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## Are big city urban planners preparing for autonomous vehicles?

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### *Abstract*

Given that our urban centres have been dominated by the private car for a hundred years, this paper asks what is next for Canadian cities. Previous research on the future of urban mobility, and specifically city planning and autonomous vehicles, has been from an American or Australian context. Working from a uniquely Canadian perspective, this paper fills a gap in the research by analyzing data from twenty-six semi-structured interviews with Canadian planning professionals from Vancouver, Edmonton, Calgary, Winnipeg and Toronto. The interviews discuss how Canadian planners are preparing for new technologies, including autonomous vehicles, and increased privatization. We recommend that large cities move forward with autonomous vehicle research with a goal of improving mobility for all, while ensuring a strong agreement framework with all for-profit mobility providers is in place that requires robust data sharing agreements and appropriate consultation with municipalities before, during, and after launching. Further, planners should further embrace the political realities of their positions and advocate for equitable mobility for all residents both in their day-to-day work and in public engagement settings.

Keywords: mobility, autonomous vehicles, city planning, advocacy, Canada

### *Résumé*

Vu que nos centres urbains sont dominés depuis une centaine d'années par la voiture privée, le présent article s'interroge sur ce qui s'ensuit pour les villes canadiennes. Jusqu'à date, la recherche sur le futur de la mobilité urbaine et, plus particulièrement, sur l'urbanisme et les véhicules autonomes, s'est effectuée dans un contexte américain ou australien. Le présent article vise à remédier à cette lacune d'une perspective uniquement canadienne en analysant les données ressorties de vingt-six entrevues semi-structurées avec des professionnels canadiens de l'urbanisme de Vancouver, d'Edmonton, de Calgary, de Winnipeg et de Toronto. Les entrevues cherchent à savoir comment leur planification tient compte des nouvelles technologies, dont les véhicules autonomes, et de la privatisation grandissante. Nous recommandons que les grandes villes entament des recherches sur les véhicules autonomes, dans l'op-

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tique d'une amélioration de la mobilité pour tous, en assurant en même temps qu'une forte structure d'accord avec tous les fournisseurs de mobilité à but lucratif soit en place qui nécessite des accords robustes de partage de données et une consultation appropriée avec les municipalités avant, durant et après le lancement. En plus, les planificateurs devraient saisir pleinement les réalités politiques de leurs positions et promouvoir une mobilité équitable dans leur travail quotidien et à travers leur engagement publique pour tous les citoyens.

Mots-clés : mobilité, véhicules autonomes, urbanisme, planification urbaine, plaidoyer, Canada

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## Introduction

In 1903, the President of Michigan Savings Bank warned his client against an investment in Henry Ford's newly-formed motor company, saying, "The horse is here to stay but the automobile is only a novelty—a fad" (City of Huntington Woods 2006, 4). Of course, we now know that this prediction was woefully wrong; in reality, the initial \$5,000 investment for one hundred shares came to be worth \$12.5 million—the equivalent of more than \$350 million today.

While it might be easy in retrospect to identify examples of erroneous technology predictions, uncertain forecasts are a necessity when preparing for the future. Indeed, for many professions, these types of predictions are a critical part of their day-to-day role. Urban planners, for example, are continually asked to look 20 to 50 years into the future and predict how the built environment should change, planning for a future that could require billions of dollars in infrastructure investment and would require the trust of perhaps millions of urban inhabitants. This paper reports on 26 in-depth semi-structured interviews with planner professionals in five large Canadian cities—Vancouver, Edmonton, Calgary, Winnipeg, and Toronto—who are preparing (or perhaps not) for new transportation technologies and dealing with increased privatization in transportation, all the while navigating the numerous political nuances inherent to their profession.

## Urban planning in modern times

Urban planning, in its modern context, started as a response to the chaos of the industrial age (Levy 2017). In response to increasing pollution and resultant health concerns, early urban planners aimed to improve the livability of cities by introducing proper sanitation, alleviating congestion, and remediating the challenges of poorly-constructed buildings. There have been shifts in foci in the planning profession since then, but the goal of providing healthier and safer urban environments has remained constant.

