# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>1.1</td>
<td>How this Working Paper Contributes to the Study</td>
<td>1</td>
</tr>
<tr>
<td>1.2</td>
<td>Report Structure</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>PEER REVIEW</td>
<td>3</td>
</tr>
<tr>
<td>2.1</td>
<td>Introduction</td>
<td>3</td>
</tr>
<tr>
<td>2.2</td>
<td>Summary Of Peer Review</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>INDUSTRY BEST PRACTICES</td>
<td>5</td>
</tr>
<tr>
<td>3.1</td>
<td>Introduction</td>
<td>5</td>
</tr>
<tr>
<td>3.2</td>
<td>Mobility Landscape in North America</td>
<td>5</td>
</tr>
<tr>
<td>3.2.1</td>
<td>Factors Driving Change</td>
<td>6</td>
</tr>
<tr>
<td>3.2.2</td>
<td>Mobility Solutions and Suppliers</td>
<td>8</td>
</tr>
<tr>
<td>3.3</td>
<td>Emerging Role of Transit Agencies</td>
<td>9</td>
</tr>
<tr>
<td>3.4</td>
<td>Business Models</td>
<td>10</td>
</tr>
<tr>
<td>3.4.1</td>
<td>Mobility on Demand</td>
<td>10</td>
</tr>
<tr>
<td>3.4.2</td>
<td>Family of Transportation Services</td>
<td>10</td>
</tr>
<tr>
<td>3.4.3</td>
<td>Public Private Partnerships</td>
<td>11</td>
</tr>
<tr>
<td>3.4.4</td>
<td>Mobility as a Service</td>
<td>11</td>
</tr>
<tr>
<td>3.4.5</td>
<td>Consolidated Transportation Services Agency (CTSA)</td>
<td>12</td>
</tr>
<tr>
<td>3.5</td>
<td>State of the Industry</td>
<td>14</td>
</tr>
<tr>
<td>3.5.1</td>
<td>Case Studies</td>
<td>15</td>
</tr>
<tr>
<td>3.6</td>
<td>Challenges and Opportunities</td>
<td>19</td>
</tr>
<tr>
<td>3.6.1</td>
<td>Equity/Title VI</td>
<td>20</td>
</tr>
<tr>
<td>3.6.2</td>
<td>Driver Training/Screening/Hours of Service</td>
<td>21</td>
</tr>
<tr>
<td>3.6.3</td>
<td>Vehicle Standards</td>
<td>22</td>
</tr>
<tr>
<td>3.6.4</td>
<td>Prevailing &amp; Minimum Wage</td>
<td>23</td>
</tr>
<tr>
<td>3.6.5</td>
<td>Private Sector Competition/Charter Regulations</td>
<td>23</td>
</tr>
<tr>
<td>3.6.6</td>
<td>Private Partner Durability</td>
<td>23</td>
</tr>
<tr>
<td>3.6.7</td>
<td>Political Considerations</td>
<td>24</td>
</tr>
<tr>
<td>3.7</td>
<td>Specialized Transit Operations – Common Industry Practices</td>
<td>24</td>
</tr>
</tbody>
</table>
3.7.1 Operations .............................................................................................................. 24
3.7.2 Supplemental Service delivery .............................................................................. 29

3.8 Emerging Mobility Technologies .................................................................34
3.8.1 Mainstream Deployment .................................................................................. 35
3.8.2 Limited Commercial Deployment .................................................................... 35
3.8.3 Pilot Deployments ............................................................................................ 38
3.8.4 Enhanced Safety Solutions ................................................................................ 39
3.8.5 Advanced Research but No Deployments ......................................................... 41

4 CONCLUSIONS AND NEXT STEPS ..............................................43

APPENDIX - Literature Search Findings .................................................................45
1 INTRODUCTION

The San Diego Association of Governments (SANDAG) is currently updating the San Diego Forward: The Regional Plan (Regional Plan), which outlines the overall vision for the future of the San Diego region. An important component of the Regional Plan is the Coordinated Plan, a guide for the implementation of public transit and social service transportation. The specialized transportation element focuses on the mobility needs of seniors and persons with disabilities who cannot use regular transit services. In order to assess the transportation needs of our growing senior and disabled populations and make recommendations for improvements in service, SANDAG is developing a Specialized Transportation Strategic Plan.

The Specialized Transportation Strategic Plan will:

- Identify transportation needs and current gaps in service;
- Survey best practices for specialized transportation from other agencies nationwide;
- Develop near- and long-term strategies for improving specialized transportation; and
- Incorporate study recommendations into the update of the San Diego Forward: The Regional Plan.

1.1 HOW THIS WORKING PAPER CONTRIBUTES TO THE STUDY

In order to provide the foundation for the development of near- and long-term strategies for improving mobility options for older adults and persons with disabilities, it is important to best understand the evolving mobility landscape in the nation. This working paper presents mobility best practices including those specific to the governance, operation, and service delivery of specialized transportation or paratransit. Also included are governance, operational, and financial characteristics of a select number of peer specialized transit agencies. The review of peer agencies includes a commentary of how the San Diego Metropolitan Transit System’s (MTS) Access and North County Transit District’s (NCTD) LIFT paratransit services perform relative to peer agencies.

1.2 REPORT STRUCTURE

This Working Paper is presented in two sections:

Section 2.0: Peer Review

The peer review focuses on the operational and financial performance of peer agencies and includes a commentary on how MTS Access and NCTD’s LIFT paratransit services perform relative to the peer agencies. The peer agencies that were analyzed are noted below:

- Los Angeles County (CA) Access
- Orange County (CA) Access
Sacramento (CA) Paratransit Inc
Portland (OR) Tri-Met LIFT
Boston (MA) The RIDE
Broward County (FLA) TOPS
Denver (CO) Access-a-Ride
Seattle (WA) Metro Access

Section 3.0: Best Practices

Section 3 presents a discussion of specialized transportation industry best practices, capturing the essence of operating characteristics of peer agencies as well as a broader range of national experiences and opportunities for enhanced mobility including greater integration between specialized and conventional transit services.

- **Section 3.2: Mobility Landscape in North America**: Includes a description of the impacts of transportation on people and cities, overview of current challenges, factors driving change, new mobility solutions and suppliers, and where the industry is headed.
- **Section 3.3: Emerging Role of Transit Agencies**: Includes a description of the transit agency as mobility manager, new business models, and challenges and opportunities for transit agencies.
- **Section 3.4 Business Models**: Includes a description of Mobility on Demand, Family of Transportation Services, Public Private Partnerships, and Mobility as a Service concepts. Also included is discussion of California’s Consolidated Transportation Services Agencies (CTSAs).
- **Section 3.5: State of Industry Overview**: Includes a description of the general state of mobility in the United States, including services, contexts, partners, and initiatives; and case studies.
- **Section 3.6 Challenges and Opportunities**: Includes a description of some of the challenges and consideration as they apply to deploying new service models, engaging private sector, and using other strategies for specialized transportation
- **Section 3.7: Literature Search Findings**: Includes a synopsis of pertinent reports and articles.
- **Section 3.8: Specialized Transit Operations – Common Industry Practices**: Presents a discussion of key functional/operational elements in the delivery of specialized transit ranging from eligibility and certification processes, to trip management and reporting. Contained within is a discussion of supplemental service delivery elements including the use of transportation network companies (TNCs) and accessible taxis.
- **Section 3.9: Emerging Mobility Technologies**: Includes a discussion of: mainstream, limited commercial, and pilot deployments as well as mobility technologies for which there is advanced research, but no deployments.
2 PEER REVIEW

2.1 INTRODUCTION

In partnership with SANDAG officials, eight specialized transit agencies were identified for peer review. Two of the specialized transit agencies in California are also the designated Consolidated Transportation Services Agencies (CTSAs) for their corresponding region.

The peer review focuses on the operational and financial performance of peer agencies and includes a commentary on how MTS Access and NCTD LIFT services perform relative to the peer agencies.

2.2 SUMMARY OF PEER REVIEW

Table 2.1 presents key operational and financial characteristics of MTS Access, NCTD LIFT, and the paratransit services provided by peer agencies.

Notable observations from the summary data include:

- NCTD LIFT and MTS Access provide a comparable number of trips per capita (0.25 and 0.26, respectively), which is 43% less than the peer agency average of 0.44.
- Similarly, NCTD’s and MTS’s paratransit investment per capita (which measures the amount of investment in specialized transit relative to the population of the service area) of $9.41 and $6.72, respectively, is considerably less than the peer average of $17.18.
- Paratransit in San Diego performs as well as or better than peer averages in terms of vehicle productivity (as measured by trip per hour) and cost per trip.
- While several of the peer agencies use supplemental contracted services such as taxis to supplement traditional demand response, the financial performance of these supplemental contracted services ranges broadly from a low in the $12 range (Seattle and Orange County) to a high of $40+ in Sacramento. This cost variance is influenced by how contracts are structured and, more importantly, how supplemental services are deployed. Several cost-effective deployments of taxi/TNC services are discussed further in case studies presented in Section 3.5.

It is important to recognize that the review of peer agency operating and financial performance may provide order of magnitude comparisons. However, several other factors specific to the respective local operating environments (including labor relations, operating policies, advancements in ancillary mobility management strategies, contract structure documents, etc.) that may influence performance outcomes need to also be considered.
Table 2.1: Key Operating and Financial Performance – Peer Review

<table>
<thead>
<tr>
<th>Name</th>
<th>City/Region</th>
<th>State</th>
<th>Service Area Population</th>
<th># of Annual Trips</th>
<th>Trips per Capita</th>
<th>Net Annual Operating Expenses ($)</th>
<th>% Farebox Recovery</th>
<th>Cost per Trip ($)</th>
<th>Investment per Capita ($)</th>
<th># of Peak Vehicles</th>
<th>Vehicle Revenue Hours</th>
<th>Trips per Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCTD Lift</td>
<td>North San Diego County</td>
<td>CA</td>
<td>849,420</td>
<td>213,603</td>
<td>0.25</td>
<td>$7,990,600</td>
<td>9.2%</td>
<td>$37.00</td>
<td>$9.41</td>
<td>61</td>
<td>122,706</td>
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<tr>
<td>MTS Access</td>
<td>urbanized south San Diego County</td>
<td>CA</td>
<td>2,462,700</td>
<td>632,000</td>
<td>0.26</td>
<td>$16,550,200</td>
<td>13.1%</td>
<td>$26.00</td>
<td>$6.72</td>
<td>166</td>
<td>259,643</td>
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<tr>
<td>Total/Combined - San Diego County</td>
<td>CA</td>
<td>3,312,120</td>
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<tr>
<td>Access Services *</td>
<td>Los Angeles County</td>
<td>CA</td>
<td>11,936,100</td>
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<td>Taxi</td>
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<td>$36.08</td>
<td></td>
<td>1,170</td>
<td>585,800</td>
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<td>Total</td>
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<td>1,956</td>
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<tr>
<td>OCTA Access *</td>
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<td>3,077,900</td>
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<td>$45.82</td>
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<td>$1,338,800</td>
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<td>$12.42</td>
<td></td>
<td>86</td>
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<td>Total</td>
<td>1,785,300</td>
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<td>$43.81</td>
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<tr>
<td>Paratransit, Inc *</td>
<td>Sacramento</td>
<td>CA</td>
<td>1,035,280</td>
<td>Demand Response 365,350</td>
<td>0.42</td>
<td>$17,717,300</td>
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<td>$48.49</td>
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<tr>
<td></td>
<td>Taxi</td>
<td>72,660</td>
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<td></td>
<td></td>
<td>$3,192,360</td>
<td>10.9%</td>
<td>$43.93</td>
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<td>22</td>
<td>23,900</td>
<td>3</td>
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<tr>
<td></td>
<td>Total</td>
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<td></td>
<td></td>
<td></td>
<td>$20,909,660</td>
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<td>$47.73</td>
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<td>134</td>
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<td>Tri-Met LIFT</td>
<td>Portland</td>
<td>OR</td>
<td>1,560,800</td>
<td>Demand Response 925,820</td>
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<td>$30.04</td>
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<td>138,740</td>
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<td></td>
<td>Total</td>
<td>1,064,560</td>
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<td></td>
<td></td>
<td>$38,302,530</td>
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<td>$35.98</td>
<td></td>
<td>296</td>
<td>538,520</td>
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<tr>
<td>The RIDE</td>
<td>Boston</td>
<td>MA</td>
<td>3,109,300</td>
<td>Demand Response 870,780</td>
<td>0.41</td>
<td>$58,765,600</td>
<td>10.9%</td>
<td>$67.49</td>
<td>$28.39</td>
<td>174</td>
<td>685,960</td>
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<tr>
<td></td>
<td>Taxi</td>
<td>110,660</td>
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<td></td>
<td>$1,344,100</td>
<td>10.9%</td>
<td>$12.15</td>
<td></td>
<td>46</td>
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<td>$60,109,700</td>
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<td>$61.25</td>
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<td>220</td>
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<td>Peer Average</td>
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<td></td>
<td></td>
<td>$36.49</td>
<td></td>
<td>$17.18</td>
<td></td>
<td></td>
<td></td>
<td>1.8</td>
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</table>

* Consolidated Transportation Service Agency (CTSA)
3 INDUSTRY BEST PRACTICES

3.1 INTRODUCTION

As the mobility landscape continues to evolve, connected travelers, continued advancements in transportation technologies, and private sector involvement present unprecedented opportunities for public transportation improvements in general and the delivery of specialized transit, specifically. In recent years, concepts such as microtransit and mobility-on-demand have helped agencies provide a range of mobility options for the senior and disabled communities by developing and integrating unconventional modes into their services, engaging the private sector in the form of transportation network companies (TNCs), taxis, and other modes as complementary alternatives to traditional specialized transit delivery schemes. However, while transit agencies continue to experiment with new business models, suppliers, and technologies to extend service (and mobility options), challenges related to providing cost-effective, efficient, and equitable service to all people remain.

