree of public acceptance	Good public acceptance	Very high public acceptance
	Researcher					
	Land Use practitioner					
	Transport practitioner					

Public acceptance has not been a major issue for either LRT or intensification around its stations.

In the case of LRT, the project has enjoyed consistent and strong support across the city (The Forum Poll, 2014). This popularity has translated into political support, with the election of pro-LRT candidates across the city for all levels of government. This is not to say that there have not been some elements of contention. Citizen concerns regarding the placement of Cleary and New Orchard stations have prompted some modifications to the design. The deviation of bus routes during the construction period has also prompted opposition from residents along Scott Street. However, there has been little opposition to the project as a whole. The intensification of land use has similarly encountered little public opposition from citizen groups.

The researcher assessment is tempered by the fact that both practitioners describe a passive public acceptance which would be more aptly described as a lack of opposition. There are many reasons why this might be;

- The location of most of the areas which are set to be intensified are the existing “target growth centres” as set out by the 1974 Official Plan. These nodes have a limited residential component, being mostly comprised of regional malls, employment centres, and campuses as per the 1974 concept. With limited residential presence, there is likely to be less community involvement, both in terms of active opposition, but also in active support.
- The relatively basic consultation practices, although effective in terms of reducing negative reactions in the community, is also less likely to result in the same enthusiasm and active support that community-led design generates. The latter have a greater potential to rally active support by aligning intensification or transit projects with the community’s objectives.

Although passive support minimizes the risk of public opposition, the project remains vulnerable to changes from authorities if there is not active community pressure in favour of it. As Ottawa’s experience with the 2008 politically motivated cancellation of its previous LRT plan by

political and administrative support for a project is not necessarily guaranteed (Hilton & Stoney, 2007). There is nothing to indicate that the same will occur with the current LRT project, especially considering the near-complete state of the first phase. However, passive support remains a weakness, especially for the land-use intensification projects around LRT stations.

5.2.6.2 Montreal

Montreal	Public acceptance of transit and intensification	1	2	3	4	5
		Public disapproval	Very little public approval	Some degree of public acceptance	Good public acceptance	Very high public acceptance
	Researcher					
	Land Use practitioner					
	Transport practitioner					

It appears that there is substantial general support for the project with 74%-82% support depending on the public opinion poll (Léger Marketing, 2017). However, as the land use implications of the project are yet to be known, it remains to be seen whether there will be good public acceptance of the project as a whole and not just the infrastructure portion.

5.2.6.3 Mississauga

Mississauga	Public acceptance of transit and intensification	1	2	3	4	5
		Public disapproval	Very little public approval	Some degree of public acceptance	Good public acceptance	Very high public acceptance
	Researcher					
	Land Use practitioner					
	Academic expert					

The lack of significant opposition (see CSF 5.1.5) or significant participation (see CSF 5.2.5) lends credibility to the interviewees' evaluation of good – if passive – public support for the project.

5.2.7 Key visionaries

This CSF evaluates whether the emergence of transit and/or TOD projects were contingent on influential local figures leading them or making them possible.

5.2.7.1 Ottawa

Ottawa	Key visionaries	1	2	3	4	5
		No key visionaries over time	Very few key visionaries over time	Some key visionaries over time	A number of influential key visionaries over time	Many influential key visionaries over time
	Researcher					
	Land Use practitioner					
	Transport practitioner					

Both practitioners indicated that the projects and policies related to LRT are the products of institutional actors, rather than any particular visionary figures.

5.2.7.2 Montreal

Montreal	Key visionaries	1	2	3	4	5
		No key visionaries over time	Very few key visionaries over time	Some key visionaries over time	A number of influential key visionaries over time	Many influential key visionaries over time
	Researcher					
	Land Use practitioner					
	Transport practitioner					

It does not appear to be a visionary-led project. However, echoing the land use practitioner's point, it is difficult to verify how the project came to be within the CDPQ considering the secretive nature of the organization as a private actor.

5.2.7.3 Mississauga

Mississauga	Key visionaries	1	2	3	4	5
		No key visionaries over time	Very few key visionaries over time	Some key visionaries over time	A number of influential key visionaries over time	Many influential key visionaries over time
	Researcher					
	Land Use practitioner					
	Academic expert					

Overall, the project appeared to be the product of the *Growth Plan's* policies mandating the designation of higher-order transportation corridors and UGCs for intensification. However, both interviewees cited Ms McCallion as a local figure who influenced the first steps of the Hurontario corridor project. However, it is difficult to confirm the extent to what this is the case.

