

# Opinions matter: Contrasting perceptions of major public transit projects in Montréal, Canada

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## ABSTRACT

Public opinion has been identified as one of the main drivers of political action in support of sustainable-transport transitions, making it essential to understand when aiming for effective transport policy. Drawing from both quantitative and qualitative data from the 2021 Montréal Mobility Survey, this paper analyzes public perceptions towards two transport projects—a light-rail transit (LRT) and a bus-rapid transit (BRT). Quantitative statements pertaining to five project impacts were compared between the two projects. Both projects had high levels of agreement (between 67% and 80%) regarding expected regional and environmental impacts, but agreement levels were lower for expected neighborhood, cultural, and residential displacement impacts (between 49% and 30%). To contextualize the quantitative findings, qualitative data were pulled from open-ended questions for both projects and analyzed using an applied-thematic-analysis approach. The qualitative responses focused primarily on negative perceptions, providing insight into potential factors contributing to the erosion of social acceptability. Our analysis of open-ended questions underscored contrasting perceptions between the two projects in terms of improvements in accessibility to destinations (minimal for the BRT vs noticeable for the LRT), governance (transparent for the BRT vs opaque for the LRT), consultation processes (adequate for the BRT vs insufficient for the LRT), and construction impacts (lengthy and disruptive for the BRT vs rapid for the LRT). These contrasting quantitative and qualitative results highlight the need for mixed methods when assessing public perceptions. Findings from this paper can be of benefit to practitioners and policy makers as they aim to ramp up efforts to expand public-transit systems.

## 1. Introduction

One of the most pressing challenges of modern cities is accelerating the modal shift away from motor vehicles and towards sustainable transport modes. To do so, cities around the world are making large investments in sustainable infrastructure, including Light Rail Transit (LRT) and Bus Rapid Transit (BRT) systems. Both systems are perceived differently by the public and by politicians, with LRT being seen as providing the necessary capacity and comfort needed to attract new riders, while BRT is usually more cost effective and faster to build. Over the last few decades, LRT has started to dominate BRT for new transit projects (Hensher, 2016). Past research in Australia has shown that LRT's favourability compared to BRT is compounded by perceptions regarding regular bus services, with BRT faring better in areas where

buses are viewed positively (Mulley et al., 2014). These evolving and contrasting public perceptions of LRT and BRT are crucial in the context of sustainable transport transition. Indeed, public opinion has been identified as one of the main drivers of political action in relation to sustainable-urban transitions (Banister et al., 2007). Despite a growing literature on social perceptions of public-transit (Calvo-Poyo et al., 2020; Ignaccolo et al., 2019), comparisons across modes have been limited (Calvo-Poyo et al., 2020; Hensher et al., 2015). This study compares public opinions of two public-transit projects of different scales that were under development in Montréal, Canada in 2021. Drawing from both quantitative and qualitative data from the 2021 Montréal Mobility Survey ( $n = 4064$ ), we aim to provide a deeper understanding of public perceptions towards a light-rail-transit system (LRT), and a bus-rapid transit (BRT) service. More specifically, this

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paper explores the following research questions: [1] What factors contribute to positive and negative perceptions of public transit projects? [2] What can we learn by comparing public opinions of two different infrastructure projects? [3] How can these findings help to inform policies and public-outreach campaigns aimed at reducing car dependency while fostering higher rates of sustainable transport?

## 2. Literature review

This paper builds on the literature on social perceptions of urban infrastructure (Banister et al., 2007), understanding public assessments of transport systems as complex socio-cultural phenomena (Cairns et al., 2014). Public perceptions of transport systems can be broadly understood in terms of subjective interpretations and values associated with different aspects of the built environment. While unique to each individual, perceptions are influenced by a variety of life-history experiences, political-economic forces, and social-cultural dynamics (Sheller, 2007; Walker et al., 2023). Public engagement activities have the potential to influence public perceptions towards what are framed as “positive” or “beneficial” perceptions. The strength and direction of their effects are dependent on multiple factors including the nature of activities in relation to the policy and policy makers’ approach to public engagement approaches (Emery et al., 2015). Conversely, informal channels such as social media can also have an impact on public perceptions which can produce, among other things, echo chambers of “negative” or “undesirable” opinions in relation to public policies (e.g., Williams et al., 2015).

The majority of recent research on public opinion and social acceptability of transport infrastructure has been primarily centered on autonomous vehicles (Golbabaei et al., 2020; Hilgarter and Granig, 2020; Hulse et al., 2018; Kassens-Noor et al., 2020; Penmetza et al., 2019; Pigeon et al., 2021) and road pricing (Börjesson et al., 2012; Gaunt et al., 2007; Grisolia et al., 2015; Nikitas et al., 2018; Schade and Schlag, 2003). While some studies have looked at social perceptions of public transit (Calvo-Poyo et al., 2020; Carvalho dos Reis Silveira et al., 2020; De Luca, 2014; Hensher et al., 2015; Ignaccolo et al., 2019; Wijaya et al., 2017), there is limited research available that compares public perceptions of public transit across different modes (Calvo-Poyo et al., 2020; Hensher et al., 2015; Mulley et al., 2014). This study aims to contribute to filling this gap through the comparison of an LRT and BRT project.

Some of the most common methods used to collect data on public acceptability of transport projects are quantitative surveys (Gaunt et al., 2007; Penmetza et al., 2019; Schade and Schlag, 2003) and social-media analyses (El-Diraby et al., 2019; Osorio-Arjona et al., 2021). Some researchers have made use of qualitative data through open-ended questions in surveys (Dunckel-Graglia, 2013; Gaunt et al., 2007; Rodrigue et al., 2023; Xenias and Whitmarsh, 2013), focus groups (Grisolia et al., 2015; Nikitas et al., 2018) or in-depth interviews (Dunckel-Graglia, 2013; Ignaccolo et al., 2019). In terms of analysis, past studies have operationalized public perceptions related to transport through factor analysis (Grisolia et al., 2015) and decision trees using machine learning (Calvo-Poyo et al., 2020). A growing body of literature has made use of a multicriteria approach using an Analytic Hierarchy Process (AHP) to integrate public perceptions in the transport planning process (De Luca, 2014; Ignaccolo et al., 2019; Xenias and Whitmarsh, 2013). While such methods are useful in informing decision makers, the calibration process they go through using qualitative data has, for the most part, been limited in terms of sample size. Lastly, past research has employed thematic analysis to analyze qualitative data (Nikitas et al., 2018; Rodrigue et al., 2023).

A few studies have employed mixed-method approaches (Dunckel-Graglia, 2013; Gaunt et al., 2007; Ignaccolo et al., 2019; Rodrigue et al., 2023; Xenias and Whitmarsh, 2013). As Creswell (2018) explains, some of the benefits of mixed-method approaches include their ability to provide a more comprehensive understanding of a research problem, to

account for diversity in public perceptions, as well as to enable systematic comparisons. All those are crucial when aiming to analyze public perceptions which are inherently subjective but may converge towards population-level trends. Mixed-method approaches are also crucial in reconciling the different types of data collected through quantitative and qualitative methods. Indeed, past methodological studies in other fields of research have noted the tendency for open-ended questions to provide more negative responses than closed-ended questions in surveys (Marcinowicz et al., 2007; Poncheri et al., 2008). Mixed-method approaches therefore gain even more importance in the context of public perceptions, where it is important to avoid the overrepresentation of negative or positive opinions. Despite these benefits, only a limited number of studies have assessed a combination of public perceptions collected through qualitative and quantitative methods for a large sample (Dunckel-Graglia, 2013; Rodrigue et al., 2023). The proposed study aims to help fill in this gap by studying public perceptions reported both through quantitative and qualitative data for a large sample, allowing for the exploration of a wider range of opinions. In doing so, we intend to contribute a nuanced examination of factors that could help to promote increased social acceptability of public-transit and support sustainable-transport transitions.

## 3. Case study area

Montréal is Canada’s second-largest city, with a metropolitan population of over four million residents (Statistics Canada, 2021). The Montréal metropolitan area is served by an extensive public-transport network operated by four different agencies regularized by one regional agency, the ARTM (*Autorité régionale de transport métropolitain*). The Société de transport de Montréal (STM) operates the bus system on the island of Montréal as well as its 69 km of underground Metro system, which extends off the island to the nearby suburbs. With the goal of reaching 35% mode share of public transport during peak morning commute by 2031 (Agence Régionale de Transport Métropolitain, 2021), Montréal has been heavily investing in public transport which includes building a new LRT system, the *Réseau Express Métropolitain* (REM) and a BRT line on the Pie-IX boulevard.

### 3.1. The Réseau Express Métropolitain (REM)

The REM, first announced in 2016 by the government of Québec, is the largest public-transit project in the province since the inauguration of the Metro system in 1966, spanning 67 km of LRT and 26 stations across four branches (CDPQ Infra, 2022). Once completed, this system will serve primarily suburban areas in the West Island (south-west in Fig. 1) and on the south shore (south-east in Fig. 1) of Montréal which are on average of higher socio-economic status than the rest of the region (Daley et al., 2022). Being the largest public-transit project in Québec since the inauguration of the Montréal Metro in 1966, the project was positively received upon its announcement (Corriveau, 2016).

