

The Road Ahead: Disruptive Innovation and Technology in Urban Transportation

By:

Brendan Rice

Supervised By:

Abidin Kusno

July 31st 2017

A Major Paper submitted to the Faculty of Environmental Studies in partial fulfillment of the requirements for the degree of Master in Environmental Studies, York University, Toronto Ontario, Canada.

ACKNOWLEDGEMENTS

This paper has been a learning experience in so many aspects, and I have been heavily inspired to continue working on and engaging with the increasingly important topics at hand. I'd like to thank a number of people that have helped me complete not just this paper but the MES program generally.

Firstly, thank you to Abidin Kusno for supervising this paper - your perspectives and ways of addressing cities from angles that I had never even considered and thusly inspiring the initial Global Cities paper that informed this one, were tremendously valuable. Thank you to Jennifer Foster for advising me through the MES program over the past two years. I'd especially like to thank Laura Taylor, as you helped me overcome "imposter syndrome" with your remarkably kind guidance whenever we chatted. Thank you to my family for putting up with MRP moods as I worked on this project, and thank you to my friend Joseph Simpson for accompanying me to coffee shops across the city to work on our respective projects.

Lastly, thank you to all my fellow MES'ers: we supported each other through some very stressful times and i'm not sure that I would have been able to have made it through without the laughs I found in that grad lounge. I hope to see all of us doing big things in planning, and judging by what i've seen from all of you, I have no doubt that will be the case.

FOREWORD

This major paper is an extension of the themes of my plan of study. I am interested in the means by which technology and disruption via innovation can impact cities and thusly planning as a field. The topics engaged with in this paper are directly aligned to those outlined in the plan of study:

- Component 1: Early Transportation Innovation Disruptors aligns with Chapter 2, which discusses informal transportation services in the Global South
- Component 2: Current Transportation Challengers aligns with Chapter 3, which discusses issues pertaining to recent transportation innovations and disruptors
- Component 3: Tomorrow's Transportation aligns with Chapter 4, which is a case study of the autonomous vehicle in the Bay Area, California.

Lastly, the suggestions for policy makers and planners in the concluding portion of this paper serve to fulfill the goals of my area of concentration in developing my understanding of disruptive transport technologies and applying that knowledge via planning practices.

ABSTRACT

Technology and cities have long been intertwined in their respective development, and thusly the relationship between them is one that results in noticeable effects when either changes. In the context of the modern city, new technology now plays an increasingly vital role in all facets of their operations, but transportation has been impacted in particular in this regard.

Whether it be via ridesharing (Uber and competitors), bikesharing, or most recently, autonomous vehicles - the role that new forms of innovation now play in the urban context is that of the disruptor. Essentially, what previously appeared to be a static division of transportation options in cities and urban regions is now being challenged by what is known as “disruptive innovations”. While the predecessors to this market strategy have persisted in the Global South as informal transportation services for quite some time, only in recent years have the principles of informality been utilized to change existing transportation markets in the Global North. These disruptive innovations stand the chance to completely alter the means by which urban residents move around their cities, but whether this alteration is for public good or for the benefit of the privileged few is yet to be determined.

What is known, however, is that the means by which these innovations are implemented is the most important indicator of whether or not new urban transportation innovations will be equitable. The process of the entry of the autonomous vehicle to the Bay Area (California) has indicated that many private interests do not appear to be particularly concerned with the role that equity plays in such technological implementations, but there are also reasons to believe that the introduction of this technology may serve societal equity by other means such as urban mobility for the disabled and elderly.

Thusly, it is vitally important that cities as institutions, and planning as a field develop adequate strategies for new transportation innovations or they risk fundamental changes to urban life that

TABLE OF CONTENTS

Chapter One: Introduction	1
• Research Goals and Methodology	1
Chapter Two: Informal Transportation Services in the Global South	3
• Historical Context of Informal, Formal Transportation Systems.....	4
• Defining Informal Transportation.....	6
• Case Study: Line 6 Transit in Toronto, Canada	11
Chapter Three: Disruptive Innovation & Transportation Technology	17
• Ridesharing.....	18
• Bikeshare.....	22
• Private Transit.....	24
Chapter Four: Case Study – Autonomous Vehicles & The Bay Area	27
Chapter Five: Suggestions For Policy Makers, Planners & Concluding Thoughts	34

CHAPTER ONE: INTRODUCTION

“We shape our tools and thereafter our tools shape us”

- Marshall McLuhan, from “The Medium is the Message”, 1967

Technological development and urban development are two processes that are directly connected throughout their respective histories. From improved agricultural technology allowing early civilizations to grow, to the industrial revolution’s associated rapid urbanization, new innovations allowed urban regions to thrive and change, almost symbiotically. The 21st century’s technological revolution has seen a rapid advancement of both technological capability and the proliferation of seemingly unstoppable global urbanization. In this global change, advancements, improvements and shifts in practice have been made in numerous fields, but one has seemingly stayed static - that field being transportation. Until the entry of a number of disruptive innovations, urban transportation could essentially be broken down into public transit (city bus, subway, streetcar), vehicular transport (personal automobile, commercial shipping) and active transportation (pedestrians and cycling). Such a simplistic division is being challenged, however, by the entry of private industry into the urban transportation regime, largely in the context of the Global North. While alternatives to (or unofficial providers of) public transportation have existed for decades in the Global South, often in the form of jitneys and other informal transit services - only in recent years has the challenging of the role of public versus private transportation in urban areas become so evident in the Global North. Yet, very little broad-scale analysis of this emerging trend of private/public transportation has been undertaken. Thusly, this paper will be an exploration of the impacts and potential outcomes of the changing landscape of urban transportation.

Research Goals and Methodology

The primary challenge of discussing issues of technology and future-oriented planning is temporal. What is meant by this is that due to the relative contemporariness of many of the topics that will be discussed, publications will come and go in terms of relevance or even accuracy. In all likelihood, certain segments of this paper itself will become outdated quicker than anticipated as technological changes occur in areas such as vehicle autonomy. Thusly, the focus of this paper is based on the relationships and issues of outcomes of the noted topics rather

than the specifics of the technologies and transportation services themselves. With that said, elements of the operational aspects of the modalities explored are examined for contextual purposes. Exploring these relationships will be undertaken utilizing a number of methods. The chapters of this paper are distinct, but distinctly related discussions of the entanglement of transportation, technology, market disruption, and planning in urban areas.

Chapter 2 provides a global and historical context to the role of transportation services that are not necessarily neatly defined as public or private. This chapter utilizes concepts of informality as discussed by Anaya Roy and Splintering Urbanism as discussed by Steven Graham. These informal services, as will be discussed, serve as a basis and inspiration for a number of the new transportation options being launched in North American cities and thusly are important to explore. **Note:** This chapter is an edited version of a term paper for ENV5023 (Global Cities) that inspired the direction of this paper.

Chapter 3 is an exploration of the role that technology and private industry has come to and is beginning to play in the urban transportation regime in North American cities, through explorations of ridesharing, bikesharing, and private transit. This chapter will utilize a mixture of academic literature, gray literature and popular media in planning/urbanism. These modalities will be examined from, one, the potential for urban transportation improvement, and two, the potential for harm to the health of urban transportation systems.

Chapter 4 is a case study on the entry of the autonomous vehicle to the roads of the Bay Area, California. This section provides the greatest challenge in terms of balancing the issue of relative topic newness and established understandings of planning. Thusly, the use of the planner's triangle will be utilized in this section to provide ease of context. Gray literature will be used primarily to undertake this case study.

Lastly, Chapter 5 provides suggestions for policy makers and planners alike in the context of Canadian cities in regards to the aforementioned topics. Additionally, concluding thoughts on this paper generally are given.

The overarching goal of this paper is to understand the intricate relationship between contemporary planning, technology and transportation and the means by which conceptions of the public and private are challenged by these issues.

CHAPTER 2 : INFORMAL TRANSPORTATION SERVICES IN THE GLOBAL SOUTH

“A regulator is supposed to create and enforce a standard. If they don’t have a standard, that doesn’t make it illegal.”

- (former) Uber CEO Travis Kalanick, 2012

The ability of residents to move around the city is an essential component of urban life. The degree to which this ability is realized can determine the economic, social and environmental success of urban regions. While some cities are oriented around the personal vehicle as the primary means of transportation, others engage with built forms more privy to the bicycle or mass public transportation systems. These forms of transport vary based on a number of contextual factors, but the underlying need for transportation in some capacity is an inescapable one for the city as a functioning system. Said success of this ability to transport is extremely variable throughout cities around the globe - thusly in a number of cities in which transportation systems are not able to fully serve residents efficiently, informal methods of transport have emerged as alternative, sometimes dominant means of transportation.

Informal transportation systems, as they are generally known, are often associated with the Global South; with images of the Indian rickshaw, the Ghanaian Tro-Tro or the Filipino jeepney¹ being vernacular examples of transportation in said regions. On a fundamental level, an informal transportation service is one in which the rider pays the drivers of said service a user fee to be transported, with such services not being associated with or regulated by the public sector.² Additionally, they are often entrepreneurial services in that they are owner operated.³ While it will be seen that this definition is somewhat limiting and many variants of such services exist in the broad perspective of informal transportation services, the type of transportation service described is now appearing to be manifesting within the Global North, with an emergence of associated practices as a means to fill the gaps of, or in some cases attempting to replace, existing public transportation systems. Whereas public transportation systems in the Global North are often seen as a ‘public service’ or ‘common good’, and not meant to be revenue generating systems⁴; emerging services in the Global North, such as Uber,

¹ Cervero, Robert. *Informal transport in the developing world*. UN-HABITAT, 200, Page 1

² Ibid

³ Ibid

⁴ Martens, Karel. *Transport justice: designing fair transportation systems*. Routledge, 2016.

Lyft are in part inspired by the private, entrepreneurial transportation services seen in the Global South - applying the fundamental ideas of laissez-faire economics to the world of mass transportation.⁵

The aim of this investigation into informal transportation structures is to understand the ways in which the informal transportation systems of the Global South speak to issues of capital, power structures and urban development - and in doing so, how these urban entanglements are informing the shift towards urban informal transportation in the Global North. This will be done through an examination of the definitions of informal transportation services, a historical context of the concept of public versus private in the global transportation sector, and a case study of Toronto's failed Line-6 service as an exploration of global-south sourced practices being implemented in the Global North. Finally, a short meditation regarding the potential future impacts of the global-north shift to informality in the transportation sector will be undertaken.