Today, the work that city planners do is multifaceted and interdisciplinary. They provide a foundation for land development, community growth, mobility options, and business activity. Through this technical-political process, planners create long-term visions and policies that translate the priorities of residents and municipal leaders into tools to shape communities. These priorities often have nuanced differences depending on a city's physical geography, specific climate, economic realities, and the vision of political leadership at any given time. There are, however, some priorities that cross all municipal boundaries. One of these is that planners must continually respond to new transportation technologies.

In the last few years, private industry has taken up the slack left by underfunded and neglected public transit providers. Companies offering ride-and car-share services (e.g. Uber, Lyft, Communauto) have emerged to fill the gaps between private vehicle ownership and public transit provision. While these companies pitch their products as a revolutionary solution to what ails modern cities, they often fail to solve the traffic, affordability, and accessibility problems tied to urban transportation and sometimes even make them worse by increasing congestion (Fehr & Peers 2018). Nonetheless, some of the world's biggest companies continue to pour billions into transformative transportation technologies and the associated marketing of these technologies to cities hoping to improve mobility access, enhance transportation efficiency, and stay within even tightening municipal budgets. Many new technologies have entered the market in the last ten years, from small scale application-based services to physical additions to micro-mobility like e-scooters. However, the 'brass ring' many private companies are reaching for is a fully autonomous car.

Although it may seem like a recent idea, the concept of a car that could drive itself was first introduced to the public at the New York World's Fair in 1939 (Patton 2014). In the Futurama exhibit designed by Norman Bel Geddes and funded by General Motors (GM), the public saw autonomous electric cars powered by circuits embedded in the road and controlled by radio waves—a vision that GM hoped would be reality within twenty years. Eighty years later, the hype surrounding the autonomous vehicle (AV) as a technology that will change transportation forever has yet to die down.

In recent years, newspapers, magazines, and technology blogs have churned out near-daily articles promoting driverless technology as a saviour of our cities. We are told that AVs will solve congestion (Brown 2018), save lives (Marshall 2017) and create more space for pedestrians (Budds 2017). Headlines like “Autonomous vehicles are just around the corner” (Economist 2018) and “Autonomous driving is here, and it's going to change everything” (Hyatt 2017) would have us believe we will be able to ditch our private cars for a fleet of driverless taxis any day now. Billions have already been invested into the AV market, an amount estimated to increase to over \$724 billion by 2027 (Emergen Research 2020). Huge companies are trying to position themselves as the leader of this driverless revolution. Despite these optimistic predictions, however, AVs are yet to make their grand arrival.

More recently, the media have taken a drastically different tone, constructing a new narrative which pumps the brakes on the imminent arrival of AVs. For example, the New York Times recently declared, “Despite high hopes, self-driving cars are “way in the future” (Boudette 2019), and Forbes has asked, “Why the rush? Self-driving cars still have a long way to go before safe integration” (Lyon 2019). Concurrently, the industry itself is beginning to realize it may have been overambitious. For example, a board member at BMW was quoted as saying, “Everyone in the industry is becoming more and more nervous that they will waste billions of dollars.” (Somerville 2018). Similarly, just three years after claiming driverless cars would arrive by 2021, Ford CEO Jim Hackett admitted that the company “overestimated the arrival of autonomous vehicles” (Reader 2019). Clearly, the road to full automation has many speed bumps, but this has not stopped AVs appearing on the agenda at municipal council meetings in Canada's major cities. The media and industry hype seems to have cooled down, but are Canada's municipal planners still as enthusiastic about driverless cars?

