Exploring Public and Private Transportation Accessibility in the Twin Cities Area

Stephan (Yujie) Lin, Hannah Brockhouse, Abigail Pleiss, Zoë Wentzel, Summer Shuai

Abstract

Our research seeks to understand the challenges with public transportation accessibility for people with disabilities (PWD) in the metropolitan area of Minneapolis, Minnesota. We show both the necessity of access to transportation and the lack of equity that currently exists with a focus on better understanding the issue in the Twin Cities, Minnesota through the global perspectives of the United States, China, and France.

1. Introduction

1.1 Definition of the Issue

With the development of the legal framework and advocacy for people with disabilities, countries around the world have been forming non-discrimination policies regarding people with disabilities, such as American Disability Act (ADA) in the United States (United States Department of Justice Civil Rights Division, 2009); Law on the Protection of Persons with Disabilities in China (Guozhong, 2006); and a law on the equal rights and opportunities, the participation, and the citizenship of disabled persons in France (Winance et al., 2007). More generic global efforts have also been implemented, notably including the agreement drafted by the United Nations in 1993 on the rights of people with disabilities, which has been adopted by all 20 countries of the United Nations (Winance et al., 2007). Despite this increased effort to provide legal support for those with disabilities, accessibility remains a large issue. This paper will focus on transportation as it is a keystone to accessibility, for it is more difficult to navigate around the world without access to transportation. Throughout this paper, we will show both the necessity of access to transportation and the lack of equity that currently exists with a focus on better understanding the issue in the Twin Cities, Minnesota through the global perspectives of the United States as a whole, China, and France.

The research conducted here will focus on addressing issues in accessibility in local transportation, both public and privatized, for those with physical limitations in Saint Paul and Minneapolis (the Twin Cities, Minnesota). There are many contexts we are bypassing here —location, types of transportation, people, etc. —in hopes of gaining a more nuanced perspective in a narrower focus. The United States Department of Transportation states that "access means being able to use, enjoy, and participate in the many aspects of society, including work, commerce, and leisure activities" (U.S. Department of Transportation, 2015). This paper approaches accessibility not

just as the physical and technical ability to use something (such as getting on a bus) but also as the social and attitudinal behaviors around that use (such as the attitude of a bus driver). Local public and private transportation include things like the bus and light rail (public) as well as Lyft/Uber and Limes (private). This knowingly excludes important means of transportation such as planes, boats, and trains. It will also not include personal means of transportation, such as personal vehicles or bikes.

In addition, while all forms of disability are important, this paper will be primarily focusing on physical disabilities (though some figures and conclusions will be broader as appropriate for full context). Although this will not be explored further in this paper, it is necessary to acknowledge that there is an intersection between people with disabilities and people in poverty. In the United States, almost half of working age adults who have been in poverty for at least one year have a disability, and nearly two-thirds of those who remain in poverty for a long period of time have a disability (Peiyun & Livermore, 2009). This is an important perspective that would warrant further research to better understand and is a lens to keep in mind while understanding the research that follows.

While people with disabilities are a minority group, they are not a small one — in fact, they are considered the nation's largest minority group (U.S. Department of Labor, 2013). According to the 2017 Disability Statistics Annual Report, from 2010 to 2016, the percentage of people in the United States with disabilities grew from a low of 11.9% to a high of 12.8%, indicating an upward trend, though the cause of this trend is not known (Kraus et al.,

2018, pg. 2). In this paper, we focus our discussion on the accessibility issues faced by people with ambulatory disabilities (marking significant trouble walking or climbing stairs) that specifically make up around 6.5% of the population (Kraus et al., 2018, pg. 11). Although equality is important no matter the size of the affected population, the scale of the size of the population of people with disabilities means that the inequity in transportation burdens even more people.

Unfortunately, public transportation today is not meeting the needs of this population in many ways despite the increased effort to provide legal support for those with disabilities. The American Disability Act in 1990 and its more recent revisions are a step toward intentional accessibility, putting into law public accommodations and accessibility focused state and local government services. However, despite these provisions, people with disabilities still face physical and social challenges. The U.S. Bureau of Transportation Statistics (BTS) reported the most frequent reasons for those challenges were "having no or limited transportation and having no one on whom to depend" (Rosenbloom, 2007, p. 526). By themselves, these barriers may seem miniscule, but when consecutive, these barriers amount to a huge problem. Transportation, according to Bezyak et al. (2017), is needed for an individuals' full participation in a community; however, almost 47% of the individuals reported public transportation being inadequate on the basis of effectiveness and timeliness.

While public transportation is not fulfilling expectations, private transportation is not a remedy. Emerging new forms of private transportation around the world like Uber, Lyft,

and shared bikes are left fairly unregulated, free from the accessibility requirements of public transportation (Disability Awareness Staff, 2018). This lack of adequate regulation in private transportation risks inconveniencing and even endangering people with disabilities.

In the Twin Cities, public transportation consists primarily of Metro Transit, which includes light-rails and buses (Metro Transit, 2019). Metro Mobility is a noteworthy system in place to help those who cannot use normal public transportation due to a disability or health condition (Metro Mobility, 2018). Private transportation includes the above rideshare companies such as Lyft and Uber as well as emergent methods such as biking through Nice Ride (Motivate International, Inc, 2018) and scootering through Lime (Lime, n.d.) and Lyft Scooters (Lyft, Inc., 2019).

Although a core tenant of public and privatized transportation is to help with accessibility and equity (Giuliano, 2011), it has been shown that widespread and significant barriers still exist for those with physical disabilities (Bezyak et al., 2017). As public transportation is a publicly funded industry (Giuliano, 2011), and private transportation is funded in part by its users; where people put their voices, votes, and money influences the level of accessibility for people with disabilities. Because of this, everybody—intentionally or not—is responsible for ensuring equality in transportation. The research included in the rest of this paper addresses these responsibilities by pulling transportation data in China, France, and the United States in order to better understand global contexts and perspectives, allowing for a more holistic understanding of accessibility in public and private transportation for those who

have physical limitations in the Twin Cities area.