5.3 Implementation

5.3.1 Site-specific tools

This CSF evaluates the presence and use of planning tools (zoning, tax increment financing, inclusionary zoning, etc.) in order to incentivize or accomplish TOD goals in the station area.

5.3.1.1 *Ottawa*

Ottawa	Site-specific planning tools	1	2	3	4	5
		No use	Use in a few key projects	Use in a few municipalities	Use in most municipalities	Widespread use across the region
	Researcher					
	Land Use practitioner					
	Transport practitioner					

Ottawa makes widespread use of site-specific tools in its zoning code, including floor-area ratio (FAR) and increased densities around identified station locations (City of Ottawa, 2014).

5.3.1.2 *Montreal*

Montreal	Site-specific planning tools	1	2	3	4	5
		No use	Use in a few key projects	Use in a few municipalities	Use in most municipalities	Widespread use across the region
	Researcher					
	Land Use practitioner					
	Transport practitioner					

The systematic and quasi-automatic designation of areas around rapid transit stations as TOD allows Montreal to score high in this CSF.

5.3.1.3 Mississauga

Mississauga	Site-specific planning tools	1	2	3	4	5
		No use	Use in a few key projects	Use in a few municipalities	Use in most municipalities	Widespread use across the region
	Researcher					
	Land Use practitioner					
	Transport practitioner					

Mississauga's zoning provisions have specifically designated the sites along the LRT corridor for significantly higher densities in most areas. Indeed, the Growth Plan mandates that UGCs served by transit attain certain density quotas (Ministry of Energy and Infrastructure, 2008).

5.3.2 Regional TOD planning

This CSF evaluates the presence and extent of TOD nodes/corridors in regional land use/transport plans.

5.3.2.1 Ottawa

Ottawa	Regional TOD planning	1	2	3	4	5
		No designations of higher densities/LUT coordination in station areas	Few instances of higher density designations/ LUT coordination in station areas	Designations of higher densities/ LUT coordination in isolated station areas	Designation of higher densities/ LUT coordination in networked station areas	Designation of higher densities/ LUT coordination in several transport corridors
	Researcher					
	Land Use practitioner					
	Transport practitioner					

As discussed previously, regional TOD planning in Ottawa essentially follows the template of the 1974 Official Plan, which laid out 13 “target growth centres” of employment and commercial development along the same transportation corridors now being converted to LRT. TOD is still following this pattern of strings of networked station areas along rapid transit lines. However, these station areas have been planned as nodes rather than as a continuous corridor, as defined as “medium-density or high-density connections between nodes” (Filion, 2009). The alignment of the LRT corridors along highways is not conducive to the creating these internodal connections. Indeed, the highways’ exclusive focus on the automobile is likely to prohibit any formation of corridors.

5.3.2.2 Montreal

Montreal	Regional TOD planning	1	2	3	4	5
		No designations of higher densities/LUT coordination in station areas	Few instances of higher density designations/ LUT coordination in station areas	Designations of higher densities/ LUT coordination in isolated station areas	Designation of higher densities/ LUT coordination in networked station areas	Designation of higher densities/ LUT coordination in several transport corridors
	Researcher					
	Land Use practitioner					
Montreal	Transport practitioner					

The metropolitan land use plan (PMAD) designates all rapid transit and commuter rail stations as TOD areas, mandating certain minimum density quotas within a generous radius of the stations. However, in the context of the REM, the frequent changes in the alignment and station placement has meant that the land use planning bodies have only been able to ensure LU/T coordination in a limited number of stations.

5.3.2.3 Mississauga

Mississauga	Regional TOD planning	1	2	3	4	5
		No designations of higher densities/LUT coordination in station areas	Few instances of higher density designations/ LUT coordination in station areas	Designations of higher densities/ LUT coordination in isolated station areas	Designation of higher densities/ LUT coordination in networked station areas	Designation of higher densities/ LUT coordination in several transport corridors
	Researcher					
	Land Use practitioner					
Mississauga	Academic expert					

The creation of the corridor master plan has demonstrated a detailed effort to plan both the land use and the transport elements together along the entire corridor (Powell, 2011).