## Literature Review

As automotive manufacturers and technology companies continue to push towards fully autonomous vehicles, planners must attempt to predict the positive and negative effects of AVs to decide what role they should play in our cities (Litman 2019). In terms of positive consequences, improved traffic safety is one area with some potential (Glaser et al. 2010; Kalra and Groves 2017; Zhang and Gao 2020). Additionally, it is feasible that AVs will increase vehicle-sharing and thereby hasten the end of private vehicle ownership, thus cutting down on greenhouse gas (GHG) emissions (Firnborn and Müller 2015; The Economist 2018; Sheppard et al. 2021). A reclamation of parking and road space could also occur, if all goes according to plan (Burns 2013; Zhang et al. 2015; Zhang and Wang 2020), leaving more space for parks and pedestrians. Additionally, AVs may be useful in solving what transit planners call the first and last mile problem (Moorthy et al. 2017; Gurumurthy 2020), the term used for the difficult-to-service areas for public transit between a transit user's home and public transit (first mile), and between public transit and their final destination (last mile).

It is also possible that the introduction of AVs could have a positive impact on traffic congestion. On one hand, some hope that because AVs will communicate with one another, they will travel in closer proximity. This will, in turn, reduce congestion and carbon dioxide (CO<sub>2</sub>) emissions by increasing vehicle throughput and smoothing traffic flows (Stern et al. 2018; Bhatia 2020). In contrast, others have argued that because AVs could allow for an ease of use that public transit may not be able to match, more people will opt for AVs for their entire journey, increasing congestion overall (Fagnant and Kockelman 2015; Naumov 2020). Congestion might also increase for other unanticipated reasons (Chase 2014). Indeed, one study that used chauffeured cars to mimic AVs found an 83% increase in vehicle miles over the course of the study, as the cars were being used to pick up packages, were sent home instead of paying for parking, and were instructed to circle the block to avoid a parking ticket (Harb et al. 2018).

Concerns about increased congestion and a lack of sustainability are not the only potential problems. Providing further incentive for urban sprawl is another issue raised in the critical literature (Ewing et al. 2003; Hall 2012; Bridgelall and Stubbing 2021). AVs shifting investment and ridership away from public transit systems is also a possibility (Lam et al. 2016; Levinson et al. 2016; Naumov et al. 2020). They could also reduce mobility for pedestrians

and cyclists by further prioritizing the movement of the automobile above all else (Meeder et al. 2017; Borenstein et al. 2020). Finally, a reliance by governments on parking fees, speeding fines, vehicle registration, and fuel taxes could leave municipal coffers empty if AVs render those funding mechanisms obsolete (Freemark et al. 2019). All of these concerns suggest that AVs could bring more of the same—entrenching our cities’ dependence on the automobile. As Legacy et al. (2019) point out, public and private entities are shaping the networks that will influence the potential impacts of AVs.

While the potential impact of AVs on cities has emerged as a popular topic of research in recent years, only a few researchers have asked whether and how planning professionals themselves are working towards integrating AVs into their forecasts. A survey of planning professionals from 120 U.S. cities revealed that very few local governments had begun preparing for AVs, but cities with larger populations and transportation budgets were more likely to be prepared (Freemark et al. 2019). Semi-structured interviews conducted in both the U.S. (Guerra 2016; Guerra and Morris 2018) and Australia (Legacy et al. 2019) showed many public-sector planners reporting that they are in a ‘holding pattern’ caused by the uncertainty of what AVs might mean for cities. Until more information is available about how AVs will function, policies promoting them as an alternative to the private car are difficult to prepare. Hence, most city planners are holding back on policy initiatives that could have any real impact—collectively adopting an attitude of “watch and wait” (Legacy et al. 2019). At present, there is no Canadian research asking whether planning professionals are working to integrate AVs into their city building efforts.

The reality of municipal decision-making is that politics and planning go hand in hand. Typically, in Canadian cities, planning policies need to be approved by the City Council. Thus planners are, to a certain extent, answerable to the elected officials who govern our cities. Planning policy proposals must take into account the likely votes of all members of council. Further, many of the overarching transportation policies are often set by provincial leaders, adding another level of political complexity. In addition, private vendors actively market their products and visions of the future to city planners and politicians in hopes of influencing future mobility trends. Planners must also take into account an increasing amount of public engagement and internal, or informal, politics that affect their positions. All of these factors combine to make the job of a planner much more than just a technical occupation.