Upon its announcement in 2016, the REM was estimated to cost \$5.5 billion and to have its first branch opened in 2020 for a complete opening in 2022 (Orfali, 2018). This relatively short construction time and smaller initial capital investment were touted as major advantages of the project’s Public-Private Partnership (PPP) approach (Corriveau, 2016). Indeed, the REM was designed, constructed, and will be owned and operated by CDPQ-Infra, which is a subdivision of the *Caisse de dépôt et placement du Québec* (CDPQ), Québec’s pension fund. The latter acts independently from the provincial government thus explaining the PPP approach (BAPE, 2016). As part of this partnership, a non-compete clause was granted by the government of Québec to the developer, stipulating that the later cannot incur any competition from other public-transit agencies within the Montréal region for the south-east branch of the network. A \$0.72 per passenger-kilometer fee (to be indexed annually) – paid by the ARTM to the developer – was also

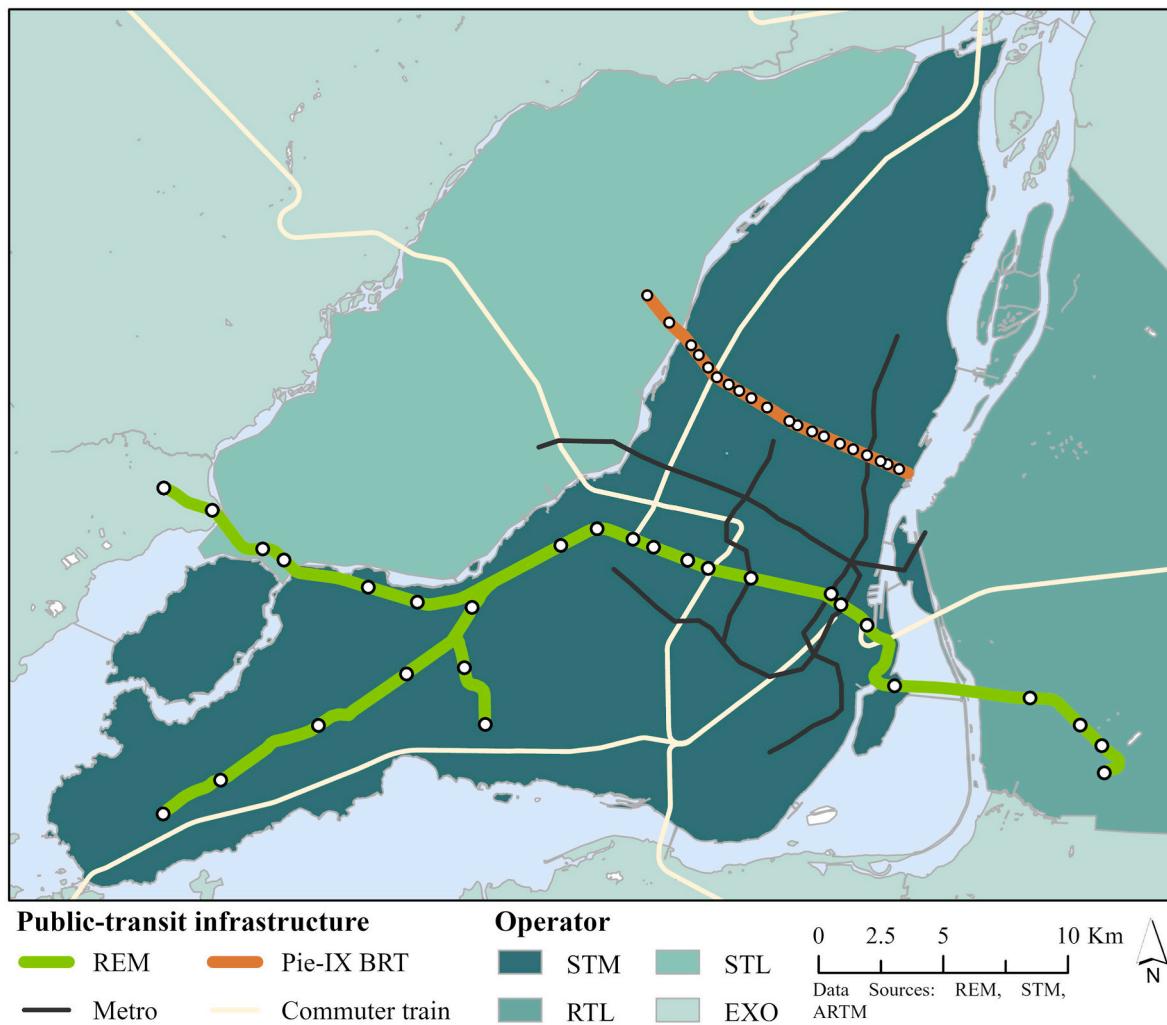


Fig. 1. Existing and planned public-transit infrastructure as well as transit operators in the Greater Montréal Region.

agreed upon. These revenues are to be used to operate the system, with the surplus being directed first to repay capital investments before being collected as profit by the developer afterwards. The choice of a for-profit public-transit approach has been a topic of debate for transportation and public-governance experts in the media, with a few arguing that some level of privatization is needed to continue to develop public transit while others cautioned that public transit should remain a public service to avoid competing private interests (Ferraris, 2016a).

Despite the promised benefits of efficiency of PPP approach, the project still faced budget increases and delays. Indeed, by 2021, the opening of the first branch of the system was scheduled for summer 2023 (3 years later than originally stated), with a complete opening by 2027, while the price of the project had risen to nearly \$7 billion (Magder, 2021). Such delays in construction and budget overruns have led to further criticisms of the PPP approach, as its key selling point of being within budget and within schedule were proven to be untrue (Bergeron et al., 2022).

In terms of design, the REM uses an automated and fully grade-separated LRT system running primarily on aerial structures, with limited underground sections in the urban core and towards the airport (Fig. 2). The REM overtook the Deux-Montagnes commuter train line corridor, which was the most frequent and the most used commuter train line in the region, serving 20,800 riders per day (twice more than

the second most used commuter train line) back in 2016 (Réseau de Transport Métropolitain, 2017). The REM was also granted the unique usage of the tunnel under Mount Royal, which is the only way to directly access downtown Montréal by rail without having to make a half-hour detour around the mountain. In doing so, the arrival of the REM forced the rerouting of a new commuter train line opened in 2014, adding over 30 min of travel time to get downtown. The relevance of the overtaking of existing infrastructure and of the right of way chosen has been heavily criticized by transportation scholars in the media (Ferraris, 2016b). Another source of tension was the initial lack of connection of the REM to the Metro lines it crosses (Marceau and Rocha, 2017), which was partly remedied following backlash from experts, local officials, and the public (Messier, 2016). As a result of those design elements, the effects of the REM on commuters' travel times have been questioned, although its higher reliability compared to existing service (mainly bus shuttles) remained a perceived improvement (Marceau and Rocha, 2017).

Like any major public project in Quebec, the REM had to go through the Office of Public Hearings on the Environment (French acronym, BAPE). Recommendations were made against the project for multiple reasons including the unjustified overtaking of the Deux-Montagnes commuter line and Mount Royal tunnel, insufficient studies evaluating alternative technologies, and the risk that private developers would



Fig. 2. Picture of the REM structure in the west of the island of Montréal (Source: Authors).

endanger the provision of public-transit services in the greater Montréal due to not being a public-transit agency regulated by the Law on transport (*Loi sur les transports*) (BAPE, 2016, pp. vii - ix). Despite this unfavorable recommendation, the Government of Québec decided to go ahead with the project with minimal changes aside from the addition of two new stations to provide connections with existing Montréal Metro stations. It is important to note that the REM incorporated little to no public consultation in its planning process (BAPE, 2016), which has left many municipalities scrambling to keep up with the rapid speed of construction to ensure a smooth integration within the urban landscape (Lévesque, 2019).

Lastly, an independent second LRT project for the East end of the Montréal Island called “*REM de l’Est*” (REM East) was presented by the same developer in fall 2020, once again without undergoing any public consultation or coordinated planning processes. The project, which involved aerial structures going through the Downtown core and residential areas on large arterial streets, was poorly received by the public and local officials (Laplante, 2021). Fear over the privatization of public-transit, the cannibalisation of the Montreal Metro ridership and the creation of urban scars were high at the time this study was conducted (Auger, 2020). Such overwhelming negative reception to this second project is likely to have had an influence on public opinion of the REM, particularly when considering that it was enough to lead to the cancellation of the *REM de l’Est*.

### 3.2. The Pie-IX Bus Rapid Transit (BRT)

Pie-IX boulevard is one of the primary arterial routes in the city of Montréal. It passes through many boroughs including numerous lower-income areas. As such, it has long been perceived as an important public transit corridor to develop. Bus-rapid transit existed on the Pie-IX boulevard between 1989 and 2002 as the 505 R-BUS Pie-IX. This service provided punctual reserved lanes in the middle of the streets running in the opposite direction to traffic, with boarding allowed from

one central platform at the center of the boulevard. However, following several injuries stemming from motorists conducting illegal turns and a few fatalities of riders crossing the street when getting to and from the platform, the service was suspended (CTV Montréal, 2009; TVA Nouvelles, 2002).