5.3.3 Certainty for developers

This CSF evaluates the extent to which there are municipal policies supporting higher densities and mixed uses in TOD areas, and developers' awareness of them.

5.3.3.1 Ottawa

Ottawa	Certainty for developers	1	2	3	4	5
		Uncertainty / Developers are unaware of TOD sites and policies	Very little certainty / Developers are not very aware of TOD sites and policies	Some degree of certainty / developers are somewhat aware of TOD sites and policies	Good degree of certainty / developers are mostly aware of TOD sites and policies	High degree of certainty / developers are very aware of TOD sites and policies
	Researcher					
	Land Use practitioner					
	Transport practitioner					

There has been the designation of areas around rapid transit stations as mixed-use and high density in Ottawa's Official Plan, aiming to direct development to those areas. Before the project has been completed, those areas have seen several such proposals and projects, including Ottawa's two tallest towers, indicating developer awareness and uptake of the designations (Bagnall, 2019).

5.3.3.2 Montreal

Montreal	Certainty for developers	1	2	3	4	5
		Uncertainty / Developers are unaware of TOD sites and policies	Very little certainty / Developers are not very aware of TOD sites and policies	Some degree of certainty / developers are somewhat aware of TOD sites and policies	Good degree of certainty / developers are mostly aware of TOD sites and policies	High degree of certainty / developers are very aware of TOD sites and policies
	Researcher					
	Land Use practitioner					
	Transport practitioner					

In Montreal's case, it would appear that developer awareness and ability to act has outstripped the capacity of the municipalities to change their zoning to reflect the sometimes-unforeseen presence of a REM station. There have been reports of real-estate speculation around planned stations (Joncas, 2018), even in the absence of higher density designations, which must still be processed by municipal land use plans.

5.3.3.3 Mississauga

Mississauga	Certainty for developers	1	2	3	4	5
		Uncertainty / Developers are unaware of TOD sites and policies	Very little certainty / Developers are not very aware of TOD sites and policies	Some degree of certainty / developers are somewhat aware of TOD sites and policies	Good degree of certainty / developers are mostly aware of TOD sites and policies	High degree of certainty / developers are very aware of TOD sites and policies
	Researcher					
	Land Use practitioner					
	Academic expert					

Mississauga's designation of significantly higher densities around most of the Hurontario corridor has seen developer uptake and a concentration of its highest densities along the LRT corridor.

5.3.4 Willingness to experiment

This CSF evaluates the willingness of actors to experiment with new policies, practices, and tools in the implementation of TOD.

5.3.4.1 Ottawa

Ottawa	Willingness to experiment	1	2	3	4	5
		Unwilling to experiment	Little willingness	Some degree	Good degree	Very willing
	Researcher					
	Land Use practitioner					
	Transport practitioner					

As the LRT project is the first mass transportation project of its kind in Ottawa, there has been a certain degree of willingness to develop new policies by the municipality. This has been particularly apparent in the planning department, which has developed new TOD land use designations for station areas in order to permit higher densities and a mix of uses (City of Ottawa, 2014). However, there is less evidence to demonstrate policy flexibility amongst transportation planning actors.

5.3.4.2 Montreal

Montreal	Willingness to experiment	1	2	3	4	5
		Unwilling to experiment	Little willingness	Some degree	Good degree	Very willing
	Researcher					
	Land Use practitioner					
	Transport practitioner					

The REM project is the product of a significant experimentation and departure from transportation planning and funding mechanisms. Through an act of the provincial national assembly, the project's planning and execution was accorded to the CDPQ (Assemblée Nationale du Québec, 2017). However, on the land use planning front, new policies or mechanisms have been slow to develop when they have in order to respond to the rapid change.

5.3.4.3 Mississauga

Mississauga	Willingness to experiment	1	2	3	4	5
		Unwilling to experiment	Little willingness	Some degree	Good degree	Very willing
	Researcher					
	Land Use practitioner					
	Academic expert					

As the first project of its kind in Mississauga, the municipality has demonstrated a good degree of willingness to experiment with new policies and practices. Most notably, it moved away from the transportation-first model of project management which was used for its MiWay BRT lines. The integrated corridor masterplan and project office demonstrated a willingness to depart from past practice (Powell, 2011)

Chapter 6: Analysis and Discussion

6.1 Results

Using an average of the expert and researcher scores, we arrive at the following table.