1.2 History of the Issue

The purpose of public transportation, whether traditional or modern emerging, as described by the Federal Transit Administration, is to provide "affordable mobility and congestion management" (Public Transit in the United States, 2015). The Union Internationale des Transports Publics (UITP), the International Association of Public Transport, founded in 1885, is a worldwide organization dedicated to supporting and promoting sustainable transport in urban areas worldwide. The UITP also holds values like inclusivity and enhancing the quality of life for everyone (UITP, 2014). We conclude that a common purpose of urban public transportation is to provide accessibility inclusively for everyone in the urban areas to transport to their destinations.

In the United States, the *Americans with Disability Act* (ADA) was passed in 1990 to protect people with disabilities from discrimination (The ADA and Public Transportation, 2019). The United States was not alone, however, as similar movements happened around the world. In many cases, the legal frameworks that protect people with disabilities came into society within the last few decades. Despite the long history of public transportation and its goals of providing accessibility to *everyone*, there were no legal requirements to provide complementary accessibility for those with physical limitations until recently.

In different parts of the world, unconventional means of urban public transportation have been emerging in recent years, including public bikes in China, which have also flowed into the European market, and the scooters in the United States, which have low

accessibility for people with disabilities. In a news report by *The New York Times* entitled "Bike-Share Options Are Rarely Available for People With Disabilities," an urban transportation committee member shared his interpretation that the bike-share program and services providing accessibility for people with disabilities should fall under the ADA, but it is an ongoing conversation from a legal perspective (Zaveri, 2018). The report indicated that there are many technical challenges around providing accessibility for people with disabilities. Similarly, reports like the one by Cassidy titled "Lawsuit Claims Popular Scooter Companies Violate the Americans With Disabilities Act" describe how the emerging shared scooter programs violate the rights of people with disabilities (Cassidy, 2019). To conclude from these cases around the world, the emerging public transportation is not providing much accessibility to people with disabilities while benefiting a variety of other parties in the community.

There are voices around the world arguing that urban public transportation is not serving its purpose. For example, in the United States, Susan Schruth (2018) argued that "Buses, trains, and stations may be accessible, but bus stops and paths to stations often are not" (Introduction section, para. 2). This report indicates that because many of the public transportation stations were built long before the ADA was passed, it is hard to change the facilitated utility in many urban areas to meet the needs of people with disabilities with the constraints of budget and time-cost. Thus, "true public transit accessibility remains elusive" (Schruth, 2018). We see that there have been voices engaging the conversations and advocating for providing accessibility for people with disabilities, but at the

same time, the issue involves many technical and adaptive challenges.

1.3 Current Aspects

1.3.1 Social Attitudinal Factor - Individual and Systematic

Many of the components that play into the disability-transportation issue stem from attitudinal barriers. We can implement technical changes to specific buses, routes, or even entire cities to provide relief in those areas, but those types of changes do not alleviate strain from the entire issue. An adaptive change must be made in the public's attitude toward those with disabilities.

1.3.1.1 Individual Behavioral Attitudinal Factor

Bezyak et al. (2017) reports that the characteristics of the driver, including inappropriate behavior and lack of knowledge, represents three of the top six barriers to public transportation for people with disabilities. No matter how accessible a certain mode of transportation is, a disabled individual will not have a positive experience if the driver does not notify passengers of upcoming stops or is not proficient at utilizing assistive equipment, for example. Additionally, Uber and Lyft drivers are not required by law to have accessible vehicles. Any driver has the right to refuse putting a portable wheelchair into their trunk or to assist in any other way (Disability Awareness Staff, 2018).

1.3.1.2 Attitudinal Factor on the Authority Level

Another example of attitudinal barriers is the current lack of regulation/policy enforcement concerning the placement of pay-to-ride scooters and bikes. The Saint Paul government site states that scooters "should NEVER be used on the sidewalks" and should instead be rode in bike lanes or on the road

(Saint Paul Gov., 2019). Our personal experience indicates that this rule is not always followed and rarely enforced. In addition, although Lime asks its riders not to park on sidewalks or service ramps (Lime, n.d.), the Saint Paul government states people can leave their bikes and scooters on the sidewalk (though not block it) or boulevard, and the city will not relocate scooters without extraordinary circumstances (Saint Paul Gov., 2019). Every day, able-bodied citizens can leave these items lying around on sidewalks and parking lots, potentially posing a safety threat to individuals with physical disabilities who may have trouble noticing or maneuvering around them. This suggests that the general public either does not consider or does not care about the harmful effects of their behaviors, and the local government policies (or lack thereof) reflect this.

Beyond the local government, the United States government as a whole is also working on the issue of accessibility. Historically, there has not been alignment in what government's role is in ensuring equality for those with disabilities. "For some, congress's fundamental task is to set the basic objectives and standards guiding governmental activity based on a broad community interest. For others, its duty is to aggregate and reconcile parochial groups or individual interests. By either conception, congress did not fufill its responsibility" (Katzmann, 1986, p. 10). Fortunately, the United States continues to work on this issue positively and consistently. In late 2019, the U.S. Department of Transportation hosted the Access and Mobility for All Summit to raise awareness of the department and government efforts to improve accessibility, efficiency, and affordability in transit and ridesharing (U.S. Department of Transportation,

2020). And in early 2021, the department drafted its first Strategic Plan on Accessible Transportation, a plan that "reflects ongoing and future initiatives across the Department's operating administrations to enhance accessibility and remove barriers in transportation for people with disabilities" (U.S. Department of Transportation, 2021). This constant approach is needed to reach further equality, especially in response to new technology, but it has not proven to be enough.

1.3.2 Local Status in the Twin Cities Metropolitan Area

In the Minneapolis - Saint Paul area in Minnesota, United States, it is hard to find bus stops without ADA-mandated curb cuts; however, 43.1% of the curbs do not meet the 5-foot-paved requirement, which means they are not really making boarding accessible for people using wheelchairs (Isaacs, 2018). Acts and law forces, like the American Disability Act, require that complementary paratransit services be provided (United States Department of Justice Civil Rights Division, 2009). This has been used as many individuals' primary transportation, but due to barriers such as recognition of eligibility for paratransit, denials of requests for paratransit services by eligible individuals, attitudinal barriers among drivers, etc., people with disabilities still do not have full access to public transportation (Bezyak, 2017). We explore this attitudinal barrier more holistically by examining the dynamics in France and China, two regions where public perception varies from the US.