Despite this suspension, the idea of reinstating the service remained present throughout the 2000s. Conversations about the ideal mode to provide improved public-transit service along the Pie-IX corridor were and continue to be common, with a tramway being discussed as an alternative mode given the forecasted demand (Corriveau, 2014; Ville de Montréal, 2008). In 2008, a BRT service for the boulevard, estimated at that time at \$100 million, was highlighted as a priority project (Ville de Montréal, 2008). The following year, the project was formally announced to the public with an increased expected cost of \$150 million and an opening in 2013 (CTV Montréal, 2009). The Pie-IX BRT represented, at the time, the first proper BRT in the greater Montréal region, with its own right of way, priority signals and high frequency. That said, the project was initially not widely covered in the media, although the coverage it received was generally neutral to mildly positive.

Unfortunately, given the state of the Pie-IX boulevard, policymakers decided to postpone the project until the reconstruction of the street itself could be conducted (Corriveau, 2014). The final version of the project was presented to the public in 2018 by the ARTM and STM. The revised project was estimated at \$393 million, divided between the ARTM and the City of Montréal, with a planned opening in fall 2022 (Corriveau, 2018). This delay led to an increase in negative media coverage as questions started to multiply concerning the BRT’s ability to fully accommodate the demand along the Pie-IX Boulevard. The idea that it should have been a tramway, especially given the long construction timeline, also resurfaced (Ferraris, 2018). That said, the BRT remained for the most part a rare topic in the media and for politicians. By fall 2021, 12 years after its announcement, the Pie-IX BRT was almost finished, and set to open in fall 2022. The final project (see Fig. 3), spanning 17 km and 20 stations, ended up costing \$523 million



Fig. 3. Picture of the Pie-IX BRT infrastructure (Source: Authors).

(Lacerte-Gauthier, 2022).

#### 4. Data and methods

##### 4.1. Montréal Mobility Survey

In fall 2021, the Transportation Research at McGill (TRAM) group conducted the second wave of the Montréal Mobility Survey (MMS). Following Dillman et al.'s suggestion for online surveys (Dillman et al., 2014), multiple recruitment methods (i.e. marketing company, social-media ads, flyer distribution and invitation emails) were applied to ensure a large and representative sample. All respondents were asked whether they knew about both projects of interest (REM, BRT). Respondents were then asked a series of quantitative questions regarding the expected impacts of each project. As such, the data used in this study was drawn only from respondents who knew about the projects.

Open-ended questions were further employed to contextualize the quantitative findings and provide room for a deeper understanding of social perceptions of sustainable transport projects. While interviews, focus groups, and ethnography are more commonly used in qualitative research (Creswell, 2018), we selected open-ended survey questions to explore a wide range of subjective understandings. Considering that much of the qualitative literature on public perceptions of transport projects has been limited to smaller sample sizes (e.g., Ignaccolo et al., 2019; Xenias and Whitmarsh, 2013), we opted to integrate qualitative questions into a larger survey to provide an exploratory examination of emergent themes pertaining to diverse public perceptions of transport infrastructure. Specifically, open-ended questions were posed at the end of each survey section asking about the impacts of each project, with the questions worded as follows: "Is there anything else you would like to share about the anticipated impacts of the [project]? If you do not have any suggestions, you do not need to respond to this question." Responses were filtered with all non-answers (i.e., answers that did not provide either a comment or a question on the related transport project) being removed.

From an initial total sample of 4063 for the 2021 wave of the MMS, 3884 respondents indicated being familiar with the REM of which 750 provided useable answers to the open-ended question. Regarding the BRT, 2332 respondents indicated being familiar with the project, with

200 responding to the open-ended question. Open-ended responses ranged in length from 3 to 355 words, with most responses being 1–2 sentences long. While recognizing the interpretive limitations of analyzing responses of this size, our aim is to enable a broad-based exploratory understanding of perceptions and attitudes towards new sustainable-transport projects, informed by an applied thematic-analysis approach, to provide a baseline for future research. By comparing and contrasting these qualitative findings with our quantitative analysis, we hope to build on calls for more nuanced transport research to better account for the heterogeneity of public-transit users' opinions (Clayton et al., 2017; De Vos et al., 2020).

##### 4.2. Analysis

For the quantitative data, Chi-square tests of independence were generated for each of the five statements that were presented to respondents in the MMS to verify whether there was a statistically significant variation in the level of agreement with the statements between the projects.

For the qualitative data collected in the open-ended questions, thematic analysis was used to guide the analysis through a consistent process of recording, systematizing, and disclosing study methods (Braun and Clarke, 2006). Our analytical method draws from Guest et al.'s (2011) approach to applied thematic analysis (ATS), which adapts qualitative analysis to applied research contexts. ATS is well suited for larger datasets, allowing researchers to account for variances while also facilitating analytical breadth. We opted for an exploratory and comparative approach to ATS to allow for a content-driven analysis and for comparing themes between different transport modes. The data-familiarization process was undertaken separately by two members of the research team who reviewed the data, giving equal attention to each item (Lincoln and Guba, 1985; Nowell et al., 2017). We worked to enhance the credibility of this process by using peer debriefing with the entire research team to help researchers to compare how their categorizations evolved and to ensure that each theme was based on significant patterns found in the raw data (Cutcliffe and McKenna, 1999; Nowell et al., 2017). We developed a codebook to systematically sort observed meanings and define boundaries around them through text

segmentation and coding (Guest et al., 2011). As recommended in ATS for larger qualitative datasets, we added quantification to our data-reduction techniques to enhance the validity of findings and to provide evidence that they were the product of a rigorous analysis (Hannah and Lautsch, 2011), as outlined in the results section. We opted to integrate direct quotes in the final research paper (as typical examples of larger patterns) to illustrate the prevalence of themes (Guest et al., 2011; King, 2004).

### 5. Results

Both quantitative and qualitative results of this study reveal variability in respondents’ perceptions of LRT and BRT projects, meriting closer analysis and comparison. Table 1 displays the level of agreement per project for the five statements that were presented to respondents in the closed-ended survey questions. Chi-squares tests used to assess the relationship between the level of agreement (i.e., agree, neutral, disagree) and the public transport project (i.e. LRT, BRT) for each of the five statements were statistically significant at the 0.0001 level, showing that the level of agreements with each statement varied between projects.

Table 2 displays the summary of the thematic analysis conducted on the responses to the open-ended questions. Themes were organized into broader categories akin to those in the quantitative data to better conceptualize the results. Table 2 also presents the prevalence of each theme for each given project. To be counted as a theme, an arbitrary benchmark of 2.5% respondents having engaged with it was established. Such a low number is justified by the broadness of the question, which did not orient respondents towards any particular theme. Directionality is also indicated next to each theme with (+) meaning that the theme relates to a positive perception, or (–) a negative perception. Overall, the majority of responses leaned towards negative themes. The following section will discuss the results described in Tables 1 and 2, linking them to the themes highlighted in Table 2.

#### 5.1. Regional impacts

As shown in Tables 1 and 2, a larger proportion of respondents agreed that the REM (80%) will be beneficial to the Greater Montréal region than for the BRT (76%). Using the qualitative data, the observed

**Table 1**  
Distribution of agreement levels per question and transport project.

Survey question	REM	BRT
1) When complete, the project will be a good thing for the greater Montréal area.		
Agree	80%	76%
Neutral	12%	18%
Disagree	7%	6%
2) When complete, the project will be a good thing for my neighborhood.		
Agree	39%	30%
Neutral	41%	51%
Disagree	20%	19%
3) When complete, the project will be good for the environment.		
Agree	72%	67%
Neutral	20%	26%
Disagree	8%	7%
4) When complete, the project will be good for Montréal’s culture and heritage.		
Agree	43%	34%
Neutral	38%	50%
Disagree	19%	16%
5) I am concerned about whether I will be able to remain in my neighborhood after the completion of the project due to rising housing costs.		
Agree	17%	8%
Neutral	34%	42%
Disagree	49%	49%

1.  $\chi^2(2, N = 6216) = 40.9, p = .00001$ ; 2.  $\chi^2(2, N = 6216) = 65.2, p = .00001$ ; 3.  $\chi^2(2, N = 6216) = 25.5, p = .00001$ ; 4.  $\chi^2(2, N = 6216) = 89.0, p = .00001$ ; 5.  $\chi^2(2, N = 6216) = 101.2, p = .00001$ .