		Ottawa	Montreal	Mississauga
Plans and Policies				
	Policy Consistency	4	5	4
	Vision Stability	4	1	5
	Government Support	3	4	4
	Upper-level Stability	3	4	4
	Local Stability	5	2	5
Actors				
	Actor relationships	3	1	4
	Regional LU-Transport Body	1	1	5
	Intermunicipal Competition	4	3	3
	Interdisciplinary Implementation Teams	2	1	4
	Public Participation	2	1	4
	Public Acceptance	4	3	4
	Key Visionaries	1	1	2
Implementation				
	Site-Specific Tools	5	5	5
	Regional TOD Planning	4	3	5
	Certainty for Developers	4	5	5
	Willingness to Experiment	3	2	4
	points	47	35	63
	%	60%	45%	80%

Figure 9 CSF Evaluation Result Table

The aggregate scores for the three cases provide a general indication as to their overall likelihood of generating TOD. Whereas Montreal and Ottawa have comparable scores at 45% and 60% respectively, Mississauga achieved a significantly higher score of 80%. Although the scores are not of equal weight – which implies that they do not lend themselves to be aggregated with meaningful accuracy – Mississauga’s comparatively high score does provide a certain level of insight into its CSF performance.

A more accurate comparison of the cases’ performance will necessitate comparisons on the basis of the individual CSFs. In order to compare them, this paper will analyse them through the three CSF categories.

6.2 Plans and Policy CSFs: Stability and Flexibility

Plans and Policy CSFs demonstrated a fair level of variability between the cases. Of the five CSFs, three had differentials of 2+ points between cases. The starkest difference could be found in *vision stability*, with Montreal scoring 1 and Ottawa and Mississauga scoring 4 and 5 respectively. Montreal’s volatile transportation planning history has contributed to a lack of a consistent, stable vision for the growth of the region.

The case of Montreal’s REM is perhaps particularly egregious in this regard, as it was planned independently of the long-term regional land use plans that were prepared by the responsible public agencies. Ottawa and Mississauga’s transportation planning and land use planning benefited from a much greater level of consistency. In both cases, the transit infrastructure and growth nodes were identified in municipal official plans in the 1970s. Strong long-term planning and implementation mechanisms – especially with regards to transit infrastructure and the accompanying development corridors – appear to be the defining difference when compared to Montreal’s CSF. An ability to lay out and stick to plans in Ottawa and Mississauga aided in maintaining vision stability, whereas volatile transportation planning and implementation impeded Montreal’s ability to follow suit.

However, not all plans are worth following or implementing wholesale. Both Mississauga and Ottawa evolved significantly with regard to the details and philosophy underpinning their long-term plans. For instance, in both cities the concept of transport-land-use integration itself evolved from a vision of employment nodes focused almost exclusively on commercial and office activities to modern notions of TOD bent heavily on high-density residential and mixed uses. It could be argued that a certain level of flexibility in long-term plans is beneficial in order to accommodate and enable changes which allow for them to best suit the changing needs of the city. Too rigid adherence to plans based on now-defunct assumptions can stand in the way of successful implementation of today’s plans. Ottawa’s *target growth centres* stand as an example of this. Developed in the 1970s, these nodes are a product of the planning philosophies and practices of the time, structuring the transit system along a string of large single-use employment and commercial centres along highways that far too often were disconnected from their surrounding low-density residential areas. Ottawa’s current LRT project follows the same route, despite the alignment’s characteristics being often incompatible with the objectives of the Ottawa’s current TOD outcome objectives (such as high walkability and compactness).

Many of the scores which are similar across all three cases. Government support and upper-level stability are two factors that relate to provincial (and, to a lesser extent, federal) policies and positions. While Canada's constitution provides provinces jurisdiction over municipalities and their policies, convention has generally seen provinces take a hands-off approach with regards to municipal affairs (Cullingworth, 1987) resulting in relatively even scores across provinces and contexts.

Policy consistency, although largely of municipal initiative, is also similar across the three cities. This could be explained by the popularity of the concept of TOD across Canadian municipalities (Filion, 2011) and the general lack of its politicization, ensuring relatively consistent support.

