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Transportation Network Companies as Cost Reduction Strategies for
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Report

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Abstract

Transportation Network Companies as Cost Reduction Strategies for Paratransit

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Paratransit service is an auxiliary type of public transportation provided for people with disabilities and older adults. Federal ADA regulations require all transit agencies receiving federal funding to provide paratransit service, but the per trip cost to transit operators is extremely expensive. Many transit agencies are looking for ways to reduce costs without limiting services. For many agencies, this results in providing the minimum services as required by ADA regulations. However, Boston's Massachusetts Bay Transit Authority (MBTA) has taken a different approach to cost reduction by entering into one of the first partnerships with transportation network companies. In September 2016, MBTA's paratransit service, The Ride, began a partnership with both Uber and Lyft as a cost reduction strategy for paratransit provision. Since the beginning of the partnership, MBTA has been able to reduce costs of providing paratransit while maintaining the same level of service. This report will examine the benefits and limitations of such partnerships between transit agencies and transportation network companies,

using MBTA's The Ride partnership as an example for potentially successful partnerships throughout the United States.

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Chapter I: Introduction

As the population in the United States continues to age, more cities are looking for ways to meet the increasing demand of paratransit. The Transportation Research Board's Committee on Paratransit states that "paratransit" means "alongside transit." "It includes all public and private mass transportation in the spectrum between private automobile and conventional transit. Paratransit modes are usually demand-responsive and provide shared rides"[1]. Paratransit serves disabled people under the American Disabilities Act (ADA) passed in 1990, providing transportation beyond the fixed route of a transit service to those who cannot take public transit due to a disability. There are 3 types of paratransit: complimentary, general, and user-side subsidy. Complementary paratransit, which offers free rides to people with disabilities as mandated by the ADA, has come to forefront in recent years due to rising costs to transit agencies.

The ADA has particular regulations that are required for paratransit. These regulations require transit operators to provide certain services as an alternative to public transit for people with disabilities. The ADA sets criteria for who is considered disabled and how service should be provided and establish safety standards to ensure reliable transit for people with disabilities and the elderly[2].

There are currently two issues that hinder complementary paratransit service: cost and limited services. Since paratransit trips are extremely expensive to transit agencies, many transit agencies are looking for ways to reduce costs without limiting services. Because of the costs associated with leaving a dispatch station, arriving at a pick-up location, driving to a destination, waiting for the rider, and taking them back to their destination, many transportation agencies are spending a large portion of their budget on paratransit. Additionally, the current system operations typically do not allow for true flexibility in mobility due to the need to call ahead of time for a

ride. Small fleet sizes have to meet very high demand, making wait times very long, and the high maintenance requirements of the heavily burdened vehicles makes paratransit extremely expensive. Many agencies are searching for ways to provide service more efficiently while reducing cost. This is a growing concern across the country. This report will discuss a relatively new cost reduction strategy for paratransit services: transportation network companies.

Transportation network companies (TNCs) are a very popular mode of transportation that has improved mobility for many. The companies operate predominantly through phone applications or "apps," and drivers use their own vehicles to transport passengers for a fee. These apps are downloaded to a smart phone, and would-be passengers use the app to order a car. The app either uses GPS or a location input by the rider, and a driver arrives and takes the person to a destination that the user inputs. The first transportation network company, Uber, began in 2010 in San Francisco and spread quickly across the country and around the world as a new alternative to taxi companies. The invention of transportation network companies has dramatically changed the way we think about our options for transportation and improvements for mobility.

The exploration of how transportation network companies can help to reduce costs to paratransit agencies is relatively new. Since TNCs has only been in existence for less than a decade, partnerships between TNCs and paratransit agencies are uncommon. The first and only paratransit provider in the country to attempt such a partnership is the Massachusetts Bay Transportation Authority (MBTA), which serves Boston and the Greater Boston Area. MBTA has been conducting this pilot program since October of 2016. Since its inception, the transit agency and users have seen a reduction in cost per trip to the user and the transit agency.

There are still issues that need to be addressed to transition this program from a pilot program to a complete paratransit service. For example, Canada's TripSpark, has taken the first

step in applying these new approaches to demand response and paratransit software. UberWAV announced a program in New York City in 2014 that allows people to request a wheelchair accessible vehicle, but it only offers its services to those in the outer boroughs who may have difficulty getting paratransit[3]. Uber and Lyft have made attempts to try to break into the paratransit market. Specifically, UberPOOL and Lyft line already provide shared mobility services that allow riders to share the cost of a ride with pickup and drop off locations near one another[4]. Currently, the MBTA and TNC partnership is still the only one of its kind, but other rideshare companies are also looking into connecting their services with paratransit agencies. There are still questions as to how such partnerships would work, but this could be a reality in the near future.

The following will present the development of this pilot program in the Boston area and critically analyze the outcomes to date of the partnership process, based on the following research questions:

1. What are the benefits and limitations of public/private partnership agreements?
2. What are the methods used to identify needs of people with disabilities and older adults?
3. How are transit agencies working in Boston with private service providers and non-profits to reduce costs?
4. What are benefits of these partnerships to users?

This professional report is divided into 4 parts. The first chapter gives a background and history of paratransit and how it became a required service. Next, it explains the American Disabilities Act of 1990 and its requirements for paratransit service and eligibility. The chapter concludes by explaining different types of paratransit and systems that transit agencies have developed to meet this federal requirement. The second discusses the cost challenges that paratransit is facing and reviews current cost reduction strategies that transit agencies are using. The chapter concludes with a discussion of transportation network companies as a cost reduction strategy and MBTA's pilot program. The third chapter presents a discussion of research methods

and explanation of the reasoning for the case study. Following this is a review of the findings based on interviews with planning professionals and stakeholders for the pilot program about the pilot program. The last section discusses how this program can be duplicated in other cities that seek to use this method as a cost reduction strategy.

Chapter II: History and Structure of Paratransit

The chapter provides an introduction to paratransit systems in order to better understand the necessity for cost reduction strategies for paratransit. Paratransit was developed as a response to ADA regulation requirements for transit agencies issued in 1990. These federal regulations required transit agencies to provide and/or subsidize accessible trips for people who had a disability that prevented them from using traditional fixed route transit.

WHAT IS PARATRANSIT

Paratransit service is a type of public transportation provided for people with disabilities and older adults and subsidized by the transit agency. Services can be provided directly by the transit agency or contracted to private providers. Transit agencies provide this service upon demand by an eligible user, who requests to be picked up or dropped off at a specific location[5]. Partnerships are often made with companies that can support paratransit through demand responsive services and accessible vehicles. All public entities that operate fixed route transit and receive federal funding are required to provide paratransit[1]. Paratransit is difficult to provide and the level of service is often driven by agencies' need to keep costs down.