The overlapping of planning and politics is an emergent phenomenon. Twenty years ago, Campbell and Marshall (1999) wrote about how planning had frequently been criticized for its political ignorance, and for “relying too much on technical analysis and paying too little attention on value differences in the planning process” (Karki 2017, 189). Others proposed that planners needed to become more skilled in politics to combat political pressures that could derail good intentions and result in marginalized citizens’ concerns being pushed to the sidelines (Flyvberg 1998; Krumboltz 2001). More recently, Grange (2013) has written extensively on the topic, recognizing that there is a need for planners to engage with politics for creating as well as implementing plans, “rather than just being a tool for it” (p. 226). More recently she has warned that “we are currently witnessing ongoing politicisation of planning, which aims at making planners loyal to the current neoliberal politics and threatens to silence planners” (Grange 2016, 1).

This market-driven context has also shaped the agenda for planners in major Canadian cities, providing guiding principles for new technology adoption. Furthermore, it has allowed automobility to remain the city building default for Canadian municipalities. The term automobility is shorthand for the car’s dominant position in modern society as the main form of transportation, economic cornerstone, city shaper, and cultural icon. Sheller and Urry (2003) describe automobility as “a machinic complex of manufactured objects, individual consumption, environmental resource use and dominant culture that generates a specific character of domination over almost all contemporary societies” (p. 115). Automobility favours and promotes car use through transportation and land use patterns, tax incentives, and planning policies, overshadowing more sustainable alternatives to cars. By prioritizing cars above other forms of transport, automobility “divides workplaces from homes, so producing lengthy commutes into and across the city. It splits homes and business districts, undermining local retail outlets to which one might have walked or cycled, thereby eroding town centres, non-car pathways, and public spaces.” (Urry 2006, 19).

## Research questions

This study uses an automobility lens, alongside a critical planning perspective, to examine Canadian urban planners’ thinking about the future of urban transportation. At the outset, the major aim was to hear from planners about their perceptions regarding technological revolutions in transportation such as AVs, and how this was affecting urban planning. As the research progressed, however, it became apparent that AVs could be seen as a continuation of our



cities' obsession with the private automobile, only in a newer form. Hence, the study evolved into a larger discussion on the future of Canadian urban mobility relative to technology and privatisation. The following research questions reflect this revised focus:

- What are transportation and planning professionals in some of Canada's major cities doing to prepare for the future of urban mobility?
- What technologies, new and old, are driving change within these cities?
- How does private industry factor into municipal planning decisions around urban mobility?
- How do planners take into account the political realities of municipal planning when making decisions about new mobility technologies?

## Methods

Twenty-six in-depth semi-structured interviews were conducted with planners in five Canadian cities—Vancouver (7), Edmonton (4), Calgary (6), Winnipeg (3), and Toronto (6)—a cross-section of major Canadian urban centres. These cities were chosen since, given their size (each had a population of 500,000 or more), they were most likely to have planning professionals working on the future of urban transportation.

The sample consisted of men (17) and women (9) who met the following criteria: (a) worked as a planning professional (transportation, urban, city, etc.); (b) worked in a decision-making role; (c) had at least three years of experience in planning; and (d) worked as a city employee for the selected municipalities or as part of the regional planning bodies where applicable (Toronto and Vancouver). Planners working for consulting organizations were not included in the study.

Interview participants were selected using direct recruitment. Names and contact information were initially collected from previously published municipal documents. Some individuals in high-level planning positions identified a more appropriate person in their organization. Further "snowball" sampling led to contact with professional acquaintances and colleagues of previous interviewees. Potential participants were sent an information letter which highlighted that the aim of the research was to discover how professionals are planning for the future of urban transportation and, in particular, whether their plans include consideration for autonomous vehicles. The letter also outlined the necessary time commitment, as well as information on ethical considerations, including promised confidentiality. Specific interview questions were not provided in advance.