Given such opportunities in innovative service delivery, SANDAG is examining immediate as well as longer term actionable strategies to best meet the mobility needs of seniors and individuals with disabilities. Strategies include those sought for travelers who could potentially take accessible fixed-route transit (bus and/or rail), but whose origin or destination cannot be conveniently accessed from the nearest available transit service options. In support of this initiative, this section presents examples of transit agency initiatives related to innovative service delivery models.

3.2 MOBILITY LANDSCAPE IN NORTH AMERICA

Mobility refers to the movement of people from one place to another. Efficient, cost-effective access to health, education, employment, and entertainment directly impacts people’s lives. Choices in travel also have large-scale societal impacts related to human rights, the economy, the environment, and the development of cities.

In advancing the Specialized Transportation Strategic Plan, it is important to embrace the concept of mobility and view senior and disabled communities through a lens of a fully integrated (and inclusive) transit or mobility market. That is, looking beyond just enhancements to mandated ADA paratransit/specialized services and imagine possibilities for next generation mobility for the entire community, including seniors and individuals with disabilities.

Over the past 60 years, mobility in the United States has been dominated by the private vehicle. Over this period, challenges have arisen related to people and cities that include:

- Large scale society-shaping trends including:
  - Congestion and accidents;
  - Personal health impacts and associated rising health costs;
— Reduced accessibility to important services and opportunities; and
— Greenhouse gas emissions.

• Urban environment outcomes such as:
  — Sprawl; and
  — Reduced neighborhood character.

• Impacts to individuals such as:
  — Reduced accessibility (e.g., the high costs to own and operate a private vehicle, physical distance from transit and alternative modes of transportation, physical and perceptual barriers); and
  — Fewer social interactions.

At the same time, more people are shifting their dependency toward public transportation. With increased congestion on roadways and concern over greenhouse gas emissions, SANDAG and other agencies see a need for an increased role in public transportation to address regional mobility needs. As such, transit agencies are under increasing pressure to provide equitable, cost-effective service for all residents, including those of all income levels, needs, preferences, and regions within the service area.

3.2.1 FACTORS DRIVING CHANGE

The landscape of mobility is changing, driven by new alternative mode choices, advancing technologies, and emerging trends in the transportation field.

• New mobility solutions and suppliers have entered the market, beginning with Zipcar as a car-sharing service in 2000, followed by Car2Go in 2008, and bike-sharing in 2011. In 2009, ridehailing company Uber was founded, followed by Lyft in 2012, with both companies emerging with a ride-splitting option in 2014 and 2017 respectively. In 2014, private microtransit providers Bridj and Chariot were founded, resulting in additional choices for people although not all residents can afford to use the services.

• The sharing economy has transformed how we travel. Is a car public or private, is it delivering goods or services? Sharing economy is a hybrid market model which refers to the sharing of access to goods and services (coordinated through community-based online services). This has given rise to next-generation mobility solutions including transportation network companies and microtransit services.

• Smartphone penetration is increasing, with more than 75% of Americans owning a smartphone. An even larger percentage owns some type of cellphone. This enables people to be connected at all times and use their phones to receive information in real-time.

• Advancing technology has improved access to real-time travel information, allowed for inter-modal payment, and enabled real-time routing and dispatching. Of special importance are the following:
  — Connected and automated vehicles (CAV): CAVs have the potential to improve traffic safety, transportation efficiency, land-use efficiency, infrastructure, and transit spending if used in the correct context. Major car companies are moving towards CAVs. There is also movement towards using the vehicles in a shared-use, on-demand context.
— **Beacon technologies and Crowdsourcing Travel Patterns**: Small Bluetooth radio transmitters, known as beacons and embedded in infrastructure, can assist riders with wayfinding. At the same time, transit agencies can receive data on travel habits from riders who are willing to share data. Data can be obtained on which bus stops riders gets on, where they disembark, and can track if they get on another bus anywhere within the system. Other opportunities may exist to partner with local businesses to send riders exclusive deals based on their geo-location and nearby retail locations.

— **Artificial Intelligence/Machine Learning**: Ridehailing is now very common and also popular with travelers. However, as Ridehailing service providers start to offer shared ride services (Lyft Line, Uber POOL/Express POOL), it is important for them to improve their ride-matching and routing algorithms. Use of data from multiple sources on traffic patterns and variability, and crowdsourced data from riders, can enable self-learning algorithms that can help with delivery of efficient and cost-effective transportation services. Most shared ride services offered by agencies through conventional demand response software today lack such level of sophistication in their algorithms, particularly when delivering same-day trips that require continuous optimization.

• **A changing mobility ecosystem:**
  — **Urbanization and the movement of people back into the city** has created the need to ensure that people can move around the city at any income, age, and ability and has highlighted the need to create cities that are dense and walkable, simulating a transit renaissance and a reclaiming of streets by people.
  — **An increasing population** highlights a greater need for multi-modal options and shared mobility solutions as cities and their surrounding areas become increasingly crowded. **An increasing and aging population** means that no transportation system is sustainable unless it is accessible.
  — **Environmental awareness and active lifestyles** have contributed to a reduced dependence on private vehicles and shift towards active transportation, such as walking and biking.

• **New funding initiatives and partnerships** are moving the market forward. These include:
  — **Ford Smart Mobility**, founded under Ford Motor Company, acquired a number of mobility, technology and microtransit companies including Chariot, Autonomic, Inc., and TransLoc Inc.
  — **New funding opportunities** are available to transit agencies to experiment leveraging existing mobility solution providers, such as the United States Department of Transportation (DOT) Mobility on Demand (MOD) Sandbox Program, part of a larger research effort at DOT that supports transit agencies and communities as they integrate new mobility tools like smart phone apps, bike and carsharing, and demand-responsive bus and van services.
3.2.2 MOBILITY SOLUTIONS AND SUPPLIERS

New and existing challenges related to mobility beg the question of how transit agencies and other agencies involved in specialized services like SANDAG can help to provide solutions in a cost-effective manner. Rather than expending effort providing new technologies and mobility solutions for transit riders, transit agencies are generally better off focusing on what they do best: moving people from point A to point B. It is by partnering or integrating with mobility solution suppliers that transit agencies can help to shape the future of urban mobility without incurring a large cost. Such mobility solutions include:

- **Microtransit**: Microtransit consists of public transit medium capacity vehicles (8 to 15 passengers) operating with on-demand, flexible routing to provide service to areas that are inefficient to serve with a fixed route. The driver operates as an employee of the transit agency or a corporation. The distinguishing feature of microtransit compared to earlier generation demand-response transit is that the passenger does not need to schedule a trip far in advance. Ordering trips can be done on-demand, and the centralized dispatching algorithm automatically adjusts service in response.

Eligibility for microtransit service, as with conventional fixed-route service, is open to the public, and fares may be integrated with the rest of the public transit network. Past attempts have been made by transit agencies to achieve this with previous generations of demand responsive scheduling and dispatch technology with only limited success. Much of the current interest in microtransit stems from the apparent ability of the mobile apps based technology being used in recent years by various third party ridesharing, ridehailing and ride-splitting service providers (see below) to provide this type of service more effectively.

- **Dynamic Ridesharing**: Ridesharing is a software-assisted modernization of conventional carpooling, in which drivers with their own personal vehicles are matched with passengers using the same subscription service, to split the cost of commuting together. For security and payment management, eligibility as both a driver and a passenger is limited to members who maintain an account with the central service.

- **Ridehailing**: Ridehailing, also known as ridesourcing, consists of a driver utilizing their personal vehicle to provide a private trip to a paying passenger; unlike carpooling and ridesharing, the driver of a ridehailing service is driving professionally, and not making their own commute in the process of transporting passengers. Ridehailing closely mirrors the service model of traditional medallion taxis and is most familiarly employed by TNCs such as Uber and Lyft.
• **Ride-splitting**: Ride-splitting is a type of ridesourcing. The driver uses their personal vehicle, drives professionally rather than as part of their own commute, and can accommodate multiple independent passengers simultaneously, on a route that dynamically updates in response to new trip requests. Ride-splitting is another service offered by TNCs in major cities, where the likelihood is higher of customers independently booking trips simultaneously, with start and end points that can be conveniently served using the same overall trip. Ride-splitting commonly uses lower capacity vehicles (less than 6 passengers).

### 3.3 EMERGING ROLE OF TRANSIT AGENCIES

As new services and suppliers are seen as important parts of the transportation network, many transit agencies are taking on the role of “mobility manager” to ensure that service is equitable in terms of cost, service area, and vehicles, and to coordinate services to prevent further congestion. An example of an agency moving towards this role is the San Francisco Municipal Transportation Agency (SFMTA) whose mission is to “work together to plan, build, operate, regulate and maintain the transportation network, with our partners, to connect communities.”

According to Brandon Hemily, Ph.D in *Transit and New Shared-Use Modes; Key questions from the transit agency perspective; a Discussion Paper (2016)*, in this new role, transit agencies are being asked to:

- Open real-time transit data to an ever-growing range of new stakeholders;
- Participate and/or build technological interfaces with the new suppliers;
- Participate in external shared-data platforms;
- Develop integrated trip planning tools or real-time information platforms; and
- Participate in, or develop, integrated payment back-offices, with a variety of public and private organizations, many of which may be in competition with each other.

As part of this emerging role, transit agencies may partner with other for-profit and non-profit partners in order to:

- Connect people to transit;
- Provide service to underserved areas;
- Fill gaps in hours of operation; and
- Reduce costs to providing accessible transportation and low-ridership fixed-route service.

Beyond partnering from a service delivery and/or technology standpoint with new providers, transit agencies are also experimenting with new business models, including in-house, on-demand service (microtransit) for both paratransit and regions with low ridership, and Family of Transportation Services, which encourages eligible paratransit riders to take conventional transit for all or part of their trips.
3.4 BUSINESS MODELS

New business models in use by other transit agencies that can be applied to specialized transportation services are described in this section.

3.4.1 MOBILITY ON DEMAND

Mobility on Demand (MOD) may expand customer travel opportunities and offer customers spontaneity of travel. The service model may be enabled by private companies (such as Uber, Lyft, taxis, or private microtransit) or public agencies, and used to facilitate first-mile/last-mile solutions, paratransit, and travel within low-density zones where it is not economically feasible to provide Fixed-route and/or specialized transit services. When used for specialized transit, the focus of MOD is primarily on offering same-day specialized transit services. However, MOD may also be used by transit agencies and TNCs to complement the transportation network and provide more mobility options for travel, in addition to public specialized transit such as those provided by MTS and NCTD.

For example, the Tri-County Metropolitan Transportation District of Oregon (TriMet) received funding for an Open Trip Planner Share Use Mobility project that will create a platform integrating transit and shared-use mobility options. TriMet will build on its existing trip planning app to incorporate shared use mobility options and more sophisticated functionality and interfaces, including data sharing for shared-use mobility providers. By integrating data, the project will allow users to plan trips that address first/last mile issues while traveling by transit.

3.4.2 FAMILY OF TRANSPORTATION SERVICES

The Family of Transportation Services (FTS) approach encourages eligible paratransit riders to complete all or part of their journey using conventional transit services, which can help reduce the average travel distance for dedicated specialized transportation trips. The transfer locations are designed to facilitate a consistent, accessible transfer to or from the conventional service. With the FTS approach, door-to-door service will still be provided to eligible customers. Benefits of the FTS model include improved travel spontaneity and reduced trip time if the entire trip is made on non-paratransit services or combination of conventional transit service and other potential mobility services such as microtransit, ridehailing, or ride-splitting. The ability for specialized transit users to take advantage of non-specialized transportation services may also help enhance user’s dignity and inclusivity. The FTS model also has the potential to decrease the cost of providing door-to-door service by reducing the average passenger vehicle revenue-miles for trips. This has the potential to mitigate cost increases to achieve additional ridership.

Many transit agencies including MTS and NCTD provide a range of transit services and may assist paratransit customers in trip planning and connectivity/transfers to fixed route bus or rail services.
3.4.3 PUBLIC PRIVATE PARTNERSHIPS

Transit agencies are partnering with private companies to improve service, and sometimes to expand the geographic area served. Private companies can complement agency services by extending service into lower-density areas by offering first-mile/last-mile solutions, defined as transportation services that connect riders from transportation stations or hubs to final destinations. Private companies can also serve as an alternative to the private vehicle. Potential private partners include TNCs, taxis, and private microtransit. With public private partnerships, transit agencies may begin to transition increasingly towards a role of “mobility manager” for San Diego County, for example. Where FTS may be seen as integrating across a transit agencies’ services, public private partnerships can extend this integration across more of the transportation network.

3.4.4 MOBILITY AS A SERVICE

Mobility as a Service (MaaS) takes the integration of mobility services across the transportation network to another level. Within the MaaS framework, public transit is the backbone and other mobility solutions expand the service area and complement the fixed-route public transit backbone network. The goal is to provide people with more options for efficient and convenient travel. MaaS can help improve transportation network equity by providing these opportunities better than can public transit alone. Beyond simply providing more travel options, MaaS dissolves boundaries between various transportation modes and can offer mobility as a package. At its most advanced, MaaS offers a monthly subscription, similar to a cell phone plan, where users can choose which services (e.g. Uber, bikeshare) to include in their package. In North America, MaaS is not yet as advanced as in Europe where this concept originated but includes integrated trip planning and payment for multimodal trips. With transit as the backbone, we can also foresee transit agencies in regions with MaaS transitioning more towards becoming “mobility managers”.

![Diagram of Mobility as a Service](image_url)
3.4.5 CONSOLIDATED TRANSPORTATION SERVICES AGENCY (CTSA)

Consolidated Transportation Services Agencies (CTSA) are designated by county transportation commissions (CTCs), local transportation commissions (LTCs), regional transportation planning agencies (RTPAs), or metropolitan planning agencies (MPOs) per California Assembly Bill (AB) 120, the Social Services Transportation Act. The goal of AB 120 is “to improve transportation service required by social service recipients by promoting the consolidation of social service transportation services”.