6.3 Actors CSFs: The Importance of Transit/Land Use Collaboration

The second category of CSFs, *Actors*, contained the most variation between cases, with five of the seven factors exhibiting a difference of 2+ points between the studied cities. As there is more to unpack, this category is divided by case, followed by a discussion.

6.3.1 Montreal REM

Montreal's REM scored poorly on several key indicators relating to work between actors due to the silo effect. The planning model of this particular project appears to place additional barriers on effective collaboration between the mandated agencies. In the REM model, the planning of the infrastructure itself (such as alignment, station placement, and station areas) was removed from the jurisdiction of the various municipalities and municipally controlled agencies which would have normally been responsible for transportation projects. This was done by the provincial government, which passed special legislation in order to exempt the REM project from many of the regulatory steps normally required, such as planning by the ARTM, Montreal's regional transportation agency, and municipal permits. As such, the coordination mechanisms between land use and transportation actors, and public collaboration and accountability have shifted to a top-down relationship, with the CDPQ – the infrastructure developer – legally obliged to inform public actors or the public of its decisions only after they were taken. It is important to note that these decisions are taken by the CDPQ based on its private interests defined by the P3 agreement. In this agreement, the CDPQ's interest are essentially defined as infrastructure metrics such as operating costs, capital costs, and ridership. In other words, the transportation concerns take absolute precedence over land-use considerations and public participation in this project with little need or space for coordination. The results of this project's pattern of siloed decisions is reflected in the projects CSF scoring.

6.3.2 Ottawa LRT

Ottawa's LRT project scored better on most of the metrics in this CSF category. Although not as categorical as Montreal's REM, there is still evidence of siloing by land use and transportation actors in Ottawa. Both Ottawa's land use planning and transportation planning are undertaken by

public departments within the same municipal structure. This allowed for a sufficient level of collaboration between actors, as evidenced by its average score on the *actor relationships* CSF. Unfortunately, Ottawa's structure stops short of integrated planning. Despite an official plan that combines both a transportation and a land use component, these two aspects are planned and defined separately and often in reaction to the other (*regional LUT body: 1*). In the case of the LRT project, land use planning appears to react to transportation planning; transportation infrastructure decisions (such as alignment and station placement) were taken by the transportation planning actors based on infrastructure concerns (e.g. ROW availability, cost, operations, etc.) and land use (e.g. planned intensification around the LRT stations). This sequential process limits collaboration and leads to situations where stations and alignments may be situated in optimal locations from a transportation perspective, but are challenging for intensification, such as LRT stations adjacent to highways. A lack of a coordinated implementation has also led to fragmented public engagement (*public participation: 2*), since the sequential planning process does not allow for the public to comment or collaborate on the final outcome of the infrastructure and the accompanying intensification. To summarize, the sequential nature of transport-then-land-use planning, although significantly more coordinated than Montreal's REM, negatively impacts coordination between actors. Without this coordination, the project is less likely to result in high-quality TOD.

6.3.3 Mississauga LRT

Mississauga's LRT project stood apart in the *Actor* CSFs, out-performing the two other cases in all but one of the factors in this category (*intermunicipal competition: 3*). The project originated from the GGH regional land use/transport planning legislation, *Places to Grow Act*, which determines and enforces intensification objectives and transportation corridors across the region. The City of Mississauga took the approach of a corridor masterplan, outlining a unified vision for both the transportation and land use aspects of the project. The integrated planning process was mentioned as a key element of the project's success in *actor relationships (4)*, *public participation (4)* and *acceptance (4)*, as well as its relative success in *interdisciplinary implementation teams (4)*. For *actor relationships*, the creation of a unified transportation/land use masterplan resulted in a high degree of overlap in goals and practices among the actors involved in the project. For public participation, the integrated nature of the project enabled citizens to comment on both the land use and the transportation aspects of the project and built support by demonstrating how both were necessary for the other. The implementation, although still in its early construction phase, has demonstrated a high level of interaction and overlap between the city's transportation department, planning department, and the regional transportation planning authority (Metrolinx).