Participants were interviewed for between 45 and 60 minutes by the first author of this paper. Two interviews were conducted with two planners present, and all but one interview was conducted in person. Interviews began with a question regarding the participants' current role within the municipality, and moved to asking about the major changes in planning within their city over the last ten years. This led to questions about challenges their city has gone through during that time, and what challenges were expected over the next twenty years. Questions about how sustainability has factored into the municipalities' planning were also included, followed by a specific question asking if AVs were being looked at, or planned for, in any meaningful way within their city. The planners were then invited to give their opinions more generally about how AVs might affect their work in the future.

While the initial goal of the research was to learn if planning in these municipalities specifically involved AVs, it quickly became evident that, in most cases, little planning around AVs was taking place. Thus, more time was spent exploring how these planners viewed AVs affecting their work and how political structures and power dynamics affected their work.

The interviews were transcribed, and the data were then loaded into NVivo, a qualitative data analysis software. Initial major codes included comments about specific modes of transportation (active, shared, private, public, light rail), references to new technologies (electric, connected, autonomous), and mentions of political, historical, and geographic differences between cities. As with any discussion of planning and transportation, many other elements that intersect with this work were also mentioned (e.g., land use policy, funding, accessibility, equity, safety, sustainability). While these themes were used to guide some of the analysis, they were otherwise deemed out of scope for this particular paper.

## Findings

Considering how often we've heard that AVs are just around the corner, we might assume that Canadian planning professionals are working enthusiastically to prepare for their imminent arrival. According to the interviews, however, the prospect of AVs has yet to significantly affect the day-to-day operations of municipal planners. Instead, the interviews reflect the finding by Freemark et al. (2019) that most cities, and their planning teams, are in a holding pattern. One of the major reasons most Canadian cities have no dedicated planning team for AVs is because this technology simply presents too many unknowns. Planners were unsure how AVs would affect their jobs and shape their city plans for the future. A Vancouver planner working for the regional provider expressed the difficulty of planning for AV technology specifically, and questioned how rapid changes in urban transport will fit into more traditional planning processes:

I think the debate we constantly have is, how on earth are we reacting to what is a rapidly-changing market and how on earth do we make these 40 year plans around these types of things?... When we really don't know how autonomy is going to function (Vancouver Planner 4).

Planners felt a lot more time would be needed for the technology to mature, and many were unsure if driverless cars would ever even appear in a widespread way on city streets. For example, a planner with the City of Vancouver spoke about both the potential and ambiguity of AVs:

Even in my day-to-day work, it is very challenging to take the idea of automation as an actionable item. Like, what am I supposed to do differently today because of automation? Not totally clear, right? And so it's good that there is [theoretical] thinking about it. And I think there will be [planning] thinking about it, and there will be increasing experience with it (Vancouver Planner 1).

Indeed, the potential changes caused by AVs and other new transportation technologies are vast, although Canadian planning professionals have been able to somewhat insulate themselves by adopting a 'wait and see' approach. Many planners expressed substantial uncertainty surrounding future technology, and said this would cause them to reexamine traditional planning approaches that may not be sufficiently flexible to react to major societal changes. When asked specifically about how best to plan for AVs, a planner with the City of Calgary mentioned looking towards bigger cities in the U.S. to gather information about potential outcomes:

I think in Canada we'll still be able to look to the States to see what they're doing. Because they're going to be out ahead of us. They just have better weather. You have places like Phoenix that are able to run these vehicles and operate without freak snowstorms (Calgary Planner 1).

The strategy of looking to bigger cities also reflects Freemark et al.'s (2019) finding that larger cities are leading the way in researching potential effects of AVs on transportation networks. This is a sensible strategy for smaller cities (with smaller budgets) who will also be less immediately affected by rapid technology change. Instead, many planning professionals see more value in spending their limited time and budget on the fundamentals of a great mobility system by building out the physical infrastructure and public transportation network to properly accommodate potential future innovations in mobility.