In California, a CTSA, as designated at the county level, is a formalized organization responsible to implement a transportation plan that promotes cost effectiveness in the delivery of county public and social service agency transportation services through service coordination. The range of options for CTSA designations as defined in law are:

1. A public agency, including a city, county, operator [transit operator], any state department or agency, public corporation, or public district, or a joint powers entity created pursuant to Title 21, Chapter 3, Article 7, and Section 6680 of the California Government Code.

2. A common carrier of persons as defined in Section 211 of the Public Utilities Code, engaged in the transportation of persons, as defined in Section 208.

3. A private entity operating under a franchise or license.

4. A nonprofit corporation organized pursuant to Division 2 (commencing with Section 9000) of Title 1, Corporations Code.

While the law provides for a range of governance alternatives, typical CTSA’s are either a transit agency or a nonprofit entity.

A range of efficiency and service quality benefits from coordination were introduced by AB 120. The following benefits were defined in the Act:

- Combined purchasing of necessary equipment so that some cost savings through larger number of unit purchases can be realized\(^1\).
  - Adequate training of vehicle drivers to insure the safe operation of vehicles. Proper driver training should promote lower insurance costs and encourage use of the service.
  - Centralized dispatching of vehicles so that efficient use of vehicles results.
  - Centralized maintenance of vehicles so that adequate and routine vehicle maintenance scheduling is possible.
  - Centralized administration of various social service transportation programs so that elimination of numerous duplicative and costly administrative organizations can occur. Centralized administration of social service transportation services can provide more efficient and cost-effective transportation services permitting social service agencies to respond to specific social needs.

\(^1\) This can include the joint procurement of management reporting and trip scheduling software, IT support services and computer hardware, as well as other intelligent transportation technologies.
— Identification and consolidation of all existing sources of funding for social service transportation services can provide more effective and cost-efficient use of scarce resource dollars. Consolidation of categorical program funds can foster eventual elimination of unnecessary and unwarranted program constraints.

• Additional benefits from coordination range from:
  — Meeting legislative requirements.
  — Operating cost savings by minimizing service overlap and duplication.
  — The effective accommodation of unmet transportation needs through a centralized trip broker. The focus of many transportation coordination efforts is on serving the mobility needs of seniors, persons with disabilities and the low income.
  — Effective demand management through a centralized mobility management including the delivery of transit training programs to shift paratransit riders to fixed route options, a centralized call center for information on available transportation alternatives, and the coordination of supplemental programs such as volunteer driver programs or taxi scrip programs.
  — Joint procurement of insurance coverage including umbrella and supplemental coverage to increase liability coverage.
3.5 STATE OF THE INDUSTRY

Transit agencies are trying new business models, creating new partnerships, and offering new and upgraded services to customers in different contexts, including the city center, suburbs, and rural areas.

Although there are a number of different contexts for implementing new service delivery models, the same vehicular partners are usually considered. Agencies have partnered with vendors to provide primarily the following types of services:

- Full service operation by vendors, where vendors provide a customer app, a software platform for scheduling, dispatching and payment, and operate vehicles.
- Agency-operated vehicles under distinct branding, fulfilling customer trip requests from vendor-provided apps while being managed by a vendor-provided dispatch solution.
- Trips fulfilled by TNCs, either subsidized or paid in full by agencies, or paid by customers.

The graphic below presents a summary of partnerships between transportation network companies (TNCs) and public agencies².

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3.5.1 CASE STUDIES

All the case studies below include service to seniors and individuals with disabilities.

3.5.1.1 SAN CLEMENTE, CA (OCTA PROJECT V PROGRAM)

When Orange County Transportation Authority (OCTA) decided to eliminate two of its unproductive routes (191 and 193) due to low ridership in the City of San Clemente, the City and OCTA decided to partner with Lyft to provide on-demand services to riders dependent on those routes.

In October 2016, City Council approved a $900,000 contract with Lyft to provide on-demand service to riders within the City limits. The contract is funded by an OCTA grant through Measure M2 Project V. Project V provides funds for local communities to develop their own transit services.
that complement the regional transit services. Through the grant, OCTA pays 90% of operating deficit and the City pays a local match of 10%. This contract allows riders affected by discontinued routes to travel locally or connect to another OCTA route or Metrolink (rail) service. The contract establishes the following guidelines for trip payments:

- Passenger pays the first $2.00 of the regular Lyft fare
- City pays remainder up to a maximum of $11.00 (up to $9.00 subsidy)
- Customer is responsible for any amount above $11.00

Riders can use the discount code SCRIDES when booking rides.

Given potential difficulties of senior and disabled riders using services offered by Lyft vehicles and drivers, riders eligible for OCTA Access service can request services from San Clemente’s Senior Mobility Program for local trips that provide a comparable level of service. The program offers free on-demand fixed-route service for shopping and senior center trips.

3.5.1.2 AC FLEX – OPERATED BY AC TRANSIT

In early 2017, AC Transit, the transit service operator in Alameda and Contra Costa Counties (California) launched a flexible service in the neighborhoods of Newark and Castro Valley (also available in Union City and Fremont), areas that had low transit demand. The service, AC Flex, is designed as an alternative to unproductive fixed-route service. As part of the service the AC Transit operates 12-passenger buses equipped with wheelchair access, fareboxes, and Clipper Card readers.

All trips must begin and end within the AC Flex service area around Line 275. AC Transit suspended operation of Line 275 from March 2017 through March 2018 to evaluate the service. The service area also includes two BART rail stations. Implemented as a one-call-one-click concept, the service allows trip booking using a web application (smartphone, tablet, computer) anytime or through the call center during restricted hours. AC Transit recommends trips be booked 30 minutes in advance. Recurring trips can be booked up to 3 months in advance.

The trip booking platform is implemented using MobilityDR platform from Demand Trans. Drivers get turn-by-turn direction on AC Flex vehicles. Riders can also subscribe to receive text or email alerts when their vehicles are 10 minutes away.
3.5.1.3  DIRECT CONNECT SERVICE BY PINELLAS SUNCOAST TRANSIT AUTHORITY (PSTA), PINELLAS COUNTY – ST. PETERSBURG, FL

In 2016, PSTA launched a unique public private partnership program to enhance local mobility by partnering with Uber and United Taxi. This service is designed to addresses the county’s sprawling population and service gaps that require riders to walk long distances to get to a bus stop. The service is designed such that:

- Riders can travel to any destination within a defined geographic service zone; or
- To or from designated stops within a zone

The service was primary designed to serve areas of PSTA where low ridership bus service was eliminated. Initially, the service was launched in the Pinellas Park and East Lake neighborhoods partnering with Uber and United Taxi. Based on the success of the program, PSTA has expanded the service to the entire Pinellas County and now also partners with Lyft. Thus far, however, rides through Lyft are currently not offered. It is unclear why, though experience with TriMet indicates that Uber and Lyft like to be exclusive partners and generally don’t work together with an agency.

PSTA service partners (now include Uber, United Taxi, Care Ride, and Wheelchair Transport) use app-based ridehailing platform. PSTA provides a discount of $5.00 per trip. Passengers pay an average of $1.00. Riders can pay by bankcards or Paypal. On taxis, riders can also pay by cash. Provider selection at is at the discretion of the passenger. Care Ride and Wheelchair Transport provide fully accessible services.

3.5.1.4  HYPERLINK PROGRAM- HILLSBOROUGH AREA REGIONAL TRANSIT (HART), TAMPA, FL

HART offers HyperLINK service to provide direct connections to bus stops in Brandon, Temple, Terrace and University Area neighborhoods. Designed as a shared ride service, this first/last mile solution was launched in the University of South Florida area with $1.2 million capital from Florida Department of Transportation (FDOT). The service is operated by Transdev who is paid $10 per trip. Riders pay $1 to connect to a designated HART stop or $3 to connect to other locations in the service zone. Riders can pay by cash or credit cards.
Private business donors (led by TECO) are funding the $170,000 two-year leases for four Tesla Model X SUV vehicles used to provide the service. The program aims to expand using Tesla vehicles equipped with autonomous vehicle technology (initially will have "drivers" to ensure safety). Also, in addition to regular shuttle buses, one Mobility Ventures’ MV-1 accessible vehicle is used to meet the needs of customers who may need accessible vehicles.

3.5.1.5 NEIGHBORLINK – LYNX, ORLANDO, FL

LYNX offers a flex service called, NeighborLink (NL), for its riders living in low density areas that are underserved by its local bus system. LYNX has currently defined 13 NL routes and zones. Riders can use an app to book trips to travel anywhere within the zone or to and from a stop on a NL route. Similar to AC Flex, LYNX operates small vehicles branded for NL service.

Riders pay fare similar to a regular fixed-route service: $2 for full fare and $1 for reduced fare (youth, seniors, disabled).

LYNX has been offering NeighborLink for several years, but it required booking rides two hours in advance until recently when an app was launched. LYNX has partnered with DoubleMap to provide the trip booking and dispatching platform. Also, DoubleMap provides real-time information and alerts to riders.

The service is operated by LYNX’s paratransit service (ACCESS) contractor, MV Transportation.

3.5.1.6 NEW LOCAL MOBILITY INITIATIVES

**Uber Express POOL:** Uber is currently piloting share ride service called Express POOL. Unlike Uber POOL that provides door-to-door service, Express POOL offers services to/from designated stops. Express POOL is currently being piloted in Boston, San Francisco, D.C., Los Angeles, Philadelphia, Denver, and San Diego.

**UberWAV and Uber Assist (UberAccess)** – Uber provides rides for persons with disabilities through branded service called Uber WAV and
Uber Assist. Uber WAV is offered for riders who may need wheelchair and Uber Assist is offered for seniors and disabled riders who may require additional assistance getting in and out of the vehicle. Riders can bring Personal Care Attendants (PCA)/companions with them. Driver-partners providing the service are certified by a third party in safely driving and assisting people with disabilities. As of early 2017, UberAccess services were available in: Chicago IL, Houston TX, Los Angeles CA, New York NY, Portland OR, San Francisco CA, and Seattle WA. Information on ridership and costs were not available.

3.5.1.7 AUTONOMOUS VEHICLES - BISHOP RANCH (SAN RAMON, CA) - 585-ACRE OFFICE PARK

Contra Costa Transportation Authority (CCTA), backed by combination of private companies, public transit operators, and air quality authorities has launched a driverless shuttle service. Two 12 seat shuttles are provided by Easy Mile. CCTA plans to operate nearly 100 driverless shuttles by 2020.

Most of the funding is provided by owners of Bishop Ranch property, a Sunset Development Company. The ranch is a 585-acre office park that includes 550 tenants and where 30,000 people go to work. Shuttles provide services in the office park area and also provide first and last mile connectivity to nearby a BART station.

The shuttle is operated after the California Assembly Bill 1592 was passed that allows the testing of electric, low-speed, multi-passenger autonomous vehicles that are not equipped with a steering wheel, brake pedal, accelerator or operator.

3.6 CHALLENGES AND OPPORTUNITIES

A public agency considering contracting or otherwise coordinating with a private entity for the provision of transportation service must navigate a number of potentially tricky regulatory standards and public perception issues. With the advent of Uber service in 2009 and Lyft service in 2012, the world of transportation has changed dramatically, but the associated regulatory framework has not kept pace. Several recent studies published by the Transit Cooperative Research Program (TCRP) and the Federal Transit Administration (FTA) has provided some guidance on how they will view any new services. Nonetheless, these new services and contractual arrangements have not been tested in the legal system.

Further changes are likely to result, but the sections below provide guidance on what issues may arise and how best to deal with concerns in the current environment. Most of the discussion applies to Uber and Lyft, but similar considerations would exist for any private company.
While the challenges below are serious and complex, they should not be viewed as “fatal flaws” that would kill the ability to take advantage of the emerging approaches to providing mobility services. They are cautionary concerns that need to be taken into account when structuring any service changes, especially if these changes affect existing services or operator jobs.

3.6.1 EQUITY/TITLE VI

Of principal concern is to ensure that any new service arrangement with a private company meets all requirements related to equity. Equity in this sense encompasses

- Service availability – where and when service is provided
- Fare – how much is charged to use the service
- Technology access – ensuring that riders have access to the service without requiring a smart phone
- Rider access – non-discrimination based upon rider characteristics, including the Americans with Disability Act (ADA) and Title VI of the Civil Rights Act.

Equity in this sense does not mean “equal” or “the same.” For example, a transit agency may establish geographic zones where a private operator provides the service, and the service in that zone may be a different type of service than is offered elsewhere. In an area of low-demand, where traditional fixed-route service is unproductive, a transit agency could contract with Uber or Lyft to provide demand-response service. Or, such service could be provided only late at night when traditional demand decreases.

The transit agency would need to ensure that such an arrangement was not done in a discriminatory fashion, such as only offering demand-response service in low-income or minority communities.

The fare charged for the service would have to be equitable when viewed against the fares charged for traditional fixed-route service, adjusted for differences in the type of service provided. For example, federal law states that fares for ADA riders shall not exceed twice the fare that would be charged to an individual paying full fare for a trip of similar length at a similar time of day (49 Code of Federal Regulations [CFR] §37.131). These laws, however, were established when ADA service was generally demand-response and was being compared with fixed-route service. It is unclear whether a larger difference could be charged for an Uber-type service that was offered to the general public. There is also a fare concern regarding whether a rider could be required to have a credit/debit card account rather than being able to use cash. A ticket vending machine (TVM) overcomes some of this limitation if they can be placed near where riders board. Such an arrangement works well for a service like a park & ride, where there are few boarding locations. However, for a demand-response service with widely dispersed origins and destinations, it would be impractical to provide full coverage with TVMs. At any rate, neither Uber nor Lyft accept cash or ticket fares. MTS and NCTD could implement an account-based fare collection, which has the potential to account for the lack of TVMs and help integrate with TNCs. An account-
based fare collection allows riders to maintain an account that they can fund with a bank card or other methods (e.g., mailing check or by paying by cash in-person). At the same time, agency can work with third party solution providers (payment platforms) to build deep linking with TNCs and other providers so riders can pay for their trips when they book or when trips have been completed. Account-based payment also allows agencies to partner with local retailers to sell passes and other fare products through electronic media (prepaid cards, loading agency smartcards) to riders from low-income neighborhoods and riders who may be unbanked/underbanked.