**Table 2**  
Prevalence of themes mentioned in open-ended questions by project.

Section	Theme (directionality)	REM	BRT	
<b>Regional impacts</b>	Need to be expanded/Regional network (+)	4%	5%	
	Inadequate choice of technology/mode (–)	2%	21%	
	Competition with existing PT/end-of-service impacts (–)	13%	3%	
	Accessibility to opportunities (+)	7%	6%	
	Will lead to urban sprawl (–)	4%	1%	
<b>Neighborhood</b>	Nuisance of construction (–)	3%	14%	
	Construction/planning timeline (–)	1%	20%	
	Quality of life impacts (i.e. comfort, noise, safety) (–)	10%	0%	
<b>Environment</b>	Favourable to the environment (+)	3%	2%	
	Not favourable to the environment (–)	8%	5%	
	Modal shift/Decrease in car use (+)	3%	1%	
	No modal shift/no decrease in car use (–)	4%	4%	
	Parking removal/absence (–)	10%	1%	
<b>Culture</b>	Visual aspect (–)	19%	1%	
	Gentrification, Increase in home values/rent (–)	8%	2%	
<b>Equity</b>	Geographical distribution of benefits (–)	6%	5%	
	<b>Governance &amp; planning</b>	Lack of public consultation/acceptability (–)	6%	0%
		Conflict of interest (–)	7%	1%

quantitative results can be partially explained by the larger scale of the REM project, which will provide a broader range of access to potential destinations. While worries of the REM leading to increased urban sprawl were voiced by several respondents, the REM’s extensive coverage was overall praised. The following comment illustrates this sentiment:

*“I can’t wait to have the opportunity to visit new places in the West Island and on the South shore that I’ve never been to as I do not drive”.*

Another theme mentioned in the open-ended responses that supports the quantitative findings pertains to the perceived (in)adequacy of the mode of transport chosen for Pie-IX boulevard, which was the most mentioned theme for this project. Many expressed frustrations and concerns that the technology chosen was not a tramway or a metro, with one respondent summarizing this issue as follow:

*“I wonder if, a few years after its opening, ridership will be so high that we will have to transform it into a tramway.”*

These perceptions could reflect a lack of familiarity with BRT as a transport mode, which is not common in the region and is usually not differentiated from regular bus service. That said, this comment expresses a common concern in the open-ended responses that the BRT might not have a large enough capacity to make a significant impact on the Montréal region, considering that it will be operating in an under-served and overcrowded portion of the public-transport network, and that it took over a decade to complete.

Overall, it is important to acknowledge that both projects have a high level of support for their regional benefits, even if respondents favor the regional benefits of the REM to a greater extent. This support was emphasized throughout the dataset for both projects, with many respondents, mentioning the need for additional expansions beyond what is currently planned. The following quote, while provided for the REM, expresses this common perspective across both projects:

*“I hope it expands to other regions of the island that are currently not well serviced by mass transit.”*

## 5.2. Neighborhood impacts

Statistically significant differences in the level of agreement were observed between the two projects for the question pertaining to neighborhood impacts (Table 2). The REM has the highest proportion of people agreeing with its positive benefits (39%) with the BRT following at 30%. The difference between both projects stems from a higher level of neutral response for the BRT (51%) than for the REM (41%), rather than a difference in disagreement level (20% for the REM versus 19% for the BRT). In both cases, the high proportion of neutral responses could indicate that many respondents live outside of the impacted areas.

The primary factors mentioned in the open-ended questions that can help explain these differences are related to the perceived negative impacts of the construction work for the BRT, including primarily detours as well as air and noise pollution. The extended planning and construction timeline, which are elements that were frequently mentioned by respondents for the BRT, can further amplify disruptions during the construction phase. As detailed in Section 3.2, the Pie-IX boulevard has been under some level of construction since 2009, which meant that some portions had been experiencing construction work for close to 12 years at the time of data collection in fall 2021. The combined effect of the disruptiveness and lengthy timeline of construction work on local residents is captured in the following response related to the BRT:

*“Construction has been going on for well over a decade if I remember correctly. This has impacted my travels and caused lots of stress and confusion for well over 5 years.”*

Still, while the REM was seen as being more beneficial to local areas than the BRT, some residents voiced concerns about potential negative impacts on their quality of life once the REM becomes operational. The most common impacts mentioned in relation to the REM were primarily the level of noise expected from frequent trains, reduced privacy from the aerial structure, and safety issues from the increased number of cars moving to and from stations. Frustration was also voiced regarding the rapid built-environment changes generated by the arrival of the light rail in lower-density areas, as mentioned in the following response:

*“[The] impacts on my neighborhood are already incredibly harmful. Our small almost rural neighborhood life is now a thing of the past thanks to the monster that is the REM.”*

Overall, the perceived disruptions caused by new transit investments, both during and after construction, are amongst the main factors likely to influence public perceptions of neighborhood impacts. In addition to prolonged construction timelines (particularly in already underserved areas with high public-transit demand), the technology and design aspects of the project can also contribute to heightened sensitivity from residents.

## 5.3. Environmental impacts

Significant differences were observed between the REM and the Pie-IX BRT in the level of agreement regarding the environmental benefits of the projects. The REM had the highest proportion of respondents agreeing it will have positive environmental benefits at 72%, compared to 67% for the BRT. While a significant difference was observed with regard to the quantitative data, no clear themes were observed in the open-ended questions to explain this difference apart from the larger scale of the REM. For both projects, negative responses were often related to the adverse environmental effects of construction activities. For the REM, the primary concern was related to the materials used – mainly concrete – as well as damages to natural habitat (e.g., damages to local forests and accidental drainage of the last wetland on the Montréal Island). This theme was summarized by one respondent:

*“Grossly overpriced when a less expensive more environmentally friendly surface option was available. The REM has destroyed acres of farmland, wetlands and other natural habitat. It is a visual blight. All this and the amount of concrete used offsets any environmentally friendly aspects.”*

The environmental mitigation efforts undertaken by the developer of the REM project were rarely mentioned in the comments. Negative environmental impacts pertaining to the construction of the BRT were also elaborated upon by some respondents:

*“Projects like this one have caused the destruction of a high number of decades-old trees and did not take into consideration the need for a canopy to fight the heat island that the boulevard has now become.”*

These discussions exemplify how tree canopies, green spaces, and wetlands are particularly sensitive environmental issues in a mature urban context and can represent a major hurdle to social acceptability of public-transport projects. Furthermore, while a few respondents stated for both projects that the new public transit services would be beneficial to the environment by reducing car travel, a larger proportion raised doubt to the ability of the BRT and the REM to generate a modal shift away from car usage. Some respondents argued that the removal of car lanes for the BRT would lead to increased traffic congestion. Even though the REM has its own right of way and will not directly change the number of lanes available to cars, it was not exempt from questions about its potential to create a modal shift given its focus on car-centric suburban areas. One suburban respondent summarized this logic as follows:

*“As a West Island resident for whom money is not a concern, I essentially drive my car EVERYWHERE. Public transportation for those who have strong incomes is completely not viable out here. Period. [...] [F]or the REM to succeed in the West Island, it is imperative that the stations have ample parking available. It is pure folly, and regrettable ignorance, if organizers and central Montréal politicians believe that adult suburbanites will cycle or take buses to access the REM. This simply will not happen.”*

This comment underscores a common perspective in the open-ended responses emphasizing that parking at rail stations and efficient access are perceived as must-haves for many suburban residents. These dynamics create uncertainty concerning the potential of public-transport projects to spur a rapid shift towards sustainable-transport modes in suburban neighbourhoods considering the predominance of auto-centric development patterns and car culture in these areas.

## 5.4. Impacts on culture and heritage

Despite the REM receiving the highest proportion of responses agreeing with its cultural and heritage impact (43%) compared to the BRT (34%), negative comments relating to these impacts were more prominent for the REM in the open-ended questions. While a BRT necessitates more imposing infrastructure than a regular bus service, it was still generally perceived by respondents as a simple extension of the bus network, rather than a transformative change to the city, thus explaining the high level of neutral response for this statement (50%). However, such a neutral attitude was not present regarding the cultural and heritage impact of the REM, which had the highest disagreement level for this question with 19%. The imposing concrete pillars of the REM's aerial structures were a common grievance of respondents as captured by one of the respondents:

*“I am worried about the visual pollution caused by the REM structures. I noticed along Highway 40 that the structures are at many points very high. I believe that this will deteriorate the aesthetical aspect of these neighborhoods and maybe even lead to a loss in home values.”*

The negative perceptions related to the visual aspect of the REM can be related (at least in part) to the nature of the project, which the city has

not seen before. Indeed, the existing rail system in Montréal is either underground or hidden in areas that are less visible to the public compared to the REM, which will be running above ground by an average of 11 m in some portions of the network. The primary aerial transport infrastructure in the region are highways, with many respondents alluding to them when discussing their fear of the REM becoming another urban fracture in the city’s landscape. As such, the observed heightened sensitivities to the visual aspect of the REM could be partly attributed to a combination of the novelty of aerial public-transit infrastructure in Montréal and the negative feelings towards existing aerial transport infrastructure in the region.

While these previous points were more prevalent, a few respondents also pointed towards large-scale public transit such as the REM as being needed to promote Montréal’s wider image as a tourist attraction and facilitate international sport, music, and arts events. This added nuanced points to diverging perspectives of Montréal, emphasizing the city as a cosmopolitan destination, rather than solely a place of living.