6.3.4 Discussion

Looking at all three cases together, some trends emerge. Success in *Actor* CSFs appear to be related to the project's planning model. Projects with higher involvement of land use bodies in the planning of the transport infrastructure (such as Mississauga) saw better performance, and those in which it was primarily led by transportation concerns saw less success. This hints at an aspect of the current interpretation of TOD which may indeed hinder its own application; TOD, even in the name itself, assumes that development and land use are to be planned in consequence of (or *oriented*

around) transport infrastructure. However, transport and land use planning do not necessarily have – and indeed often don’t have – the same objectives, or even non mutually-exclusive ones. Many retrospective analyses bring up this conflict. As Cervero, et al. (2004) wrote in *TOD in the United States*:

All of these entities [involved in TOD projects] have different ideas about what the project should accomplish... Too often, projects are implemented without a clear vision of desired outcomes, the different goals of the actors, and the ways in which those goals may work at cross-purposes and lead to a project that, while perhaps superior to traditional development, falls short of the potential of TOD.

This lack of land-use/transport (LU/T) integration may explain the significant discrepancies in the performance of cases in the most polarized CSFs. Regional LU/T Body and Interdisciplinary Implementation Teams CSFs showed a great deal of variation between cases. In both, they evaluate the ability of a project to integrate the transport and land use aspects of a project, and are therefore sensitive to a lack of coordination between the two. Transportation planning has had “*the tendency [...] to deliver transport within a narrowly defined view of mobility, focused on increasing speed and with consequences for other urban activities.*” (Mephram, 2013) When the infrastructure is planned according to objectives different from those which will guide the land-use which is meant to surround it, the former may inadvertently undercut the latter. A common example of this in the Montreal and Ottawa cases is the significant presence of highway-adjacent transit alignments, as mentioned in Chapter 4. Although practical from a transport planning perspective (offering a speedy, low-cost, low-impact corridor), it is a distinctly sub-optimal location for the types of compact, pedestrian-oriented development which TOD definition literature consistently associates with successful TOD.

It is not only necessary for development to be oriented around transit, but to have transit infrastructure which enables the land use aspects of TOD. This is affirmed by Curtis in his retrospective assessment of TOD implementation policies in Perth:

For successful TOD transition, land-use planning must accompany the project planning phase of transport infrastructure projects. Implementation of land-use change for TOD must also accompany and coincide with infrastructure construction [...] (Curtis, Renne, & Bertolini, 2016).

Those projects which saw land use considerations integrated early on in the planning process and which maintained a close working relationship between land use and transport actors appear better able to resolve many of the inconsistencies in their respective objectives before construction. This can be viewed through the lens of the TOD definition *Node-Place Model*, as described in section 2.2. As Belzer & Autler (2002) state, “[m]any of the shortcomings of TOD projects can be better understood when those projects are viewed through the lens of place and node.” In this context, if transport actors bring *node* considerations to the table and land use actors provide a *place* perspective, it is necessary for them to resolve the tension between the two in order to achieve balanced TOD projects (Gert-Joost, Bertolini, & De Jonge, 2006).

As explained in Chapter 1, most of the rapid transit projects currently underway in Canadian cities are focused on providing new transit options to the historically underserved auto suburbs and urban fringe. This is certainly the case for the three cases studied in this paper. Looking at them through a *node-place* lens, auto suburbs tend to be *high-node, low-place* areas, characterized by both low land use intensity and a high degree of mobility (especially in regard to automobile trips)

(Handy, 2002). The new transit infrastructure feeds their quality as nodes through improved transportation. However, a *place-poor, node-rich* area requires a far greater improvement of its *place* aspects than its *node* qualities in order to move towards equilibrium (Gert-Joost, Bertolini, & De Jonge, 2006). This may help to frame why, in the context of Canadian auto suburbs, a transportation-led transit project is unlikely to result in balanced transit-oriented development. Manifestly, improving transportation (i.e. *node* improvements) has been the primary objective of transportation planning. But in the context of *node-rich, place-poor* suburban areas, that *improvement* alone is likely to perpetuate the *node-place* disequilibrium at best, and to aggravate it at worst.

Successful TOD requires a balance which this approach is unlikely to generate. This is not to say that transportation improvements are undesirable. However, when *place* considerations (i.e. land use) are not fully taken into account in the design of a project, the inherent *node-place* conflicts are likely to be decided in a way which is convenient from a *node* perspective. As an example, alignments seen from a nodal perspective are likely to be situated along available rights of way (such as highways, railways, or less populated corridors) where cost savings are higher and speeds are often higher too, but these areas tend to be more difficult to intensify. Bringing a *place* lens would result in different decisions, such as opting for a slower or more expensive alignment which is more *intensify-able*.