Technology access is another equity concern. The Pew Research Center has tracked the prevalence of cell phones and smart devices among different population groups. Overall, they found that in the US, 95% of individuals own a cell phone of some type, with 77% owning a smart phone. This widespread adoption indicates that technology access may decline as a consideration over time, but the report did identify some areas of concerns. Notably, older individuals (65+) were less likely to have a cell phone (85%) or a smart phone (46%). People with less than a high school education were less likely to have a smart phone (57%) as were lower income (less than $30,000/year) individuals (67%). Rural residents were also less likely to have a smart phone (65%). These results are at a national level; further differences may exist at a regional or local level.

Equity is also an issue when it comes to the treatment of individual riders. This issue is primarily a concern when it comes to how an individual driver may treat an individual rider, such as an Uber driver refusing to transport someone from a federally protected population group. Both Uber and Lyft have guidelines for their independent contractors (drivers) that prohibit such discrimination, and even go beyond federal laws by prohibiting discrimination based upon “sexual orientation, marital status, and gender identity”, which are not covered by federal statutes. If a driver is shown to have engaged in such discrimination, he/she will be barred from driving for the company.

3.6.2 DRIVER TRAINING/SCREENING/HOURS OF SERVICE

The safety of the service provided is a paramount concern to a transit agency. Safety relates to both the safety of the driver (discussed here) and safety of the vehicle (discussed in the next section).

The Federal Motor Carrier Safety Administration (FMCSA) has established several relations to ensure that drivers can safely operate their vehicle. One area of regulation is the “hours of service,” that is, how many hours can a driver safely drive before taking a rest break. For interstate commerce (where federal regulations apply), related to a vehicle that carries nine or more passengers including the driver, there are three hour-of-service limitations. First, a driver cannot be on-duty for more than 15 hours without taking 8 hours off. Second, a driver cannot drive for more than 10 hours without taking an 8-hour break. Third, a driver cannot be on-duty for more than 60 hours during any consecutive 7-day period or 70 hours during any consecutive 8-day period. While these regulations apply only to interstate commerce, most states have similar legislation.

What’s notable about the above regulations is they apply to drivers who operate a vehicle that carries nine or more passengers. Most Uber and Lyft vehicles are private cars that carry five to seven people, so these regulations do not apply. Uber and Lyft have recently imposed their own hours of service limits. Lyft requires drivers to take a 6-hour break for every 14 hours the driver has the app in service. Uber requires a driver to take a 6-hour break after 12 hours of “driving time.” Driving time equals the time the

WSP
Page 21
driver has the app in service, less time spent stopped between trips. While these regulations are an attempt to mimic the federal hours-of-service rules, nothing prevents an individual driver who is contracted by both Uber and Lyft from far exceeding these service hours by switching back and forth between the apps.

In order to drive for either Uber or Lyft, drivers must pass a background check. Neither company reveals precisely what the checks encompass, but they cover a motor vehicle record review and a criminal background check. Uber notes that it periodically re-runs background checks. Generally, a driver is declared ineligible if they exceed a certain number of traffic violations or have a “felony, violent crime, or sexual offense” for both companies, and “drug-related offense, or certain theft or property damage offense” for Lyft. These requirements may not be as strict as the public agency can or does perform on its operators. For example, neither company does a fingerprint check as do some taxi licensing boards.

It should be noted that neither Uber nor Lyft does any drug screening, whether pre-employment, periodic, or for-cause. Instead, both companies rely on their rating system to identify problem drivers. A rider is encouraged to report drivers suspected of driving under the influence and the company will follow up with investigation, discipline, suspension and/or termination.

Neither Uber nor Lyft does any training for their drivers, although Uber does note that some drivers that have been removed from driving can have their privileges reinstated if they complete some training. There is no general operation, safety, or customer interaction training. Instead, these companies rely on the “community guidelines” and rating system to identify where a driver may have a problem. Taxi license boards have differing training requirements depending upon the city or jurisdiction.

### 3.6.3 VEHICLE STANDARDS

Vehicle standards are important from a safety and accessibility perspective. From a safety perspective, all vehicles must pass the annual state inspection standards, whether owned by a private individual (for Uber and Lyft), a taxi company, or a bus owner. Uber and Lyft further place age limits on their vehicle; generally, a vehicle can be no older than 10-15 years, depending upon the company and location. Neither company conducts in-person vehicle tests, instead relying on the annual state inspections to ensure the vehicle is safe to operate. For non-safety issues, such as body or interior damage, the companies rely on riders to report issues.

Neither Uber nor Lyft have a requirement to operate an accessible vehicle. The guidelines for both companies require a driver to accept wheelchair passengers if their wheelchair can fit into their vehicle. This lack of an individual vehicle being accessible is not a problem for the FTA, assuming that some mechanism exists to provide an equivalent level of service to the rider. As a practical matter, this burden would fall on the public transit operator to be able to dispatch an accessible vehicle when needed. A potential issue is that the accessible service must be “equivalent” to the service provided to those without disabilities, including response time. It is unclear from FTA guidance on how this would work if an accessible vehicle is dispatched from a remote facility while non-accessible vehicles are prevalent throughout a community.
3.6.4 PREVAILING & MINIMUM WAGE

Special requirements relate to the wages and benefits of mass transit employees. According to the US Department of Labor, when federal funds are used to acquire, improve, or operate a mass transit system (public transportation), federal law requires arrangements to protect the interests of mass transit employees (49 United States Code (U.S.C.) § 5333(b) (formerly Section 13(c) of the Urban Mass Transportation Act)). Section 5333(b) specifies that these protective arrangements must provide for the preservation of rights and benefits of employees under existing collective bargaining agreements, the continuation of collective bargaining rights, the protection of individual employees against a worsening of their positions in relation to their employment, assurances of employment to employees of acquired transit systems, priority of reemployment, and paid training or retraining programs (49 U.S.C. § 5333(b)(2)).

This could potentially be an issue if any current operator jobs are replaced by lower-wage jobs, especially if the replaced jobs were covered by a collective bargaining agreement.

In the case of using Uber/Lyft, the hourly wage will inevitably be lower than the wages paid to unionized operators. While little data exists on the earnings of Uber and Lyft drivers, the drivers must pay all expenses (gas, maintenance, and insurance) out of their earnings, so their effective hourly rate is dramatically lower, perhaps even less than the federal minimum wage. According to a recent study conducted by MIT’s Center for Energy and Environmental Policy Research (CEEPR), Uber and Lyft drivers earn a median wage of $3.37 per hour. While Uber has contested this finding by claiming the average gross earning closer to $20 per hour and MIT is revisiting the research methodology, such a low wage is considerably lower than what transit drivers typically earn, particularly accounting for other benefits they also receive as agency employees.

3.6.5 PRIVATE SECTOR COMPETITION/CHARTER REGULATIONS

Public bus companies are prohibited from providing charter service in competition with private charter bus companies. In general, these regulations prevent FTA subsidized grant recipients from unfairly competing with private companies.

The FTA website specifically notes that these regulations do not apply to demand-response service to individuals, so they would not apply to any Uber-type services. They could potentially come into play if a transit agency looked at establishing its own service in competition with a Bridj-type operator that provides a customized route for select companies or groups of individuals. In general, this is not likely to be much of a concern for any services contemplated by either MTS or NCTD, but it is another item to take into consideration.

3.6.6 PRIVATE PARTNER DURABILITY

A hard-to-quantify challenge or consideration is the concern over the long-term viability of any private sector partner. This concern has always been present with any private bus company or taxi company, but is, perhaps, more acute with the newer technology-based companies.
In the past, a transit operator faced the risk that its private partner could go out of business. This risk could be controlled by partnering with more than one taxi company, for example, or by owning its own vehicles which would be operated by a private bus company. If the private bus company went out of business, the public transit operator would be able to reclaim its equipment for use by a new contractor in a short amount of time.

For the newest mobility companies, whether bus-based, such as Bridj, or private-car based, such as Uber and Lyft, the risk is greater. Bridj, which was founded in 2014, has already ceased operation, and Uber/Lyft face challenges to their business model that could jeopardize their existence. Already in Europe, Uber has been classified as a “taxi” company, which subjects it to additional regulation, including having to classify its drivers as “employees” rather than “independent contractors.” Should that occur in the US, Uber and Lyft’s cost of operation will dramatically increase as they will now have to offer benefits to their employees and ensure they meet minimum wage standards.

### 3.6.7 POLITICAL CONSIDERATIONS

The above challenges have been presented primarily as legal issues that should be structured to avoid any potential regulatory pitfalls. Regardless of any legal consideration, any of these challenges could enter the political realm, either positively or negatively. The political issues could be more acute when changes to existing services are proposed, as opposed to the implementation of new service. SANDAG, MTS, and NCTD should be sensitive to how any changes will be perceived by the community at large and its elected representatives.

### 3.7 SPECIALIZED TRANSIT OPERATIONS – COMMON INDUSTRY PRACTICES

#### 3.7.1 OPERATIONS

MTS’ Access and NCTD’s LIFT are complementary paratransit services designed to meet the requirements of the Americans with Disabilities Act (ADA). These are available to individuals whose physical, cognitive or sensory disabilities prevent them from using the accessible fixed route (bus, light rail, and commuter rail) transit systems. The following functional attributes of specialized transit system operations are discussed in context of industry best practices:

1. Eligibility and Registration
2. Reservations and Scheduling
3. Fare Policy
4. Performance Measurement

Through Triennial Review (TR) findings, FTA provides continual guidance concerning the correct interpretation of ADA regulations and requirements. Industry best practices are based partly on the
collective findings of TRs of all grantees. In recent years, such findings have drilled deeper into the
details of paratransit service; for example, eligibility suspension policies.

1. Eligibility and Registration

Industry best practice favors a relatively strict and precise process for determining who is eligible to use
ADA complementary paratransit. The ADA requires that the process “strictly limit” ADA eligibility to
people who meet the ADA criteria. This is not intended to discourage eligible applicants from obtaining
service; rather to prevent responsible agencies from conferring paratransit access unduly on segments
of the general public who are not necessarily covered by the ADA.

Strict eligibility is considered as one of several tools imbedded in the ADA regulations to manage
limited program resources for the benefit of those who are eligible under the law. On one hand,
insufficient limits on eligibility can lead to a system where costs cannot be contained and, as a result,
constraints must be placed on service to balance the budget that may be inappropriate or violate ADA
law. This jeopardizes transportation for many eligible individuals who have no other option. On the
other hand, a complementary specialized or paratransit program that strictly limits eligibility without
using best industry practices risks many eligibility denials to people who have a civil right to ADA
paratransit service. Therefore, industry best practice typically limits eligibility to people who meet the
ADA criteria, and strives for precise eligibility determinations to ensure that the intent of the ADA is
met fully.

Additionally, it is a best practice to have a comprehensive manual describing the eligibility process in
detail, including staff responsibilities as well as agency policies and procedures. Formal written
documentation is not always standard practice among small transit agencies; however, better program
outcomes depend in part on staff familiarity with implementation policies, procedures and materials, as
well as the consistency of their use.

A. Eligibility Criteria / Process: Industry best practice favors robust application of the conditional
eligibility provision, which constitutes eligibility determination on a trip-by-trip basis. The National
Transit Institute’s (NTI) Comprehensive ADA Paratransit Eligibility document suggests that 30% to
45% percent of all ADA-eligible individuals require complementary paratransit service only under
certain conditions; meaning that they should be considered conditionally eligible. The use of
conditional eligibility is an important consideration for both MTS and NCTD.

The ADA provides for some flexibility to design a locally appropriate process for determining
paratransit eligibility. Ideally, the application should enable both MTS and NCTD to assess eligibility
based on a comprehensive list of skills needed and tasks required to use the County’s fixed-route
system whenever it is possible. The required skill set should be customized to unique characteristics of
the San Diego environment, including not only weather, but topography and pedestrian infrastructure as
well. All conditions that affect travel should be considered. For example, the applicant's potential travel
throughout the entire service area, during all seasons. Incidental conditions such as disorientation and
fatigue must be considered as well.

FTA has found in ADA compliance reviews that some transit providers did not adequately consider
path-of-travel barriers, weather, and other possible issues when setting conditional eligibility
B. Personal Care Attendants/Companions Policies: The ADA indicates that at least one personal care attendant (PCA) or travel companion may ride with any eligible customer. This means that MTS Access or NCTD LIFT must carry an eligible rider's additional companions if space is available. Both Access and LIFT do ask about travel companions and personal attendants when reservations are made so that the information can be used to develop runs and ensure adequate capacity on vehicles dispatched to deliver service.

2. Reservations & Scheduling

A. Scheduling Window: The ADA allows MTS and NCTD to negotiate pick-up times within a two-hour window framed by up to one hour before and one hour after requested departure time. Through the Triennial Review (TR) process, FTA has provided significant guidance on best practices that should be applied when booking customer travel requests. A key is to define the window in proper context of a complete understanding of the customer’s trip characteristics. Industry best practice tends toward more completely understanding the specific travel need of the individual customer before establishing the pickup window. A preferred strategy is to negotiate pickup time by requesting information about customer time constraints as part of the booking process. A customer’s appointment time must be considered when scheduling the ride. This includes whether the time requested is the earliest possible time that a customer can travel, or whether it is based on preferred arrival time or a fixed appointment time. When there is a latest arrival time (e.g., medical appointment), the scheduling window should be set to ensure that the customer gets to the appointment on time. When there is an earliest departure time on a return trip (for example, a time when the rider gets off work and so cannot leave before then), the scheduling window should be from that time to one hour after.