Despite typically adopting a "wait and see" approach, most planners felt it was very important to at least consider the potential impacts of new transportation technologies on cities. Most assumed that AV technology could affect current transportation systems, but that the need for public transit would not disappear, as exemplified by these comments from planners from Vancouver's regional authority and the City of Calgary.

I don't think transit will disappear, I think transit's role is going to significantly shift and change. I think low-ridership services will disappear and will be replaced through different technology solutions (Vancouver Planner 5).

I think a lot of people jump to, ‘we’re not gonna have any transit anymore’. The intensity of people moved will never be replaced by autonomous vehicles. But feeding into transit is a huge opportunity (Calgary Planner 3).

The planners interviewed were keeping their focus on mass transit options (busses and trains) and other types of space efficient mobility (walkability and bikeability) and felt strongly that planning decisions should not be driven by the latest technology. While it may be too early for a technology like AVs to meaningfully impact city planning, the interviews show that these technologies are causing a shift in planners’ thoughts about the future—but not without concerns. Planners were worried that a focus on AVs could derail the plans they already had developed, a real possibility considering the number of new entrants into a previously public-only led transit system (e.g. ride-share, car-share, e-scooter, and bike-share companies).

In Canada, The City of Toronto is providing early research on AV technology that may later be relied on by smaller municipalities. In particular, the City is home to a dedicated team working on AVs who released an Autonomous Vehicles Tactical Plan (City of Toronto 2019) to help the city prepare for the arrival of AVs. Planners mentioned that by doing this work they wanted to get ahead of private industry and hoped to avoid unintended consequences from early policy adoption. Their goal is to identify the problems that this type of technology may help solve and help guide private industry to the potential solutions that help build the best possible mobility network for the city. For example, one planner with the City of Toronto working directly on integrating AV technology into the current system wanted to ensure that the proper policies were in place well before the technology dictated their planning direction for them:

We realized we didn’t want the technology to drive policy, we thought policies should drive the technology. Our city council, our community has already built a vision for what they want to run or to become and it’s agnostic to technology. So we want to be greener, we want to have a healthier city, we want to have a strong economy, we want to have a more equal and fair city (Toronto Planner 2).

In this planning group, the goal of getting out ahead of new technology was the main impetus for working on AVs early in their development. Similarly, planners from other cities were concerned about a primary focus on technology being forced on them from city and provincial leadership as well as private for-profit providers. For example, a City of Edmonton planner highlighted their “people first” approach to planning that should remain as the highest priority, regardless of technological advancement:

The solution is to make great cities and to force the tech to serve the people instead of forcing the people to serve the tech... The way technology or huge trends emerge is that we change and it changes together. It’s not like we’re going to wake up one morning in a year or two and autonomous vehicles will be causing chaos; it will slowly integrate itself (Edmonton Planner 4).

Some planners did mention they often felt pressured to focus on the newest technologies, to the detriment of people-first planning and existing transportation modes that had proven to be effective but which many cities had not yet fully utilized. Potential overreliance on new technology had several interviewees mention an internal conversation about ‘new mobility’ versus ‘old mobility.’ The planners interviewed for this study felt strongly that modern on-demand technology, for example, did increase convenience for some trips but not on a scale that would be useful for the masses, whereas more traditional modes of transportation (e.g. biking, walking, bus, light rail) provided far more possibility for equitable and efficient mobility when funded and implemented to their full potential.

When asked if this technocentric approach was an issue within their municipality, a City of Edmonton planner voiced their concern about an overreliance on technology:

I think that we have to be careful when we’re thinking about approaches and when we’re thinking about technologies [...] Whether it be the autonomous vehicle or whether it be the LRT... It’s really about how are we making it easier, more convenient, for people to get from one place to the other? My biggest fear with this is that we’re going to actually focus more on the technology and assume that the technology will solve the problem, rather than the approach (Edmonton Planner 1).