1.3.3 Summary of the Aspects

Looking at these examples, it is clear that there remains both technical physical challenges and adaptive social challenges. Like most issues,

the current aspects regarding physical accessibility to transportation can be better understood by looking at its history. The foundation of many of these challenges likely come from the fact that transportation systems—physical, legal, and social—were built long before accessibility was a normal part of the discussion. Now, emerging types of transportation, like shared bikes and scooters, are not mandated under ADA rules, again leaving those with physical disabilities to have to maneuver a system not designed with them in mind. More than anything else, an attitudinal shift in the minds of those creating transportation systems, those driving the systems and able-bodied citizens who use the systems, needs to occur to not assume ability as the norm and to be more knowledgeable and compassionate toward people with physical disabilities.

2. Global Perspectives

2.1 The United States

We focus on the Minneapolis - St. Paul Metropolitan area in this research by studying actions and policies made in the United States. Our prime motivation for choosing this area was because it is our current local context, and we wished to understand it from a more global lens. Horizontally, we use other global perspectives to compare and measure local public transportation's developmental status in this area. Vertically, we look at the progress of the issue and learn how accessibility becomes an issue for people with disabilities in the current public transportation system. It is important to tackle these aspects of the current system to focus conversations around what is happening to the people with disabilities and physical limitations in our current public transportation system. Then, by pulling perspectives, evidence and observations from other parts of the world, we ask how the issue could be framed and approached, brainstorm how the authorizing environment could be managed and what tough conversations need to happen, and think about where we could look for allies.

In the United States, from the perspective of policies, ADA officially came out on July 26th, 1990, and the regulations around public transportation became more formulated and standardized after (The ADA and Public Transportation, 2019). Many public architectural facilities like sidewalks and bus stops were constructed long before the ADA law was issued. We found on the Architectural and Transportation Barriers Compliance Board's Rules and Regulations Section in Guidelines for Transportation Vehicles' Accessibilities for People with Disabilities (2016) that ADA requires The U.S. Department of Transportation (DOT) to revise the accessibility standards for transportation vehicles and urban planning around the transportation systems like the curb of the bus stops. However, from the urban planning standpoint, there are dilemmas around rebuilding and reforming in the process of working to meet the requirements of ADA from the perspectives of funding and social attitudinal reactions. The complexity of the accessibility issues for people with disabilities in the United States ties into the public motivation towards supporting people with disability and the accountability of local urban planners to meet the requirements of the ADA.

2.2 China

We choose China as one of the comparison cases because this country has a similar legal framework as the ADA called Law of the People's Republic of China on the Protection of Disabled Persons, which was also passed in 1990 (China Law, 1990). In 2012, this legal

framework implemented a new Regulation on Construction of a Barrier-Free Environment, which also provided standards for urban planning projects and social infrastructure to ensure accessibility for people with disabilities (Zhang, 2012). This regulation and the standards provided are similar to the ADA's requirements in the United States, so analysis in China is comparable from a policy implementation angle. As for urban public transportation, similar to that in the United States, China not only faces the issues around accessibility for people with disabilities in traditional public transportation systems, but China also has issues around emerging new forms of public transit services and quality of said transportation.

Despite the similarities in policies and the modern forms of public transportation, there are social contexts in China that the United States does not share. One important note is that the government structure and internal support for disability in China is not the same in the United States and China. In addition, the increased population size of China impacts the ways the systems work in reality. The shared privatized public transit system, for example, is explained well by Campbell (2018): "Sharing is a wonderful principle, but the reality, without strict regulations, is a whole lot of screaming and biting." Some regulation implemented on public transportation is in consideration by the government, "including creating a regulation and service platform, setting up non-shared bikes parking areas and setting up an evaluating system to supervise bike quality, and withdrawing all shared electric bikes from the city" (Xinhua, 2018). A strong level of difficulty in managing this shared-transit system in China is obvious due to "[t]he rapid urbanization and large scale motorization" (Peng et al., 2012), while in the United States, the shared-transit system just started

to show up in different regions. Also, the ownership of most of the public transportation in China belongs to the government, which is also different from the United States where the Federal Transit Administration (FTA) "provides financial and technical assistance to local public transit systems" but does not own the transits (United States Department of Transportation, 2016).

2.3 France

We choose France as another sample for comparison because, first, by looking at different transportation rankings on various travel websites, we noticed that Paris as a major city in France ranks very highly (Dickson, 2018 & Victor, 2018 & Yirka, 2019). We want to see which aspects of the public transportation system in France cause the country to receive positive feedback and few critiques. Also, France brings in a unique perspective different from both the United States and China with its system for people with disabilities named Residential Care Facilities (RCFs, called "établissements medico-sociaux" in French) (Rapegno & Ravaud, 2017). This social institutionalization for people with disabilities, from a macroeconomic lens, could create a different demand and supply system and possibly change the social behaviors and defaults of people with disabilities because the supply chain structure shifts when people with similar needs and social services cluster in the same geographic regions (Williamson, 2014).

The landscape of transportation in France is largely privatized — in that private firms build, own, and operate transit systems in most French cities — but the French government is not absent from these systems. According to Jacobson's groups' research in 1996 around patterns and policies in social infrastructure history, the

French government has played a more and more active part in public transportation system over time. During the 19th and early 20th centuries, the French government officials intervened and started to be more active in public transportation systems' designing and budgeting. Because patterns of French transit are impacted by "the slower rates of urban population growth, tighter government regulation, and greater difficulties in assembling large tracts of property for subdivision" (Jacobson et al., 1996), after World War II, automobile use cut sharply into public transit ridership and profitability. But in the early 1970s, the French government levied a special transportation tax to make public transportation more viable (Jacobson et al., 1996).