It is acceptable to set the schedule around the requested pickup time (plus/ minus one hour) when the customer’s travel plans are not constrained by appointments or earliest departure times.

B. Scheduling Will-Call Return Trips: Will-calls can provide significant rider benefits for a limited number of trips, when the rider does not know the return time. In some medical situations, will-calls are vital, and it is a good practice for a transit agency to make them available. Yet they are workable only if limited in number, particularly during peak operating times. A large number of will-calls at peak operating times can overburden a system and make it difficult to deliver service on time.

C. Managing Cancellations & No-Shows: The ADA allows MTS and NCTD to suspend, for a reasonable period of time, access to complementary paratransit service for customers who indicate a pattern or practice of missing scheduled trips.

The intent is to encourage paratransit customers to recognize the substantial value of limited complementary paratransit resources and to avoid no-shows resulting in service capacity lost to the system. Suspension is a tool for handling those who repeatedly fail to appear for their prearranged rides and have a detrimental effect on operational efficiency, cost, and the quality of the service for other eligible customers. Suspension of eligibility is not intended to be used as a demand management tool. The challenge of no-show policies is to balance customer service and operational efficiency.

FTA guidance speaks to the presence of a pattern or practice with intentional, repeated, or regular actions, not isolated, accidental, or singular incidents. Moreover, only actions within the control of the individual count as part of a pattern or practice. Missed trips due to operator error are not attributable to
the individual passenger. The ADA does not allow a suspension of access to service for no-shows that are considered to be beyond the customer’s immediate control.

Industry best practice leans toward no-show policies that do not penalize customers after a fixed number of occurrences (usually three) within the fixed time frame (e.g., 60 – 90 days). Years ago, this approach was nearly standard practice; however, recent TR findings suggest that this approach may be found to be overly restrictive, and not necessarily sufficient evidence of a pattern.

Generally, cancellations made at least two hours before the scheduled pick-up time are no longer equated with lost service capacity. Industry best practice increasingly is to accommodate requests for same-day and next-bus-available service when possible, and to implement operating practices to redeploy vehicles in productive service.

As an alternative to a traditional “three strikes and you’re out” approach, responsible agencies are increasingly thinking in terms of the percentage of trips missed over a longer period of time to identify any pattern of missed trips. Some agencies assess the no-show records of individual customers relative to the average no-show rate for the customer base as a whole. Some suspension policies consider the absolute number of occurrences as well as relative frequency to avoid arbitrary outcomes. For example, a customer who travels once and misses the trip would have a 100% no-show record; however, the single data point does not constitute a pattern.

Enhanced customer service is essential to the transit industry as a consumer-oriented retail business. Increasingly, complementary paratransit providers are working with customers in constructive ways to reduce no-shows. Examples of pro-active approaches include keeping customers aware of their record of no-shows, verifying the accuracy of recorded no-shows when customers disagree with particular events, issuing a warning only for the first offense, and giving the customer an opportunity to appeal a suspension.

Other best practices address aspects of the reservations, scheduling, and trip fulfillment. For example,

- record specific pickup location details and directions and ensure that the instructions are provided to the driver;

- review cancellations made after 5:00 pm to confirm that if they are unable to cancel a ride in a timely way because cancellation calls are not taken early enough before their scheduled trip. For example, when a customer with a variable condition has an early morning trip scheduled but is unable to anticipate the need to cancel until that morning, best practice might be considered outside of the customer’s control if the occurrence is not repeated.

D. Use of Technology: Advanced technologies, particularly Automatic Vehicle Locator (AVL), Mobile Data Terminals (MDTs), Global Positioning Systems (GPS), and Interactive Voice Response (IVR) systems, are assisting some transit agencies improve on-time performance.

AVL technology allows the agency to monitor the location of its paratransit vehicles on a real-time basis and provide historical location information on trips. Paratransit providers can use this information to enhance proactive dispatching, thereby reducing late pickup and drop-off times.

MDTs facilitate communications between vehicle operators and the dispatcher. Drivers use the terminals to record their arrivals and departures in real time. This information is then used to calculate new
estimated arrival times for subsequent trips. Late pickups or drop-offs are flagged to the dispatcher who can then reassign later trips that might otherwise have become backed up.

Automated confirmation and reminder calls using IVR are consistent with industry best practice among systems with computer-based scheduling capacity. Common is the practice to auto-call customers with prior day trip confirmations and same-day reminders to help reduce cancellations and no-shows, and to help improve on-time performance.

3. Fare Policy

Similar to the strict eligibility requirements and the ¾-mile service area, the maximum fare is intended as another sustainability tool used to manage the total cost of the complementary paratransit (specialized) program. Most US transit providers peg specialized/paratransit fares to twice the regular fare for a comparable fixed-route trip. Comparability considers the presence of zone fare structures, transfer charges, and other attributes of the fixed-route system fare structure.

Transit agencies may require companions to pay the same paratransit fare as the eligible rider with a disability, which may not exceed twice the full non-discounted fixed-route fare. A personal attendant may not be charged any fare. However, any additional attendants may be required to pay the fare.

The FTA requires grantees to charge no more than half fare to individuals with disabilities (as well as senior citizens) during off-peak times on the fixed-route. Many transit agencies have instituted fare incentives for paratransit eligible riders that go beyond this, such as allowing them to ride for free on the fixed-route system. Moreover, more transit agencies permit personal care attendants and some other companions to ride fare-free. This is an important addition because some paratransit eligible riders would not be able to (or would not feel comfortable) riding the fixed-route unaccompanied.

4. Performance Measurement

Beyond just internally-focused measures such as operating efficiency, labor productivity, and maintenance effectiveness, industry best practice focuses on key performance measures.

A. On-time Performance: Maintaining schedule reliability is a key challenge for most paratransit service providers. Schedule adherence is measured against a pick-up window of 30 minutes or less, which is an industry standard.

B. No Capacity Constraints: Substantial numbers of untimely pickups, trip denials, missed trips, and excessively long trips are considered illegal capacity constraints. It is current practice in the paratransit industry to view an on-time pickup as a vehicle arrival within an established on-time window. It is important to reinforce the pickup window concept with riders, drivers, dispatchers, and reservationists. Riders may otherwise not understand or remember the window, and think the vehicle is late when it is not. A good time to do this is when the rider makes the reservation. When the reservationist confirms the final trip information, instead of saying: "We will pick you up at 9 o'clock," if the transit agency has a zero — thirty (0/+30) window, for example, the reservationist could instead say, "We will pick you up between 9 and 9:30 a.m." The result is that, over time, riders will become more educated about the pickup window.
## SUPPLEMENTAL SERVICE DELIVERY

Building on the previous discussion of the evolving landscape of mobility, this section discusses common specialized transit industry practices specifically with the use of supplemental delivery services. These services include the use of taxis, accessible taxis, and TNCs.

### 3.7.2.1 TAXI BEST PRACTICES / ATTRIBUTES OF AN EFFECTIVE ACCESSIBLE TAXI/TNC PROGRAM

This section provides a general overview of:

- The evolution and development of wheelchair accessible taxi services;
- The barriers that restrict the effectiveness and success of accessible taxi programs;
- How jurisdictions have promoted accessible taxi services; and
- Factors that support the sustainability of accessible taxi services (ability to accommodate a mobility device as well as sensitive to broader aspects of accessibility needs including sensory, cognitive, etc.).

A comprehensive review of taxi participation in paratransit programs and the integration of wheelchair accessible taxi services can be found in the Transit Cooperative Research Program (TCRP) report, *TRCP Synthesis 119: Use of Taxis in Public Transportation Programs for People with Disabilities and Older Americans* (2016).

Historically the taxi industry in North America has been characterized by a high degree of entrepreneurial independence. It remains highly market driven with service coverage concentrated in areas with the maximum potential for financial return. Maximum service coverage is often characteristically limited to areas of high demand density or concentrated on markets willing to pay for a higher value (market segments able and willing to pay a premium fare for what may be perceived as premium service) and responsive service.

Traditional taxi firms vary in size and business models and may include:

- Large companies with a concentration of taxi licenses or medallions and a large fleet of vehicles that they operate with staff drivers or lease out to independent drivers;
- Dispatch brokerages that charge monthly dispatch fees to independent owner operators for dispatch and administrative services; and
- Small “Mom and Pop” outfits that operate completely on their own, taking reservations from home offices or by cellphones while on the road.

Operations in small urban centers or rural centers are often undercapitalized, and through time, can go in and out of business as demand fluctuates.—Increasing operating and business costs (fuel, vehicle maintenance, insurance, brokerage fees, and permits) as well as rising household living costs can push small or independent taxi operators out of business. The same can be true for the emergent software-based TNCs.

Taxi industry regulation can range from a high level of regulatory oversight, as is the case in many metropolitan areas, to a very limited level or complete lack of regulation, as can be the case in small communities or rural areas.
In recent years, the traditional taxi industry has experienced significant competition from software based TNCs such as Lyft and Uber. In many markets, traditional taxi companies are losing market share to TNCs with more and more taxi drivers jumping ship and becoming TNC operators. TNCs have also created a regulatory challenge in jurisdictions where for-hire taxi operations are highly regulated. The market penetration, economic viability, and regulation of Lyft and Uber operations will continue to play out over the near-term horizon.

**The Taxi Industry and the Americans with Disability Act:** Federal legislation does not require taxi operators to purchase accessible vehicles as long as they only use sedan-type vehicles. The Americans with Disabilities Act of 1990 (ADA) requires taxi operators using vehicles larger than sedans, to provide equivalent service. In addition to the ADA, federal support exists for the purchase of accessible taxi vehicles through tax incentives and capital funding under Federal Transit Administration Section 5310 grant program.

The ADA further stipulates that taxi companies when buying or leasing a new service vehicle other than a sedan-type automobile, such as a van with a seating capacity of fewer than eight persons (including the driver), the acquired vehicle must be accessible, unless the company is already providing “equivalent service”. Equivalent service is defined as parallel to services provided to the general public including comparable response times and application of published fare structure. ADA also requires that taxi drivers must be trained to provide safe and appropriate assistance and service to individuals with disabilities.

The ADA also requires that taxi companies provide accessible communication services through accessible formats and technology to enable everyone to obtain information and schedule services. If the company offers online reservations or the option to make reservations by phone app, it must provide dispatching that is accessible to callers who are deaf or hard of hearing and accessible to web users who are blind or have visual impairments.

Although required by law, this is not necessary the case with current taxi operations, especially in smaller communities where oversight may be minimal. Enforcement may only come to the forefront if there is a public non-compliance lawsuit or complaint. In certain cases, an ADA compliance complaint “may be the straw that breaks the camel’s back” and force a decision to cease the operation of accessible taxi services.

TNCs such as Lyft and Uber contend that they are software-based industries, not transportation services, and therefore do not have to comply with ADA accessible transportation requirements.

**Evolution of Taxi/Public Paratransit Partnerships and Accessible Taxi Service:** The partnership between taxi companies and public agency transportation providers and accessible taxi service initiatives evolved prior to the introduction of the ADA.

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3 The Architectural/Transportation Tax Deduction: IRS Code Section 190, and the Disabled Access Credit: section 44 of the Code are two federal tax incentives that can be used to support the purchase of accessible taxi vehicles.
During the 1970s and 1980s, paratransit and social service agencies increasingly partnered with taxi companies to provide or supplement their services to their ambulatory clients. Both pre-ADA and ADA complementary paratransit services recognized the potential of taxi partnerships to provide supplemental capacity to:

- Provide backup for bus breakdowns and accidents;
  - Offload trips from buses running late;
  - Provide service during hours with low productivity (evenings and weekends); and
  - Increase capacity when needed to avoid ADA trip denials.

In addition, public transportation agencies have involved taxi companies in subsidized taxi voucher programs as demand management strategies to shift ridership from core paratransit programs.

Much of this partnering has focused on service to the paratransit eligible persons not needing a wheelchair accessible vehicle. Through time, contractual arrangements became more sophisticated with specific performance expectations, driver screening and training requirements and trip assignment criteria to enhance service efficiencies. In a survey conducted of 45 public transportation agencies, 39 (85%) reported the use of taxi contractors.

Accessible Taxi Services: Taxi operators have long provided private for-hire services to passengers using wheelchairs. Traditionally, wheelchairs were folded and placed in the back seat or trunks of taxi sedans. However, the provision of this level of service has been spotty, dependent on the willingness of drivers to provide any necessary assistance in and out of the sedan or minivan, and to take the time to fold and stow a passenger’s wheelchair. Additional charges were often imposed above the regulated meter, flat rate or zone charges. Service was not available to persons who could not independently transfer or be safely assisted in and out of their wheelchair. This service was not available to persons using power wheelchairs. This is still the case when individuals with disabilities request Lyft or Uber service. Drivers may not be willing to accommodate a passenger using a wheelchair.

As ADA has become more strictly enforced, the lack of consistent for-hire services to individuals with disabilities became increasingly recognized as discriminatory.

Wheelchair accessible taxi initiatives were piloted in the 1980s and have become increasingly important as ADA becomes more strictly enforced. Strategies to introduce wheelchair accessible taxi services have included: the limited issuance of new taxi medallions to companies or individuals who operate wheelchair accessible taxis; regulatory requirements for all taxi companies in a jurisdiction to include accessible taxis within their active licensed for-hire fleet; or the public agency procurement of accessible taxis with grant funding and the leasing of these vehicles to taxi companies willing to operate them. There have also been independent, private initiatives to procure and operate wheelchair accessible taxis to a targeted market specifically including individuals with disabilities. The TCRP reported that 23 (61%) of 38 transportation agencies in the United States using taxi companies had wheelchair accessible taxis available. In the United Kingdom, 100% of all taxis operating in London are wheelchair accessible.