Historical Context of Informal, Formal Transportation Systems

When attempting to understand the dichotomy between formal and informal methods of transportation, historical context of such is limited in the regard that such a distinction between public and private transportation has been a modern construct essentially. That is not to say the idea of government operated or privately operated transportation services did not exist prior to modern systems, but rather that the line between the two was often blurred to the point of indistinguishability.

Arguably, the first organized public transit system in a city, ever, was the omnibus of the mid 1660's in Paris.⁶ This system, a horse-drawn carriage on fixed routes around the city, was highly popular amongst the public, and operated for fifteen years until the service was regulated to only serve members of the city's elite alongside fare increases.⁷ The name omnibus, is actually a retronym that is sourced from a later similar service, also started in Paris, two centuries later - with the name omnibus roughly translated meaning "travel for all".⁸ This service was also incredibly popular amongst residents, and saw massive growth of lines and different companies

⁵ Isaac, Emily. "Disruptive Innovation: Risk-Shifting and Precarity in the Age of Uber." *Berkeley Roundtable on the International Economy BRIE Working Paper*, 2014

⁶ Kuipers, J. F. J. *Buses on the Continent, 1898-1976: A Pictorial Survey Through Some Eighty Years of Public Transport on the Continent of Europe*. No. 104. Oakwood Press, 1977.

⁷ Kirkland, Stephane. *Paris Reborn: Napoléon III, Baron Haussmann, and the Quest to Build a Modern City*. Macmillan, 2013.

⁸ Ibid

running services within Paris and the surrounding towns.⁹ Growth of this type of service grew to the point that twenty-three separate companies were operating Omnibus services, until Napoleon III forced the merger of said companies into “Compagnie Generale des omnibus”, which is a predecessor to today's RATP Group, which operates Paris' public transportation system.¹⁰ This is an important historical precedent for the public/private, informal/formal dichotomy as it indicates that shifts from citizen driven (informal?) systems to centralized state-operated systems are not just possible but have happened on metropolis scales. In fact, many European and North American mass-transit systems owe their inaugural routes to previously operating private companies that were either purchased or regulated into the public systems that now exist.¹¹

When looking into the history of early transportation systems, much of the literature regarding such refer to services in which users paying the operator of a transportation mode for their service as ‘public transportation’ even though in essence it was operating as a private enterprise.¹² In this regard, it highlights the historical distinction between private and public transportation being moreso about the accessibility of the service via members of the public rather than being operated by a public entity, as it would be defined now. In some sense, this historical understanding of mass transportation fitting into neither the public or private domain neatly is more in line with the Global South manifestation of mass transportation than the vernacular understanding of such in the Global North.

With the knowledge that public transport systems that are now instituted in the Global North owe their foundational elements in part to arguably informal transportation systems, and the understanding that the distinction between public versus private systems may be less black and white than they immediately appear, in place, it is now possible to engage in the current context of informal transportation systems on a global scale.

⁹ Ibid

¹⁰ Ibid

¹¹ Cudahy, Brian J. *Cash, tokens, and transfers: A history of urban mass transit in North America*. Fordham Univ Press, 1990.

¹² Ibid

Defining Informal Transportation

The ranging variance of what is considered informal transportation is partially why this area of exploration is one that is worthy of exploration - in that the literature surrounding informal transportation systems has largely not examined this concept from a systemic or broad lens, instead focusing on specific systems and their impacts within specific regions. These explorations are valuable insights into the means by which informal transportation systems operate - but for the purposes of this exploration of the topic, a holistic and critical analysis of the phenomenon is required. To do such, however, requires the definition of the concept - of which is not a simple task, with consideration to the variance and conflicting understanding of the field. To gain a working definition of what informal transportation is, an examination of the existing definitions in literature on the topic will be overviewed, followed by the inherent conflicts between such and finally a working definition will be derived from this exploration.

Urban Theory and Informal Transportation

Informal transportation is, on a baseline level, a for-profit system of transporting people - whether individually, or in group transport- in a manner outside of or against the existing transportation regulation of a city/region. ¹³However, this basic conceptualization of informal transport may be too simplistic and ‘catch-all’ to fully inform the picture of how variant transportation systems integrate within a city’s urban fabric. Thusly, a theoretical examination of the concept of informality and associated concepts in an urban context is relevant to this discussion of informal transport, as much of the language that feeds into the literature regarding this concept utilizes similar thought.

Ananya Roy’s exploration of the topic is particularly relevant in this regard, as her framing of informal sectors as expressions of sovereignty are in line with the idea that informal transport is by-and-large entrepreneurial, or individually driven (literally and figuratively) in practice. ¹⁴Additionally, her highlighting of Giorgio Agamben’s work is also relevant saying that informality is not the “chaos that precedes order, but rather the situation that results from its

¹³ Mateo-Babiano, Iderlina. "Indigeneity of transport in developing cities." *International Planning Studies* 21.2 (2016): 132-147.

¹⁴ Roy, Ananya. "Urban informality: toward an epistemology of planning." *Journal of the American Planning Association* 71.2 (2005): 147-158.

suspension”.¹⁵ In the context of urban informal transportation, this can be analogous to the fact that while many of the transportation services provided may be considered “illegal” in that they are not regulated by the state, or are operating outside of the relevant regulation, the state allows (or disallows) their continued existence.¹⁶ An example of such in the Global North perspective would be the initial entry of Uber in to the transportation sphere. Prior to their regulation by a number of municipalities, Uber was criticized for being an “illegal” taxi service - but Uber’s response was often that they were not operating against the law, but rather they were operating outside the regulation of the law - in that the relevant taxi legislation in most cities did not apply to this new concept of ‘ride-sharing’ services.¹⁷ In this particular regard, Uber utilized this segment of informality to continue its operations, even as it was engaging with the state to be regulated and allowed by the powers that be.

This point regarding the involvement (or lack of involvement) by the state in regards to transportation services is an important one moving forward with a definition. If the presence of the state determines the legality/illegality of a transportation method, and thusly it’s formality/informality, in a vacuum it could be argued that informal transportation is a superfluous phrase, and instead could simply be referred to as transportation service. While cities are precisely the opposite of a vacuum (spaces of connections) this distinction is important with consideration to the concept of informal transportation existing out of contrast to formalized transportation systems, rather than being an institution in and of itself.

Stephen Graham and Simon Marvin’s “Splintering Urbanism” is also a relevant piece of literature to inform this discussion of informal transportation. Their essential thesis is that modern urbanization and its manifestation of disconnected urban enclaves has resulted in urban fabrics that are highly connected globally but tearing apart at the neighborhood/community level - resulting in cities that are at competition with itself for the best infrastructure, which in practice seems to mean that areas with the greatest access to power and capital gain access to such.¹⁸ While it is not necessarily the case with all examples of informal transportation systems, there is a strong correlation of such systems existing where access to ‘formal’ public transit is

¹⁵ Ibid

¹⁶ Roy, Ananya. "Urban informality: toward an epistemology of planning." *Journal of the American Planning Association* 71.2 (2005): 147-158.

¹⁷ End-game approaching for Uber 'operating outside the law' in Toronto, Oliver Moore, *The Globe and Mail*, 2016

¹⁸ Graham, Steve, and Simon Marvin. *Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition*. Routledge, 2002.

limited or nonexistent. ¹⁹Their example of the increased proliferation of helicopter use in Sao Paulo by the city's rich and elite, however, highlights that the link between informality and splintering urbanism is not necessarily being a direct relationship between income/class and use of formal versus informal methods. ²⁰What it does indicate however, is that the use of informal methods of transport are more likely to be utilized depending on the the level of segregation between effective (transportation) infrastructure. Essentially, informal transportation will be utilized by who it is most effective for - if the splintering of a city has resulted in a transit system that is useful for the middle to upper class and not for the poor, it is apparent who would utilize the 'illicit' method of transport. A well known quote by Gustavo Petro, a former Bogota mayor and economist, harkens to this idea in a way he likely did not intend, saying "A developed country is not a place where the poor have cars. Its where the rich use public transportation". ²¹ In the current manifestation of urban development, this may well be the case - but that is not to say that the public transportation system is then for the poor to use.

Marvin and Graham's discussion of splintering urbanism is relevant in this discussion beyond the lines of formality and informality. What they highlight in regards to the relationship between capital and equitable distribution (or lack thereof) of infrastructure is especially pertinent in any analysis of infrastructure. While highly networked infrastructure aligns with more utopian understandings of urban systems in which various municipal systems such as water and transportation are integrated to provide the most efficient and effective service - on-the-ground implementation of such infrastructures can result in fragmented communities of haves and have-nots. North American highway infrastructure built in the post-war era is one such example of the convergence of utopian planning and the splintering of urban communities. Whereas the suburban middle and upper class was able to quickly travel between home and work on newly built road infrastructure, the communities that were either destroyed or fragmented by new highways were left with the burden of the built form but not utility of using such infrastructure.

¹⁹ Ibid

²⁰ Ibid

²¹ Litman, Todd. "Smarter Congestion Relief in ASIAN Cities." *Transport and Communications Bulletin for Asia and the Pacific* (2013):

Defining Informal Transport in a Global Context

One of the main sources of contention for defining informal transportation is the fact that what is considered formal versus informal modes will vary depending on geo-cultural contexts. An encapsulation of the conflict within defining the term can be found with TroTros in Accra, Ghana. These owner operated mini-bus services move residents around the city, of which has no formal public transportation service, but operate on fixed routes.²² These vehicles are regulated in so far that they are given a Tro-Tro licence by the government to drive the vehicle, but the industry itself is self-regulated by a union of Tro-Tro operators.²³ Would this fit the definition of informal transportation? Clearly, the answer is not entirely clear. Another example of confliction would be Jeepneys in the Philippines. The colourfully decorated Jeeps, many of which are left behind military Jeeps from American occupation of the country, are among the most used mass transportation services within the crowded urban cores.²⁴ While light rail transit exists to provide inter-regional and longer distance travel, Jeepney's in varying capacities are the most popular form of transportation, with "classic" jeepneys serving the working class and poor, and more upscale modern vehicles providing similar services for the upper-middle to upper class.²⁵ The issue of defining whether or not they would be considered informal transport lies in the fact that both regulated and unregulated versions of the service operate, often providing the exact same service, competing for customers.²⁶ The only point of difference is the colour of their license plates, designating them as "colorum". There is little indication however, that this impacts their respective ridership levels.²⁷ In this regard, defining transport modalities along lines of regulated versus unregulated does not always accurately frame these forms of transportation.

In their report "Informal Public Transportation Networks in Three Indonesian Cities" researchers from the Cities Development Initiative For Asia (CDIA) argue that too much of the research that engages the issue of informal transportation does so from a perspective that places

²² Grieco, Margaret, Jeff Turner, and Edward A. Kwakye. "Informal public transport and the woman trader in Accra, Ghana." *Seventh World Conference on Transport Research*. 1995.