In European Union countries, there were great cases for improving accessibility for people with disabilities. The EU has its standards that require facilities within the transit system to provide plenty of accessibility to people with disabilities and countries in the EU are strictly following the criteria by rebuilding facilities. France specifically started the Mobi+ project to improve the urban transit system's accessibility and services for people with disabilities, specifically Disabled, Wheelchair, and Blind (DWB) along with implementation of emerging technological urban planning (Zhou et al., 2012). However, recent research shows that even with great improvements to the public transportation system to provide better accessibility for people with disabilities, mobility for people with disabilities is still very limited (Rapegno & Ravaud, 2017). We see a technical improvement in public transportation system in favor of people with disabilities in France, but there are many adaptive challenges around true improvement for people with disabilities.

3. Visual Depiction of the System
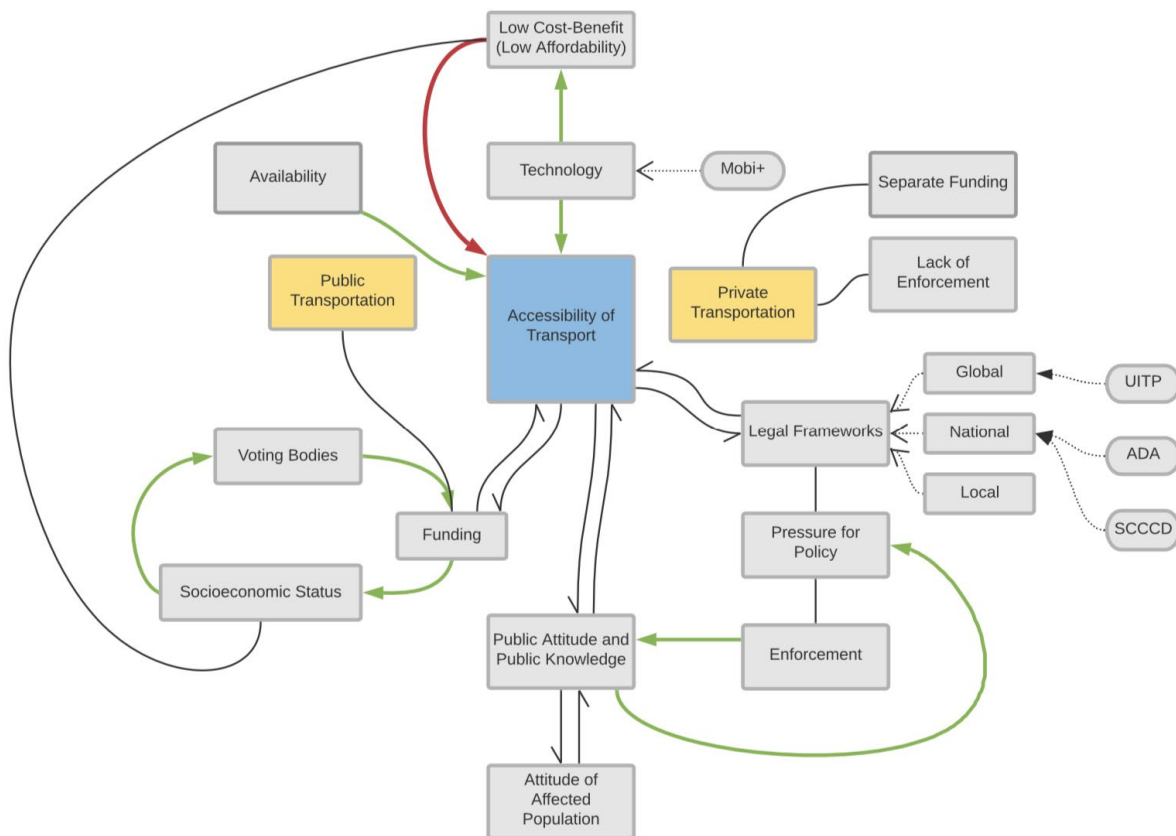
Reference: Maunder, D.J., Venter, C.J., Rickert, T.E., & Sentinella, J. (2004). *Figure 9.*

The visualization of the system illustrates the intersectionalities within the public transit system so that one can find all the stakeholders, factors, and issues that exist in the system.

3.1 Description of the Visual Depiction

At first glance, the visual of transportation accessibility is overwhelming. We intentionally designed the image in this way to represent the complexity we see in the system. There is complexity not just on one level but on multiple levels scaling through the interactions of multiple subsystems. One of the broadest levels includes the division of the system into public and private transport. Examples of public transport explored in our research include Metro systems, trains, and buses. Private transport includes taxis, ride-share systems, Uber and Lyft, and scooters. All three of our global perspectives include this division of systems, which itself includes many other divisions, such as funding and policy. There is also the level of technical vs. adaptive systematic components. Not all of the subsystems within this issue maintain the same role of technicality. Our visual models the image created by Maunder et al. (2004). Their research discusses how to "substantially transform the livelihoods of disabled people themselves and their immediate families" by increasing access to transport (Maunder et al., 2004). The visual is created in the way that the boxes further towards the bottom of the system represent entities that are more adaptive in nature. These subsystems will not be solved by "quick fixes" and have more to do with the baseline issues that have created inaccessible transport. The boxes towards the top of our diagram represent issues that are highly technical and highly advanced. This means that these issues are products of the adaptive issues being unresolved, such as public perception toward people with disabilities and the responsibility

people feel toward ensuring equity. Over time, highly advanced and very specific components have emerged in the larger system.

We additionally have high complexity on the level of subsystem interaction. Some entities in this diagram carry more weight on total accessibility than others—entities with the closest, most direct relationships have simple arrows connecting them. Dashed arrows represent specific examples of ideas in the system. Not all of these examples are applicable across our global perspectives as each region globally interprets the subsystems differently. Subsystem interaction is described by feedback loops. Red arrows here represent negative feedback loops, while green represents positive feedback. When exploring such a complex, systematic issue, it is important to be able to see the ways in which our subsystems are reinforcing each other. This will be a key step for anyone who wishes to intervene upon the issue.