WHERE IT EXISTS

Paratransit exists anywhere there is a federally-funded entity offering fixed route transit. Urban and rural areas approach meeting paratransit requirements differently. In urban areas, paratransit needs are met through accessible van fleets that are a supplement to fixed-route transit. Private taxi companies also supplement paratransit services. They all offer service within the standard ¾ mile of the fixed-route. Services differ in urban and rural areas.

Paratransit exists in almost all urban areas in the United States. Most transit agencies offer services 7 days a week. Urban paratransit services either provide services through their own fleet of vehicles or in partnership with private transportation companies. Discussions of paratransit often refer to services in urban areas. Most rural transit agencies do not operate fixed route transit and therefore meet paratransit requirements with the demand-responsive services that are available to all residents, regardless of ability. Services are not offered all days of the week. Many transit agencies do not offer transportation on Sundays[6,7].

ADA REGULATIONS

American Disabilities Act

The American Disabilities Act ensures equal access and prohibits discrimination of people with disabilities. The Federal Transit Administration (FTA) works to maintain equal access for people with disabilities using paratransit through Part 37 subpart F of transportation regulations. A public entity that is operating a fixed route system is only required to provide paratransit service in their jurisdictional boundaries. Paratransit service must be comparable and complementary to fixed route system level of service for people with disabilities. FTA regulations define comparable and complementary for transit agencies to determine whether the services they offer are suitable. Essentially this means that paratransit service must be comparable with traditional public transit service with accessible features.

Eligibility for Paratransit Services

Prior to the passing of the American Disabilities Act, applying for paratransit services was only done through paper applications, and a doctor or other health professional would need to confirm that a person had a disability and required services. After the ADA passed in 1990, the

application process changed as the requirements for paratransit became more stringent. Rather than a paper application, in-person interviews became used to determine the functional eligibility of a person. In person interviews and functional assessments started to be given by paratransit agencies[8].

Functional assessments and in-person interviews are typically conducted by the paratransit agency[9]. The process for these interviews is not standardized. Transit agencies vary in the number of interviews they conduct per year as well as the types of assessments that take place. Assessments can range from a transit agency holding an interview to determine intellectual ability to ride public transit, to asking a person to attempt to board a public transit vehicle to determine eligibility. Paratransit users sometime find that transit staff conducting the assessments are not properly trained to make eligibility determinations[40]. This results in some users being determined ineligible for paratransit services when they may need them. These assessments also allow transit agencies to be extremely strict in their determination of eligibility[10].

The American Disabilities Act also specifies 3 categories a person could fall under to become eligible for paratransit. The first category includes any person with a mental of physical disability who is unable to board, ride or exit any vehicle on a fixed route system without assistance of another person. The second category includes any individual with a disability that requires the assistance of a boarding assistance device (such a wheel chair lift) to board, ride or exit a vehicle, but who is dependent on a transit route that does not have an accessible transit option. This also includes rail systems that do not have accessible cars available. The last category includes people with impairment-related conditions that absolutely prevent them from traveling to a transit stop. People with disabilities that can ride public transit but may face barriers in getting to a transit stop,

such as sidewalks in disrepair or missing, that make it more difficult for someone with a disability to reach a transit stop than someone without a disability also do not make a person eligible.[11,12]

Paratransit eligible clients are allowed to ride traditional fixed-route transit free of charge by 1990 ADA. This additional benefit traditionally has resulted in an increased number of applicants for paratransit eligibility. An increased number of applicants has created the need for in-person interviews and functional assessments due to the possibility of fraudulent applicants. In addition to free fixed-route transit trips, demand response services are also provided to clients. Free rides on public fixed-route transit are offered in an effort to relieve demand for demand response services. In the next section, I will discuss the types of demand response paratransit[9].

PARATRANSIT SERVICE OPTIONS

Levels of Paratransit Service

The levels of paratransit service range from curb-to-curb, door-to-door, and door-through-door.

·   Curb-to-curb: Driver does pick up and drop off at the curb of the location and only assists with boarding and exiting the vehicle.

·   Door-to-door: Along with curb-to-curb service, the driver then assists the passenger to the entrance of the location

·   Door-through-door: Along with door-to-door service, the driver assists the passenger with exiting the pick-up location and entering the drop off location.

There are two systems that are most commonly used by transit agencies to fulfill paratransit requirements: dial-a-ride and user-side subsidy programs[7].

PARATRANSIT SYSTEMS

Dial-a Ride

Dial-a-ride is a type of demand-response service used for paratransit that requires the client to request paratransit service 24 hours or more in advance of a trip to schedule a ride. This requirement exists to ensure that operators can keep up with the demand for rides. Dial-a-ride is similar to a carpool in the sense that a driver has multiple passengers with many destinations and is required to pick up and drop off riders at their preferred, individual locations[13].

This demand-response service is operated similar to a taxi with small and medium-sized accessible vehicles but costs the same as a traditional transit ride. Most vehicles used for dial-a-ride services are wheelchair accessible but there are options for conventional vehicles. Transit agencies often operate and maintain a fleet to be used for these services. Transit agencies also contract private taxi companies to provide paratransit services. Due to a cap on the amount that transit agencies can charge by ADA regulations, these rides are heavily subsidized by the transit agency and other organizations that help provide this service[13].

Third Party Vouchers

In a third party voucher system, transit agencies provide vouchers to transit users that are eligible for paratransit service. These vouchers are then used to pay for rides with any participating paratransit providers. Providers use the vouchers to recover the cost of paratransit trips from the transit agencies. Transit agencies still subsidize trips, but rather than subsidizing by paying private companies directly, the responsibility of recovering costs is on the company. Paratransit clients do not pay more than what is required by law. These services are most often provided by taxi-cab services in the service area. Taxi service used to supplement paratransit service is difficult to

monitor. As the companies are contracted by transit agencies, they do not have the same standards

for driver training[14].

Chapter III: Cost Challenges Facing Paratransit and Cost Reduction Strategies

COST CHALLENGES

Currently, demand-response paratransit services cost is expensive for transit agencies. Most agencies choose to and sometimes must contract their demand-response services out to other providers because of the high cost of maintaining their own fleet. Agencies must pay the contractors to schedule, operate, maintain and provide staff in order to fulfill the ADA regulations. According to research and personal interviews conducted for this study, one ride can cost a transit agency as much at $20-$50[15,16]. High costs make it difficult for agencies to provide services to all the people that need them. A diagnosed disability is regularly required to be able to use paratransit. This means that many people who are weak, cannot walk far, have difficulty staying focused while driving, or who experience driving cessation due to old age are ineligible. This can result in a lack of mobility for people who do not meet strict requirements set by the transit agency.