### 5.5. Gentrification and housing affordability

Due to the phrasing of the statement pertaining to this issue, agreement with the statement entails a perception that gentrification will take place due to the transport project. With this considered, a larger proportion of respondents were worried that the REM could lead to residential displacement (17%) compared to the BRT (8%). Considering that the REM represents larger investments in the areas it will serve, some

respondents anticipated increased taxes and expressed concerns about household displacement. This concern was voiced by multiple respondents, as exemplified in the following comment:

*“I hope the Municipal Governments won’t use this as another push for more exorbitant tax raises as Montréal and my neighbourhood have already reached too high rental prices for normal incomes. I hope the surrounding areas will not become also unliveable for anyone but the large income earners.”*

At the same time, some respondents suggested the need to foster denser, mixed-use developments across the Greater Montréal Area, especially surrounding suburban REM stations as a means of improving housing options. This is shown in this quote, made by a respondent with apparent familiarity with planning concepts and vocabulary:

*“Québec needs to invest in neighborhoods in the suburbs surrounding each station. It would be beneficial if each station were a destination with actual, local, mid-sized commercial zoning (NOT STROADS) instead of just bedroom communities. Spreading out population and creating more “missing middle” would alleviate the cost of housing in [the Montréal region], improve walkability in what are now car-only suburbs, and generate wealth in communities that have REM stations.”*

While these contrasting comments reveal variability in respondents’ perceptions about the anticipated impacts of new transport projects, they show that housing affordability and residential displacement are becoming foremost concerns in the Greater Montréal Area, meriting

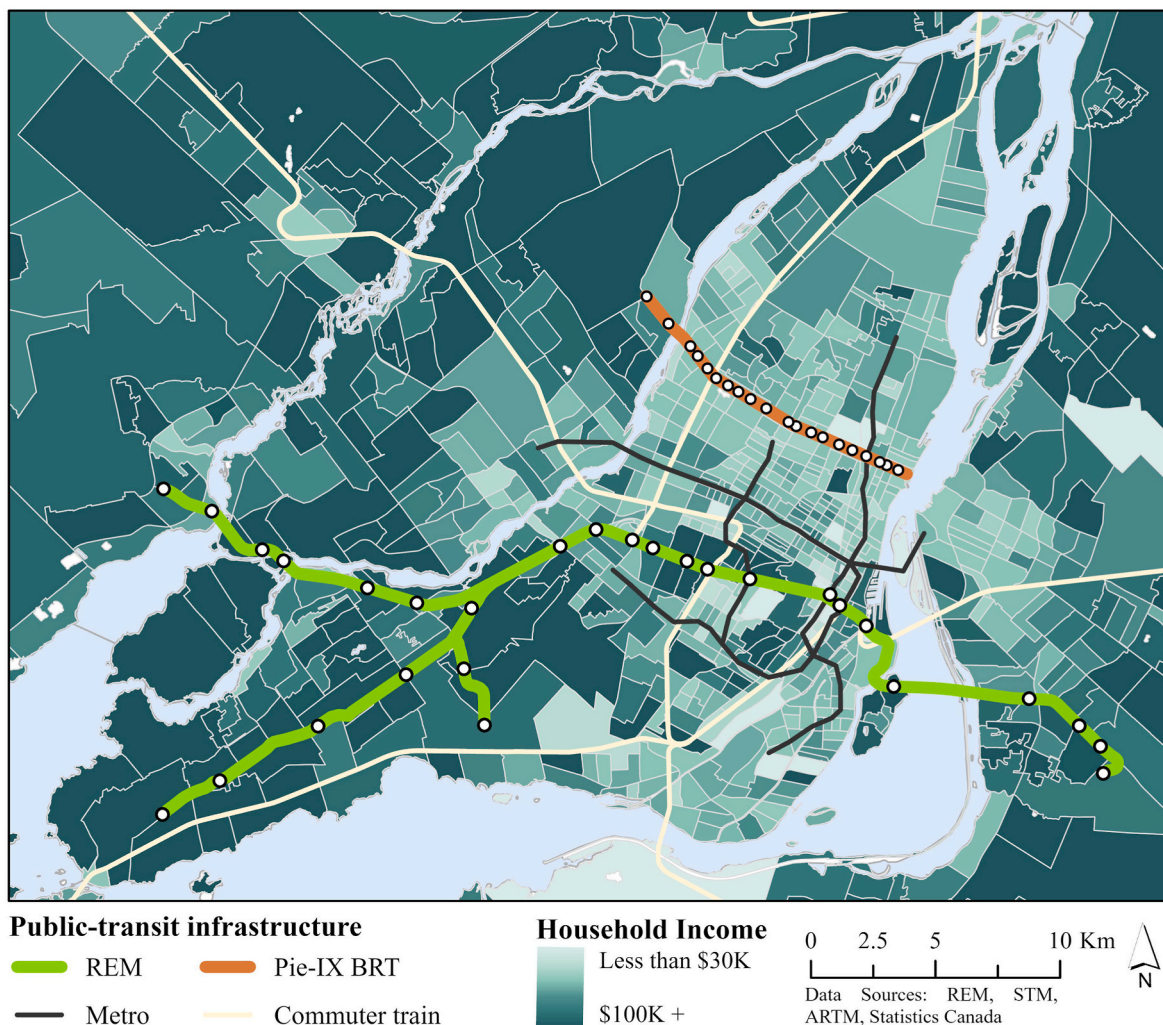


Fig. 4. Geographical location of the REM and Pie-IX BRT in relation to census tract-level median household income patterns in the Greater Montréal area.



careful policy attention when planning for new public-transit infrastructure.

### 5.6. Equity concerns

Aside from the themes covered in the quantitative questions, responses to the open-ended questions highlighted additional considerations through which the projects can be compared, with distributional equity of benefits surfacing as a major concern for both projects. It is important to preface this analysis of equity concerns by a rapid overview of transport equity in Montréal. As shown in Fig. 4, lower income areas are concentrated in the central and northeast portions of Montréal Island, whereas higher income areas are concentrated in the Western part of the Island as well as in the further suburbs. The REM is implemented primarily in the wealthier parts of the region, providing public transit to primarily car users that have the means to pay for the mode of travel of their choice. In relation to this reality, one respondent shared the following sentiment, echoing many others:

*“This only is a project serving the interests of the wealthier communities of the West Island, it is not a project for the metropolis in general.”*

In contrast, the Pie-IX BRT is implemented in the east part of the Montréal Island which has historically been poorer than the rest of the island and has a fairly limited public-transit service. Despite this reality, the project still faced equity-related criticisms. Indeed, some respondents highlighted that the main time savings would be for the users at the end of the line in Laval – which is predominantly suburban – and not in Montréal North or Saint-Michel – two of the most dense and underserved neighborhoods in terms of public transport in Montréal. Some respondents compared the BRT with other public-transit services in Montréal, highlighting that more efficient technologies (e.g., LRT, Metro) seem to be reserved for higher income areas. One respondent, although not reflective of a majority, voiced their concern on the matter:

*“The BRT is an inequitable project for the target populations, it will have a negligible impact on their geographical exclusion and travel times. A metro line would have been the equitable solution but it seems that poorer neighborhoods, more dependent on public-transit, don't have the right to have a metro. The slowness of the project's implementation has already had negative impacts on the local populations, worsening their socio-economic conditions and their accessibility to the rest of the Montréal boroughs.”*

The prevalence of these concerns in the open-ended questions for both the BRT and REM suggest the need for additional attention to address objective and perceived distributional inequities when planning new transport infrastructure.

### 5.7. Governance and planning processes

Another theme arising from the applied thematic analysis was that of governance and planning processes. In terms of governance, several respondents mentioned having issues with the lack of consultation and transparency in the planning of the REM. As discussed in section 3.1, the project was developed using a PPP and a more rapid planning process in comparison to typical public-transport projects, such as the BRT. Respondents further mentioned perceived conflicts of interest in the development of the REM, with the perception that the developer might be putting their own financial interests before collective benefits. As related to these processes, several respondents also expressed worries about the potential negative impacts of the REM on the rest of the public-transit network in Montréal. One respondent summarized the issues at play as follow:

*“I think the entire idea was not well planned and am skeptical it will work (sic) stated. Also worried about existing services I now use, given the 'non-*

*compete clause' that the REM has. Overall, I wish the REM did not exist, it may bring more problems than it solves.”*

The non-compete clause, which was detailed in section 3.1, stipulates that the developer cannot incur any competition from other existing public-transport agencies. However, contrary to popular belief, this agreement is valid solely for limited sections of the new LRT system. Nevertheless, concerns related to the integration with existing public-transit services are also compounded by the high royalty per passenger-kilometer that the regional public-transport agency has to pay to the operator. Some respondents voiced their concerns that this would cause increases in overall costs of public transport in the region. The implications of potential service cuts due to the arrival of the REM could have strong implications on users' daily life as exemplified by the following comment:

*“I am very concerned that [sic] the continued availability of service. [...] Will our [commuter train] service be reduced and eventually cut off? No one is able [sic] answer this definitively. The REM stations are not conveniently located for us. Our current [commuter train] station is a 15 min walk to our front door. Hard to beat that. Reduction of our current service will mean that we will be driving 1hr each way to work instead of taking the train.”*

This integration issue with existing services is in stark contrast with the BRT which, while it was criticized for taking long to plan and build, it was simultaneously praised for its harmonious integration with existing public-transport infrastructure:

*“The BRT is a good project, done in accordance with standard practice and harmoniously integrated with existing public-transit services in the region.”*

Overall, a public-transport project's governance and its impacts on wider public-transit services seem to be crucial components influencing social perceptions. Promoting an integrated vision for each project and engaging with residents' concerns through public consultation processes could serve as constructive pathways to promote increased social acceptability.

## 6. Discussion

This paper has examined contrasting public perceptions of LRT and BRT infrastructure, while exploring how the characteristics of these projects intersect with their social acceptability. The size of the project seemed to be linked with engagement with the project itself, with the largest project gathering more polarized opinions on issues such as regional benefits, residential displacement, equity, environmental impacts and urban form. Key findings also included seemingly contradictory criticisms of the rapidity and opacity of PPP approaches as well as the slow progress of public planning methods. Accounting for these dynamics provides a valuable opportunity to move beyond techno-economic approaches that dominate transport research and policy-making (Lowe, 2020; Schwanen et al., 2011). While the quantitative statements yielded overall positive perceptions of the project, the open-ended questions resulted in mainly negative responses, which is coherent with past studies (Marcinowicz et al., 2007; Poncheri et al., 2008). The combination of the positive perceptions from the quantitative data and the mainly negative responses to the open-ended questions provided a nuanced perspective of factors contributing to social acceptability and their relative importance, highlighting the benefits of employing mixed methods when studying public perceptions. This also suggests that planners would benefit greatly from such nuanced approaches, which would provide them with more complete information with which to prepare relevant public-engagement activities and adapt project designs.