One of the most important feedback systems here involves the interaction between socioeconomic status and voter power. Those with high socioeconomic status decide the fate of public transportation as described by Giuliano (2011). High socioeconomic status leads to higher voting in this positive feedback loop. If you are higher on the socioeconomic scale, you are statistically more likely to vote in the first place (Brians & Grofman, 1999). We also know that voting is what leads to more funding for public transport. In the first paragraph of the section titled "Who is the Customer?", Giuliano says, "With public funds accounting for the vast majority of transit revenues, the voter, not the transit user, is transit's primary customer" (Giuliano, 2011). What ties this feedback loop together, then, is the idea that

transit systems are motivated to benefit or "impress" those with high socioeconomic status over those of lower status, and, as mentioned earlier, those with disabilities tend to be disproportionality of lower economic status (Peiyun & Livermore, 2009).

Higher up on the hierarchy of specificity is the feedback of increased technology on accessibility levels. Generally, technology is implemented to improve a systematic issue. For example, the Mobi+ system established in France is a highly-advanced framework that has been shown to improve rider satisfaction (Zhou et al., 2012). However, increased technology only improves accessibility on some levels. We know that technology is not always economically salient. Unfortunately, lack of affordability also decreases accessibility (Steinfeld et al., 2018). Though not well-researched, we also wonder if highly advanced systems negatively impact attitudes. This could possibly be due to intimidation factors or extra burden for the rider to learn and engage with the technology. From an intervention perspective, the question, then, is how can we use technology to create adaptive change within this system?

Policy-level regulation is not the most glamorous component of this issue, but it is absolutely critical to making change. Where we currently stand in the US, the government does not enforce regulations for privatized transport (Saint Paul Gov., 2019). Where the government provides no action, there is no modeled example for the public. Lack of enforcement therefore leads to poor public awareness of their personal impact on persons with disabilities. We especially see this in regards to scooters and bike-shares. Lack of policy enforcement circles back to the idea that voter power is directly related to changes in funding. If we consider the portion of the public with mid-to-high

socioeconomic status, low public awareness leads to lack of pressure for policy and funding changes. There is then no pressure for the government to improve regulation and increase enforcement of policies, so the cycle continues. We wonder what would happen if the government (in any region) took on a new role in protecting the affected population. Would public attitudes follow suit?

4. Understanding the System

4.1 Who Has Power and Influence in the System?

Globally, the issue of accessible transportation should be relevant to all individuals. Even if disability does not directly affect one's life, transportation almost certainly does, and, as explained further below, everyday people have power over changing transportation systems. Because of this high relevance, we see the power in the system as being split in all different directions. There are of course legal systems which can include national and local government, but this issue also includes the affected population, caretakers of the affected population, public transport employees, taxpayers, voters, advocates, other transportation users, and stakeholders with financial motivation in the system.

In the US, the legal systems hold the most direct power. The United States Department of Justice Civil Rights Division (2009) provides detailed information regarding these laws. In terms of policy, Act II of the ADA mandates that public transport authorities cannot discriminate against individuals with disabilities. Additionally, newly purchased vehicles must be deemed accessible, which is defined as usable by individuals with disabilities (United States Department of Justice Civil Rights Division, 2009). The paratransit system is a special system designed for those who cannot use the traditional public transport system. Act II says that "unless it

would result in an undue burden, paratransit must be provided anywhere that fixed-route buses or rail systems operate" (United States Department of Justice Civil Rights Division, 2009). This shows that at least within the realm of public transportation, the ADA holds power that supports those who are disabled.

Within private transportation, the story is a bit more complicated. The US legal system also mandates that companies that provide transportation as a support to their main business must also offer transportation to those with disabilities (United States Department of Justice Civil Rights Division, 2005). However, this same source also explains that these laws do not apply to companies in which their main business is transportation. We see this as being a detrimental power imbalance favoring the private sector of transportation as companies such as Uber and Lyft drivers are not required to have accessible vehicles (Disability Awareness Staff, 2018). Although there is no evidence on why private transportation companies are exempt from ADA laws, this kind of model shows that the rights and equality of people who are disabled are not always the top priority. The companies themselves hold power and may choose if they wish to provide more accessibility—Uber, for example, has features such as anti-discrimination policies and UberASSIST (meant specifically for riders with assistance needs) to be more accessible (Uber, 2019). Nonetheless, as mentioned earlier, drivers are not required to have accessible vehicles (Disability Awareness Staff, 2018), and any regulations that exist are up to the individual company, leaving power directly in their hands and, indirectly, the people who fund them.

When it comes to emerging transportation, such as shared scooters and bikes, we have found an absence of evidence on who holds power. The relative recentness of the companies also means that legal systems may not have had adequate time to react effectively. Similar to other privatized companies, they may take the onus into their own hands. Recently in Minnesota, however, an advocate filed a lawsuit against the city of Minneapolis and local scooter companies for failing "to maintain the accessibility of public sidewalks, curb ramps, crosswalks, and transit stops in the city for people with disabilities" (KSTP, 2019). This shows the potential power of everyday advocates to work within a system to empower those with disabilities as well as hope for regulation on privatized transportation, perhaps removing some of their power.

Voters, as the ones who elect politicians into power and vote on certain policies, hold indirect power over all of these laws. In addition, public transportation is funded more by the voter base than its user base. Giuliano (2011) points out the problem with this: rather than making improvements and policies that benefit its riders, including those with disabilities, public transportation authorities are incentivized to please the voter, which are statistically those with high socioeconomic status. This removes the power from people with disabilities and places their access to public transportation in the hands of those who may or may not care. The typical voter therefore benefits from this system as they are the ones being satisfied. To be clear, those with disabilities are still able to vote but statistically are lower socioeconomic status (Peiyun & Livermore, 2009) and are therefore less targeted by the system. In addition, as accommodating those with disabilities can be an expensive endeavor with little financial gain (Bus Profile, 2019), both public and private companies financially benefit from less

strict policies and enforcement. On the flipside, those with disabilities are harmed by being reliant on a system that does not consider them.