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Wheelchair Accessible Taxi Vehicle Development: In North America, early wheelchair accessible taxi design ranged from small shop modifications of old Checker Cabs and non-commercial minivans as well as rare research and development prototypes that never made it to commercial manufacture because of high production costs. The objective was to design and introduce vehicles that could accommodate wheelchairs without requiring the passenger to transfer from their wheelchair, as well as accommodate passengers using power wheelchairs and/or scooters.

The minivan modifications included side and rear wheelchair ramps and, as was often the case, the modified light weight minivan models marketed in the 1980s through the early 2000s had short service life cycles when put to commercial for-hire service. In a case study summarized in TCRP Synthesis 119, Luxor Cab of San Francisco stated that the life cycle of the ramp taxis they operated was in the range of 220,000 to 250,000 service miles while the life cycle of the taxis sedans they operated was in the range of 350,000 service miles. Many taxi operators also found modified minivans to be too expensive to purchase for their fleets. The Taxicab, Limousine and Paratransit Association (TLPA) noted in their report, Assessing the Full Cost of Implementing an Accessible Taxicab Program (2010) that used accessible minivans cost up to $35,000 and new ones cost up to $49,000, while a typical used sedan purchased for a taxi fleet cost approximately $5,000 (pre-prep cost). In contrast, Luxor Cab reported in the TCRP Synthesis 119 that the type of ramp taxis (wheelchair accessible minivans) that they use cost between $35,000 and $50,000 while a sedan costs in the range $15,000 to $18,000 to purchase.

AM General has introduced a purpose-built, wheelchair accessible commercial taxi. The Mobility Venture MV-1 (now being manufactured by A-1 Limousine Inc. out of Princeton, NJ.) includes a side loading wheelchair ramp and a forward-facing wheelchair position next to the driver. MV-1s have been in sufficient production volumes to be integrated into commercial taxi fleets as well as use by independent Lyft and Uber drivers. Unit costs are in the $50,000 plus range.

Barriers That Negatively Impact the Implementation and Sustainability of Accessible Taxi Services: The following provides an overview of factors that negatively impact the implementation and sustainability of wheelchair accessible taxi services.

- **High Cost to Purchase Accessible Taxis:** Traditionally, many undercapitalized taxi companies or independent owner-operators purchased used sedans for their fleets. Typically, these were heavier duty, used law enforcement vehicles purchased at public auctions. More recently, there has been a shift to the procurement of newer (often) electric-gas hybrids as taxis operators become more concerned with image and attempt to reduce fuel-related operating costs. In many cases, image concerns for the traditional taxi industry has become critical as market competition from TNCs becomes stronger.

    As identified above, the purchase cost of a wheelchair accessible taxi tends to be more expensive

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than the purchase of a more traditional sedan or non-modified minivan. For some taxi operators and many independent TNC operators, this relatively higher cost may discourage the procurement of a wheelchair accessible taxi. As a rule, TNC operators use their personal vehicles for for-hire service. In some cases, the higher purchase price of a wheelchair accessible vehicle may be cost prohibitive.

- **Higher Maintenance Costs and Shorter Vehicle Life Cycle:** Earlier generation wheelchair accessible minivan conversions were often built for private use and not for more rigorous commercial passenger service use. Higher anticipated maintenance costs and shorter useable vehicle life cycles can discourage the procurement of wheelchair accessible taxis.

- **Density of Demand:** Taxi and TNC operators tend to serve areas or locations with a high density of potential trips such as hotels, entertainment areas, transportation terminals, and medical complexes and are not willing to respond to trips far from their preferred areas of operation. They also may choose not to operate during hours when demand is lower. In the case of smaller communities, it can be difficult to ensure 24/7 coverage. Taxi and TNC operators may be reluctant to deadhead long distances to serve short trips originating and ending outside their higher density market areas, or to provide night owl coverage when demand is generally lower. Service coverage is highly market-driven.

- **Perceived Limitations of Market for Accessible Services:** Taxi and TNC operators may view persons requiring an accessible vehicle to be too limited a market to warrant the procurement and operation of a wheelchair accessible vehicle. Many may feel it is more profitable to concentrate on the general public for-hire market requiring a more generic vehicle.

- **Higher Insurance Coverage Requirements for Public Transportation Agencies:** Taxi insurance requirements are generally defined in local taxi ordinances. Generally, liability insurance requirements are lower than those required by contractors working for public transportation agencies. Public transportation agencies can require up to $2 million liability insurance coverage.

- **Fear of Exposure to Potential Liability:** Taxi and TNC operators comfortable with general public markets may be apprehensive to provide service to individuals with disabilities because of a perceived risk associated with providing assistance to individuals with disabilities, and or risks of injury while in transit. Concerns include passenger injury and workplace injury to the driver.

- **Limited Driver Screening:** In smaller communities without comprehensive taxi regulations or industry oversight, there may not be adequate driver background screening to comfortably satisfy the criminal background screening requirements of public agencies serving individuals with disabilities or older adults. In some cases, background checks can be limited to ensuring that participants have valid driver licenses.

- **Participation in Random Drug and Alcohol Testing Programs:** Taxi companies or TNC drivers may not be willing to participate in an approved random drug and alcohol testing program for fear that they may, on occasion, not pass. As a way of keeping overheads to a minimum, taxi companies may be reluctant to incur the cost of implementing and maintaining their own ongoing testing program. In some jurisdictions, taxi companies are mandated to have a random drug and alcohol testing program.

- **Limited Industry-Based Driver Training or Disability Sensitivity Training Programs:** Unless motivated by good business practice or mandated under local taxi ordinances, taxi companies may not provide customer service training beyond an overview of key local trip generators and attractors, critical requirements of the local taxi ordinance, and company rules and procedures. To offer
accessible taxi services or to effectively partner with a public transportation agency, wheelchair handling and driver assistance training and disability orientation/sensitivity training workshops may be required. In terms of the latter, sensitivity training must include, in addition to the handling of a mobility device, broader aspects of accessibility needs including persons with a sensory, cognitive, and other physical limitations.

In practice, there may exist a resistance of some taxi drivers to provide the necessary assistance to passengers with disabilities. Reasons include inherent personal prejudices or a perception that the time necessary to assist a passenger with a disability adds too much non-revenue time to each trip. This also could be affected by liability risk concerns.

- **Limited Taxi Ordinance Enforcement Resources:** Some jurisdictions may not have sufficient staff resources to effectively monitor and enforce compliance with local taxi ordinances, including the provision of wheelchair accessible taxi services where mandated. With supplemental taxi service contracts, local public transportation agencies may also lack the staff to monitor and enforce compliance with service agreements. One comment frequently heard: “The problems with taxis most frequently cited relate to a lack of accessible vehicles, oversight and contract compliance, and service quality and reliability.”

### 3.8 EMERGING MOBILITY TECHNOLOGIES

This section explores some of the emerging mobility technologies and concepts that are either still in their infancy or yet to be tried in the specialized transportation environment. Opportunities have been identified in the following areas:

- Trip Discovery/Planning;
- Trip Booking;
- Payments;
- Service Delivery; and
- Customer Information and Wayfinding.

Further, available technologies have been summarized under the following categories:

- **Mainstream technologies:** Refers to technologies that are widely deployed in the industry for solutions relevant to customers and agencies. There are very low risks in deploying such technologies.
- **Limited commercial deployment:** While there have been some experimental deployments, either technologies/solutions have not matured or there is not enough acceptance for mainstream use by customers and/or agencies.
- **Pilot deployments:** There have been some deployments, typically funded by USDOT grants or under public/private partnerships. Concepts or technologies are still in their infancy.

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10 TCRP Synthesis 119 (2016) p. 60
3.8.1 MAINSTREAM DEPLOYMENT

Personal Mobility Enhancements: There are several mainstream technologies available through many vendors that can help enhance the mobility experience of specialized transportation customers. These technologies include:

- Real-time information on vehicle arrivals and service alerts. Specialized transportation customers often have access to real-time information on iPhone and Android devices as well as real-time information on a transit agency’s website. Also, trip planner capabilities should incorporate the real-time status of vehicles when displaying travel options to customers.
- Account-based payment systems.
- Self-service portal for demand response/specialized transit trips where customers can register, apply for, and track their eligibility and book and manage trips.
- Trip notification via interactive voice response (IVR) system the night before the trip and a configurable number of minutes prior to arrival of a vehicle at pickup location.
- Better adoption of continuous optimization of a commercially available scheduling engine to support same-day trips and vehicle assignments.

No identified risks are anticipated in deploying suggested technology enhancements.

Benefits: Suggested enhancements will have the following benefits as perceived by riders:

- Improved customer experience
- Service reliability
- Seamless mobility

3.8.2 LIMITED COMMERCIAL DEPLOYMENT

3.8.2.1 ENHANCED RIDEHAILING/BOOKING

Ridehailing or ridesourcing apps have been prevalent in recent years and have provided travelers additional travel alternatives. They are most suitable solutions for supplemental service. Most of the ridehailing companies now provide their public application programming interface to third party developers. This could potentially allow specialized transportation riders to book their trips with one click. However, the experience is not as seamless as it might be expected, as is the case with most mobility aggregator apps. Google Transit for example, provides a trip discovery or planning platform and booking is done by individually going to ridehailing company websites or apps. Often, transit agencies may also partner with a suitable mobility aggregator such as Moovel who
provide an integrated trip brokerage platform for booking and payment for multiple services (e.g., TNC, carshare, bikeshare, and transit) through a single trip planning app. TriMet is currently implementing such a solution as part of their Mobility-on-Demand (USDOT Sandbox) grant.

Ridehailing solutions by now have been integrated with transit agencies under various models (e.g., fully or partially subsidized by agency or paid by customer) and pose limited risks.

**Benefits:** Suggested enhancements will have the following benefits:

- Enhanced trip booking and payments experience;
- Seamless door-to-door mobility via multiple modes;
- Increased personal mobility alternatives and first/last mile connectivity; and
- Cost-savings to agency by reduction in the number of expensive demand response/specialized transit trips.

### 3.8.2.2 CASHLESS PAYMENTS

Cashless payment systems enable customers to pay for trips electronically. A cashless system would potentially allow agencies to eliminate fareboxes, which are expensive to maintain, especially factoring in the cost associated with the daily cash collection, accounting, and reconciliation processes. However, cashless payment systems require customers to have access to banking, which is issue for historically unbanked and underbanked populations. Cash-based fare collection range around 10-30% of fare payment at most agencies. For example, even after many years of their rollout of the Ventra open payment system, Chicago Transit Authority’s cash payment ratio exists at 8%. Cash payments at suburban agency Pace are even higher at 20%.

Considering a best-case scenario for banked customers, a cashless payment system requires a series of strategies to reduce the amount of cash usage by targeting specific rider market segments. Infrequent specialized transit riders and socio-economically challenged riders resort to cash-based payments. Targeted strategies could and should be developed for these market segments to steer them towards adopting cashless payments.

With the advent of account-based payment, agencies now have more flexibility in steering customers towards electronic media by establishing an extensive retail network so customers have access to locations where they can buy or reload smartcards using cash, with no need for a bank account. For example, Massachusetts Bay Transportation Authority (MBTA) in Boston is planning to achieve fully cashless payment by 2020. Part of this strategy involves developing a retail reload network such that 98% of its stops have a retail location within walking distance (typically a quarter-mile).

Specialized transit systems have greater opportunities in adopting cashless payments since those customers have registered accounts and could potentially be provided electronic fare media which is tied to their accounts. Also, customers could pre-pay for some of the trips online when booking.

Opportunities and technologies now exist more than ever to adopt cashless payment to a certain degree. There will always remain a segment of the population that will not be able to use electronic media due to lack of a bank account - unless they use cash to replenish at a retail location. The private sector is also
advancing technologies such as PayNearMe where customers can pay using cash at a participating retail location such as CVS or 7/11 for online transactions. PayNearMe has now also partnered with Blackhawk Network where customers could go to retail locations that are interfaced with Blackhawk Network for prepaid card sale and distribution. Adopting 100% cashless payment may leave out a significant section of ridership that is unbanked or underbanked and might also raise Title VI compliance concerns.

3.8.2.3 ENHANCED WAYFINDING

Wayfinding is one of the key issues in specialized transit, particularly with the senior and disabled population who may not be familiar with the transit service area. Reasons why wayfinding is an issue may include the rider’s unfamiliarity with routes and stops, poor signage, temporary relocation of stops, stops located within a large transfer center, and shared stops with another agency. In some cases, particularly with riders with a disability, their inability to locate a fixed-route stop often prompts them to use the more expensive paratransit service option.

Agencies have conventionally relied on map and text-based signage and tactile guideways to help riders locate stops and other transit facilities, but modern technologies based on radio-frequency identification (RFID) or Bluetooth Low Energy (BLE) beacons open greater possibility in helping riders orient towards a bus stop and navigate. Typically, there are the following components involved in beacon-based wayfinding:

- BLE tags that transmit Bluetooth signal and can be installed anywhere, indoors or outdoors. These signals can be preprogrammed to transmit specific information, such as a bus stop number; and
- Riders’ smartphone that has an app to detect BLE signal and help navigate the rider through built-in accessibility features of the phone. This could be visual, audio, or haptic (e.g., vibration) feedback.

Some agencies and vendors use additional features in improving the navigation aid. These include defining a geo-fence around a stop so the app on a rider’s device knows when to start the navigation. Also, BlindWays, the app developed and deployed by Perkins Institute for the Blind and Raizlabs in partnership with MBTA in Boston has a crowdsourcing feature that allows riders to mark obstructions or physical objects (e.g., tree, fire hydrants, potholes, broken sidewalks) on the map which helps the app to use that information and provide proper guidance to visually impaired riders. PathVu is also a crowdsourcing application that allows riders who use a mobility device (scooters or wheelchairs) to navigate safely to their location.
There are apps meant to address specific types of disabilities as well. For example, WayFinder 3 by AbleLink, also featured by USDOT’s Accessible Transportation Technology Research Initiative (ATTRI) program, allows riders with cognitive disabilities to orient and navigate themselves while traveling.