Chapter 7: Conclusion and Recommendations

7.1 Recommendations

As the case studies in this paper have demonstrated, there are sometimes wide variations in Canadian cities' policies, regulatory frameworks, and institutional structures. This can make it difficult to offer highly specific policy recommendations for future projects. This said, there are broader recommendations which can be applied across the broad range of contexts.

The most important recommendation which has emerged from this research is the importance of ensuring that the transportation infrastructure around which development is to occur is itself actively designed in order to facilitate TOD development. Although this may appear intuitive, this level of coordination was not observed in two of the three cases studied. Being an important barrier to successful TOD around transit, this lack of integrated planning is likely to hinder future projects in one of their main stated objectives.

Other jurisdictions have experimented with integrated transit and land use planning. In his examination of Australian integrated planning, David Mephram (2013) notes the following:

The research shows that a successful policy for TOD needs to ensure that the land use/TOD objective is not a superficial add on to the transport planning process but instead is embedded in the 'DNA' of the planning process and a key factor in determining issues of mode, route and station locations. (Mephram, 2013)

Meaningfully integrating land use into transport planning is not a simple matter of putting them under the same umbrella organization.

Although Montreal provides a stark example of heavily-siloed planning in separate – and often antagonistic – organizations, the fact that Ottawa has both its transportation planning and land use planning branches under the same municipal umbrella shows that this organizational juxtaposition is not sufficient to integrate the planning of a project. This is not a unique situation:

Participants at both the Melbourne and Perth forums identified the lack of transport and land use integration as issues of concern. The challenge [in Melbourne] has been perceived as an issue of organization fragmentation because land use and transport exist as separate departments with different Ministers. Conversely, DPI in Western Australia administratively integrates transport and land use under one Minister, and yet participants indicated that the delivery of land use and transport planning integration remains problematic. Some suggested that working practices remained fragmented, referring to silos, but this was now simply hidden under the overarching organisational structure. (Legacy, 2009)

Collaboration is therefore not simply a question of organizational structure, but a need for meaningful integration of transportation and land use needs and constraints throughout the project. Mississauga's example of a unified corridor plan combining both aspects appears to be one such path.

This research has demonstrated a link between integrated land use and transportation planning and a higher likelihood of the emergence of TOD around transit projects, one of the major stated objectives of the authorities involved in their funding and implementation. In order to ensure that the major investments in these projects have a high chance of successfully attaining this outcome, steps should be taken to ensure that the institutional context is structured in such a way as to facilitate it. More concretely, this means the integration of transport and land use planning.

In order to ensure an integration which is sensitive to the different municipal contexts across Canada, this paper proposes that meaningful transport and land use integration be made a systematic practice across all projects. Although more research will be required to establish a definitive policy proposal, the insights derived from the research process lead me to advance a policy outline which illustrates how the high-level recommendation might be applied; Canada's governmental structure has a tendency to distribute the responsibilities for delivering services and infrastructure towards more local governments (municipal and provincial) while distributing public revenues upwards (provincial and federal). As such, intergovernmental transfer programs are a common tool in order to allocate federal and provincial dollars towards local projects (Office of the Auditor General of Canada, 2008). This is the case of the federal *Public Transportation Infrastructure Fund*, where federal and provincial monies cover over 90% of public transport projects undertaken by municipal or regional authorities. These funds come with eligibility conditions attached in order to ensure the policy objectives are reached. As demonstrated by this research, the attainment of many of the main objectives of this funding program are hindered by the lack of integration of transport and land use planning. As such, it would be appropriate for the PTIF to add a demonstration of integrated planning to the conditions of funding, ensuring a policy outcome while allowing for an implementation which is sensitive to the differing municipal contexts.

7.2 Conclusion

In the beginning of this paper, three sub-questions were posed:

1. What are the favourable institutional conditions for TOD?

This paper used Bertolini and Thomas's TOD Critical Success Factors (CSFs) in order to evaluate the likelihood of successful TOD in projects currently underway. This framework looked mainly at institutional conditions (such as government support and policy stability) and interactions (such as between land use and transport actors, the public, and political institutions).

2. To what extent do CRTPs present these favourable conditions?

Of the three cases studied, one (Mississauga) stood out as presenting a high number of these favourable conditions. Ottawa and Montreal's projects were significantly less successful, notably in those CSFs related to actor interactions.