ADA regulations mandate that the fare for each ride not be more than double the fare of a trip on fixed-route transit. The ADA regulation is intended to ensure that even people with limited income can have access to paratransit services, but the financial burden is ultimately transferred to transit providers. If a fixed route bus rider pays $1 per trip, a paratransit rider cannot pay more than $2 per trip. This federal regulation makes it extremely difficult for transit agencies to recover even a portion of trip costs from riders. Additionally, riders are commonly low-income which would create an equity issue for users. In addition, disabled riders often do not have the means of making enough money to pay for the rides themselves. The agency must therefore use funding

allocated to operate fixed-route transit systems in order to subsidize paratransit. With limited funds, transit agencies ultimately cannot provide services to everyone who needs them[1718].

Although the need for paratransit has increased with the rise in the older adult population, cost prevents many transit agencies from expanding services for people who have difficulty using fixed route transit. A 2012 United States Government Accountability Office report estimated the average cost of an ADA paratransit trip was $29.30, while the average cost of a fixed route trip was $8.15.[19,20] For transit providers, a paratransit trip can cost more than 3 times the amount of a fixed route trip. For instance, in 2015, the fare for one paratransit trip on Houston's MetroLift was $1.25 but the estimated cost for one round trip for the agency was $22.51 for taxi service and $30.46 for a trip on a small bus with wheelchair access[20,21,22].

Given the high cost of providing service, many agencies must make the decision to limit service to keep expenses manageable. The most popular cost reduction strategy has been to strictly follow ADA regulations and restrict access to only individuals who fall into those categories. For example, transit agencies can ask applicants to prove they cannot ride fixed route transit by having them attempt to board without assistance and not providing services for people who have difficulty getting to a transit stop. Limited budgets also affect the quality of services provided. With limited capacity to provide service, paratransit trips are often late for pick-ups and drop-offs due to poor coordination and lack of staffing. This reduces the quality of life of paratransit users, making it difficult to participate in the workforce or taking more than half a day to go to the grocery store.

CURRENT COST REDUCTION STRATEGIES

The following will give some cost reduction strategies that have been attempted or are in current use by other transit agencies.

Limited Service as a Current Cost Reduction Strategy for Transit Agencies

According to ADA regulations, "Service must be provided in a corridor that roughly matches the fixed-route transit system, such as bus or rail, and extending three quarters of a mile on either side of the fixed-route corridor". In many urban areas this is relatively easy because there are many fixed routes and therefore many options for paratransit travel. But in suburban areas this is a much larger problem for consumers. Residents of many suburban and rural areas have few or no options for public transit. This means that even though the ADA requires agencies to have paratransit, if there is no public transit, there are no regulations on whether paratransit is provided by the municipality[17].

Reservation and operation requirements are also mandated by the ADA. Advanced and next-day service reservations are required**Error! Bookmark not defined.**, but there is no requirement for same-day service. Transit agencies must provide staff that can schedule rides. They have to set up a system for people ask for a ride one day in advance. Unfortunately, this leaves out people who may need a ride the same day. There are many instances when it is difficult for consumers to plan things a day in advance. This eliminates flexibility of travel and constricts times at which consumers using paratransit can travel.

Feeder Service- Dallas Area Rapid Transit

Feeder service is a hybrid of fixed route transit and demand response service. Feeder service is offered to some paratransit clients that may not have difficulty boarding fixed route transit but have difficulty reaching a fixed route transit stop. For example, a person in a wheelchair may be able to board an accessible bus but they may have difficulty reaching the bus stop due to lack of a sidewalk. To solve this problem and still be able to use-fixed route transit to some

capacity, demand-response vehicles would pick up one or more clients from their home and take them to a nearby stop where they would board a fixed route train or bus[23].

Although feeder service is a strategy used by transit agencies to reduce costs, there are still several issues that are problematic. Feeder service applies to less than 5% of paratransit clients. Clients who can use feeder service must be able to complete any transfers between fixed routes without assistance. This makes trips much longer and inconvenient for most paratransit users. Additionally, feeder service must be available at the origin and the destination of the trip or the client must be able to reach their final destination without assistance[25]. For example, Dallas Area Rapid Transit (DART) uses feeder service as a cost reduction strategy to help paratransit users connect with fixed route transit. DART Paratransit feeder service connects paratransit users to a DART passenger facility. "A passenger facility is a Park and Ride, rail station, transfer location, or transit center[24]." After the passenger arrives at the passenger facility, they are then able to board traditional fixed route transit.

Distance Based Rates-Seattle King Metro

Distance-based rates for extension of paratransit route services can help to increase the number of people who use the service and make the service more efficient. Seattle's King Metro did this by extending the hours of service. Most transit agencies run shorter daily hours than the fixed route public transit. King Metro decided to extend its hours to match that of the local public transit[11]. This allowed people to take trips off peak hours and reduced the amount of gas and time spent in the car for drivers. Off peak trips could be run on an "on-call" basis or offered for high priorities trips, such as non-urgent emergency room trips.

Another strategy is providing services outside the ¾ buffer zone around fixed transit required by the ADA. Trips inside the buffer zone would be free and riders would have the options

to extend their trip further for a distance-based rate. Transit agencies could provide more service in their area and would not be burdened by the added cost. They could also provide connection to other service agencies in the areas outside the fixed route. Volunteers could operate outside the fixed route buffer zone to avoid overlap of services. The vehicles that operate outside the service area would be similar to taxis which would reduce the cost for the rider. For riders who cannot afford the distance-based rate, the agency would implement income based payments for high frequency ridership areas[25]. This would avoid disparities in service and allow access to mobility for disabled people who have low income.

Taxi Service-MetroLift

The METROLift Subsidy Program (MSP) in the Houston area offers same-day service for METROLift eligible passengers for trip requests that cannot be made in advance. Similar to transportation network companies, this is a type of contract with the transit agencies that allows more flexibility in the fleet available for paratransit service. The subsidy program provides clients with a voucher for up to $8 per trip. The client pays the first $1 of the trip and any amount above the price of the voucher. MSP currently partners with Yellow Cab Co. and Fiesta Cab Co. in the Houston area. The private taxi services are responsible for trip scheduling. The service is offered 24 hours a day, 7 days a week [26],[27],[28].

METRO issues vouchers directly to taxicab companies, and METRO provides the taxicab companies with a list of METROLift certified clients monthly. Customers call the taxicab company and identify themselves as MSP eligible with a patron ID number. The taxicab company then verifies this number against the METROLift-provided list. Drivers are then dispatched with a random voucher number generated by METRO that identifies the passenger with a photo ID at pick-up. The driver then fills out a blank form with the voucher number, and the customer must

sign the form. The driver then takes the form to the taxi company to be reimbursed for the cost of the trip **Error! Bookmark not defined.,Error! Bookmark not defined.**.