Past scholarship has emphasized the potential for socio-cultural research to provide greater insights into the processes through which

sustainable-transport technologies can gain greater social acceptability (Ryghaug et al., 2023). Our study builds upon this literature by stressing the need to consider how the characteristics of public-transit projects, particularly the mode and technologies used, can interact with local contexts. Indeed, while grade-separated transit systems are common across many North American contexts, Montréal residents' concerns about the REM's elevated structure could be indicative of localized cultural perceptions of such infrastructure, in addition to attachments to existing landscapes and architecture. For the BRT, the perceived inadequacy of the technology could partially relate to the lack of other BRTs in the region and current perceptions of the regular bus service, since the project is being perceived primarily as an extension of the current bus system rather than a new, separated service. This is similar to what has been found in past research on factors shaping perceptions of BRTs (Mulley et al., 2014). Public information campaign on new modes of public-transport in a region could potentially help in alleviating some of the skepticism towards their efficiency and adequacy. Nevertheless, it is important to recognize that negative perceptions of the BRT and LRT could also be indicative of an inadequate implementation of the technology in the Montréal context or the inadequacy of the technology or project to adequately serve underserved populations in the region.

Previous studies have demonstrated the importance of adequate public consultation to meet local transport needs (Vassi et al., 2015; Wijaya et al., 2017) and to positively influence perceptions of sustainable transport modes (Clayton et al., 2017; Kormos et al., 2021; Reed et al., 2018). Our study further highlights the need to consider the potential trade-offs between rapid implementation and adequate public-outreach initiatives when planning new public-transit infrastructure. While the BRT was mostly lauded for its public-engagement initiatives, the REM was often criticized for its opaque governance and lack of meaningful public consultation. These findings underscore that while more rapid implementation can be beneficial for generating support for public-transport projects, these priorities should not come at the expense of adequate public consultation. Conversely, our study suggests that slow project planning and construction can exacerbate negative effects of construction on local residents, as evidenced through comments regarding the BRT. Indeed, recent research has highlighted the need for balance between disruptiveness in sustainable transport policy (needed to spur behavioral changes) and implementability (a combination of social acceptability considerations and project-completion goals) (Marsden and Docherty, 2013; Thaller et al., 2021). Our comparison of two public transit project – one planned through a more participatory approach, and one developed using a PPP – underscores the need for additional research to better understand how to balance the need for thorough planning and public-consultation processes with efficient project-implementation objectives to minimize detrimental impacts during construction while maximizing societal benefits.

Our findings suggest the need for improved public-engagement regarding local impacts and equity concerns surrounding transport projects. Indeed, unaccounted externalities of transit projects on local environments and neighbourhoods were a common theme arising from our analysis, from concerns about noise pollution, to issues of increased car traffic and road-safety issues, to the destruction of wetlands and tree canopies. Concerns about housing and rental prices for residents surrounding the REM were notable, highlighting growing issues of housing unaffordability in Montréal. While some unaccounted impacts may be expected during the construction of large-scale transport projects, the heightened concerns over such externalities across our dataset underscores the importance of both meaningful public outreach and appropriate land-use policies to minimize and mitigate detrimental impacts. Residents' concerns about potential household and neighbourhood displacements surrounding transit nodes foreground the necessity of strengthening affordable housing policies in the movement for equitable urban transitions, especially in areas targeted for major public investments (Bélanger and Goyer, 2022; Chapple et al., 2022; Zuk et al.,

2018). When considering the scale of the REM as a multi-billion investment and the socio-economic inequities observed when comparing the two projects, the current prioritization of higher-income areas for new LRT infrastructure further points to the need for comprehensive efforts to address distributional inequities when planning new transport infrastructure. Such concerns are likely to be applicable in many other urban contexts, particularly in North America, where the public-transit investments have been tailored more towards wealthier suburban residents.

Linking to this notion of spatial inequities, issues of suburban opposition to sustainable-transport projects were also observed through our analysis. Indeed, many suburban respondents dismissed the possibility of using active or public-transport services to access the REM, insisting instead on the development of additional car-parking facilities around stations. This resistance to sustainable-transport changes — what some researchers refer to as suburban inertia (Filion, 2015) — points to the deep entrenchment of automobility in contexts of dispersed suburbanism. While some residents will continue to request increased parking-space availability to facilitate access to light-rail stations, the literature linking land-use and transport planning has demonstrated that significant land-use changes, and a reduction in car-parking spaces, are necessary to achieve a significant modal shift away from automobility (Batty et al., 2015; Jacobson and Forsyth, 2008; Levinson, 2019). The observed reluctance of many respondents to changes in their neighborhoods following the development of the REM point to the need to further interrogate the power dynamics that continue to enable car-centric attitudes and development patterns to remain stable over time (Geels, 2014; Ryghaug et al., 2023; Sheller and Urry, 2000). In particular, our findings raise questions on the extent to which LRT infrastructure, which effectively prioritizes expanding transport options for suburban commuters, will be capable of spurring an immediate shift away from car dependency. While these issues merit additional research and analysis, better communication and public outreach strategies could be devised to address misconceptions and ease resistance to new sustainable-transport projects.

Indeed, our quantitative results illustrate respondents' predominantly positive perceptions related to the regional and environmental benefits of both projects, even in cases where respondents did not foresee direct project benefits for their local neighbourhoods. Our qualitative analysis provides further nuance to these findings, revealing the value that many residents ascribe to increased regional accessibility via public transit and the possibility of future project expansions. Residents' considerable concerns about governance and planning processes, potential issues of pollution and traffic safety, reduced tree canopies and greenspace, aesthetics, distributional inequities, and rising housing costs could present significant stumbling blocks for sustainable-transport projects in gaining social legitimacy, calling for additional research and policy attention. At the same time, some respondents' perspectives on transport and land-use connections, particularly as related to housing availability around suburban LRT stations, offer important insights into the potential to use public-transport investments as a leverage to transform sprawling cities into more dense, diverse, and liveable environments. The potential for these changes to be implemented successfully and to gain wide-reaching social acceptability may very well be tied to their connection to adequate land-use and affordable-housing policies as well as their ability to help address, rather than worsen, existing housing and transport inequities. Above all, our findings demonstrate that when assessing new public transport projects and their ability to incite change, public opinions matter.

## 7. Conclusion

This paper has provided a comparative analysis of perceptions of two sustainable-transport projects, while presenting a few pathways through which project characteristics can influence their social acceptability. Our findings point to the importance of understanding situated social

and cultural factors when analyzing public opinions of transport infrastructure. While prolonged construction timelines, opaque governance, distributional inequities, as well as issues of car-centrism and suburban inertia can exacerbate negative perceptions of new infrastructure projects, our findings indicate that efficient project implementation, increased regional accessibility, well-defined environmental benefits, and public-consultation processes throughout can all contribute to positive public opinions.

Informed by our findings, we propose three key policies to foster positive support for new public-transit infrastructure. First, public engagement activities should be conducted throughout the planning process for all public-transit projects. Continual public involvement in the planning process could help shift project design towards more equitable and environmentally sound alternatives. It could also help inform preventive policies to limit potential residential displacement, mitigate construction impacts, and inform the public about the key characteristics of different alternatives. Secondly, such public involvement should not be done at the expense of efficient project delivery and vice-versa. Having an ongoing public engagement process for new infrastructure projects could allow for a more rapid planning process without overlooking the key information obtainable from the public's lived experience. Lastly, transparent public governance is crucial to foster public support and ensure sustainable growth of public-transit systems. Of course, given that this paper focused on factors influencing public perceptions of new public-transit infrastructure and not the effectiveness of potential policies on public perceptions, future research would be needed to provide guidance on the latter.

There are some limitations to the conclusions reached in this study that should be mentioned. First, despite having a large sample, the survey respondents tended to skew towards a wealthier, older, white-male demographic, which is not representative of the Montréal population. This sample can be partly explained by the fact that the REM – which was the primary project of focus of the MMS – will serve primarily wealthier and suburban areas (Daley et al., 2022). In light of these discrepancies, we have attempted to provide equal attention to comments from respondents from underserved areas of the city, whose concerns were still prevalent in the open-ended responses. That said, intentional sampling of underserved groups in future iteration of such research could help in recalibrating the importance of different factors in shaping public perceptions. Additionally, as the data used in this study were collected during the construction of both projects, future comparative research would be needed to evaluate the changes in perceptions between the construction and operational phases of new transport projects. We hope that additional qualitative, mixed-methods, and socially engaged research can help to move beyond techno-economic approaches that dominate transport research and policymaking and provide more nuanced understanding of urban and transport issues. We suggest that providing a deeper socio-cultural understanding of public opinions offers important insights for tapping into the conditions through which new transport technologies can gain greater social legitimacy and contribute to sustainable urban transitions.