However, the reality of the situation for many planners is that their focus is often determined by municipal council directives and budget decisions, leading to concerns that they might be directed to focus on what might work in the future instead of what has been proven to work in the past. For example, one Vancouver planner with the regional authority spoke about the concerns of new transportation technologies:

I would say that there's a danger [...] that those become almost distractions or cop-outs towards what remain very basic, fundamental transportation planning principles like mass transit [...] It has a role to play, and we don't know exactly where that will go or what it will look like. There's different futures that people can kind of imagine, and hopefully, we would get ahead of some of those because they're not all pleasant (Vancouver Planner 2).

Many planners spoke specifically about fundamental principles of transportation, such as aiming to improve the built environment and social connection for everyone, which are at risk as more private entities enter the transportation business. Some had major concerns about cities providing opportunities to private entities through federal, provincial, and municipal policies, and relying too heavily on the services of these private entities as part of overall transportation offerings. One City of Toronto planner was blunt in their assertion about for-profit companies and how governments need to act soon in order to regulate them:

I think the private mobility providers talk about caring, but in the end they're for-profit companies. They'll do what they need to do to get other governments on board. It is imperative that these governments become aware, investigating this issue, so that they can start to tell these transportation network companies how to behave (Toronto Planner 3).

Despite such worries, city and provincial leaders continue engaging many private companies in partnerships that provide new mobility options for residents while, at the same time, not adequately funding public transit and equitable mobility in their cities. Some planners therefore feel they are on the front lines in an apparent battle between public good and private gain. A planner from the City of Edmonton, for example, highlighted that their municipality is sitting back and has often allowed private industry to shape the potential future of urban mobility. However, Edmonton was not the only municipality welcoming private industry into its urban mobility planning. In the midst of an economic downturn, Calgary has seemingly embraced private industry, seeing it as an economic gain for the region. The city has attempted to use municipal connections with technology industry leaders to diversify their economy and build collaborative relationships:

Calgary tends to take a bit of a different approach about it. «Okay. So what can we partner with industry on to try and move this forward and incentivize it? (Calgary Planner 2).

In contrast to this openness to private business from the two major municipalities in Alberta, the larger urban centres of Toronto and Vancouver were less willing to open their doors to private companies hoping to pilot new technology. This could perhaps be because they know that large populations make their cities fertile ground for private mobility companies looking to get ahead in the industry. Indeed, such companies often need a city's blessing to operate far more than the city needs the company's newest mobility technology. Regardless of the level of partnership between municipalities and private companies, planners were keenly aware of the need to get ahead of these technologies. They aimed to do this by ensuring the continued provision of mobility options beyond the private automobile, and by developing policies that guide private industry and new technologies onto a path that improves mobility for everyone and doesn't just benefit for-profit companies.

## Discussion and conclusion

Although automobile-focused urban planning and design has historically been the norm for many decades, it has led to numerous unanticipated issues. As Cervero et al. (2017) observe, “the cumulative consequences of this nearly singular focus on expeditious movement have revealed themselves with passage of time, measured in smoggy air basins, sprawling suburbs and—despite hundreds of billions of dollars in investments—a failure to stem traffic congestion.”



(p. 1). Thus, any attempts to shift mobility options within cities away from the automobile are up against two difficult forces. First, this shift must navigate a physical infrastructure built specifically for the automobile over the last century. Second, this shift will undoubtedly be difficult to promote in cities with a planning and political culture steeped in automobility. Put simply, it is very hard for city decision-makers to imagine a city without the car. Further complicating matters, traditional and more technology-focused private industries have a vested interest in continuing this style of city building, to say nothing of many land developers and suburban home builders.