Volunteer Demand-Response Services

Volunteer programs have emerged in many places that either do not have ADA-mandated services because there is no transit agency in the area, or the cost of paratransit is too expensive for riders. Volunteer programs are often run by non-profits or religious organizations. They have less strict requirements for who can participate in these services. Some also partner with transit agencies to improve the level of service provided and decrease cost for the agency. Los Angeles' volunteer driver program "offers eligible transit riders free travel while the transit agency pays the drivers 50 cents per mile including gas". In Los Angeles, the current cost for one paratransit trip is about $35 and this method brings it down to around $10. This significant saving allows the transit agency to provide other public transit services. Another program outside of Baltimore, Maryland provides rides to older adults in exchange for other services. For example, a volunteer gives a ride and the passenger makes them a meal. This provides social interaction and a supportive community for seniors[25].

Volunteer programs also have the flexibility to offer other services that may be too expensive for transit agencies. A Houston nonprofit, Senior Rides and More, provides free services to elderly people 65+ within 30 zip codes in Southwest Houston and 11 in Northwest Houston.[29] Services have no fixed routes to adhere to and volunteers absorb the cost of transport with their own cars. This reduces cost for the transit agency. It also allows people who may not have the money to use paratransit to participate in the service. Volunteer program partnerships with transit agencies can help to alleviate cost and encourage more ridership for people who need it.

There are also challenges with volunteer services, including finding qualified drivers. "The core concerns involve liability and insurance coverage"[30]. Volunteers can drive their own cars or an organization can provide the car. If an organization relies on volunteers to use their own cars, it may be difficult to regulate what amenities that cars need in order to provide safe and secure transportation services. As some agencies pay very little to volunteer drivers, they may also eventually have to pay for maintenance of the car. If they expect people to maintain their own cars, there may be a smaller pool of people to choose from[30].

Centralized Dispatched System-MBTA

In Boston, MBTA uses a centralized dispatch system to improve efficiency and thus reduce the cost of trips[31]. The dispatch system for MBTA paratransit was serviced by North, South and West service providers. These service providers are all serviced by different companies so service differs across the service area. Now all dispatch services to a central location in Boston with one service provider. The effort to bring all services to a centralized location had three benefits: improving efficiency, reducing costs, and improving accountability.

Efficiency of dispatch services was improved by allowing clients to call one number and interact with one service regardless of where they are in the service area. With only one service provider, there is less confusion on who to contact and problems, such as missed pick-ups, are solved faster, and it is easier to coordinate vehicle dispatch. Trip coordination reduces costs because there a less gaps in service between different regions of a service area, thus preventing vehicles from having overlapping routes. Finally, having one service provider improves accountability when problems arise because the same service provider is dealing with all rides and routes in the MBTA service area[31].

TRANSPORTATION NETWORK COMPANIES

With 21st century technological advances, the use of rideshare programs by transit agencies to ease the cost of paratransit has been gaining momentum. Research has found that ridesharing is an effective strategy to reduce costs of paratransit because it transfers the cost and coordination of the trip directly to the driver and the passenger. Transit agencies are trusting rideshares as a reliable means of filling the gap between what the transit agency can do and what people need. Since this is a relatively new and evolving approach to paratransit, new research is emerging about the role of rideshare companies in paratransit.

Rideshare providers could offer a new way to reduce the cost of coordinating rides and finding willing drivers. Coordination is direct, making it more efficient. "Cars on demand are dependent on successful matching of cars, riders and drivers in real time, all of which are not possible without smart phones and associated software"[32]. The transit agency could provide the cars but create a system to connect drivers with passengers. This eliminates the cost of having to provide staff. Currently, for Dial-A-Ride services, people must call to speak with an operator who then must coordinate a ride. If a system is in place to eliminate operators in exchange for part-time system maintenance staff this would reduce staffing costs and funding could be allocated elsewhere.

One of the difficulties for transit agencies is finding users who will participate in a new pilot program. Some potential users may be deterred from ridesharing because of the necessity to learn new technology, or because they have safety concerns. Rideshares often require the use of smartphones and technological devices that may not be accessible for everyone. In addition, older adults may have difficulty operating applications on the phone. Some people with disabilities who cannot drive include physical handicaps that may also interfere with the use of a phone.

This literature review has examined papers, articles and online federal documents in order to gain an understanding of how paratransit has been developed since its inception. After identifying what paratransit is and the process of its inception, research reports and articles were used to determine issues that transit agencies were facing in providing paratransit service. Online resources were used to get more information specifically about the two companies used in the MBTA pilot, Uber and Lyft. This background information was then supplemented by news articles and news reports about the MBTA paratransit pilot program. In the next chapter, I will present the "MBTA The Ride," the first pilot program of its kind in the United States. The pilot program began in October 2016 and has been extended to April 2018[33].

Chapter IV: Methods and Case Study Findings

RESEARCH METHODS

The MBTA paratransit pilot program, the only one of its kind in the United States, was presented at the Transportation Works Conference in Austin, TX (2017) and Waco, TX (2018). At the time of the writing of this report, there have been discussions about the possibility of other similar pilot programs but no other transit agency has yet followed through[18]. As the first of its kind, there was not much available information on the current status of the pilot program. For these reasons, a site visit and interviews with project managers, planning professionals and advocates were necessary to get a complete view of the status, success and challenges of the project. Case study research was also done through a site visit which observed the types of accessible vehicles in the current MBTA paratransit fleet.

Interviewees consisted of professionals and advocates for paratransit services. Interviews were conducted through phone calls recorded through handwritten notes. The intention of the questions was to obtain both provider and user perspectives. Some questions differed depending on the subject's area of expertise. Interview questions fell into 4 categories that will be discussed in this chapter: funding challenges, service, user experience, and future changes.