#### CRediT authorship contribution statement

**Lancelot Rodrigue:** Conceptualization, Data curation, Formal analysis, Methodology, Visualization, Writing – original draft, Writing – review & editing. **Aryana Soliz:** Conceptualization, Investigation, Methodology, Writing – original draft, Writing – review & editing. **Kevin Manaugh:** Conceptualization, Data curation, Formal analysis, Methodology, Writing – original draft, Writing – review & editing, Supervision. **Yan Kestens:** Conceptualization, Formal analysis, Funding acquisition, Supervision, Writing – original draft. **Ahmed El-Geneidy:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Methodology, Project administration, Supervision, Writing – original draft, Writing – review & editing.

#### Data availability

Data will be made available on request.

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#### References

- Agence Régionale de Transport Métropolitain, 2021. Plan Stratégique de Développement du Transport Collectif 2021-2035.
- Auger, M., 2020. REM de l'Est : double emploi et cicatrice. Radio Canada. <https://ici.radio-canada.ca/nouvelle/1758049/rem-est-nord-ligne-verte-train-srb-cdpq-artm>.
- Banister, D., Pucher, J., Lee-Gosselin, M., Lee, M., 2007. Making sustainable transport politically and publicly acceptable: lessons from the EU, USA and Canada. *Institutions and sustainable transport: Regulatory reform in advanced economies* 17–50.
- BAPE, 2016. *Projet de réseau électrique métropolitain de transport collectif - Rapport d'enquête et d'audience publique*.
- Batty, P., Palacin, R., González-Gil, A., 2015. Challenges and opportunities in developing urban modal shift. *Travel Behaviour and Society* 2 (2), 109–123. <https://doi.org/10.1016/j.tbs.2014.12.001>.
- Bélanger, H., Goyer, R., 2022. Housing policies and Montreal's neighbourhoods: social mix or social exclusion? *Can. J. Urban Res.* 31 (1), 67–82.
- Bergeron, M., Dubuc, A., Ouellette-Vézina, H., 2022. Le REM de la Rive-Sud encore retardé. *La Presse*. <https://www.lapresse.ca/actualites/grand-montreal/2022-10-20/le-rem-de-la-rive-sud-encore-retarde.php>.
- Börjesson, M., Eliasson, J., Hugosson, M.B., Brundell-Freij, K., 2012. The Stockholm congestion charges-5 years on. Effects, acceptability and lessons learnt. *Transport Pol.* 20, 1–12. <https://doi.org/10.1016/j.tranpol.2011.11.001> [Article].
- Braun, V., Clarke, V., 2006. Using thematic analysis in psychology. *Qual. Res. Psychol.* 3 (2), 77–101.
- Cairns, S., Harmer, C., Hopkin, J., Skippon, S., 2014. Sociological perspectives on travel and mobilities: a review. *Transport. Res. Pol. Pract.* 63, 107–117.
- Calvo-Poyo, F., Medialdea, A., Ferri-García, R., 2020. Citizens' opinion about investment in public transport projects in cities. *International Journal of Sustainable Transportation* 14 (10), 806–818.
- Carvalho dos Reis Silveira, T., Romano, C.A., Gadda, T.M.C., 2020. Public transport usage among university students: what to expect based on customer satisfaction survey (CSS) analysis. *Transport* 28 (3), 32–45.
- CDPQ Infra, 2022. The REM. <https://rem.info/en/reseau-express-metropolitain>.
- Chapple, K., Loukaitou-Sideris, A., Miller, A., Zeger, C., 2022. The role of local housing policies in preventing displacement: a literature review. *J. Plann. Lit.*, 08854122221137859 <https://doi.org/10.1177/08854122221137859>.
- Clayton, W., Jain, J., Parkhurst, G., 2017. An ideal journey: making bus travel desirable. *Mobilities* 12 (5), 706–725.
- Corriveau, J., 2014. Pie-IX Toujours Sans SRB Dix Ans Après L'annonce. June 4th, 2014. <https://www.ledevoir.com/politique/montreal/410029/montreal-pie-ix-toujours-sans-srb-dix-ans-apres-l-annonce>.
- Corriveau, J., 2016. Un train électrique de 5,5 milliards. *Le Devoir*. <https://www.ledevoir.com/politique/montreal/468947/transport-collectif-dans-la-region-de-montreal-projet-de-5-5-milliards>.
- Corriveau, J., 2018. Le début de la fin de la saga du SRB Pie-IX. *Le Devoir*. September 12, 2018. <https://www.ledevoir.com/politique/montreal/536532/contrat-pour-la-construction-du-srb>.
- Creswell, J., 2018. *Qualitative, Quantitative and Mixed Methods Approaches*. Sage.
- CTV Montréal, 2009. Reserved Bus Lane Coming to Pie-IX Boulevard. <https://montreal.ctvnews.ca/reserved-bus-lane-coming-to-pie-ix-boulevard-1.465442>.
- Cutcliffe, J., McKenna, H., 1999. Establishing the credibility of qualitative research findings: the plot thickens. *J. Adv. Nurs.* 30 (2), 374–380.
- Daley, J., Rodrigue, L., Ravensbergen, L., DeWeese, J., Butler, G., Kestens, Y., El-Geneidy, A., 2022. Foot-based microscale audit of light rail network in Montreal Canada. *J. Transport Health* 24, 101317.
- De Luca, S., 2014. Public engagement in strategic transportation planning: an analytic hierarchy process based approach. *Transport Pol.* 33, 110–124.
- De Vos, J., Waygood, O., Letarte, L., 2020. Modeling the desire for using public transport. *Travel Behaviour and Society* 19, 90–98.
- Dillman, D., Smyth, J., Christian, L., 2014. *Internet, Phone, Mail, and Mixed-Mode Surveys: The Tailored Design Method*. John Wiley & Sons.
- Dunckel-Graglia, A., 2013. Women-only transportation: how "Pink" public transportation changes public perception of women's mobility [Article]. *Journal of public transportation* 16 (2), 85–105. <https://doi.org/10.5038/2375-0901.16.2.5>.