For general public riders, vendors are starting to launch apps that use augmented reality for better wayfinding. These apps use the smartphone camera to display real-time information to the stop location at which the camera is pointing. Such tools can be very useful to infrequent users of transit.

While there have been several deployments of BLE-based beacons, they are still not mainstream, particularly in a transit environment. Key issues with this approach are the training of customers with a disability and the need, in most cases, for a smartphone. Also, it is important to make sure the navigation map being used for directions has an updated database of not just locations, but also any physical obstructions.

Maintenance of beacons is also a concern. Beacons operate on battery power and there will need to be a way for an agency to know the battery level to ensure beacons can be serviced when running out of power.

The biggest beneficiaries of wayfinding solution will be riders with disabilities. However better wayfinding solutions will also assist general public riders and could prompt more riders to take fixed-route transit service.

### 3.8.3 PILOT DEPLOYMENTS

#### 3.8.3.1 CONNECTED AND AUTONOMOUS VEHICLES

A self-driving vehicle (sometimes called an autonomous vehicle or driverless vehicle) is a vehicle that uses a combination of sensors, cameras, radar and artificial intelligence (AI) to travel between destinations without a human operator. While most agencies are still running pilot programs for field testing in a controlled environment, some municipalities such as Las Vegas have already started running Connected and Autonomous Vehicles (CAV) shuttles in mixed traffic.

A key component of a CAV shuttle solution should be to link these vehicles with an overall control center, so riders can hail these shuttles like any other ridehailing service and board them at designated stops. Given the size of these vehicles (16 seats or less) these shuttles can be operated on most streets in any neighborhood given their lower turn-radius needs.

Further, the “connected” aspect of these shuttles can be utilized for ensuring pedestrian and passenger safety as discussed in the next section. V2X sensors installed on the vehicles can interact with other vehicles and roadside equipment for collision avoidance. Advanced vision sensors such as those offered by MobileEye can be used for object detection and collision avoidance as well.

While agencies are running pilot programs with key CAV providers such as Navya, EasyMile, Local Motors, and operators such as Transdev and Keolis, safety and reliability continue to be an issue. The
shuttle Keolis ran in Las Vegas was involved in an accident on Day 1 of testing. Even though the vehicle was not at fault, it stopped to avoid a collision with the vehicle in front instead of backing up a little as a human driver would do.

These shuttles could still be operated in dedicated guideways, similar to Jacksonville Transit Authority’s experimental Urban Circulator project. Manufacturers continue to test and perfect the technology behind autonomous driving.

CAV shuttles offer a promising future for providing additional mobility options including first/last mile connectivity given the small size of these vehicles, “connected” nature, and reduced operating cost due to being driverless.

### 3.8.4 ENHANCED SAFETY SOLUTIONS

Pedestrian safety is an important factor in planning mobility solutions for older adults and individuals with a disability. Connected vehicle technology can assist with ensuring safety through collision avoidance and warning systems. There are the following types of technologies in testing/pilot stages:

- **V2X Safety Solution**: Vehicle to vehicle (V2V), vehicle to infrastructure (V2I), vehicle to pedestrian (V2P) and similar technologies where vehicles and roadside equipment communicate over secure, dedicated short range communication (DSRC) to alert pedestrians or bikers at intersections and other vehicles equipped with V2V sensors; and

- **Vision-sensor and Range Sensor based Collision Avoidance**: Technology used in autonomous vehicles could also be installed in regular (transit) vehicles for object detection and collision warning/avoidance. This technology includes vision and/or range sensors on vehicles that interact with an on-board vehicle computer to process data and detect objects. Drivers or pedestrians are warned about potential collisions. In some cases, breaks could be applied automatically to avoid an accident.

V2X technology is still being developed and not available in commercial space. USDOT pilot demonstrations have used after-market kits from Savari Networks and others for providing V2X functionality. However, given DSRC has been widely adopted as the standard in the industry, several car manufacturers are starting to include DSRC connectivity functionality in their vehicles. There is no expected timeline on any transit vehicles or transit system vendors incorporating such connectivity in their solutions.

Vision and range sensor based technology is more widely available from Mobile Eye (now part of Intel). These units are expensive though and cost $5,000-$7,500 per vehicle and hence restrict agencies from widely deploying these units.

**Benefits**: Safety is critical to transit industry, particularly given Vision Zero initiatives that seek to eliminate traffic-related fatalities. While safety technologies mentioned in this section are not mainstream yet they are expected to be widely deployed in coming years. Presence of such technologies, particularly on autonomous vehicles will give riders extra confidence when riding the vehicles. Similar to any technology deployment, equipment installed on vehicles or at roadside infrastructure will require maintenance to ensure failsafe operation. This may have staffing impacts on the organization.
3.8.4.1 MOBILITY AS A SERVICE

Mobility as a Service (MaaS) takes the integration of mobility services across the transportation network to another level. Within the MaaS framework, public transit is the backbone and other mobility solutions complement the public transit foundation by expanding the service area. The goal is to provide people with more options for efficient and convenient travel. MaaS can help improve transportation network equity by providing these opportunities to more people, beyond the population served by public transit alone.

Beyond simply providing more travel options, MaaS dissolves boundaries between various transportation modes and can offer mobility as a “package.” At its most advanced, MaaS offers a monthly subscription, similar to a cell phone plan, where users can choose which services (e.g. Uber, bikeshare) to include in their package. With transit as the backbone, we can also foresee transit agencies in regions with MaaS transitioning more towards becoming “mobility managers.”

As many of the nation’s transit agencies advances Smart City initiatives, there are opportunities to consider integrated trip planning and payment and move towards a MaaS model. Electronically, different transportation modes and mobility solutions may be integrated through a mobile device application, generally complemented with a web portal and/or call center. (The latter recognizes that not all riders will be able and/or willing to use a mobile device application.) Such an integrator is equipped with functions including inter-modal real-time information, inter-modal trip planning, inter-modal trip booking, and inter-modal payment. There are potential benefits related to an integrated platform for mobility. For instance, in San Francisco when a new transit agency is added to the integrated fare management system, all transit agencies in the management system have seen an increase in ridership.

In North America, MaaS is not yet as advanced as in Europe where this concept originated. Key elements of a MaaS framework are open data, service interoperability, and an account-based payment system. While agencies in the US have adopted open data for trip discovery/planning and real-time passenger information, there are no standards for transactional data exchange such as trip booking, service coordination, payment, billing, and invoicing.

The MaaS framework changes the way agencies do business today. Agencies have the flexibility to take on a role of a brokerage service, particularly for demand response trips, and work with regional public and private players for fulfilling service requests. However, agencies will have to develop appropriate business models for service delivery. MaaS is basically the “Netflix or Amazon of Transportation” where agencies can provide their own service but also offer services from other operators in the MaaS marketplace. Agencies should develop institutional agreements with providers to cover legal and other concerns such as customer safety, security, data privacy, driver and vehicle due diligence, and other aspects.

MaaS framework can provide several benefits as follows:

- Ubiquity of travel options involving a variety of modes and operators;
  - Seamless travel across modes offered by participating service operators;
  - Better management of discounts and travel incentives;
  - Reduced use of car travel resulting in reduced vehicle miles traveled (VMT), and better air quality; and
— Ability of agencies to serve larger geographic areas by partnering with public and private service operators.

3.8.5 **ADVANCED RESEARCH BUT NO DEPLOYMENTS**

3.8.5.1 **BETTER SERVICE INTEROPERABILITY WITH TRANSACTIONAL DATA STANDARDS**

The consulting firm, Demand Trans, under contract with the Transportation Research Board (TRB) is conducting research to address the development of standards for data exchange between demand response service providers. The key focus of the research involves (per research statement from the TRB):

- Develop specifications that may evolve, at some future time, to standards for transactional data;
- Consider privacy and security in the transmission and storage of transactional data;
- Identify key strategies to encourage adoption of the proposed specifications;
- Propose and carry out an approach for testing the specifications;
- Create an open source tool for data producers to validate their data against the specifications; and
- Create and convene a forum for consensus-based refinement of the technical specifications.

**Benefits:** Key benefit of transactional data standards are as follows:

- Better coordination among demand response/specialized service providers at regional scale;
- Increased integration among demand response systems from different vendors; and
- Efficient deployment of platforms such as MaaS.

3.8.5.2 **BLOCKCHAIN-BASED TRIP BOOKING AND PAYMENT**

Blockchain is the technology that is behind cryptocurrencies, such as Bitcoin, but it has much wider applications. Blockchain is considered the “new Internet” where every transaction record ever created is stored in permanent information blocks. This can be perceived as a distributed ledger that does not reside in one single database. Blockchain has the potential to eliminate huge amounts of record-keeping and save money. Blockchain is a public electronic ledger that can be openly shared among disparate users and that creates an unchangeable record of their transactions, each one time-stamped and linked to the previous one. Each digital record or transaction in the thread is called a block (hence the name), and it allows either an open or controlled set of users to participate in the electronic ledger. Each block is linked to a specific participant. Given the distributed/decentralized nature of Blockchain, it can allow individual customers to book and pay for trips using systems that don’t necessarily have access to a central database or booking or payment system. Booking or payment systems used by customers will essentially be written transactions in the same Blockchain. Providers and users of those individual systems can also execute contracts and agreements electronically. Those agreements are part of the
Blockchain as well. Further, peer-to-peer transactions between customers and service providers are verified against contractual terms and conditions. This concept can help with service models such as MaaS where the decentralization of trip booking, and payment ledger can help expand participation of service providers across a large geographic area.

Blockchain is still in its infancy in terms of its application in the transportation industry. There are few examples, and none that involve human transportation. However, it is likely that MaaS solution providers may realize the benefits of the decentralized nature of transactional database and start commercial deployments as pilot programs.

There are a couple of examples of Blockchain-based implementations for carsharing and other related applications where customers can execute smart contracts, book, and pay. These include a DOVU partnership venture between Toyota Research Institute and MIT Media Lab, and Tesseract platform from EY.

**Benefits:** As discussed, decentralized database, particularly in the context of demand response transportation, autonomous shuttles, and MaaS service delivery model can help attract customers who typically do not use transit due to difficulty in accessing booking and payment application. This problem is especially acute when different system providers are used by entities such as a parking operator, toll operator and transit service operators.
4 CONCLUSIONS AND NEXT STEPS

Transit agencies in the United States have been partnering with private sector such as TNCs, private microtransit companies, and real-time routing and dispatching software providers for more than two years now, particularly since the MoD Sandbox initiative was launched by USDOT. However, transit agencies are still assessing how best to position themselves in the shifting paradigm of mobility. Throughout this time agencies have experimented with replacing existing services, complementing current services, and adding new services. Given most of the operating cost in transit industry is attributed to direct driver employment and vehicle ownership, agencies have experimented with a variety of models, where they 1) operate a service on their own; 2) use a contractor to run their services; or 3) partner with TNCs or taxis and subsidize trip cost. There is no clear conclusion on the best model, and it varies largely depending on the type of service being provided and the ridership demography. The experiments continue.

The transit industry is witnessing a rapidly changing world fueled by internet-age technologies. The power of the internet allows agencies to plan and deploy technologies at a rapid pace even in situations when multiple service providers are involved. Several technologies/solutions identified in this document have either been field tested as part of a pilot program or have been widely deployed. Solutions such as MaaS, while still having very limited deployments, promise a great future given their ability to bring different providers together under a common service model.

Technologies and solutions discussed in this document will be further discussed as part of the Specialized Transportation Strategic Plan document finalization process to identify (longer-term) demonstration opportunities either through public private partnership or through USDOT research funds, as available under ATTRI and Connected Vehicles programs.
APPENDIX - LITERATURE SEARCH FINDINGS

The following section presents a synthesis of several relevant documents on specialized transportation that are germane to the development of SANDAG’s Specialized Transportation Strategic Plan. For each document, a summary is provided and an explanation provided on the relevance to the development of the SANDAG Plan.

Integrating Americans with Disabilities Act Paratransit Services and Health and Human Services Transportation


Summary: This report explains how public transit operators can coordinate ADA paratransit and transportation programs supported by the Department of Health and Human Services (HHS) in order to reduce the cost of providing such services. The report gathers information on successful programs, and recommends how more programs can achieve a higher degree of effectiveness. The report concludes that further research is needed at all levels (local, regional, and statewide) to:

- Develop and publish ADA/HHS coordination best-practice model programs demonstrating costs savings and service improvements.
- Examine different levels of paratransit service to determine the distinctions between ADA paratransit service and medical transportation.
- Develop a methodology for human service providers to measure their true transportation costs.
- Develop informational material to help agency staff understand the impact and implications of ADA on paratransit services.
- Identify the statutes, the availability of funding, and a method to determine the cost of a trip to recover the full operating costs.

Florida Statute: Title XXX, Chapter 427: Special Transportation and Communications Service, current

By statute, the primary legislative purpose for the Commission for the Transportation Disadvantaged is as follows:

The purpose of the commission is to accomplish the coordination of transportation services provided to the transportation disadvantaged. The goal of this coordination shall be to assure the cost-effective provision of transportation by qualified community transportation coordinators … Therefore, the Commission has two essential functions: to provide cost-effective transportation services to a class of transportation-disadvantaged citizens and, second, to deliver those services in each locality of the state through locally acting, qualified community transportation coordinators.

(427.0155) Community Transportation Coordinators; Powers and Duties: Community transportation coordinators shall have the following powers and duties:

(1) Execute uniform contracts for service using a standard contract, which includes performance standards for operators.

(2) Collect annual operating data for submittal to the commission.

(3) Review all transportation operator contracts annually.

(4) Approve and coordinate the utilization of school bus and public transportation services in accordance with the transportation disadvantaged service plan.