²³ Ibid

²⁴ Kurokawa, Takeshi, and Iwata Shizuo. "Characteristics of jeepney operation and demand in Metro Manila, the Philippines." *Proceedings of the Japan Society of Civil Engineers*. Vol. 347. 1984.

²⁵ Ibid

²⁶ Ibid

²⁷ Kurokawa, Takeshi, and Iwata Shizuo. "Characteristics of jeepney operation and demand in Metro Manila, the Philippines." *Proceedings of the Japan Society of Civil Engineers*. Vol. 347. 1984.

its emphasis on issues of regulation and power relation when urban informality in Global South regions is an already studied common phenomenon, and thusly not the most valuable aspect of investigating informal transportation systems.²⁸ Instead, they argue that when defining informal transportation systems, emphasis should instead be placed upon the operational component of their existence - with their main dimensions of such being route flexibility, service gap filling and the serving of niche communities.²⁹

To complicate matters even further, modal terms that may mean one thing in one region may be something entirely different in another. Paratransit would be an example of such. Paratransit in the North American context generally means pre-hailed public transport for the physically disabled³⁰, whereas in the Global-South, paratransit is considered more along the lines of on-demand transportation services similar to a taxi service³¹. These entanglements of what is considered informal transport, what framing such should be examined by and the means by which local populations understand these forms of transportation leads to the idea that the actual definition of the concept may not be as important as the influence it has within the regions that they operate. Nonetheless, to engage critically, a definition that can be utilized to examine case studies and such is needed.

Working Definition of Informal Transportation

As can be seen in the above explorations of the theory and practical aspects of informality and informal transportation, it is incredibly difficult to assign a narrow definition of what informal transportation is due to, one, it's existence as a contrast to the formalized, and two the variant methodology by which these services operate. However, there are a number of commonalities that persist throughout. Firstly, there is the fundamental idea that informal transportation is not operated by, assisted by or fully sanctioned by the state in the same means a 'public transit system' in the Global North would be. Second, there is the operational component that such services are for-profit enterprises that are generally flexible in routing and serve to provide transportation where it is otherwise not available or insufficient. Thusly the working definition for this topic is as follows. ***Informal transportation: transportation services, provided by a non-state or state-associated actor in exchange for monetary goods - in competition with,***

²⁸ Informal Public Transportation Networks in Three Indonesian Cities, Cities Development Initiative For Asia, 2011

²⁹ Ibid

³⁰ Cervero, Robert. *Informal transport in the developing world*. UN-HABITAT, 200, Page 1

³¹ Ibid

filling the gaps of, or acting as a city's mass transportation service. While this definition is not of any particular novelty compared to other literature on the topic, it is general enough to allow broad analysis, but specific enough to encapsulate the types of services aimed to be explored.

Case Study: Line 6 Transit in Toronto, Canada

While historical, theoretical and broad-scale analysis of informal transportation is important, arguably the best way to understand the implications of what existing informal transportation and shifts to informality means in the context of transportation and cities, is to examine on-the-ground examples of such. There is two aims for this case study. Firstly, is to examine the notions of informality as explored previously and how relevant and accurate conceptual understandings of informality are with a specific case. Second, is to explore how notions of informality are informing innovations in transportation in the Global North.

The United Nations Habitat Report on Informal Transportation's dimensions of informal/formal transportation will be utilized to examine the case studies, as the dimensions are where measurable shifts between the informal and formal sector can be identified, in conjunction with the working definition inspired by existing literature and theory. The UNH Report's framework of understanding informal versus formal forms of transportation is shown below.³²

DIMENSION	FORMAL	INFORMAL
Economic Standing	Middle And Upper Class	Lower Class, Poor
Legitimacy	Legal, Regulated	Illegal, Unregulated
Internal Organization	Orderly, Vertically Integrated	Less Structured, Horizontal
Assets and Capitalization	Intensive	Minimal

³² Cervero, Robert. *Informal transport in the developing world*. UN-HABITAT, 2000

Technology	High Tech	Low Tech
Skill Levels	Knowledge Base, Cognitive	Labor-based, Adaptive
Political Influence	Strong, Empowered	Weak

Two dimensions have been removed from the original UNH report, those being “Society & Culture” with the distinctions of modern/traditional, as these are highly subjective and problematic dimensions, in that modern/traditional is arguably a dimension based on a Global North perspective only. Additionally, “legal status” has been removed, as it falls too similarly with the dimension of “legitimacy”, and credit/financing has been removed as it is similar to assets/capitalization.

In examining this case, it will be assumed that it fits within the working definition of informal transportation as developed previously - however, in undergoing this analysis, the fundamental notions of what is considered informal transport may be challenged.

TORONTO - Line 6 Transit - Summary

Toronto, prior to the 1980's was often seen as a global example of building for mass rapid transportation, with transportation engineers, planners and policy makers often visiting to bask in the efficiency of the public transportation system.³³ Moving forward to the 21st century, however, the TTC (Toronto Transit Commission) is considered to be underfunded, overcrowded and generally perceived as not meeting the transportation needs of Toronto residents in a number of pockets of the city.³⁴ The Liberty Village-Parkdale corridor is often highlighted as one such pocket, specifically the 504 King Streetcar route, which carries a large number of passengers from their homes in Liberty Village to the downtown core, especially so during the morning rush hour.³⁵ Conditions on the route are consistently rated poorly, with overcrowding and lack of consistent service often highlighted as reasons for its perception as poor service.³⁶ Due to this service, in the Summer of 2014, two Toronto residents announced they would be starting a service called Line 6 Transit as a means to offer an alternative to those who would otherwise take the 504 King Streetcar.³⁷ The fundamental idea was that through 'crowd-funding' a charter bus for a \$4.25 fare versus a \$3.00 TTC fare, users would be entitled to a seat every morning that would pick them up from a pre-designated location at a specific time and bring them into the downtown core.³⁸ The eventual idea, the founders stated, was to utilize this crowd-funding method to determine what routes would be added in the future, essentially meaning the service would be a bottom-up, user driven service.³⁹ The service, after running for a number of weeks with success and full buses eventually shut down in the Spring of 2015 due to threat of legal consequences from the City of Toronto, based on the regulated transit monopoly the TTC has in the region.⁴⁰

Line 6 Informality/Formality Dimensions

³³ Solomon, Lawrence. *Toronto sprawls: a history*. University of Toronto Press, 2007.

³⁴ Fanelli, Carlo. "Neoliberal urbanism and the assault against public services and workers in Toronto, 2006-2011." *Articulo-Journal of Urban Research*(2014).

³⁵ Shalaby, Amer S., Kenny Ling, and Jim Sinikas. "Evaluation of Multiple-Unit Streetcar Operation in Toronto, Canada." *Transportation Research E-CircularE-C112* (2007).

³⁶ Ibid

³⁷ Startup tackles Toronto transit woes with crowdfunded shuttle service, Ivor Tossell, The Globe and Mail, 2014

³⁸ Ibid

³⁹ Crowd-funded bus takes a run at transit-starved Liberty Village, CBC News, September 2014

⁴⁰ Liberty Village shuttle service Line Six official shuts down, Luke Simcoe, Metro News, 2015

- Economic Standing -

The customer base for Line 6 was largely from Liberty Village, an area predominantly populated by ‘young professionals’ and thusly in the category of middle/upper class.⁴¹ Additionally, the advertising regarding the service was tailored to those who could ‘afford’ to pay extra for a premium service. In this regard, the service falls into the **FORMAL** dimension.

- Legitimacy

The dimension of legitimacy is likely the strongest indicator of informality in this case. As stated previously, the TTC legally has a mandated transit monopoly in the City of Toronto.⁴² However, Line 6, in their initial pilot argued that they were not infringing upon this monopoly due to a small provision in the relevant legislation that states an exception exists “to transport a group of persons for a specific trip within the municipality for a group fee”.⁴³ While in the end, the company was unwilling to fight the language of said exception in court after legal threat from the TTC⁴⁴, their willingness to engage in the service in the absence of order regarding a new formatting of transport deems this dimension as falling in line with **INFORMAL** transport.

- Internal Organization

Fundamentally, the idea of Line6 was to be a horizontal system, with founder Brett Chang saying “Any route moving forward is going to be driven by people... We want to see bottom-up transit planning.”⁴⁵ The eventual idea was to utilize user driven data for demand to develop new routes. In this context, Line6 can be seen as **INFORMAL**.

- Assets and Capitalization

Considering that the aim of the system was to be crowd-sourced, crowd-funded and chartered, Line6 had minimal assets other than the data that was being provided by customers. The buses being used were not owned by Line6 and the fare price of the system (at least for it’s initial entry to market) was meant to cover costs, not to make

⁴¹ City of Toronto Ward Profiles, Ward 19 - Trinity Spadina, 2011 National Household Survey

⁴² Crowd-funded bus takes a run at transit-starved Liberty Village, CBC News, September 2014

⁴³ Startup tackles Toronto transit woes with crowdfunded shuttle service, Ivor Tossell, The Globe and Mail, 2014

⁴⁴ Liberty Village shuttle service Line Six official shuts down, Luke Simcoe, Metro News, 2015

⁴⁵ Startup tackles Toronto transit woes with crowdfunded shuttle service, Ivor Tossell, The Globe and Mail, 2014

profit.⁴⁶ Founder Brett Chang ventured as the service continued, premium services could be offered to gain profit revenue. However, in the existence of the service as it operated, this dimension could be considered **INFORMAL**.

- Technology

The system developed was centered around a technology focus, with as stated previously, the aim of the system to be one that could inform itself regarding new routes and areas for service improvement.⁴⁷ Much of the actual work for the founders other than chartering the buses was developing the operating system for crowd-funding the routes. While the service did not continue, the founders then shifted their focus to this route-improvement via technology idea to provide feedback to the TTC.⁴⁸ In this dimension, the service can be considered **FORMAL**.

- Skill Levels

The idea of this dimension as knowledge based versus labour based is one that is not entirely clear in the context of this example. That is to say that foundationally, the idea of the system is primarily a tool of cognition and use of data to provide a service, but with the founders having set up unofficial ‘stations’ with coffee and service information, and the required effort to ensure the service was running according to schedule leads one to see this case as an unclear merger of these two dimensions.⁴⁹ In this regard, Line6 is **UNDEFINED**.