Public transit employees also hold power in the system as the ones who control how they treat riders with disabilities. Unfortunately, in the United States, attitudinal barriers are a key player driving the current power imbalance. Attitudinal barriers are a norm for transportation in the US, and characteristics of the driver often negatively impact rider experience for those with disabilities (Bezyak et al. 2017). Attitudinal barriers could be attributed to lack of knowledge, poor training, stigma, or poor modeling by authoritative frameworks. Because of this poor rider experience, people with disabilities report feeling a lack of social inclusion (Tillmann, 2013). In summary, the power imbalance could be a result of lack of enforcement, poor modeling, and subsequent poor public attitudes, which all continue to support America's inaccessible systems.

At their base, the systems of power in the United States look very similar to China's system - where the United States has ADA, China has the Law on the Protection of Persons with Disabilities (Guozhong, 2006). Guozhong (2006) helps inform our understanding of these systems. This aforementioned law mandates accessibility, including in transportation. As shown earlier, the United States has a general Department of Justice Civil Rights Division. However, China has a more specific government disability policy group, created in the 1980s, called State Council Coordination on Disability (SCCCD). They are the ones who made the Law of Protection of Persons with Disabilities and who continue to make regulations, so while the law holds power over government and companies, SCCCD holds power over the law. It is also important to note the intersectionality of this group. Health, civil affairs, education, labor, social security,

and national organization of people with disabilities are all involved, showcasing a wide variety of players in the system. There is also China Disabled Persons' Federation, which is an umbrella organization for those with disabilities to help give them a voice. Finally, China has over 38,000 grassroots organizations focusing on disability, showing public support for helping those with disabilities and the power of advocacy (Guozhong, 2006).

Overall, China appears to have structural support for people with disabilities advocated on an authority level. One evidence is the fact that anyone under the Central Government carries responsibility for those with disabilities, including the State Council, people's governments of provinces, autonomous regions, and municipalities (China Law, 1990). In addition, China Law explains that all members of society have a role in the service of disabled individuals. As such, people may be more easily motivated to advocate for and support those with disabilities.

France also has laws for protecting those with disabilities with the most recent noteworthy law being formed in 2005: Law on the Equal Rights and Opportunities, Participation and Citizenship for Disabled Persons (Winance et al., 2007, p. 161). Similar to China, France is effective at getting all the actors involved - politicians, scientists, administrators, associations, etc. - again showcasing the power of their voices (Winance et al., 2007). This is highlighted in a French government statement: "The Government is working hard to achieve more cross-functional coordination and to simplify the situation as much as possible by coming up with solutions based on individual needs and on the expertise of disabled people themselves, as well as their close supportive circle" (Gouvernment, n.d.). This split of power

helps give more influence to everyone in the system.

Whereas the US has laws focusing on anti-discrimination and China advocates for servicing those with disabilities, France "asserts the need for everyone to have access to everything" (Winance et al., 2007, p. 161). This highlights a different approach to people with disabilities with a larger focus on empowering rather than simply helping. This is accomplished in part through compensating those with disabilities, spurred originally through military reparations but now available to others with physical disabilities (Winance et al., 2007). This compensation is used to help those with disabilities smoothly reintegrate into society, helping cover things like rehabilitation, physiotherapy, and reentering the workforce (Winance et al., 2007). The compensation is one of the many duties of one of France's main disability resources, Caisse Nationale de Solidarité pour L'Autonomie (roughly translated as the National Solidarity Fund for Autonomy), a government group that is also in charge of funding as well as disability research and public education (Accessibilité, 2019). This funding could potentially point to an increase in support on the advocacy level. Empowerment for disabled populations is reinforced by compensation; while compensation itself likely does not improve attitudes, the support behind the funding might.

Unfortunately, both China and France have a gap in public evidence surrounding privatized transportation. However, it would not be unreasonable to believe that transit employees' attitudes still affect people with disabilities' experiences on transit. One notable example of privatized transportation accessibility is in China, where DiDi is the equivalent of Uber/Lyft (里 昂, 2017). The company has chosen to provide a

special vehicle service for those with physical limitations, showing awareness of and care for people with physical disabilities, but the two-hour wait time indicates that the transportation is still not equal to those who are physically abled (里 昂, 2017).

All in all, the United States, France, and China all have similar actors made up of legal systems made to support those with disabilities, advocates (who are sometimes contributing to the legal system) who push for more accessibility, public transportation that is hurt by the fight for accessibility due to costs with little financial incentive, and private transportation companies that are unregulated when it comes to accessibility. Citizen voters who do not have disabilities, including those who do not even use public transportation, hold the power to help shape the system to be more accommodating but may see little benefit from it if they are not close to someone with a disability (and could theoretically even see their taxes going up due to costs of the system). As such, those who do not see the importance of accessibility for people with disabilities and those incentivized by money, such as the transportation companies, benefit from the system when it prioritizes those who do not have disabilities. Those who have disabilities or otherwise wish to fight for accessibility benefit from the parts of the system in which it mandates law over accessibility. However, as both China and France see it as a citizen's duty to help those with disabilities, citizens may be more likely to see systems that promote accessibility as beneficial for everyone despite raised costs.

4.2 Who is Being Harmed in the System?

Individuals with disabilities are being harmed by being reliant on a one-way system. An unjust system of accessible transportation for those

with disabilities first and foremost harms the population of individuals with physical disabilities. Persons with physical disabilities are affected every day by the issues of perception and outcomes that result from the lack of accessibility (Beyzak, et al., 2017). Across cultures, disabilities are viewed differently. This results in various perceptions of those with disabilities and consequently can affect the degree of harm to those individuals as well.

In the United States, regulations, such as the American Disability Act, are in place to try to ensure equality amongst disabled individuals (United States Department of Justice Civil Rights Division, 2009). These systems are not perfect, and inequalities persist in inadequate public transportation and attitudinal perceptions remain (Beyzak, et al., 2017). The lack of accessible transportation creates negative outcomes for not only the disabled individuals but also populations in poverty and low education, affecting access to essential things such as education, employment and social services (Venter et al., 2002). According to Reed (1977), this lack of accessibility is the single most important factor preventing thirteen percent of the disabled population from working. This affects not only those individuals but also the greater population and economy as a whole.