Funding Challenges

1. What are some funding challenges for paratransit in your region/service area?

2. What strategies have you used for cost reduction?

3. Do you forecast increased savings from the TNC rideshare program?

4. How has this impacted your funding challenges and your ability to offer services?

Service

5. How did the TNC partnership start?

6. How has the addition of TNCs affected the services you offer?

    Users

7. What has user feedback been like?

8. Does the user choose who they ride with or the paratransit agency?

    Future Changes

9. What is your advice for other transit agencies, what are things you wish you knew?

CASE STUDY RESULTS

Funding Challenges

As discussed in the previous chapter, paratransit service is generally expensive for most urban transit agencies in the United States. Boston is no different and also has one of the highest per trip costs in the nation at around $50 for a one-way trip. Boston provides extended service beyond what is required by the American Disabilities Act. Figure 1 shows the cities and towns serviced by the MBTA The Ride paratransit service. This contributes to the high cost of service as users can travel to any destination within the region. The increase in the number of seniors in these service areas that need paratransit has caused added to the strain on the paratransit system; like most transit agencies in the United States, Boston's MBTA must also provide service to an aging population. The northern service area saw about 8,000 trips per day prior to the inception of the program.
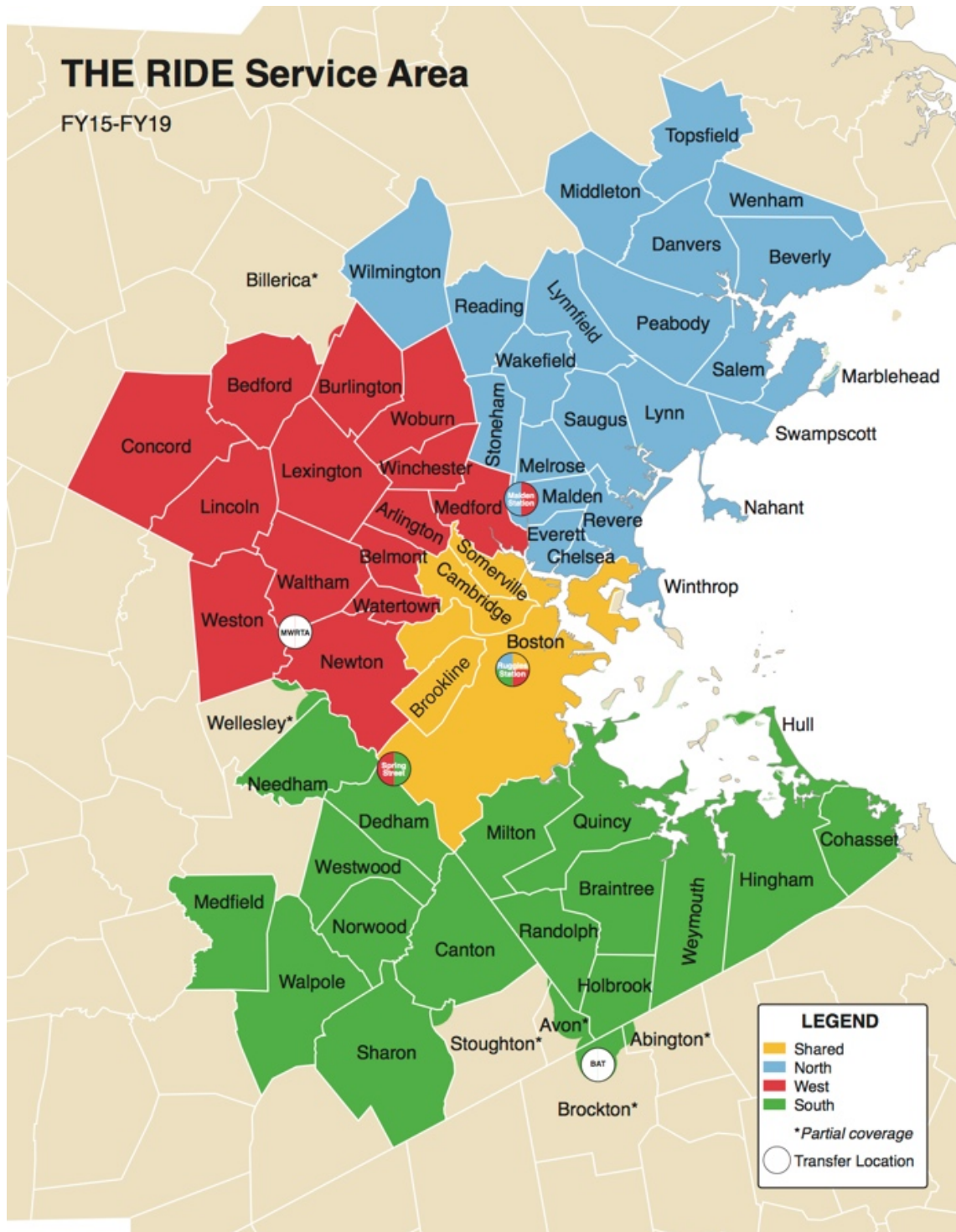
Figure 1. MBTA service area map (mbta.com)

By 2010, MBTA's The Ride ridership had increased about 51% over the previous 5 years.

MBTA paratransit services are the second largest portion of the transit agencies budget[34]. This was

the driving incentive to find cost reduction strategies. As many transit agencies have done, the first strategy was to begin to limit service to the minimum ADA requirement. As shown in Figure 1 the MBTA transit system operates predominantly in the "shared" or yellow portion of the service map. Limiting service would mean that the majority of the North, West and South service areas would be eliminated. In many of these areas, there is no fixed-route transit and MBTA The Ride is the only transportation provided for people with disabilities. This caused significant pushback from many community advocates and members of communities that did not have other options. The MBTA determined that because there was such heavy reliance on The Ride in these service region, that limiting service would not be the best option for the transit agency. MBTA wanted to review paratransit service in order to determine how to solve this problem.

Executive Order 530, was developed by The Commission for the Reform of Community, Social Service and Paratransit Transportation in the Commonwealth, and released in July 2012. The Commission was developed through Executive Order 530 in April 2011 to

- "Conduct a detailed review of the MBTA's "The Ride"

- Conduct a comprehensive review of all state-and federally-funded community transportation services

- Provide detailed recommendations for reform[35]"

  The goal of the report, was to

- "Conduct a detailed review of the MBTA's "The RIDE" services, demand response services provided by the RTAs, and transportation services funded by EOHHS;

- Conduct a comprehensive review of all state- and federally-funded community transportation services, including demand responsive services, paratransit services, ADA complementary paratransit service and social services transportation;

- Provide detailed recommendations for reform and the introduction of efficiencies in the provision of all state- and federally-funded community transportation services in the Commonwealth.[36]"

The purpose of this assessment was to determine where MBTA The Ride could be more efficient in providing service to users. The report included efficiency recommendations, including the need for more accessible taxis and the need for a program that uses taxi service to provide paratransit service. At this time, TNC were still new in the United States and the commission expressed concern that using taxi service might not "make economic sense" for taxi providers. In the reports, findings on the use of accessible taxi service to provide paratransit transportation for users suggested:

"…is possible that for transit agencies, this non-ADA option may succeed in diverting ADA paratransit trips from higher subsidy per trip paratransit services to a lower subsidized service. And in general, such subsidy programs make an existing resource more affordable for those who depend on community transportation, while also giving them a same-day option, and the ability to make a trip that goes beyond a service area and/or after hours."

One recommendation to address this issue was to "Implement pilot accessible taxi subsidy programs to encourage customers to utilize accessible taxis and establish a tracking system to determine whether reduction of 33 subsidy levels attributable to diverted trips is greater than the subsidy of new trips generated"[36].