Political Influence:

This dimension is particularly interesting in this case, as the founders of the system had both previously worked in high-level positions for the Provincial government, with one founder having worked for the Office of the Premier of Ontario and another having worked for the Office of the Leader of the Official Opposition.⁵⁰ Additionally, the online platform utilized for the initial launch of the system was NationBuilder, a tool generally used by political strategists during elections and politicians to engage with their

⁴⁶ Ibid

⁴⁷ Ibid

⁴⁸ Liberty Village shuttle service Line Six official shuts down, Luke Simcoe, Metro News, 2015

⁴⁹ Startup tackles Toronto transit woes with crowdfunded shuttle service, Ivor Tossell, The Globe and Mail, 2014

⁵⁰ Startup tackles Toronto transit woes with crowdfunded shuttle service, Ivor Tossell, The Globe and Mail, 2014

constituents.⁵¹ While there is little indication that the founders utilized their political connections to launch the service, it is apparent their political background had a strong influence in their service development. Thusly, this dimension could be considered **FORMAL**.

Case Study Observations:

Thusly, for Line6 - in total 3 dimensions could be considered formal, 3 dimensions considered informal and one undefined. In examining this case, it can be seen that the dimensions that the UNH report highlighted as means of distinguishing formal from informal transportation can be interpreted in a number of contexts and are seemingly dependant on the context in which the system is operating.

Concluding Thoughts on Informal Transportation Services

As can be seen through this exploration of informal transportation systems, much like the idea of informality generally, it is a difficult and confounding concept to attempt to examine from a perspective of viewing informal transportation systems as an institution in and of itself, in the same way one would examine formalized transportation systems. The fact remains that these systems exist as ‘informal’ due to contrast with formalized transportation institutions and thusly attempting to analyze them as their own is not entirely fruitful in developing a meaningful understanding of the concept. That being said, understanding the means by which systems that would be considered informal operate, the value that they provide to the communities in which they operate and the innovations that adaptive systems can provide may allow for insight into coming innovations to the Global North. It is not just for this reason, but an important one nonetheless to analyze, in the hopes that the changing transportation landscape is one that follows the positive aspects of informal transportation systems.

⁵¹ Ibid

CHAPTER 3: DISRUPTIVE INNOVATION & TRANSPORTATION TECHNOLOGY

“Why not serve coffee on the bus? Why not help passengers plan trips, or provide a security presence? Make public transit a higher quality, almost concierge-like experience—rather than a basic utility designed for those who have no other option.” -
Jeff Tumlin, 2017 ⁵²

These questions are ones asked by Jeff Tumlin, a notable transportation consultant who was tasked with starting and initially running the City of Oakland’s transportation department.⁵³ In the context of his quote, he is discussing how North American transportation systems need to modernize to survive the incoming shifts in mass transportation culture. While he is no doubt correct that public transit systems must continuously improve service to maintain or grow ridership, the means by which he suggests they can be improved are perhaps not the first that commuters would list. According to TransitCenter’s publication “Private Mobility, Public Interest”, riders of public transit most desire improved reliability, speed of travel and redundancy options.⁵⁴ If this is perspective espoused by a respected transportation professional who was tasked with building an entire city’s transportation department, what then is to be said of the state of perspective from private industry on how urban transportation can be improved? Will ridesharing reduce urban congestion? Will bikesharing take residents out of their cars and into the bike lane? Would it be best if employers provided transport to their employees? Through an overview of the recent state of transportation and technology, these potential solutions to urban transport issues as offered by private industry will be explored, and evaluated based on the benefits and harms each may provide.

The mid 2010’s have seen an unprecedented competition between the public and private transportation sectors, which has quickly transformed a relatively static structure

⁵² Bliss, Laura "What the New York City Ferry Could Teach the Subway" Citylab, 2017

⁵³ Ibid

⁵⁴ TransitCenter. "Who’s On Board: 2014 Mobility Attitudes Survey." *New York: Transit Center* (2014).

into a rapidly shifting and uncertain one.⁵⁵ Silicon Valley has taken note of the desire for transportation options and thusly transportation ventures have become an increasingly popular investment for venture capitalists, hedge-funds and governments alike.⁵⁶ They are poised to challenge the app/digital/web sectors for Silicon Valley dominance and name recognition. Companies that previously had no transportation aspirations, such as Google or Apple have opened their own transportation-oriented divisions to compete with the likes of Tesla and Ford Motors.⁵⁷ Billions of dollars are flowing into this burgeoning faction of the technology sector at a rate that has allowed new transportation services to launch (and fail/succeed) at a pace too rapid for cities to meaningfully analyse their impacts, and has left little time to critique what their entry means to the role of transportation as a public infrastructure.

The aim of this chapter is to engage with this issue of public/private transportation and critically analyze recent “innovations” in the urban transport landscape. In essence, a critical overview of the state of the urban transportation-technology nexus as of mid-2017 will be given. Three main areas of focus will be undertaken; ridesharing, bikesharing and private mass transit. These areas have been selected as they touch upon the three main sectors of urban transportation generally; automobile transportation, active transportation and mass transportation. With the basic premise in mind that it is not the innovations themselves that are beneficial or harmful to urban transportation health, but rather their associated implementations, each modality will be examined from the the perspective of potential for opportunity and the potential for harm.

Ridesharing

Ridesharing, as it has come to be known, is arguably the most commonly known disruptive transportation innovation, and arguably the format that has inspired a number of variants. Uber, one such ride sharing services has rapidly become such a household brand that according to Ted Graham, innovation lead at General Motors, the phrase “the uber of...” has become a joke of sorts within Silicon Valley / Startup culture to describe

⁵⁵ Isaac, Emily. *Disruptive innovation: Risk-shifting and precarity in the age of Uber*. Berkeley Roundtable on the International Economy, [University of California, Berkeley], 2014.

⁵⁶ Ibid

⁵⁷ IBM Center for Applied Insights, Digital disruption and the future of the automotive industry, 2015

the approach that entrepreneurs now use to market/pitch their services.⁵⁸ One of the primary issues with discussing ridesharing is the lack of consensus regarding what actually constitutes a ridesharing service.⁵⁹ The name itself paints an image of communal ridership, sharing of a vehicle or as it has been known more commonly: carpooling. However, most rides taken via Uber are single riders according to recent estimates.⁶⁰ Some examinations of urban mobility consider bikeshare and carshare systems to be ridesharing, while others have primarily defined it as on-demand taxi services.⁶¹ While the lack of consensus on this term itself is a point of interest, with consideration to the idea that nomenclature can play a significant part in public perception of these technologies, for the sake of clarity in this discussion, a basic definition of ridesharing will be utilized. Thus the most common element of ridesharing services will be used to categorize this discussion - that being an on-demand transportation service via mobile phone application. This is largely considered as “real-time ridesharing”, making note of the on-demand aspect of this growing service structure.⁶² This categorization is broad enough to encapsulate most “ridesharing services” such as Uber, Lyft, Hailo, Chariot and such - each of which have various service models and policies - but specific enough to allow for a critical discussion of such services as they pertain to urban transportation, technology and planning. These services have been extremely popular in the cities that they have set up operations⁶³, and with such, their entry to the market has provided an early picture of the dynamics at play in regards to how public and private interests engage with each other in the urban transportation regime.

In early June 2017, the American ridesharing service *Lyft* introduced a new service for (initially) Californian cities and Chigao called “*Lyft Shuttle*”, of which the basic premise is a pre-set route for a cheaper price than “regular” ride-sharing trips.⁶⁴

⁵⁸ Graham, Ted “The Uber of Everything”, Above All Press, 2017

⁵⁹ Ibid

⁶⁰ Meyer, Gereon, and Susan Shaheen, eds. *Disrupting Mobility: Impacts of Sharing Economy and Innovative Transportation on Cities*. Springer, 2017.

⁶¹ <https://static.tti.tamu.edu/tti.tamu.edu/documents/0-6818-1.pdf>

⁶² Miller, Kristi, et al. *Dynamic Ride-Share, Car-Share, and Bike-Share and State-Level Mobility: Research to Support Assessing, Attracting, and Managing Shared Mobility Programs-Final Report*. 2016.

⁶³ Ibid

⁶⁴ Brinklow, Adam "Lyft Tries to Explain Why Their Bus Lines Matter" Curbed San Francisco, 2017

The service, utilizing location data from potential customers, would develop a route most efficient for customers that had pre-registered, and allow last-minute passengers to board at predesignated pickup locations if space provided.⁶⁵ While the initial reaction to this service within Silicon Valley was positive and seen as a potential alleviator of employee commuting issues; outside of the technology world, observers were quick to point out that the company had, in essence “invented” the city bus.⁶⁶ More accurately, as highlighted by the dimensions of the previous chapter, Lyft had proposed a jitney service.

The idea of an updated jitney service is one that has not quite garnered the same level of interest as other services, but unlike a number of the other transport alternatives examined in this chapter, jitneys are neither a new idea, nor did they ever truly leave North American cities.⁶⁷ Essentially since cars have been on North American roads, jitney services or “penny-cabs” as they have often been called, have serviced numerous communities.⁶⁸ The difference between existing jitney services and the services being proposed/beginning to operate are the structures behind their operations. Community jitney services are largely “bottom up” in that they developed out of community need and often are operated by community members themselves⁶⁹ With that said, in jurisdictions in which ridesharing has been banned or in which the demand has not quite reached desirable levels for market entry, companies such as Uber have mobilized community support in a style not dissimilar to electoral politics. Uber’s CEO has been quoted as saying ““What we maybe should’ve realized sooner was that we are running a political campaign and the candidate is Uber.”⁷⁰ This strategy was successful in Calgary, Alberta where Uber directed citizens to contact their elected representatives to ensure that they voted to legalize Uber’s operations in the municipality.⁷¹

⁶⁵ Ibid

⁶⁶ Ibid

⁶⁷ Chan, Nelson D., and Susan A. Shaheen. "Ridesharing in north america: Past, present, and future." *Transport Reviews* 32.1 (2012): 93-112.

⁶⁸ Woodworth, Park, and Robert W. Behnke. "Smart jitney/community-enhanced transit systems." *2006 Bus and Paratransit Conference*American Public Transportation Association. 2006.

⁶⁹ Ibid

⁷⁰ Moon, Youngme. "Uber: Changing the Way the World Moves." *Harvard Business School, Case 9-316* (2015): 101.

⁷¹ Shields, Lisa. "Driving decision-making: An analysis of policy diffusion and its role in the development and implementation of ridesharing regulations in four Canadian municipalities." (2016).