In China, there are many laws, regulations, and systems in place to provide support for those with disabilities. As mentioned previously, there is the Law on the Protection of Persons with Disabilities, the State Council Coordination on Disability (SCCCD), the China Disabled Persons' Federation, and many more supporting organizations (Guozhong, 2006). There are many structural systems in place that aim to benefit the individuals of the disabled population. Perception wise, China holds a responsibility for those with disabilities and places importance on all members' roles in society (China Law, 1990).

In France, the perception of those with disabilities is complex to understand. Here, persons with disabilities are placed in residential care facilities (RCFs) instead of being integrated with the general population (Rapegno & Ravaud, 2017). The result of this is a lack of accessible transportation to those not in these RCFs, causing limited movement of individuals restricted to certain areas or minimization of movement as a whole (Rapegno & Ravaud, 2017). This could possibly also affect an individual's quality of life, independence, and perception of their own disability. However, we also acknowledge the strength of the French legal support in regards to anti-discrimination and individual empowerment. As France is having good technical improvement in public transportation systems for people with disabilities through our research, we wonder if there is a discrepancy between what the government "says" and the action that is taken. The role of RCFs can contribute to the harm that is being done in this system, but it is not necessarily a detrimental element on the whole.

4.3 Who Benefits from the Current System?

Overall, through the system the way it is, those who benefit are those who make money off of it. This is especially true for privatized systems where there is minimal incentive to change the system. Additionally, for privatized transportation, such as shared bikes or scooters, the target individuals are not those with physical disabilities; therefore, there is another lack of incentive to change. A privatized system like this would be financially harmed by new systems that place importance on equality in privatized transportation. In each cultural perspective, those

benefiting vary depending on the cultural makeup of each system.

In the United States, funding is currently different for private and public modes of transportation. Privatized systems are not mandated as public ones are. In the public system, there are laws like the ADA that require accessibility in transportation vehicles; however, the system is lax in areas regarding old vehicles (United States Department of Justice Civil Rights Division, 2009). There is uncertainty in the system about what to do with old vehicles that don't comply. Additionally, there is a gap in the system regarding the cost burdens of updating the system (Bus Profile, 2019). Thus, people with disabilities should be benefiting from the system as stated in the definition of public transportation, but they are not.

In China, the number of individuals benefiting from the current transportation system is minimal. We have seen that there are many systems in place to try to improve support of disabled individuals. One key aspect of the system in China, however, is that there is poor quality transportation, an issue affecting everyone (Campbell, 2018). There is difficulty in managing specifically the new transportation systems in China. Legal frameworks in this sector don't directly benefit anybody (Hu, 2017). Poor quality transportation systems are a deeper issue for all of the population, not just individuals with disabilities.

In France, the owners of the RCFs are the beneficiaries of the system the way it is (Rapegno & Ravaud, 2017). Similarly to the United States, transit systems have previously been built, owned, and operated by private firms in French cities and many still are (Jacobsen et al., 1996). Historically, owners of these private systems have benefitted. However, since those companies are privatized and most disabled persons are in RCFs

today, there is minimal incentive to change and provide accessibility for these individuals.

4.4 What Ethical Standards Exist?

Legal framework and ethical standards are highly connected to each other. This is described by Celine (2017) who says that "Many of the existing laws originated in ethics, while ethics, in turn, is rooted in morals and the perception of the rightness or wrongness of an act or conduct." As mentioned before, legal frameworks exist within each of the global perspectives. In the United States, the ADA Standards for Accessible Design sets minimum requirements to be "both scoping and technical – for newly designed and constructed or altered State and local government facilities, public accommodations, and commercial facilities to be readily accessible to and usable by individuals with disabilities" (Department of Justice, 2010). In China, The Law on the Protection of Persons with Disabilities was enacted in 1991, which has been essential to the protection of the rights of people with disability. However, in the aspect of accessibility, they still see some issues: "Problems include limited awareness of accessibility needs, shortage of technical and financial resources, and the relative lack of local economic and social development in many regions" (Guozhong, 2006). With that awareness in mind, China set up the China Disabled Persons' Federation (CDPF), and under the support of the organization, there are some 38,000 grassroots associations of people with disabilities that are active throughout the country, both at the community and village levels (Guozhong, 2006).

In the US, the everyday citizen voter is essentially put in charge of the funding of public transportation (Giuliano, 2011). This is what we have described further in detail previously.

However, the everyday citizen is not necessarily the one utilizing public transport the most frequently. Additionally, their voter power says nothing about their knowledge about disability. One of the biggest barriers for disabled individuals who use public transportation is attitudinal, referencing the lack of care from the public eye (Beyzak et al., 2017). The US thus far has generally failed to recognize that prejudice exists, especially in regards to individuals with physical differences (Mccluskey, 1988). Thus, we argue that apart from law, there is not an adequate framework for ethical standards currently in America.

The global perspective from China tells a completely different story. Advocacy here is passionate, as supported by the presence of the CDPF as mentioned and the corresponding NGOs (Guozhong, 2006). Additionally, the ethical attitudes about disability contrast from the ethical standards in the US. In one scholar's thesis, the philosophical teaching of Daoist Zhuangzi is used to symbolize relatively newer attitudes about disability in China. This scholar says that "disability endows one with greater insight and acuity, such that the disabled person outwits the able-bodied in their understanding and awareness of the *dao* and obtains *de*, which is 'virtue' or 'power'" (Lewis, 2014). While we recognize this example is anecdotal in nature, philosophy is deeply rooted in a nation's history. A nation's historical attitudes can in turn direct current belief systems.

In France, non-discrimination policies with clauses for disabled persons dictate the social treatment of disabilities. Silvers and Francis (2005) describe how from the perspective of public transportation, bus drivers in America, for example, sometimes give negative reactions towards people with disabilities. This mindset is adopted from the social framework of resources allocated to "curing."

They automatically form this degrading mindset towards a passenger with disabilities boarding their bus. Because of France's policies, however, these types of negative mindsets do not appear to persist. Winance (2007) better describes this idea through an explanation of France's views, practices, and policies. The modern view of disability in France is more personalized but also includes category-based and universalist approaches in which people are either sectioned off or all grouped together. Ethically, public attitude in France does not appear to be as detrimental as the attitudes persisting in the US.