3. What lessons can be learned for future CRTPs?

Close and meaningful actor relationships appear to be the key differentiator between the cases studied. More specifically, collaboration between land use planning and transport planning from the earliest stages of the infrastructure's design appears to be important in order to lay the foundations for the emergence of successful TOD, and its absence may place significant barriers to it in the future. Future projects should strive to integrate land use considerations into the planning of its transport infrastructure from the start.

The main question, “*To what extent do CRTPs provide the right conditions for TOD?*”, can be partially answered. From the three cases studied, we can see that there is a high degree of variation between projects across the country. Those which have integrated land use and transportation plans such as Mississauga appear very likely to provide favourable conditions for successful TOD, while those which don’t (such as Ottawa and Montreal’s REM) appear to be only somewhat more likely than chance to generate TOD.

The variability itself contains some insights into the likelihood of success of Canadian rapid transit projects. The lack of consistent approaches to transit projects and development across cities in Canada demonstrates a lack of a systematic approach to the issue. This leaves a core objective of these projects up to chance. There is a need for the methodical evaluation and implementation of institutional practices within cities as well as between them.

This paper has evaluated and compared three approaches, but more research is necessary on the question. Firstly, as this research was limited to three cases due to constraints of resources and time, the evaluation of a wider sample of transit projects would help to paint a more detailed picture of the various practices across the country. Second, although this paper does propose preliminary policy recommendations, more detailed policy analysis would be required in each case.

As mentioned in the beginning of this paper, Canadian cities currently have a historic opportunity to reorient themselves from car-centric spaces to transit-oriented places. Governments on all levels have expressed a desire to harness these investments in infrastructure to advance sustainability in cities, both in mobility and in land use. However, as this research demonstrates, not all projects will be effective in that regard. Cities with institutional practices which can meaningfully integrate land use and transportation planning are likely to succeed, while those which plan them subsequently and separately are not. This research and its recommendations are a start, but point to a need for further research into the policies necessary for successful TOD in the Canadian context. As governments continue with their historic investments in rapid transit infrastructure, this will be necessary to make sure that Canadian cities are fully harnessing their potential.

7.3 Research: lessons and limitations

This paper’s methodology strives for rigour. However, there are some caveats and limitations which must be considered in the interpretation of its results.

- **Internal vs external validity:** Although I had hoped to be able to evaluate all Canadian projects currently underway, constraints of time and resources required me to proceed with a more limited sample of cases in order to maintain a reasonable degree of internal validity. Although the case selection did allow me to select cases which are representative of a large number of projects, the high degree of variability has reduced the external validity of the conclusions. The methodology of this paper could easily be applied to more cases, given more time and a wider scope.

- **Interviews:** Following the framework established by Bertolini and Thomas, I interviewed two experts or practitioners in each case, followed by a documented researcher evaluation. However, the people interviewed, as actors in ongoing projects, could have very different perspectives on the issues discussed, which could affect results. Although I attempted to control for this with my own external evaluation, personal bias remains a potential weakness in the combined score.

- **Prospective policy analysis:** The prospective, in-vivo nature of this research was necessary to evaluate current trends in TOD implementation, but it also requires us to depend on indicators of likely success rather than of success itself. It is possible for a project with a low score to produce highly successful TOD. The score simply provides an indication on the likelihood of that outcome, but there remains an element of uncertainty.

- **Predictive value of the framework:** Thomas and Bertolini's evaluation framework is based off of a meta-analysis of case studies on TOD. It provides indicators for TOD success, but it has yet to be tested for its predictive value. This paper has applied it in three cases in the early stages of implementation. Further evaluation at build-out could test and refine the predictive value of the model.

- **Personal note:** Life has a way of throwing a few curveballs. In my case, during the writing of this thesis, I ended up juggling a number of life events. Moving back to Canada and into my first house (a bit of a fixer-upper) with my partner turned my weekends of writing into weekends of painting and renovations. At the same time, I was offered a dream job in the City of Ottawa planning department in a position where my recommendations come into daily practice. My weekdays of writing soon became workdays. I could never have foreseen how my life would change in the few short months of research. And although it may have blown my time management Gantt chart to bits and required some creative workarounds, I wouldn't change it for the world.

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