One of the supposed favourite authors of former Uber CEO Travis Kalanick is Ayn Rands's "a writer commonly associated with libertarianism and unfettered capitalism."⁷² This speaks to a component of the supposed "sharing economy" that Uber, Lyft and other ridesharing services are part of - that being that it is at essence an exercise in neoliberalism. While consumers have been largely satisfied with the low costs associated with using the services, the underlying quiet breakdown of decades long norms of labour practices have been largely (but not entirely) unnoticed.⁷³ Drivers for ride sharing companies are considered contractors rather than employees, and thusly are not protected by a number of labour laws, are not allowed to be unionized and so forth.⁷⁴ While this has been attempted to be remedied by a number of jurisdictions, the trend itself of labour decentralization and flagrant disregard for workforce policy is a worrying one if such companies have been espoused as the future of urban transport.⁷⁵ Some have argued that this model is in fact regressive rather than progressive, such as Bhairavi Desai of the New York Taxi Workers Alliance who argues "Ride-share companies like Uber are informalizing driver labor. Throughout the world, whenever workers' labor is deprofessionalized, they lose protections and rights....As much as Uber supporters talk about their model being something modern, I really think it seems quite backwards as far as workers' rights are concerned."⁷⁶ This return to fundamental capitalism at its core is evident in examples of crisis events. During a terrorist attack in Sydney, Australia, Uber was criticized for allowing its "surge-pricing" model to engage at a time where residents were attempting to flee a potentially deadly situation.⁷⁷ While it is logically an extension of fundamental supply/demand market forces, the lack of oversight speaks to the core of neoliberal rhetoric regarding the hand of the market being supposedly ideal for consumers.

⁷² Anthony, Andrew "Travis Kalanick: Uber-capitalist who wants to have the world in the back of his cab" The Guardian, 2014

⁷³ Drahokoupil, Jan, and Brian Fabo. "The platform economy and the disruption of the employment relationship." (2016).

⁷⁴ Ibid

⁷⁵ CITE THIS

⁷⁶ Chen, Le, Alan Mislove, and Christo Wilson. "Peeking beneath the hood of uber." *Proceedings of the 2015 ACM Conference on Internet Measurement Conference*. ACM, 2015.

⁷⁷ Nicoll, Emily & Armstrong, Sally "Ride-sharing: The rise of innovative transportation services", MaRS Discovery, 2016

Bikeshare

Bikeshare systems are becoming an increasingly common form of cycling in cities with a significant level of adoption over the past decade. As of 2007, 68 cities globally had an official bikeshare system operating, whereas in 2015, that number has jumped to 850 cities - an increase of 1150%.⁷⁸ The basic premise of a bikeshare system is the availability of short-term rental bicycles on demand. While there exist differing types of these systems, such as those with docks and those that utilize “floating” bikes with no designated return location, the fundamental idea of user co-owned bike fleets is the same.⁷⁹ This lack of ownership and thusly lack of need for security locks, personal maintenance and other inconveniences of personal bike ownership has allowed for users that would have otherwise been unfriendly to the idea of urban cycling to put themselves in the bike lane.

While bike-sharing programs differ in operations from city to city, one common element for most systems is corporate sponsorship.⁸⁰ Portland’s system is sponsored by Nike⁸¹, New York City’s by CitiBank⁸², Vancouver’s by Shaw Communications⁸³, and until recently, Toronto’s was sponsored by TD Bank.⁸⁴ Toronto now stands as one of the few cities to operate their system mainly via public subsidy alongside Montreal’s Bixi system.⁸⁵ The main point of interest for this examination of bikeshare systems as they pertain to the aforementioned topics of this paper is the means by which private interests have entered the urban cycling regime and the impacts that bikesharing have had on urban transportation regimes as a whole.

⁷⁸ Ibid

⁷⁹ Ibid

⁸⁰ Gaegauf, Tucker. "Bikeshare Funding White Paper: A Guide to the Different Bikeshare Business Models and Funding Process." *A2B Bikeshare Website*.

⁸¹ BIKETOWN: Portland’s Bike Share System | Biketown via <https://www.biketownpdx.com/>

⁸² Citi Bike: NYC's Official Bike Sharing System via <https://www.citibikenyc.com/>

⁸³ Vancouver Bike Share | Mobi via <https://www.mobibikes.ca/>

⁸⁴ Kalinowski, Tess “Bike Share Toronto to double with \$4.9 million from Metrolinx” The Toronto Star, 2015

⁸⁵ Bike sharing guide. Ottawa, Ont: Transport Canada, 2009. Print.

A major point of contention that has been raised as bikesharing has become increasingly ubiquitous is the issue of equitable access to the systems. For a number of North American cities, early research on user demographics has demonstrated that disadvantaged or marginalized populations have been less likely or have had less access to use of existing bikeshare systems.⁸⁶ In Chicago, Denver and Seattle's systems significant discrepancies between race, education levels achieved and income levels were found.⁸⁷ For Boston's system, 43% of the white population of the city lives in close proximity to a bikeshare dock, yet only 7% of the black population has such access near their place of residence.⁸⁸ In a particularly stark example, Washington DC - which has a demographic makeup of 50% black residents, was found to have only 4% black ridership of the bikeshare system.⁸⁹ The inequity to bikesharing is perhaps linked to underlying structural issues of inequity in the United States (and Canada) but the fundamental issues with such is that these inequities manifest themselves through implementation, not the modality innovations themselves. How then should cities deal with this manifestation of inequity?

There is reason to argue that bikesharing, if utilized correctly, may actually serve to increase transportation equity in cities. While this has not yet been the case in most cities as previously highlighted, there exists opportunity to ensure such - such has been the case with San Francisco's "Bike Share for All" program.⁹⁰ After considerable controversy over the implementation of bikeshare infrastructure in neighborhoods that did not desire such⁹¹, San Francisco's system engaged in community consultation to develop a strategy that would allow low-income and marginalized populations to better access the system. The result was a reduction in membership prices for low-income residents to \$5 annually, an extension of time limits on the bike use, and the removal of

⁸⁶ Shaheen, Susan A., et al. "Public Bikesharing in North America During a Period of Rapid Expansion: Understanding Business Models, Industry Trends & User Impacts, MTI Report 12-29." (2014).

⁸⁷ Jaffe, Eric "Yet More Evidence Bike-Share Isn't Reaching the Poor" Citylab, 2016

⁸⁸ Ibid

⁸⁹ Stehlin, John Garrard. "Business Cycles: Race, Gentrification, and the Production of Bicycle Space in the San Francisco Bay Area." (2015).

⁹⁰ Brown, Brytanee "OAKMOB 101: A Case Study in Expanding Access to Shared Mobility" TransForm, 2017

⁹¹ Stehlin, John Garrard. "Business Cycles: Race, Gentrification, and the Production of Bicycle Space in the San Francisco Bay Area." (2015).

debit/credit card requirements.⁹² Philadelphia's strategy for increasing use amongst marginalized populations and ensuring equity in system usage is based largely in marketing that utilizes images of underrepresented populations and engaging in extensive community outreach, which has demonstrated itself to be effective.⁹³ While this should seem like common sense in the context of planning, for corporations that are engaging in “city-building” like bikeshare systems for the first time, the distinct difference between market research and community consultation has been made apparent. If bikesharing as a modality continues the growth that it appears poised to, these strategies are ones that corporations engaging in providing this new form of infrastructure should be giving heavy consideration to.

Private Transit

As discussed in chapter 2, private competition to public transit systems is not without precedent, but is a trend that is increasing in practice in the Global North, both in jurisdictions that allow for competition and perhaps most importantly, in ones that do not. The timing of the entry of private options to the transportation regime is one that has shown to be both an opportunity for cities with issues of service delivery, as will be seen with Innisfil, Ontario, but also a point of contention for those that rely heavily on user's fares for continued operation. Toronto, for example, after the launch of Uber, saw an overall drop of 15 Million TTC riders in 2016, which cost the public transit agency \$46 million.⁹⁴ Whether or not Uber was the direct cause of the shortfall of fares is difficult to quantify, what matters moreso is the mere presence of private alternatives to existing systems that was previously limited to taxi services. With this in mind, this section aims to evaluate the impact of allowing private alternatives to compete with existing mass transportation regimes in cities.

Much like Line6 as discussed in Chapter 2, private alternatives to public transportation systems have persisted as long as mass public transit systems have existed.

⁹² Metropolitan Transit Commission, "Motivate and MTC Announce Expanded Bike Share Equity Program", News Release, 2016

⁹³ Ursaki, Julia, and Lisa Aultman-Hall. "Quantifying the equity of bikeshare access in US cities." *Transportation Research Board 95th Annual Meeting, Washington, DC*. 2016.

⁹⁴ Rieti, John "'Sluggish' ridership in 2016 cost TTC \$46M, but CEO says this year will be different" CBCNews Toronto, 2017

The difference between now and as recently as 2013 is the seeming paradigm shift that cities have gone under in regards to their views regarding the entry of private enterprises into municipal delivery of transportation for residents. The acceptance and regulation of Uber and similar companies into the urban transportation regime has opened an entry point for private interests in the municipal transport regime. Arguably, this shift can be credited to the success of Uber, which has expanded to operate its ride-sharing service in 633 cities worldwide.⁹⁵ While ridesharing has already been discussed, what has not been addressed is private industry competing directly with public transit for users.

Innisfil, a community in the Greater Toronto Area on the shores of Lake Simcoe, as of early 2017, hired Uber to act as the municipality's public transit provider.⁹⁶ This is the only known Canadian example of Uber operating a service in place of a public transit agency, but the relatively small scale at which it is doing so in Innisfil should not negate the institutional importance of such a move. According to the town's chief planner Tim Cane, Innisfil has struggled to provide any sort of public transit system other than regional bus connections. The agreement between Uber and Innisfil will see the ridesharing service's operations subsidized by the municipality, allowing residents to use Uber for a flat rate of \$3 between designated locations, or a \$5 discount on custom destination rides. The costs associated with this project highlight why private transportation options may begin to be seen as desirable to cities. Estimates have the cost of the Uber-Innisfil project at \$100,000 for a 6-9 month pilot, while adding two municipal bus routes to the area would cost the region \$610,000.⁹⁷ For a smaller municipality, this difference in prices is substantial. This highlights a fundamental aspect of the private/public transportation dichotomy in that private systems are able to provide much lower operational costs due to the lack of associated bureaucracy and labour protections. It is doubtful that municipalities with challenging transportation issues are concerned with philosophical differences between the public and private and the meaning of allowing private competition into their transportation landscape, but rather are more concerned with providing transportation access to their residents. This is the dilemma that

⁹⁵ Uber, Cities via <https://www.uber.com/en-CA/cities/>

⁹⁶ Pelley, Lauren "Innisfil, Ont., partners with Uber to create substitute for public transit" CBCNews Toronto, 2017

⁹⁷ Ibid

larger cities must keep in mind as they potentially begin allowing private options, that while private transportation may be initially more cost-effective, the precedent that such sets allows for arguments to be made for broad-scale privatization efforts.