After this Executive Order 530 report was completed, MBTA attempted to start a partnership program with taxi companies, but for several reasons the pilot program did not come to fruition. The main issue was that technology was not available to enable coordination between

the providers and clients. The paratransit client would put money onto a credit card and the transit agency match these funds in order to pay for the taxi, but this system raised concerns about fraud and liability. There was also difficulty with coming to an agreement on how the program could work successfully.

An Entry for TNCs

Scheduling has been one of larger barriers in providing efficient service to paratransit users. All interviewees mentioned that this was a major issue in clients receiving demand-response service. They reported that coordination and efficient scheduling were difficult to maintain because the service area for MBTA paratransit it so large. With clients traveling from one region of service to another, the scheduling provider and call centers changed. This made it difficult to get to and from destinations in different regions of the service area. The coordination and central system that TNCs provided gave an alternative to the current system with its dynamic scheduling that previous paratransit scheduling could not provide. The pilot program is not only gave the opportunity to test a pilot program with users but to learn more about how scheduling can be improved and integrated with the increased demand.

EFFECTS OF THE TNC PILOT PROGRAM

Cost

For the pilot program, the customer paid the first \$2 of the trip and MBTA paid the remaining fare up to \$42. If a customer used carpool options in the application the trip is only \$1 for the rider and MBTA pays up to \$41 per ride. With Uber and Lyft pricing these trips overall cost significantly less than traditional paratransit rides at \$3.15 or \$5.25 for premium trips[37].

Service	THE RIDE	Pilot Program
Fare	$3.15 or $5.25 for premium trips	As low as $2.00
Booking Timeframe	At least 1 day in advance	On demand - Instant request to dispatch
Day-of Wait Time	30-minute window	As low as 5 minutes in core service areas
Trip Reservations	By phone	Via smartphone app or phone call (Lyft only)

Figure 2. The Ride compared with MBTA's TNC Pilot program (mbta.com)

As shown in Figure 3 if a trip costs, $6 then the user would pay $2 and MBTA pays $4. But, if a trip costs $45 then the user would pay the first $2 the MBTA would pay $40 and the user would then pay the last $3; resulting in the user paying $5 total for the trip that costs $45.

Examples of your cost:

- A $6 trip will cost you $2 and the MBTA will pay $4
- A $20 trip will cost you $2 and the MBTA will pay $18
- A $45 trip will cost you $5 and the MBTA will pay $40

Figure 3. Examples of fare prices (mbta.com)

The pilot program began operation in October 2016, and by March of 2017, the MBTA saw its paratransit costs decline by about 20%[38]; initially the cost reduction strategy seemed successful. MBTA was hopeful that the savings would continue and eventually lead to a reduction in budget.

However, the lower fares and increased mobility led to increased demand for trips among users. Customers took 28% more trips in the first 5 months of the program, which meant that the MBTA had to pay for more trips[38]. Currently, MBTA is not seeing the same initial savings that

they saw at the beginning of the program. Interviewees reported that the budget for paratransit trips is now about even with the cost of the trips. Although the transit agency is no longer losing money, they are still not seeing the same savings experienced initially[39].

Aside from an increase in demand, another factor that may limit cost reduction is that all trips cannot be transferred to this pilot service. Some riders still require the use of certain accessible vehicles that are provided by the transit agency fleet. With maintenance and staff for this fleet still being a requirement, these costs still exist.

Service

The MBTA TNC pilot program partner relationship began in October of 2016 and is still ongoing as of April 2018. The pilot group consisted of 300 people who were already paratransit users. Users download the traditional TNC application onto a smart phone and sign up for the pilot program. The TNC company communicates with the customer to provide a code to use for payment. When someone signs up, the TNC sends the information to MBTA. MBTA verifies eligibility and sends the TNC back a number of trips that is allowed for the ride. All customers eligible for use of MBTA The Ride are eligible for the pilot program, although the program may not be appropriate for people with disabilities that need accessible vehicles.

The user can either input an address or the GPS system inside the application can identify the location of the person and send the driver to the location. Rides can be requested immediately, but Lyft users can also schedule rides ahead of time. The service is only curb-to-curb, which, as mentioned in previous chapters, means that the driver can, but is not required to, help the rider get into and out of the car. Drivers are not trained ADA service providers. Once the rider is in the car, they are taken to their destination. When they exit the car, there is no exchange of money since the driver is paid through the application. The user's payment is reflected in the application so that

they see the amount they owe, but not the total cost of the ride. When the riders are ready to be picked up, they can call another car that will come to their location. Time between request and pick-up is normally no more than 10 minutes. Customers can only travel to destinations inside of the service area and within the times MBTA The Ride operates. All trips outside of these parameters are charged to the customer in full, as with any other traditional rider. There are no identifying features in the TNC applications that identify a rider as a paratransit or traditional rider. After the ride, the rider and the driver are both able to rate each other between 1 and 5 stars, 1 being a poor experience and 5 being a positive experience. If the score is less than 5, Uber asks for the reason for the score. This score is than averaged with all other ratings each person has received and the average is displayed in the application for both the rider and driver for future trips. Due to this, there is very low risk of discrimination from drivers from picking up paratransit passengers.

It is important to note that traditional The Ride paratransit vans and service are still being offered during the pilot program period. Although all riders are eligible, TNC paratransit service cannot replace all paratransit rides. For example, a customer who needs significant assistance getting in and out of a wheelchair would use traditional The Ride vans that are equipped with ADA certified drivers and equipment to accommodate their needs.

USERS

As discussed in previous chapters, ADA regulations define eligibility for paratransit, but the transit agency makes the final, individual determination on who is eligible based on applications. This process often excludes people who could benefit from paratransit services. For example, there could be a case with an application for someone who is blind to be eligible for paratransit. The general belief could be that this person would obviously be eligible. But, if this

person can reasonably board traditional fixed route transit, then they could be considered ineligible. The second group is separated into both those who are eligible.

In Boston, and more specifically in suburban areas, older adults have increased their demand for paratransit. This has to do with an increasingly large population that was dependent on cars and can no longer drive. The transition from driver to non-driver significantly decreases mobility for many older adults. Although this lack of mobility creates a need for paratransit, this need cannot always be fulfilled. There is a desire by this community to share in the benefits of The Ride's services but they cannot be fulfilled solely by the current system.

Technology

As mentioned previously in this chapter, users of paratransit in the MBTA service region generally fall into two groups: aging baby boomers who have experienced a decrease in mobility and are now eligible for paratransit services, and people with disabilities who are above 18 years of age and eligible for paratransit.