- El-Diraby, T., Shalaby, A., Hosseini, M., 2019. Linking social, semantic and sentiment analyses to support modeling transit customers' satisfaction: towards formal study of opinion dynamics. *Sustain. Cities Soc.* 49, 101578.
- Emery, S., Mulder, H., Frewer, L., 2015. Maximizing the policy impacts of public engagement: a European study. *Sci. Technol. Hum. Val.* 40 (3), 421–444.
- Ferraris, F., 2016a. Le difficile équilibre entre public et privé. *Le Devoir*. <https://www.ledevoir.com/societe/transport-urbanisme/484052/transport-collectif-le-difficile-equilibre-du-public-et-du-privé>.
- Ferraris, F., 2016b. Structurant, le Réseau électrique métropolitain? *Le Devoir*. <https://www.ledevoir.com/societe/transport-urbanisme/481373/structurant-le-reseau-electrique-metropolitain>.
- Ferraris, F., 2018. Trop peu, trop tard pour les bus rapides sur Pie-IX? *Le Devoir*. <https://www.ledevoir.com/societe/transport-urbanisme/530015/srb-pie-ix-trop-peu-trop-tard-disent-les-experts>.
- Filion, P., 2015. Suburban inertia: the entrenchment of dispersed suburbanism. *Int. J. Urban Reg. Res.* 39 (3), 633–640.
- Gaunt, M., Rye, T., Allen, S., 2007. Public acceptability of road user charging: the case of Edinburgh and the 2005 referendum. *Transport Rev.* 27 (1), 85–102. <https://doi.org/10.1080/01441640600831299> [Article].
- Geels, F., 2014. Regime resistance against low-carbon transitions: introducing politics and power into the multi-level perspective. *Theor. Cult. Soc.* 31 (5), 21–40.
- Golbabaei, F., Yigitcanlar, T., Paz, A., Bunker, J., 2020. Individual predictors of autonomous vehicle public acceptance and intention to use: a systematic review of the literature. *Journal of Open Innovation: Technology, Market, and Complexity* 6 (4), 1–27. <https://doi.org/10.3390/joitmc6040106> [Review], Article 106.
- Grisolia, J., López, F., Ortíz, J., 2015. Increasing the acceptability of a congestion charging scheme. *Transport Pol.* 39, 37–47. <https://doi.org/10.1016/j.trapol.2015.01.003> [Article].
- Guest, G., MacQueen, K.M., Namey, E.E., 2011. *Applied Thematic Analysis*. sage publications.
- Hannah, D., Lautsch, B., 2011. Counting in qualitative research: why to conduct it, when to avoid it, and when to closet it. *J. Manag. Inq.* 20 (1), 14–22.
- Hensher, D., 2016. Why is light rail starting to dominate bus rapid transit yet again? *Transport Rev.* 36 (3), 289–292. <https://doi.org/10.1080/01441647.2016.1155851>.
- Hensher, D., Mulley, C., Rose, J., 2015. Understanding the relationship between voting preferences for public transport and perceptions and preferences for bus rapid transit versus light rail. *J. Transport Econ. Pol.* 49 (2), 236–260.
- Hilgartner, K., Granig, P., 2020. Public perception of autonomous vehicles: a qualitative study based on interviews after riding an autonomous shuttle. *Transport. Res. F Traffic Psychol. Behav.* 72, 226–243.
- Hulse, L.M., Xie, H., Galea, E.R., 2018. Perceptions of autonomous vehicles: relationships with road users, risk, gender and age. *Saf. Sci.* 102, 1–13. <https://doi.org/10.1016/j.ssci.2017.10.001> [Article].
- Ignaccolo, M., Inturri, G., Giuffrida, N., Pira, M.L., Torrisi, V., 2019. Public Engagement for Designing New Transport Services: Investigating Citizen Preferences from a Multiple Criteria Perspective.
- Jacobson, J., Forsyth, A., 2008. Seven American TODs: good practices for urban design in transit-oriented development projects. *Journal of Transport and Land Use* 1 (2), 51–88.
- Kassens-Noor, E., Kotval-Karamchandani, Z., Cai, M., 2020. Willingness to ride and perceptions of autonomous public transit. *Transport. Res. Pol. Pract.* 138, 92–104.
- King, N., 2004. 21—Using templates in the thematic analysis of text—. *Essential guide to qualitative methods in organizational research* 256.
- Korman, C., Sussman, R., Rosenberg, B., 2021. How cities can apply behavioral science to promote public transportation use. *Behavioral Science & Policy* 7 (1), 95–115.
- Lacerte-Gauthier, 2022. 13 ans et 520 millions \$ plus tard, le service rapide par bus Pie-IX inauguré. November 3rd, 2022. <https://www.journaldemontreal.com/2022/11/03/13-ans-et-520-millions-plus-tard-le-service-rapide-par-bus-pie-ix-inaugure#:~:text=Le/20projet/20de/20SRB/20Pie,les/20travaux/20se/20sont/20amorc/C3/A9s>.
- Laplante, C., 2021. Manifestation contre le REM de l'Est. *La Presse*. <https://www.lapresse.ca/actualites/grand-montreal/2021-11-20/manifestation-contre-le-rem-de-l-est.php>.
- Lévesque, K., 2019. REM: des villes «bousculées». *La Presse*. <https://www.lapresse.ca/actualites/grand-montreal/201903/25/01-5219581-rem-des-villes-bousculees.php>.
- Levinson, D., 2019. The 30-minute City: Designing for Access. *Network Design Lab*.
- Lincoln, Y.S., Guba, E.G., 1985. *Naturalistic Inquiry*. sage.
- Lowe, K., 2020. Undone science, funding, and positionality in transportation research. *Transport Rev.* 1–18.
- Magder, J., 2021. REM to Cost at Least \$350 Million More than Expected. *Montreal Gazette*. <https://montrealgazette.com/news/local-news/rem-to-cost-at-least-350-million-more-than-expected#:~:text=The/20revised/20price/20tag/20now/20coco mes/20to/20246.9/20billion>.
- Marceau, J., Rocha, R., 2017. Le REM fera-t-il perdre ou gagner du temps sur la Rive-Sud? *Radio Canada*. <https://ici.radio-canada.ca/nouvelles/special/2016/8/trace-train-rem-slr-rive-sud-economie-temps/index.html>.
- Marcinowicz, L., Chlabicz, S., Grębowski, R., 2007. Open-ended questions in surveys of patients' satisfaction with family doctors. *J. Health Serv. Res. Policy* 12 (2), 86–89.
- Marsden, G., Docherty, I., 2013. Insights on disruptions as opportunities for transport policy change. *Transport. Res. Pol. Pract.* 51, 46–55.
- Messier, F., 2016. Le REM mieux connecté au métro de Montréal grâce à trois nouvelles stations. *Radio-Canada*. <https://ici.radio-canada.ca/nouvelle/1002189/le-rem-mieux-connecte-au-metro-de-montreal-grace-a-trois-nouvelles-stations>.
- Mulley, C., Hensher, D., Rose, J., 2014. Do preferences for BRT and LRT vary across geographical jurisdictions? A comparative assessment of six Australian capital cities. *Case Studies on Transport Policy* 2 (1), 1–9. <https://doi.org/10.1016/j.cstp.2013.11.001>.
- Nikitas, A., Avineri, E., Parkhurst, G., 2018. Understanding the public acceptability of road pricing and the roles of older age, social norms, pro-social values and trust for urban policy-making: the case of Bristol [Article]. *Cities* 79, 78–91. <https://doi.org/10.1016/j.cities.2018.02.024>.
- Nowell, L., Norris, J., White, D., Moules, N., 2017. Thematic analysis: striving to meet the trustworthiness criteria. *Int. J. Qual. Methods* 16 (1), 1609406917733847.
- Orfali, P., 2018. Le REM, à vendre après cinq ans? *La Presse*. <https://www.journaldemontreal.com/2018/04/23/le-rem-pourrait-etre-vendu-apres-5-ans>.
- Osorio-Arjona, J., Horak, J., Svoboda, R., García-Ruiz, Y., 2021. Social media semantic perceptions on Madrid Metro system: using Twitter data to link complaints to space. *Sustain. Cities Soc.* 64, 102530.
- Penmetsa, P., Adanu, E.K., Wood, D., Wang, T., Jones, S.L., 2019. Perceptions and expectations of autonomous vehicles – a snapshot of vulnerable road user opinion. *Technol. Forecast. Soc. Change* 143, 9–13. <https://doi.org/10.1016/j.techfore.2019.02.010> [Article].
- Pigeon, C., Alauzet, A., Paire-Ficout, L., 2021. Factors of acceptability, acceptance and usage for non-rail autonomous public transport vehicles: a systematic literature review. *Transport. Res. F Traffic Psychol. Behav.* 81, 251–270.
- Poncheri, R., Lindberg, J., Thompson, L., Surface, E., 2008. A comment on employee surveys: negativity bias in open-ended responses. *Organ. Res. Methods* 11 (3), 614–630.
- Reed, M., Vella, S., Challies, E., De Vente, J., Frewer, L., Hohenwallner-Ries, D., Huber, T., Neumann, R., Oughton, E., Sidoli del Ceno, J., 2018. A theory of participation: what makes stakeholder and public engagement in environmental management work? *Restor. Ecol.* 26, S7–S17.
- Réseau de Transport Métropolitain, 2017. *Rapport Annuel 2017*.
- Rodrigue, L., Soliz, A., Manaugh, K., El-Geneidy, A., 2023. Situating divergent perceptions of a rapid-cycling network in Montréal, Canada. *Active Travel Studies* 3 (2). <https://doi.org/10.16997/ats.1355>.
- Ryghaug, M., Subotički, I., Smeds, E., von Wirth, T., Scherrer, A., Foulds, C., Robison, R., Bertolini, L., Beyazit Ince, E., Brand, R., 2023. A Social Sciences and Humanities research agenda for transport and mobility in Europe: key themes and 100 research questions. *Transport Rev.* 1–25.
- Schade, J., Schlag, B., 2003. Acceptability of urban transport pricing strategies [Article]. *Transport. Res. F Traffic Psychol. Behav.* 6 (1), 45–61. [https://doi.org/10.1016/S1369-8478\(02\)00046-3](https://doi.org/10.1016/S1369-8478(02)00046-3).
- Schwanen, T., Banister, D., Anable, J., 2011. Scientific research about climate change mitigation in transport: a critical review. *Transport. Res. Pol. Pract.* 45 (10), 993–1006.
- Sheller, M., 2007. Bodies, cyberscars and the mundane incorporation of automated mobilities. *Soc. Cult. Geogr.* 8 (2), 175–197.
- Sheller, M., Urry, J., 2000. The city and the car. *Int. J. Urban Reg. Res.* 24 (4), 737–757.
- Statistics Canada, 2021. *Canadian Census 2021*.
- Thaller, A., Posch, A., Dugan, A., Steininger, K., 2021. How to design policy packages for sustainable transport: balancing disruptiveness and implementability. *Transport. Res. Transport Environ.* 91, 102714.
- TVA Nouvelles, 2002. Encore un décès sur la voie réservée du boulevard Pie-IX. <https://www.tvanouvelles.ca/2002/06/13/encore-un-deces-sur-la-voie-reservee-du-boulevard-pie-ix>.
- Vassi, A., Vlastoy, F., Athanasopoulos, K., Vlastos, T., 2015. Public perception of sustainable mobility in times of austerity—the case of Piraeus. In: *Book of Abstracts of the International Conference on Changing Cities II, Ville de Montréal*. (2008). *Plan de Transport*.
- Walker, I., Tapp, A., Davis, A., 2023. Motornormativity: how social norms hide a major public health hazard. *Int. J. Environ. Health.*
- Wijaya, S., Imran, M., McNeill, J., 2017. Multi-level policy tensions in Bus Rapid Transit (BRT) development in low-income Asian cities. *Transport. Res. Procedia* 25, 5104–5120.
- Williams, H.T.P., McMurray, J.R., Kurz, T., Hugo Lambert, F., 2015. Network analysis reveals open forums and echo chambers in social media discussions of climate change. *Global Environ. Change* 32, 126–138. <https://doi.org/10.1016/j.gloenvcha.2015.03.006>.
- Xenias, D., Whitmarsh, L., 2013. Dimensions and determinants of expert and public attitudes to sustainable transport policies and technologies. *Transport. Res. Pol. Pract.* 48, 75–85.
- Zuk, M., Bierbaum, A.H., Chapple, K., Gorska, K., Loukaitou-Sideris, A., 2018. Gentrification, displacement, and the role of public investment. *J. Plann. Lit.* 33 (1), 31–44. <https://doi.org/10.1177/0885412217716439>.