The discussion of private versus public transit, and systems somewhere in the middle, has mainly been in the context of consumer choice, where decision is made based on the needs and financial capabilities of the user. What has yet to be discussed however, is the impact of private transportation services, not in the sense highlighted previously but rather private in the exclusive or even exclusionary sense. While private limousines taxi reimbursements and company vehicles have been a longtime practice of private industry in regards to employee use, mass transportation of employees has not been a commonplace practice. That has begun to change however, especially in the technology-company saturated Bay Area, California⁹⁸. Private shuttle services are being utilized by large corporations to shuttle their employees to and from work.⁹⁹ A 2015 estimate states that in the Bay Area, California these private shuttles transport 35% of the number of passengers that the regional transit authority, CalTran, does every day.¹⁰⁰ This use of private shuttles has seen tense confrontations at times between residents and users of said private shuttles, with a number of protests and direct –action shutdowns of these services. While the implementation of these private shuttles themselves indicate a potential shift in how employers view their responsibilities in providing transport access to their employees, the community action against these shuttles that do not serve the public also indicate organized resistance to the increasing inequality being promulgated by exclusionary transport.

⁹⁸ Stamen Design, "The City From the Valley", 2015

⁹⁹ Ibid

¹⁰⁰ Stamen Design, "The City From the Valley", 2015

CHAPTER 4: CASE STUDY - AUTONOMOUS VEHICLES & THE BAY AREA

“People may outlaw driving cars because it’s too dangerous. You can’t have a person driving a two-ton death machine.” - Elon Musk, Tesla CEO (2015)

To further the examination of the nexus of transportation technology, disruption and planning, a case study with a focus on these topics is an appropriate means of understanding tangible impacts of the rise of disruptive transport technology and the means by which they have entered into the new urban transportation vernacular.

The San Francisco Bay Area (hereby referred to as “The Bay Area”) is a coastal urban region in northern California, and is the selected location for this case study. It is home to many of the companies that have been engaging in ‘disruption’ of urban transport, such as Uber, Tesla, Apple and Google.¹⁰¹ Due to this proximity, companies have utilized the region as a laboratory of sorts for new transport technologies¹⁰², which serves as the rationale for selecting this region for study. The autonomous vehicle, or “self-driving car”, as it has been come to be popularized, is a technology that allows for a vehicle to be operated on-road without driver control. The degree to which the movement of the vehicle is autonomous is variant, with some companies developing vehicles that are partial-autonomous (parking, enhanced cruise control) to complete autonomy, such is the case with Google’s vehicle that has no steering wheel whatsoever.¹⁰³ Regardless of the minutia of the actual technology, the autonomous vehicle is a product that has gone from being a concept of science-fiction to an on-the-ground reality in a period of time so short that cities have had little time to prepare for or regulate the incoming shift of vehicle autonomy. Thusly, it is worthy of critical analysis.

¹⁰¹ Weber, Richard M. "Resistance Is Futile; Disruption Is Inevitable." *Journal of Financial Service Professionals* 71.2 (2017): 55-59.

¹⁰² Baker, David R & Said, Carolyn "How the Bay Area took over the self-driving car business", San Francisco Chronicle 2017

¹⁰³ Markoff, John. "Google cars drive themselves, in traffic." *The New York Times* 10.A1 (2010): 9.

Through this case study on the autonomous vehicle's entry to the Bay Area, a number of questions will be undertaken to better understand the role of disruptive transportation innovation in planning and associated equity concerns. The two main questions, each with a relevant sub-question are as follows:

- What are the impacts of the entry of new transportation technologies in the Bay Area,
specifically in economic, environmental and equity contexts?
+ How do these impacts relate to contemporary planning?

Author's Notes:

- "autonomous vehicles" may be referred to as "AV" or "AVs" (plural) in this case study and later portions of this paper.
- While the goal of this case study was initially to only utilize the Bay Area to discuss the potential planning impacts, too little literature for this specific purpose exists. Thusly, the Bay Area will be utilized to illustrate the analysis undertaken where appropriate. At points, the autonomous vehicle will be explored from a more macro-oriented analysis.

Impacts of the Autonomous Vehicle and Contemporary Planning

What are the impacts of the entry of new transportation technologies in the Bay Area, specifically in economic, environmental and equity contexts?

The autonomous vehicle, even by conservative estimates, will change the transportation structures of most urban regions heavily.¹⁰⁴ While some regions anticipate this tangibly in the coming decade, the Bay Area has already been confronted with the reality of self-driving vehicles.¹⁰⁵ What has this confrontation looked like? This will be explored utilizing the planner's triad, which is comprised of economy (overall economic growth and opportunity), environment (environmental protection) and equity (social justice, economic opportunity).

¹⁰⁴ Guerra, Erick. "Planning for cars that drive themselves: Metropolitan Planning Organizations, regional transportation plans, and autonomous vehicles." *Journal of Planning Education and Research* 36.2 (2016): 210-224.

¹⁰⁵ Baker, David R & Said, Carolyn "How the Bay Area took over the self-driving car business", San Francisco Chronicle 2017

Economic Impact

The potential economic impact of autonomous vehicles is considerably large. There are a number of areas in an economic context that AVs will likely change. In the areas of employment, shipping and manufacturing will be considerably affected, with the need for drivers on long-haul highway journeys essentially being rendered obsolete.¹⁰⁶ This is not a far-away future, with consideration to the fact that, Otto, a service recently purchased by Uber, has already been operating driverless shipping on Californian roads.¹⁰⁷ Taxis and personal transport are another economic sector that will be heavily impacted by driverless technology.¹⁰⁸ While the taxi industry has already had to compete with the lower prices of ridesharing services, the field of competition will be made even more difficult with the entrance of driverless taxi and transport services. One could list a large number of jobs that will be impacted by this change, such as food delivery, rental car services, valet parking and so forth. Essentially, it is not fully known the true extent that the autonomous vehicle will impact the economic activity of the region (and globe), but through the process of adoption, these changes will become increasingly apparent – much like the app economy of the early 2000’s considerably changed a number of aspects of commerce and media.

For the Bay Area, one particular economic impact that may not be felt elsewhere is the flow of investment in AV technology.¹⁰⁹ Much like how Detroit was once the car manufacturing capital of the United States, the Bay Area stands the chance to become a new manufacturing centre for this technology. As of 2017, 60 companies, both American and global have set up operations in the Bay Area to engage in AV research and operations.¹¹⁰ According to a recent study by Intel, the AV industry is valued at a potential \$7 Trillion worth of economic activity.¹¹¹ This would make such an industry

¹⁰⁶ Fagnant, Daniel J., and Kara Kockelman. "Preparing a nation for autonomous vehicles: opportunities, barriers and policy recommendations." *Transportation Research Part A: Policy and Practice* 77 (2015): 167-181.

¹⁰⁷ Davies, Alex "Uber's Self Driving Truck Makes Its First Delivery: 50,000 Beers" *Wired*, 2016

¹⁰⁸ Fagnant, Daniel J., and Kara Kockelman. "Preparing a nation for autonomous vehicles: opportunities, barriers and policy recommendations." *Transportation Research Part A: Policy and Practice* 77 (2015):

¹⁰⁹ Baker, David R & Said, Carolyn "How the Bay Area took over the self-driving car business", *San Francisco Chronicle* 2017

¹¹⁰ *Ibid*

¹¹¹ Strategy Analytics, "Accelerating the Future: The Economic Impact of the Emerging Passenger Economy" 2017

one of the most profitable and lucrative industries of all time.¹¹² While this money is largely in the white-collar world of technology and business, there does exist the opportunity for an increase in skilled repair tradesmanship. With a potential decrease in number of actual vehicles on the road and an increase in miles travelled, there will be a need for highly skilled technicians to make repairs and maintenance on this incoming fleet of vehicles.¹¹³

Environmental Impact

The environmental impact of personal vehicles has been demonstrably negatively impactful for the global environment, and the consistent snarls of traffic in the Bay Area have been harmful to the local environment of the region. According to the American Lung Association's "State of the Air 2017" report, the Bay Area is the 4th worst region in the United States for yearly air pollution rates.¹¹⁴ How then, has the development of the autonomous vehicle challenged or worsened this environmental state? While the introduction of the autonomous vehicle in the Bay Area has not yet reached the point where demonstrable impact can be observed, there are a number of points of information that indicate that the effect of the autonomous vehicle will be positive for the environment.

While arguments have been made that the autonomous vehicle may result in higher emission rates due to higher rates of vehicle usage, there are two main reasons why this is not likely to be the case. Arguably due to California's policies on the phasing out of fuel-based vehicles and financial incentives to produce/manufacture electric cars, almost all proposed and produced AVs have been electric vehicles, and thusly have a much smaller carbon footprint on the environment and have almost no associated emissions.¹¹⁵ While this does put a larger pressure on the electricity grid, California's plans to move to a low-carbon renewable based energy system will be timed well to

¹¹² Marshall, Aarian "Robocars Could Add \$7 Trillion To the Global Economy" Wired Magazine, 2017

¹¹³ Ibid

¹¹⁴ American Lung Association. "American Lung Association state of the air 2017." American Lung Association National Headquarters, New York City, NY, 2017

¹¹⁵ McDermott, Ethan G. "Examining the effects of policy interventions on increasing electric vehicle adoption in California." (2017).

handle this adjustment.¹¹⁶ Additionally, a potential shift to vehicle sharing (ridesharing in the truest sense) may result in less cars on the road overall, although this point is of contention and dependent on the implementation strategies utilized by cities and private industry alike.

Equity Impact

The personal vehicle has been espoused as fundamental manifestation of personal liberty in the modern age, allowing individuals movement between wherever they so choose.¹¹⁷ However, research has shown that cities that place priority on automobile users over users of other modalities such as public transport or active transportation end up creating inequitable transportation regimes – not just inequitable in the context of modalities, but often inequitable in the context of income levels, race and physical abilities.¹¹⁸ With the adoption of the autonomous vehicle, there exists the opportunity for cities to engage their own transportation equity levels, whether this will be the case is yet to be seen. Potential barriers for marginalized communities to access this new technology, such as income level or other structural inhibitions may result in inequity from this potential new system essentially since its inception.