User feedback to TNCs have been divided between these two groups. Baby boomers who are eligible for paratransit have difficulty sing the service due to its reliance on new technology, such as smart phones. As the method of requesting a ride is very different from the traditional dial-a-ride service, the transition to a new method to request a ride could be difficult. Older adults generally favor obtaining a ride through the traditional dial-a-ride service. The system seems to work best for users who are more adept at using smartphones in their everyday lives. The app interface does have accessibility features for hearing and sight impaired individuals. Users who are more proficient in smartphone technology tend to have more positive feedback for the method in which rides are requested from TNCs.

User Ride Experience

The MBTA staff interviewed reported that safety and user experience were some of the agency's biggest concerns due to drivers that are not trained by the ADA to drive people with disabilities. However, ride experience has generally been positive according to interviewees. Riders are allowed to rate each driver on their ride, which helps to avoid unsafe driving scenarios or discrimination toward people with disabilities. The rating system described earlier encourages drivers to ensure that the rider has a positive experience. If a driver does not conduct themselves in a manner that is agreeable to the rider, they can put their complaints in the application. Customer service and complaints are all dealt with electronically.

There have been very few complaints about the service of TNCs. There has been particular concern for users who use wheelchairs or have service animals as they may require more from the driver than the average rider because they may require more assistance than a typical rider. Instances where these issues have occurred have been rare and have been addressed through the TNC support team.

An increase in mobility and flexibility for users is the most important and intended part of the user experience. This program overall has helped to increase mobility and flexibility by allowing users to immediately request rides. For example, if a user wants to go visit a friend there is no need to schedule a trip 24 hour in advance. They can simply order their ride and see their friend that same day. This flexibility and increased efficiency of scheduling trips is the largest benefit of the program. From the user perspective people can improve their quality of life by increasing their mobility[40].

Chapter V: Considerations and Recommendations

This research suggests that MBTA's TNC pilot has a positive impact on users and transit agencies by reducing costs for both parties. However, using TNCs as a cost reduction strategy may not be a good fit for all transit agencies. Based on lessons learned from the MBTA pilot program, this chapter discusses criteria for successful transportation network partnerships and recommended steps for transit agencies that wish to establish such partnerships.

CRITERIA FOR CONSIDERING A PILOT PROGRAM

Through this review of MBTA and the literature, there are three essential criteria for successful public-private partnership between a transportation network company and a paratransit company: having an established transportation network company, having a large paratransit service area, and having users comfortable with the necessary technology.

TNC Service Area

The first criterion to be a candidate for the pilot program is to already have a transportation network company established in the area. Currently, Uber and Lyft are the only companies that have made partnerships for a paratransit pilot program. These two firms are the industry leaders among transportation network companies, and where Uber and Lyft already operate in a transit agency's service area, it may be easier to begin such a program. Although other transportation network companies could operate these types of partnerships, Uber and Lyft are the oldest version of transportation network companies that exist. This means that they are likely to have more information on market trends for TNC service.

Currently, most transportation network company service is offered in urban areas, making this pilot program difficult to begin in rural areas. In the future, these companies may begin to

operate in these rural areas, but it is not currently clear how or when this could be an option for small cities.

Determining which transportation network company would be a good option for the transit agency is also an important decision. Uber and Lyft both operate with similar service ranges in the Boston area, but in other cities there may be only one company operating. Uber currently operates in 312 cities in addition to many cities all around the world[41]. Lyft operates in 282 cities but does not operate in as many states and also does not operate internationally[42]. In some transit agency service areas, there may be no transportation network service at all. In such cases, the transit agency that desires this type of partnership may advocate for the service to begin in their service area.

Large Paratransit Service Area

The second required criterion is a large paratransit service area. With a large service area, it may be easier to recoup costs as additional users begin using the service. A large service area also offers the opportunity for "cross-subsidizing," or offsetting the costs of service for higher cost trips with lower cost trips. In the MBTA The Ride service area, there are particular places where the program is reducing costs to a greater degree than in other areas. For instance, the North paratransit district overall sees a high number of rides because transit in general is limited, so this district is seeing more savings because there are more rides in this part of the service area. Areas with less demand can balance increased demand in areas with more users.

A large service area also provides a larger testing area for the pilot program, which makes it easier to see how the program operates in different urban and suburban areas. Based on interviews, the large service area should include at least one urban area with high demand for paratransit service (8,000 or more trips per day).

"Tech-Savvy" Users

The last criterion is having users who are comfortable with the technology necessary to use the service. The research found that although the pilot program was successful in reducing cost, users who were not technically equipped to understand the program, such as lacking the ability to operate a smartphone, still preferred to use traditional services. As a result, pilot program users were more likely to be younger who were more adept at adjusting to new technology. Transit agencies that serve an older population may experience a more difficult implementation process if users are not provided assistance to adjust to the new service.

PROCESS: STARTING A PILOT PROGRAM

Relationship

Establishing a long-term relationship between the transit agency and TNCs is vital for transitioning a pilot program into a permanent program. The nature of a pilot program is traditionally to test out a plan. In the MBTA case, the pilot program has progressed into a relationship in which the TNC and MBTA can discuss ways to improve the program while the pilot phase is still taking place. A pilot program should be seen as an iterative process that needs to allow for changes, which means that the pilot phase could take longer than planned. Both parties should acknowledge that everything may not be completed in the first phase of the project and be willing to be flexible.

Paratransit agencies may eventually create their own TNC system, but they should build such partnerships first in order to understand the benefits and risks before incurring the financial burden of developing their own program. Constantly improving services based on user feedback

can lead to programs that are independent or otherwise removed from the traditional TNC framework.

Finally, the relationship should be a mutually beneficial learning experience for both parties. There should be incentives for both the TNC and the transit agency to keep a positive relationship, such as financial goals that both agencies need to reach. This is most important when publicizing the pilot program to other organizations that may be interested in pursuing this same venture. There should be a plan in place to address challenges that arise and even for exit, if either party feels the program is no longer beneficial.

Develop an Advisory Committee

The first step to starting a pilot program is to identify the needs of paratransit users from the transit agency. This can be done through developing an advisory board. An advisory board should include staff in the transit agency and community advocates for people with disabilities. The community advocates can be identified through non-profit organizations or other community groups that have a mission to improve the lives of people with disabilities. After advisory group members are identified, the board will be the driving force behind decisions made for the pilot program moving forward. Community advocates will identify needs of paratransit users and the transit agency members will discuss what can reasonably be done to meet these concerns.

Volunteers

The second step is to identify volunteers who are willing to test the program. The volunteer group should ideally be experienced paratransit users who can provide detailed and valuable feedback for the paratransit team. Based on research, the recommendation for sample size would be 300 or more current paratransit users. A larger sample size would produce more detailed and

representative results. The transit agency should consider incentives, such as free rides for a certain period, to obtain volunteers.