4.5 What Technical Solutions Exist?

There are multiple examples of technical applications that countries are using to try to fix the transportation issue. However, it's a long process and despite advancements, there are still improvements to be made. Shaping the built environment is one essential way to gain more accessibility in the perspective of the physical environment, which includes "pedestrian paths to stops and stations" (Steinfeld, 2018, p. 39). In the US, "Montgomery County's transportation agency has worked with plaza and center owners to coordinate stop locations and make good pedestrian connections to stores" (Steinfeld, 2018, p. 41). Uber and Lyft were originally implemented to improve accessibility on this level, but they are not required to be ADA compliant. While there is motion to change this, it is slowed by their claims of being software companies rather than public transportation, as well as the fact that they do not provide the vehicles to their drivers (Disability Awareness Staff, 2018). In addition, the Transportation Research Board reports that these innovative transportation services are disrupting conventional taxi and limousine services and are raising policy challenges related to personal

security and public safety, insurance requirements, employment and labor issues, and accessibility and equity (Transportation Research Board, 2016).

The US has also implemented fare reductions, an effort to make the actual use of transportation more feasible for those with disabilities. Users must qualify for the fare reduction through an interview, which can actually decrease accessibility. Overall, fare reductions help with affordability, which is important due to poverty rates amongst those with disabilities, but do not improve the physical accessibility of the vehicles because the procedures one needs to go through sometimes appears to be confusing and burdensome (Steinfeld, 2018, p.41).

In China, the Olympic games held in Beijing in 2008 aimed to raise the awareness about the accessibility of public transportation to the disability community. News outlets and mass media published some thoughtful articles during this time that showed the improvements made on accessibility. One of the articles highlighted improvement in the buses and subway with upgraded facilities for people with disabilities, including elevators and escalators in the subway systems and seats for people with disabilities (侯, 2016). However, some of the facilities are in poor maintenance status due to the excessively large passenger flow volume. Also because of the huge passenger flow volume, it is difficult for people with disabilities to access these facilities (侯, 2016). This is not the only example of poor quality transportation in China. Many bike-share companies appear to support the accessibility system by increasing the quantity of the shared bikes. However, the subsequent surplus has a negative effect on the system as a whole. Liu

(2018) says that "Good quality public transportation is the foundation of sustainable mobility." The oversupply of bicycles then not only affects people with disability but affects the whole country's traffic system. Thus, this technical solution by simply amplifying the shared transit tools does not work well in practice, specifically in populated metropolitan areas.

In France, rider-friendly technology has been launched to improve the accessibility of public transportation to disabled populations in the urban area. The Mobi+ system is a highly advanced system meant to improve accessibility through data exchange and service provisions (Zhou et al., 2012). The three main solutions in the project work to rebuild the pavement, adapt the bus floor to the height of the pavement, and deploy the pallet. The Mobi+ system mainly uses the technology and data to provide more accessibility through three subsystems: a wireless communication subsystem, which provides the data exchange and network connection services between buses and stations in the complex urban environments; the bus subsystem, which provides the DWB class detection and bus arrival notification services; and the station subsystem, which implements the urban environmental surveillance and bus auxiliary access services. The prototype of the system shows that it "can provide an effective bus access service for people with disabilities by minimizing significantly the total bus route time" (Zhou et al., 2012). To improve the accessibility issue on the whole and see real data among it will be a long-term process. However, the action of Mobi+ initiates a good trend of trying to improve the issue and collect data in the meantime.

5. Summary

Globally, and locally in the Twin Cities, transportation accessibility is not equitable. The issue has come to light in the media recently, but the motivation for change is not quite at the system level (Rosenbloom, 2007, p. 527). We have explored the system in the US (specifically Twin Cities, Minnesota), China, and France, and have shown how the different contexts address the issue. All global perspectives in this paper maintain laws regarding accessibility and protection for people with disabilities, but the legal guidelines have proven to be ineffective on their own. This is especially clear in the United States as 47% of people with disabilities say transportation is inadequate (Bezyak et al., 2017).

The improvement of accessibility cannot rely on law alone. Transportation accessibility is influenced by a multitude of sectors (Steinfeld, 2018). We have discussed sectors such as public vs. private classification, funding, voter power (which is largely influenced by socioeconomic status), public attitudes and public knowledge, policy, and policy enforcement. Even this list is not completely extensive, speaking to the weight of this issue and the need for a system level change.

If we do nothing, and no one else advocates for the affected population, the current issues may snowball. As explained before, the costs of updating vehicles to be more accessible is high (Bus Profile, 2019) and changing requirements usually take time to adapt, sometimes only affecting new infrastructure (United States Department of Justice Civil Rights Division, 2009). Because of this, the importance of everyday citizens becoming advocates is likely greater than the general population recognizes. "The effectiveness of different accessibility service approaches is not studied systematically,

including the factors of budgetary resources organizational scale, and experience and education of staff" (Steinfeld, 2018, p. 32). If the current system does not change, transportation will likely remain inadequate. The French standard of everyone having access to everything is impossible if people literally can't get places (Winance et al., 2007). On top of the legal and physical implications, a failure to shift toward a positive attitude may continue to cause division and lack of belonging to people with disabilities and could risk even increasing the separation of populations due to unequal accessibility.

The technical solutions in place are not likely sustainable. Traditional modes of transportation are simply not enough to provide adequate services for the target population (Zhou et al., 2012). Technical solutions alone are expensive and not all encompassing, nor are they the only problem with accessibility. As is, transportation will move in a direction that benefits legal frameworks and those with social power. Attitudes will not change if left unchallenged, but the shift in mindsets is necessary since the voters/taxpayers and users of private transportation hold power over the system. The most adaptive changes that need to be made have to do with public perception of this issue (Bezyak et al., 2017).

In conclusion, transportation is failing to uphold its core tenant of accessibility and equity. Despite some legal requirements, accessibility for all is not maintained due to many things including inconsistent policies, lack of enforcement, and driver bias. Looking at transportation accessibility through the global perspectives of United States, China, and France, we have gained a better perspective of the people and systems involved as well as the technical and

adaptive issues at hand, helping us better comprehend the nuances surrounding the lack of transportation accessibility locally.

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