One area of concern for the autonomous vehicle in regards to equity that both philosophers and engineers alike have had to engage with is the “trolley problem”.¹¹⁹ The Trolley Problem is a well-established hypothetical ethical dilemma, in which an individual must decide to whether to allow a trolley with broken brakes to continue on a path that would kill X number of people, versus adjusting the path, which would kill less people. This dilemma will have to be addressed by the artificial intelligence of AV technology, of which is developed by human programmers.¹²⁰ This is a particularly direct highlighting of the underlying equity issue with AVs in that they will at points during potential accidents have to make determination on who to move the vehicle towards.

¹¹⁶ Ibid

¹¹⁷ Chen, T. Donna, Kara M. Kockelman, and Josiah P. Hanna. "Operations of a shared, autonomous, electric vehicle fleet: Implications of vehicle & charging infrastructure decisions." *Transportation Research Part A: Policy and Practice* (2016): 243-254.

¹¹⁸ Pereira, Rafael HM, Tim Schwanen, and David Banister. "Distributive justice and equity in transportation." *Transport Reviews* 37.2 (2017): 170-191.

¹¹⁹ Goodall, Noah J. "From Trolleys to Risk: Models for Ethical Autonomous Driving." (2017).

¹²⁰ Ibid

Companies engaging on AV research have not largely been transparent with their determination methodology for such.¹²¹ In addition, there have already been issues with AVs not being able to properly recognize cyclist and other road users, as the technology that has been developed has largely been programmed in mind with other cars and pedestrians only crossing at designated locations.¹²² If these issues are not addressed adequately, there again stands the potential for other road users to be made lower priority in future planning regimes.

While the issues highlighted in regards to equity are of concern, there does exist the potential for an increasing of equity. Primarily, mobility equity for the disabled and elderly is the area with the greatest potential for improvement via the autonomous vehicle. The first non-staff driver of Google's self-driving car was Steve Mahan, a legally blind man who was able to travel via car by himself for the first time in his life.¹²³ If the AV regime that is developed is one that purposefully makes transportation access a priority for those that previously were largely unable to be mobile, than the accessibility of cities generally only stand to increase.

How do these impacts relate to contemporary planning?

While the impacts (and potential impacts) discussed are notable in and of themselves, how the Bay Area has and is responding to such may serve as a guide (or warning) to urban regions moving forward with autonomous vehicle policies and plans. Brooks Rainwater of the National League of cities has pointed out, however, that only approximately 6% of major American cities have any mention of vehicle autonomy in the long term transportation plans or official plans period.¹²⁴ The City of San Jose is one of the few cities globally that has pre-emptively engaged with the issue of autonomous vehicles directly, with innovation manager of the city Jill North stating "We're not the first to have autonomous vehicles in our city, but we want to be one of the first to do it right," after the city announced its intention to develop city-wide policy regarding

¹²¹ Marshall, Aarian "Lawyers, Not Ethicists Will Solve the Robocar Trolley Problem" Wired Magazine, 2017

¹²² Levin, Sam "Uber admits to self-driving car 'problem' in bike lanes as safety concerns mount", The Guardian, 2016

¹²³ Douma, Frank, Adeel Lari, and Kory Andersen. "The Legal Obligations, Obstacles, and Opportunities for Automated and Connected Vehicles to Improve Mobility and Access for People Unable to Drive." *Michigan State Law Review* 2017.1 (2017):

¹²⁴ McCauley, Ryan "San Jose, Calif., Releases Autonomous Vehicle RFI" FutureStructure, 2017

autonomous vehicle implementation.¹²⁵ Thusly, the directed response to these impacts is the responsibility of planners to grapple with, a challenge that will have to be dealt with sooner rather than later. While AVs are obviously a transportation issue, the planning and policy response will require that more than just transportation planners engaged with the issue. Rather, as highlighted in the response to the previous question, the scale of impact for the autonomous vehicle will touch upon most segments of urban life - built form, community planning, environmental planning and economic planning. What then, is the role of the contemporary planner in addressing the potential outcomes of the entry of autonomous vehicles to cities?

The phrase “contemporary planning” is meaningless in the sense that it refers to planning via its temporal context more than it speaks to any particular planning methodology associated with the 21st century. It speaks moreso to the problems that 21st century planning has had to grapple with - reversing car-centric planning of the 20th century, encouraging density to reduce the impact of urban sprawl and aligning planning practice with environmental and equity concerns. As planning has been aiming to move cities away from automobile dependency, automobile oriented urban design and away from urban sprawl, the autonomous vehicle is a potential reason for planners to begin re-orienting planning around cars once again.¹²⁶ This will be one of the greatest challenges of implementing the autonomous vehicle for the planning field. If consumer demand for the autonomous vehicle results in substantial changes to the urban built form to accommodate them, should planners do such? In essence, this dilemma brings together two of the biggest criticisms of 20th century planning, that being car-centrism and paternalistic planning. Unlike the 20th century however, which saw the heavy-handed implementation of both, planners may need to select one of the two. Either way, planning as a field and as an institution has been delivered a tough choice. This choice may not be needed however, if planners are able to come out ahead of the impending AV revolution and increasing the speed at which cities plan for AVs, not necessarily speeding up the adoption of the technology. Planning for multiple potential outcomes of AV

¹²⁵ McCauley, Ryan "San Jose, Calif., Releases Autonomous Vehicle RFI" FutureStructure, 2017

¹²⁶ Schneider, Benjamin "Do Driverless Cars Need Their Own Roads Around Manhattan? Citylab, 2017

implementation may ensure that a total upheaval of the urban built form is not required, but rather will allow for careful consideration and compromise amongst the various actors involved in the adoption of the autonomous vehicle.

CHAPTER 5: SUGGESTIONS FOR POLICY MAKERS, PLANNERS & CONCLUDING THOUGHTS

A city is not a city without some form of transportation system. For some, such a transportation system may consist entirely of roads and highways made for cars. Others may have extensive underground subway systems with light-rail counterparts. Some cities treat walking and cycling as the most important modes, as rare as they may be. For most Canadian cities, the reality of urban transportation lies somewhere in between these extremes. These urban Canadian regions represent roughly 80% of the nation's population, and if trends persist, that number will continue to grow.¹²⁷ What, then, do the transportation innovations highlighted, from bike shares to autonomous vehicles mean for this 80%? As of mid-2017, very little - if one bases this valuation on policy and municipal preparation for the ongoing and incoming transportation changes explored. Fundamentally, Canadian cities are overwhelmingly underprepared for potentially revolutionary changes in not just the way that residents move around their cities, but also in the ways that private interests inject themselves into the functioning of urban regions themselves.

This concluding chapter has two aims. Firstly, suggestions for policy makers, politicians and planners will be established. These suggestions are meant to provide guidance for an emerging urban reality that will force cities to become more future-oriented than ever before. Additionally, they engage with the operational aspects of the modalities more so than the previous analytical exploration. Second, concluding thoughts on the topics addressed as a whole will be discussed.

Suggestions for Policy Makers & Planners

Planning is by virtue a future oriented profession, and yet, much of the work done by planners is fixing the mistakes of past planners who believed themselves to be adhering

¹²⁷ Statistics Canada, "The City/Suburb Contrast: How Can We Measure it?" Government of Canada, 2014

to the “best practices” of the time. What then, can be done to ensure that the decisions made by planners and policy makers of the 2010’s (and onwards) are not ones that will have to be undone by future planners? Perhaps rather obviously, planners will need to plan for change. This in itself is quite a broad suggestion, thusly, specific suggestions for policy makers and planners on how they can plan for change will be given based on a number of topics discussed previously.

Technology & Innovation

1. Embrace technology and innovation to further urban growth

Technology is such a quintessential component to modern, urban life that much like having a municipal water, electricity or infrastructure department, Canadian municipalities should begin to treat technology and innovation in the same fashion. Toronto has begun this process by opening a modernization department. This is especially important for Canada’s largest city, with consideration to the idea that it has seen heavy investment by Silicon Valley and has even been referred to as Silicon Valley North.¹²⁸ Google has indicated that they wish to redevelop an entire section of the port lands of Toronto that currently sits underutilized.¹²⁹ While the actual implementation of this development should be heavily examined, it indicates that there exist the opportunity for technology and its associated economic activity to benefit the regions innovation is developed. Thusly, it is suggested that other Canadian cities utilize this potential growth strategy and develop their own methods for engaging with technological advancement.

2. Do not allow innovation to be co-opted for austerity

During a recent debate by Toronto city council on a long-range transit plan, Councillor Michael Thompson questioned why council was planning for transit decades in advance, with the prospect of Elon Musk’s proposed hyperloop as rationale for questioning such.¹³⁰ He argued that due to the rapid advancement of technology, especially in the transportation sector, planning for future transit growth was an exercise in futility. This line of thinking sets in motion the idea that prospective technological changes are of higher priority than existing realities for urban residents. Geoff Manaugh summarizes this danger in his piece “Hypnotized by Elon Musk’s Hyperloop” in saying “If the

¹²⁸ Teja, Salim "How Trump is Helping Canada Beat America" Time Magazine, 2017

¹²⁹ Pringle, Ramona "Google Plans to 'fix' Toronto by building smart city", CBCNews, 2017

¹³⁰ City of Toronto, Toronto City Council - Meeting 17, March 31st 2016

Hyperloop's purpose is to address large-scale urban mobility, then there are many other options already deserving of public funding and attention—ones that do not require a hard rebooting of the entire urban world to be realized.”¹³¹ This is exactly the risk posed by looking to technology via the private sector to solve urban transportation issues, in that private industry is primarily interested in making a profit and service secondary, whereas public transit itself is a public service first and foremost. Thusly, public services in the coming era of the sharing economy and technological advancement should be still be invested into heavily and consistently.

Bikeshare

1. Expand urban bikeshare networks

Existing research on Bikeshare systems have indicated that mere existence of a Bikeshare system in a city increases cycling rates overall, and draws in residents that otherwise did not engage in urban cycling. While Toronto, Montreal, Vancouver and Hamilton have existing bikesharing networks¹³², the potential for other midsize to large cities to implement such systems is significant. With overall cycling usage on the rise in most Canadian cities, the timing of expanding and building new systems is at a prime to increase active transportation. Thusly, cities should utilize this opportunity by building up their cycling infrastructure and bikesharing networks.

2. Do not build a bikeshare network without an equity strategy

As discussed previously, Bikeshare systems that have been developed without community consultation and engagement with marginalized communities result in systems that are homogenous or distinctly inequitable in rider demographics. To ensure that this does not persist, existing systems should engage in community outreach, similar to the method utilized by Philadelphia and San Francisco as discussed previously. Additionally, areas that do not yet have bikesharing systems but are looking to implement them stand the greatest opportunity to develop equitable systems that serve the public good in the most effective means possible.