Feedback

The third step is developing a method of feedback for paratransit users to discuss their experience with the pilot program. This feedback method must accommodate people with disabilities that may have difficulty using certain methods. For example, there should be an audible feedback method for users who may have difficulty with sight or speech. Feedback is the most important step in implementing the pilot program, so volunteer users should be willing to provide feedback after their experience.

Feedback should be focused on user experience and the benefits and improvements that can be made to the service. This will ensure an uninhibited transition if the program were to be implemented as a paratransit service in the future. Feedback questions should focus on: payment methods, pick-up/drop off experience, efficiency of time, and safe driving practices. Examples of questions topics are provided in Table 1.

Table 1. Possible Survey Question Topics

Fares	- Payment methods: Ease of use - Cost of fare
Pick-up/Drop-off Experience	- Driver professionalism - Connecting with driver through application or dispatcher
Timing	- Wait time - Distance of trips
Safety	- Driver safety - Pick and drop off safety door to door

MBTA expanded the length of their pilot program based on user feedback. After the first round of feedback, the transit agency can make adjustments to the program in later stages to move toward an official program and partnership.

TNC-PARATRANSIT APPLICATIONS AND ROAD BLOCKS

TNC-paratransit applications can face several roadblocks. This section will discuss these roadblocks and methods for possible improvement as the pilot program moves forward, drawing on lessons learned from the MBTA pilot program. The MBTA paratransit partnership was adapted to address challenges as they arose, and as a result, the program now operates differently than when it started.

Demand-Shifts and Pricing

The MBTA's initial intention for the pilot program was to use it as a possible cost saving strategy for the transit agency. The program did save the transit agency money in the beginning, but initial cost savings were soon followed by an increase in demand for service. The Ride initially saw a reduction in overall costs of about 20%, with per trip decrease of about 80%[38]. Because the pilot program increased flexibility and mobility for many paratransit users, there was a large increase in demand**Error! Bookmark not defined.**. Currently, the transit agency is not experiencing the same savings it was as the beginning because demand has increased. Users are taking more trips per day at the same price that they had in the past. This has resulted in the transit agency essentially "breaking even" on overall transit budget.

As demand will surely shift in other regions that attempt a similar program, pricing must be addressed to use this method as a cost reduction strategy that is beneficial for both the transit agency and customers. The amount that an agency can subsidize a trip depends on the agency's

paratransit budget. But this must be balanced with consideration of what paratransit users can afford to pay for a trip. As the pilot program continues, this issue will continue to be assessed to find an appropriate price point.

Allocating Paratransit Trips Among the TNC Fleet and the Transit Agency's Fleet

Agencies need to anticipate that not all trips can be transferred to TNC vehicles. MBTA The Ride operates traditional paratransit services alongside the TNC service offered, as not all customers can use TNCs to satisfy trip needs. As discussed in previous chapters, some users need an accessible vehicle for various reasons. This requires that the paratransit agency still offer the option for accessible vehicles.

When designing a pilot program, there should be a consideration for different trip types, and what the best options are for users. Determining whether a ride can be serviced by a TNC or by agency provided or contracted vehicles should consider: trip length, type of accommodations, and what part of the system can serve the user most efficiently and safely. Determining trip length can be useful in determining whether the trip should be serviced by traditional paratransit or TNCs. Longer trips could be better served by the transit agency fleet than a TNC ride. This would ensure efficiency of service to mitigate high costs of long trips. Ultimately, there must be a balance between what the transit agency can provide and trips that are transferred to TNCs. This should be determined by the transit agency based on the types of customers it is serving. If too many trips are transferred to TNCs there could be a deficit of accessible vehicles for those riders that need traditional service.

Additionally, there may be services offered outside of the transit agency and TNCs. Nonprofit organizations, advocacy groups, health centers and other auxiliary transportation systems could already be operating in the area that is being served by the paratransit agency. There

must be a full assessment of alternative services for people with disabilities. Coordination with organizations that provide these services could avoid duplication of services and also reduce costs for the transit agency. There should be a centralized dispatch system to coordinate and dispatch all vehicles with efficiency.

Chapter VI: Conclusion and Final Thoughts

CONCLUSION

Paratransit costs are still high for many transit agencies across the country. This issue continues due to laws set by the federal government to achieve equitable public transportation. As high costs persist, transit agencies seek ways to reduce the cost of providing service. As this case study has shown, new methods to reduce costs are being pursued to continue providing paratransit service that is consistent in service with traditional public transit agency offerings for differently-abled users. The goal of transit agencies is to provide this service without having to limit who can take advantage of the service.

This case study and research suggests that transportation network companies can be seen as a feasible option as a cost reduction method for transit agencies. As paratransit is required by transit agencies who use federal funding, this area of research will be continuously relevant to public transit.

Initially, the MBTA agency saw a dramatic reduction in costs per trip as well as reduced fares for riders. Yet, as the pilot continues, demand for trips is continually increasing, as ease and lower fares have increased demand. Currently, the transit agency is not seeing the same savings and the pilot is now close to "breaking even".

This pilot program has put MBTA at the forefront of innovation for cost reduction strategies for paratransit. Although the program is not seeing the initial predicted results, the program is the first of its kind to take advantage of a new mode of transportation. This innovation will not only be beneficial for the future of the MBTA but for paratransit as a whole.

This paper has identified steps that other transit agencies can consider for launching a pilot program and for assessing how such a program could work. It is important to emphasize that the MBTA program is a pilot and is not yet a full-service program. This means that suggestions made in this paper may change over time as more issues and benefits of TNC partnership reveal

themselves. The MBTA program has been extended once and the hope is that it will extend longer in order to truly assess the possibilities of how this service could be transitioned to a fully functioning program. The paper offers criteria for determining whether a pilot program like the one described here might be a good match for a transit agency. Once this is assessed, transit agencies can follow the steps needed to determine how to make it most beneficial for their transit agency. Considerations should be made for application including demand shifts, design and relationships with private partners that are also stakeholders in this process.

FINAL THOUGHTS

The future of paratransit service is heavily reliant on finding successful cost reduction strategies that do not limit service to people with disabilities. Barriers to transportation can create difficulty in other aspects of life for people with disabilities. Having paratransit that is limited or inconsistent can affect job prospects due to not being able to arrive on time, health risks as it may be difficult to reach doctors' appointments or get medications they may need, and limit mobility and flexibility for all aspects of life.

Future research needs to be conducted on the long-term effects of these types of TNC-paratransit programs. As discussed, transportation network companies are not a solution for all types of paratransit trips. Issues that still need to be addressed include having ADA certified drivers and attempting to increase the number of accessible vehicles for serving people with disabilities who have difficulty riding in traditional cars. These are issues that continue to persist while using this paratransit cost reduction strategy. If transit agencies can determine how to use TNCs efficiently to enhance their own service and to serve all paratransit users, there may be more savings for transit agencies.

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