Our interviews with planners in large cities across Canada suggest that the majority are not working to integrate driverless cars into their planning decisions. In fact, planners were mostly worried about the implications AVs could have on urban transportation, due to more private companies entering the urban mobility marketplace. It seems that many for-profit companies introduce new mobility technologies as solutions in search of problems. To those with a vested interest in the driverless car, limited planning for AVs may be frustrating. For others more skeptical, this finding will be a welcome validation that the marketing efforts of technology companies will not easily derail planners from following established techniques for equitable urban transportation. Further, planners' concerns about the increasing privatization of urban mobility systems demonstrate their commitment to ensuring equity and fairness, by keeping the 'public' in public transit.

However, much more must be done at the policy level by all three orders of government to ensure that when these new technologies, and the private companies developing them, find their way to our urban centres they are only a small fraction of a larger, more robust, transit network that moves residents efficiently, effectively and equally. Further, municipalities should put in place strong agreement frameworks with any for-profit mobility provider that requires them to share their data with city planning staff, while provincial leaders need to ensure these companies appropriately consult with municipalities well before launching. This type of arrangement would help municipalities more effectively plan for future mobility needs in the long term, and help determine the effectiveness of new technologies in the short term.

Finally, planners must also fully understand the political characteristics of their work and aim to advocate for proper focus from political leaders. While it can seem politically expedient for city leaders to push for new innovations and technologies, they need to realize that these come at the expense of a planning department's limited time and budget being better spent on the fundamentals of good public transportation. Planners should voice their opinions on these matters as often as possible to make clear to political leaders that privatization of mobility is antithetical to good public transportation.

This paper provides insight into how Canadian planning professionals are preparing for new transportation technologies and increased privatization in transportation. The findings highlight that urban planners understand the potential benefits of AVs but do not yet factor these into their decision-making in a meaningful way, and expressed concerns about the encroaching efforts of private business to enter the public transportation sphere. Unfortunately, this decision-making must always be thought of as being rooted in a market-driven city building mindset. These socially shared planning beliefs have become the default across Canadian cities, and have crafted a standardized playbook for urban development that has legitimized this approach while making alternate viewpoints seem impossible.

While some researchers have implied that the dominance of a market driven approach to planning is unavoidable since planners cannot be dissociated from the political regimes in which they work (Roy 2006) others, like Grange (2017), feel that while planning no doubt contributed to such a neoliberal society, planners also have the ability to counteract these processes. For the planners I interviewed, getting political meant leveling the playing field between public and private interests and attempting to undo much of what automobility has done to our urban spaces.

Viewing a city as a system of automobility shows us why these practices exist for planners, residents and civic leaders. The culture of city building has prioritized the planning of cities for the private automobile, particularly in North America. Research on automobility has covered many physical outcomes of this system (e.g. suburban growth, decline of public transit, environmental impacts, transport-related discrimination). As planners work within this system, trying to create more sustainable and equitable cities, they are pushed by elements of automobility to continue planning in the same way as they always have. They are also guided by city leaders whose approaches to city building are themselves influenced by the system of automobility.

This study also highlights several important areas for future research. First, a quantitative survey of a wider sample of Canadian planning professionals, using similar questions to those asked during the interviews, would be valuable. So too would case study research into the planning, cultural, and geographical differences between cities and how these influence the transportation planning of specific cities. It would also be beneficial to interview politicians

about their vision of the future in terms of AVs and urban transportation. Finally, further research into the effects of privatization and private companies on city planning outcomes could help cities and their planners choose the terms under which public and private partnerships best serve the public good in the future. Also, research into AVs and their potential effects on sustainable city planning efforts would help cities more fully understand their potential impacts. Overall, these findings provide a unique Canadian perspective that corroborates previous research (Guerra 2016) showing uncertainty surrounding the adoption of AVs, with smaller municipalities relying on planners from larger cities to lead the way.

New technology can be exciting but is not necessarily more effective than what preceded it. There are already effective ways to improve mobility in our cities, such as mass transit, walkability and bikeability initiatives, and denser urban forms. It will be up to planners, municipal leaders, and residents to ensure that the future of urban transportation takes a people-first approach.

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