Rideshare

¹³¹ Manaugh, Geoff "Hypnotized by Elon Musk's Hyperloop", The New Yorker, 2017

¹³² Vijayakumar, Nithya, and Cherise Burda. *Cycle Cities: Supporting cycling in Canadian cities*. Pembina Institute for Appropriate Development, 2016.

1. Allow and regulate ridesharing systems

Ridesharing systems have demonstrated themselves to have flaws and operational issues in the cities in which they operate, but they have also demonstrated the desire for their services in urban markets. In essence, a “pandora's box” of sorts has been opened in terms of such services, in that now ridesharing services have established themselves as a component of the urban transportation sphere, it is unlikely that cities will be able to suspend their operations without significant pushback. With this in mind then, cities should carefully begin to allow ridesharing services if they have not yet done so. Again, cities that do not yet have ridesharing services active in their transport sphere stand to develop the most effective regulations as they have been able to observe the success and failures of cities before them.

2. Do not allow ridesharing services to dictate terms of regulation

As was the case in Toronto, by entering into the market without regulation in place, Uber was able to essentially dictate the terms of regulation for their operations in the city.¹³³ Even when the service was banned for all intents and purposes, while the municipality engaged in policy drafting, the company continued operations with direct permission from corporate leadership.¹³⁴ This set a dangerous precedent for the entry of private interests to Canadian municipalities, and should not be allowed to be repeated in any context. With the dawn of the autonomous vehicle, as discussed, there will likely be another regulation confrontation. Toronto’s experience should serve as a lesson in the regulatory challenges that cities will come to face.

Private Transit

1. Allow for competition where appropriate

In certain contexts, such as Innisfil as discussed previously, areas that are otherwise poorly served by public transit may be suitable opportunities for allowing private transit options for residents. Unlike the Innisfil example, in which the municipality was

¹³³ Keil, Roger. "Toronto Alles Uber: Being Progressive in the Age of Progressive Conservative Urbanism." *Alternate Routes: A Journal of Critical Social Research* 28 (2017).

¹³⁴ Keil, Roger. "Toronto Alles Uber: Being Progressive in the Age of Progressive Conservative Urbanism." *Alternate Routes: A Journal of Critical Social Research* 28 (2017).

approached by Uber, rather than the inverse¹³⁵, it is suggested that open competition to provide transit service be utilized. Much like any public infrastructure project, potential contractors for the project must bid to be hired for said project. Municipalities should be leading this form of competition, as it appears to be gaining broader acceptance, rather than allowing private interests to dictate the means by which competition is allowed. Competition, when utilized correctly can allow the public to receive services for the best possible quality in price. It is suggested that cities utilize this fundamental competition aspect of market capitalism to ensure that when private options are utilized, that options of these options are available.

2. Do not allow private transit to lessen investment in public transit

As discussed in the above suggestions relating to technology, private transportation competition stands the risk of reducing investment in public transit. It is therefore suggested that if/when cities allow private transportation services to operate, tax revenue from such services is funneled into investments in public transit. The abilities for cities to do such will vary from jurisdiction to jurisdiction, but coordinated strategy between the relevant levels of government in this context is vital to ensure that public transit is not reduced in quality via attrition.

Autonomous Vehicles

Make plans for the autonomous vehicle, but do not plan to the autonomous vehicle.

Jennifer Keesmaat, Chief Planner for the City of Toronto, has been one of the most vocal proponents of urban AV preparation, urging planners and policy makers around the country (and globally) to speed up their strategies for the incoming technology.¹³⁶ Her perspective on the autonomous vehicle as it pertains to the mosaic of urban transportation is that it may serve to help the efficiency of commerce and long-distance transport, but to assume that it will result in highways and roads becoming seamlessly flowing movers of people is likely not the case. Essentially she has argued that a single occupancy human driven vehicle and a single occupancy autonomous vehicle are arguably the same in the

¹³⁵ Pelley, Lauren "Innisfil, Ont., partners with Uber to create substitute for public transit" CBCNews Toronto, 2017

¹³⁶ Chittley, Jordan "Self Driving Cars: Street Smart" The Globe and Mail, 2017

context of the built form for most Canadian cities.¹³⁷ Rather, she makes the suggestion that autonomous vehicles become part of the mosaic of urban transportation changes in which the decentralization of modal ownership will be the most transformational and positive aspects of new transport technologies.¹³⁸ This perspective is one that will serve municipalities well to plan for, even if the demand for autonomous vehicles appears to be one pushing a transport revolution. The role that the personal vehicle played in destroying segments of North American cities in the 20th century stands to be repeated if municipalities allow planning to be dictated to them.

Utopianism and Planning

Planning as a field is arguably inherently future oriented. While a part of planning is addressing issues created by the planning of the past, the bulk of work and thought in planning is directed at the potential of tomorrow. It should be no surprise, then, that the vision of a futuristic urban utopia has informed planning thought and policy for much of its existence as a formalized field.

Unlike the (largely unrealized) 20th century vision of utopian planning, which would see the state instituting large-scale changes to the built form¹³⁹, the emerging vision of 21st century utopianism is a merger of libertarianism, capitalism and technology in which private industry (supposedly) paves the way forward for the ideal urban society.

The framing of Elon Musk's proposed hyperloop bears direct similarities to how Le Corbusier espoused his vision for the urban future, with descriptions of a perfectly flowing urban system of transport, where pedestrians, drivers and other forms of transport are cleanly separated, allowing for previously impossible urban growth. However, while both Musk's and Le Corbusier's vision of the future are somewhat similar in proposed built forms, the main point of interest that policy-makers and planners should take note of are the intended goals of any utopian vision of the city. Whereas there are problematic components of Le Corbusier's vision, alongside his 20th century paternalistic planning

¹³⁷ Ibid

¹³⁸ Chittley, Jordan "Self Driving Cars: Street Smart" The Globe and Mail, 2017

¹³⁹ Fishman, Robert. *Urban Utopias in the Twentieth Century: Ebenezer Howard, Frank Lloyd Wright, and Le Corbusier*. MIT Press, 1982.

contemporaries, by and large the aim of these large, top-down urban utopia proposals was to better the city as an institution and to serve the public good. The new wave of urban utopians however, espouses similar visions of a highly-functioning city, but achieved via the supposed efficiency of the private sector. While the services proposed may have utility and benefit to the urban resident, the ultimate goal of private industry is to gain capital wealth and thusly has little vested interest in providing equitable services. Thusly, as planners enter this new era of techno-utopianism, it is vital that they consider the role of equity and justice in planning. It may be tempting to allow this burgeoning technocratic promise of efficiency to take the reins of urban development, but as highlighted through the course of this paper, there are often unintended consequences of allowing private interests to gain a stronger foothold in providing public services. As highlighted by a number of the modalities examined, there exists an enormous potential for fundamental changes in the way urban transport is conducted, and while it may well be possible to achieve a planned utopian city, planners must ensure that whatever form such takes is developed with the interest of the public in mind, ensuring that services and transport are provided equitably and justly. Margaret Atwood, who has written a number of (fictional) works regarding the future was quoted as saying “within every dystopia there's a little utopia”¹⁴⁰, of which the inverse sentiment is one that planners should have in mind as they work towards building an urban utopia for the public. While it may well be possible to create the science-fiction version of the city that much of the modern utopian vision is seemingly based from, there must be a consistent and directed focus on ensuring that the marginalized, oppressed and underrepresented are protected and included in whatever form of city comes next. Without doing such, the city of the future may well become a glossy version of the city of the past.

Concluding Thoughts

The vernacular vision of the future is often based on technological development, whether it be flying cars, hyperloops, self driving cars or space travel. The utopian ideal of what humanity's future can be seems to be fixated on this technological aspect of development, rather than, say, societal advancement or equity. This is not entirely unfounded with

¹⁴⁰ Marchese, David "Doomsday Machine" New York Magazine, August 2013

consideration to the fact that historical technological advancement have brought associated societal improvements, but with each iteration of societal change based on technological improvement, there have been communities left behind. Prior to the industrial revolution, income disparities were large between the ruling class and those below, but relatively leveled for most of the population. With the dawn of industry, income inequality between the ruling class and the working class grew larger, as did the discrepancy between those who worked in profitable industries and those that did not. While the industrial revolution is historically looked upon as having improved human life generally, this element of inequity often goes unobserved. This is what cities must keep in mind as they grapple with changing technology. While it may be tempting to hope for technology and directed innovation as the savior of all urban woes, especially in transportation, careful consideration must be given to allowing such technologies/innovations into the urban landscape as they may appear to improve the quality of urban life, erstwhile exasperating the underlying issues of inequality that persist. Former New York City traffic commissioner Sam Schwartz's thoughts on the autonomous vehicle illustrate this in saying "I have no doubt the technology will be there. But again I come back to the very basic point, these ideas are not necessarily for the public good. It's going to be good for a certain class of people, the ones that are in their limousines stuck in traffic behind a thousand Ubers and Lyfts."¹⁴¹ There are a few aspects to this quote that are especially relevant to this paper's themes. The word "necessarily" is vital to distinguish between technology/innovation itself and the outcomes that they bring. While Schwartz may be completely correct in his prediction of the implementation of autonomous vehicles, especially if cities do not prepare adequately for them on an equity level, these innovations in and of themselves are not actors. It is the role of government and private interests alike to determine if and how these innovations are implemented in an urban context. The "how" of this implementation is the determination of whether these technologies will be "necessarily" for the public good. If cities allow private interests to serve predominantly the privileged, then it will not be for the public good. If cities encourage and/or mandate that transportation technologies are

¹⁴¹ Hawkins, Andrew J. "Flying Taxis or Futuristic Tunnels Won't Save Us From the Misery of Traffic" The Verge, 2017

utilized to better the transportation options of its most vulnerable residents, then there exists the opportunity for a serving of the public good. Jane Jacobs, a venerated urbanist writer stated in her last publication “Dark Age Ahead” - “the destructive effect of automobiles are much less a cause than a symptom of our incompetence at city building”¹⁴² This is the crux upon which the urban future stands - replace the word automobile with autonomous vehicle or private shuttle or Uber - will cities be blaming the woes of future cities on these innovations? Essentially, the answer to this is yes - if urban regions do not adequately examine, study and critique the innovations that will supposedly solve the basic problems of cities that have constantly persisted, these innovations stand to serve the same role of the automobile. Perhaps these innovations will be convenient for the individual but damaging to city life as a whole. Conversely, if these innovations are given adequate scrutiny and implemented in a manner that encourages equity and equal transportation access, there exists the opportunity to fundamentally change urban life for the better. Which version of the future cities take is entirely up to them.

¹⁴² Jacobs, Jane. *Dark age ahead*. Vintage Canada, 2010.