(5) In cooperation with a functioning coordinating board, review all applications for local government, federal, and state transportation disadvantaged funds, and develop cost-effective coordination strategies.
(6) In cooperation with, and approved by, the coordinating board, develop, negotiate, implement, and monitor a memorandum of agreement including a service plan, for submittal to the commission.

(7) In cooperation with the coordinating board and pursuant to criteria developed by the Commission for the Transportation Disadvantaged, establish priorities regarding the recipients of non-sponsored transportation disadvantaged services that are purchased with Transportation Disadvantaged Trust Fund moneys.

(8) Have full responsibility for the delivery of transportation services for the transportation disadvantaged as outlined in s. 427.015(2).

(9) Work cooperatively with regional workforce boards established in chapter 445 to provide assistance in the development of innovative transportation services for participants in the welfare transition program.

**Economic Benefits of Coordinating Human Service Transportation and Transit Services**


This report describes “basic coordination concepts, typical economic benefits of coordination, strategies that enable transportation operators to achieve significant economic benefits from coordinating their operations, and potential overall industry impacts” through the integration of paratransit services.

**Coordination:** Providing for shared authority, responsibility, management, and funding are seen as the key elements to coordination. Significant savings can result from the coordination of such functions as:

- Service planning
- Purchasing
- Vehicle operations
- Maintenance activities
- Marketing

Envisioning coordination as a “political process” is important to success, and recognizing that efforts to establish coordination may require an initial investment of time and energy spent discussing and negotiating collaborative agreements. Bringing together multiple organizations and levels of government is often necessary, and a willingness to be open-minded toward change is critical.

**Economic and Non-Economic Benefits of Coordination:** Economic benefits ascribed to coordination of transportation services include:

- Additional opportunities for funding
- Increased efficiency: reduced costs per vehicle hour or per mile
- Increased productivity: more trips per month or passengers per vehicle hour
- Enhanced mobility: increased access to jobs or health care, or trips provided to passengers at a lower cost per trip; and
- Additional economic benefits: increased levels of economic development in the community or employment benefits for those persons associated with the transportation service.

Other, non-economic benefits that may result from coordination of services can include:

- Improving service quality (on-time services, better trained drivers, better vehicles, and more safety equipment)
- Increasing the number of people and groups served
  - Expanding service areas
Centralization of management and oversight activities
More accurate reporting of costs and outputs

**Strategies for Achieving the Benefits of Coordination:** Analysis of existing conditions is seen as a primary tool for achieving benefits through coordination of service. Is the service experiencing low vehicle utilization or do high trip costs exist? These are just some of the results that can be revealed.

Once issues have been identified, it is important to establish specific goals and strategies to address identified issues.

To increase revenues and improve utilization, it is suggested that opportunities to provide additional service under contract to Medicaid or other “human service agencies” be explored, or to augment school district bus services. Such joint service programs could be beneficial for both transit service providers and the clients of these programs. Two major programs of this nature include implementations by Miami-Dade Transit, and Portland, Oregon’s Tri-Met.

Another strategy would be consideration of an area-wide coordinated dispatching system, and vehicle sharing arrangements. As noted in the report, dispatching vehicles from a centralized point would address:

- Overlapping routes
- Duplication of service
- Inefficient route design
- Poorly timed schedules

Coordinated dispatching can result in lower per trip costs, increased productivity per vehicle, and improved community service. Reduced per trip costs and increased productivity mean that more services can be provided with the existing level of funding.

Ultimately, the aggregate potential benefits of coordination will depend on a number of factors. Total savings would be determined after an assessment of changes in the existing system to be undertaken as part of the coordinated provision of services.

**Conclusions**

- Strategies that coordinate shifting paratransit services to fixed route services, and having ADA paratransit services provided by non-transit agencies
- Partnership arrangements that expand transportation services into areas not now receiving public transit services.
- Coordination of the transportation functions of multiple human service agencies
- Generation of additional income for transit authorities through the provision of travel services to clients of human service agencies.
Statement of Findings – Senior Related Transportation Issues

Source: California Commission on Aging Forum “Planning for an Aging California”, 2005

Coordinated transportation options are required for the many older Californians who do not or cannot use private automobiles. Large numbers of older adults are served by conventional transit and paratransit services required by the Americans with Disabilities Act (ADA). However, there are some useful steps that can be taken in order to provide appropriate services.

Recommendations and findings from this forum included:

1) A continuum of coordinated services
   a) Helping create mechanisms for increased coordination of transportation services, and connecting seniors with them
   b) Assisting community-based transportation services with training, as well as with access to funding, and the encouragement of favorable insurance regulations.
   c) Including in “mature-driver” education programs information regarding alternative mobility programs.

2) Dealing with the isolation in rural areas which presents challenges to seniors trying to reach essential services.
   a) Encouragement of innovation in services and service delivery through flexibility in farebox recovery requirements, as defined in the Transportation Development Act (TDA)
   b) Additional guidance and oversight of the TDA’s “unmet transit needs process”, to ensure fair consideration of proposed transit services.

3) Integrate transportation into delivery of Health and Human Services
   a) Establishment of a Mobility Task Force, to be comprised of representatives from the Health and Human Services Agency and Caltrans.
   b) Creation of mobility managers in each locality, who would be responsible for “connecting clients with appropriate services.”

4) Coordination
   While addressed in the recommendations above, it was suggested to convene a “mobility summit” to implement strategies and recommendations from the transportation component of the Statewide Strategic Plan on Aging.

5) Planning and Design of communities, with the mobility needs of older people in mind.
   People can become stranded in their own communities when they experience difficulty in driving, especially in those communities that are difficult to serve by transit and require a car to access basic services. Features that limit the ability to provide transit service include:
   - Lack of through streets
   - Long distances between residential areas and essential services,
   - Separation from other built up areas. The ability to walk and to get to and from transit service is limited by lack of sidewalks

Street patterns that create excessive walking distances between homes and potential transit routes, and wide streets without adequate provision for pedestrian crossings should be avoided.

Even older adults who do drive can find their mobility limited by the layout of residential and commercial developments if these do not take their needs into consideration. In some cases, communities specifically
marketed to attract older people lack provision for transit and walking. In other cases, major residential facilities or services for older adults have been built in hilly areas and on the fringes of built-up areas where transit access and walking are difficult.

Many communities are promoting “smart growth” principles that emphasize pedestrian access and other design features to create more community feeling. However, the features of smart growth developments are not necessary designed with the needs of older drivers and pedestrians in mind. The California Task Force on Older Adults and Traffic Safety has focused on the concept of “walkable communities” and identified the following features to help create safe walking environments for older pedestrians:

1. Mixed-use zoning (combined commercial and residential)
2. Fixed lighting installations
3. Rest spots and benches on sidewalks
4. Well-maintained, obstacle-free sidewalks
5. Adequate safe and accessible roadway crossings

6) Funding – Identification and quantification of current state-administered spending on transportation by seniors.

Additional information regarding senior’s attitudes and issues regarding transit services was provided. Results of research and statistical information included:

1. Transit service is lacking or very limited in many suburbs, especially in more recently developed areas, and in rural areas.
2. Transit service is often limited in off-peak periods when many seniors prefer to travel.
3. Seniors’ ability or willingness to use transit may be limited by long travel times, long distances to stops, difficulty boarding vehicles, inconsistent announcement of stops, confusing presentation of information (e.g. rolling destination signs, wrapped buses), fear of crime, lack of shelters and benches, and uncomfortable seats.
4. Many seniors find it hard to switch from driving to transit.
5. Many trips require transfers between transit operators, and centralization of medical services is increasing the need for multi-operator trips. These multi-operator trips can be confusing to plan and difficult to complete.
6. Despite reduced fares on transit, some very low-income seniors have difficulty affording transportation.
7. Many seniors cannot travel independently on transit.
8. Transit services appropriate to seniors making local intra-community trips are often not available.
Transportation Disadvantage Populations: Some Coordination Efforts Among Programs Providing Transportation Services, but Obstacles Persist


The General Accounting Office is the audit, evaluation, and investigative arm of Congress. GAO exists to support the Congress in meeting its Constitutional responsibilities and to help improve the performance and ensure the accountability of the federal government for the American people. GAO examines the use of public funds, evaluates federal programs and activities, and provides analyses, options, recommendations, and other assistance to help the Congress make effective oversight, policy, and funding decisions. In this context, GAO works to continuously improve the economy, efficiency, and effectiveness of the federal government through financial audits, program reviews and evaluations, analyses, legal opinions, investigations, and other services. GAO's activities are designed to ensure the executive branch's accountability to the Congress under the Constitution and the government's accountability to the American people. GAO is dedicated to good government through its commitment to the core values of accountability, integrity, and reliability.

This study was completed by the GAO to access federal programs that exist to serve the “transportation disadvantaged”. Specifically, this GAO study:

1. Identifies the federal programs that fund such services and the expenditures
2. Assesses the extent of coordination among the various programs, and
3. Identifies obstacles to coordination and potential ways to overcome such obstacles.

Background: Throughout the United States, many senior, disabled, and low-income individuals face significant challenges in transportation mobility and access.

A recent survey and analysis of consumers age 50+ (AARP survey) concluded that 16 percent of respondents over age 75 reported not having a driver’s license, and 25 percent of the respondents had not driven at least once in the last month according to the survey. Older adults are also more likely to have difficulty accessing traditional public transportation due to physical ailments.

Thirty percent of respondents with disabilities reported difficulty in accessing transportation, compared to 10 percent of respondents without a disability.

Low-income households are less likely to own a car than other households due to the prohibitive cost of purchasing, insureing, and maintaining a car, and public transportation may not provide sufficient options for their needs. Over 90 percent of public assistance recipients do not own a car.

Study Conclusions - Identified Federal Programs: Overall, the title of this GAO report states its general conclusion, that “some coordination efforts [exist] among programs, but obstacles persist.”

The GAO identified 62 federal programs that fund transportation services to populations that are transportation-disadvantage, most of which are administered by four federal agencies – the Departments of Health and Human Services ([HHS] 23), Labor ([DOL] 15), Education ([DOE] 8), and Transportation ([DOT] 6). The remaining 10 programs are in the Departments of Housing and Urban Development (HUD), Veterans Affairs, Agriculture, and the Interior.

Many of the 62 programs are significantly involved in providing transportation services to their recipients. Sixteen of them are routinely used to provide transportation and an additional 11 programs spent at least $4 million for transportation services to transportation-disadvantaged populations. The remaining programs also fund transportation services, but do so minimally, or the extent of transportation services funded is unknown, according to program officials.

Expenditures: The full amount these programs spend on transportation is unknown because transportation is not always tracked separately from other spending. However, available information on 29 of the programs
APPENDIX

indicate that federal expenditures are at an estimated $2.4 billion. The amount spent on transportation services by the remaining federal programs is unknown, mainly because the majority of programs do not require recipients of federal funds to report transportation spending information to the federal agency. It is however estimated that the total program obligations for the remaining 33 programs were approximately $14.8 billion (it is unknown how much of the $14.8 billion was devoted to providing transportation services).

Approximately half of the 62 programs have matching requirements that require states and localities to contribute between 5 and 50 percent of total costs. Total state and local spending for transportation services, which supplements federal spending for such services, is likely significant, at least in the hundreds of millions. It is difficult to determine the amount of nonfederal contributions to transportation services on the basis of matching requirements because grantees are generally required to match total program spending rather than spending for a particular service, such as transportation. Detailed information is also not available due to the lack of reporting requirements.

Coordination Efforts: Under most of these federal programs, funding recipients typically purchase transportation services from existing sources, including contracting for services with private transportation providers or providing bus tokens, transit passes, taxi vouchers, mileage reimbursement to volunteers or program participants, or some combination of these methods.

Efforts to improve services and achieve cost savings through coordination of transportation activities (sharing resources/information or consolidation of services) among federal agencies vary.

Several of these programs have requirements for grantees to coordinate their services with other agencies providing similar services. For example, Head Start grantees are required to make every reasonable effort to coordinate transportation services they provide with other human service transportation in their community. In addition, some programs have provisions designed to avoid duplication of efforts and encourage the use of existing community resources.

It was shown that in some areas, coordination efforts among providers including those mentioned above, has shown promising benefits including improved customer service, service improvements and lower unit costs. However, examples of overlapping, fragmented, or confusing services resulting was also cited due to lack of coordination.

Federal Level: At the federal level, the DOT, HHS, and DOL have all undertaken some activities to improve coordination among their programs, largely by with the assistance of the Coordinating Council on Access and Mobility.

However, DOT and HHS make few references for coordinating services for the transportation-disadvantaged in their strategic and annual plans, and other agencies do not mention such activities at all. Also, several federal agencies that provide services to the transportation-disadvantaged are not involved in coordination efforts at the national level.

State and Local Levels: Efforts to coordinate transportation activities and services at the state and local levels varies widely, more so than at the federal level. Approximately 50 percent of States have a State organization which oversees the coordination of most of the transportation services for the transportation-disadvantaged. In some states however, no such statewide coordination body exists, but even in states without coordination organizations, some of the state and local agencies were engaged in coordination efforts.

Examples of coordination efforts include:
Coordinated planning: this type of effort uses a combination of human service and transportation agencies and providers working together to plan transportation services, i.e. Wisconsin’s *Area Consortium on Transportation* formed to improve the planning and provision of transportation for the disabled and those who are transit-dependent. This council consisting of consumers, transit providers, county and city officials, disability organizations, and aging groups has implemented various pilot coordination programs.

Brokerage: In this type of coordination effort, one agency or provider serves as the central point of contact for providing ride and eligibility information for actually arranging transportation services for clients of multiple programs, i.e., officials in several counties in New York wanted to maximize residents’ mobility by coordinating transportation services offered by various federal and state programs, but lacked the expertise or start-up costs to do so. Using grant funds from the Departments of Transportation and Health, the counties instituted a coordination demonstration project whereby one agency coordinates service for patrons for all the counties involved.

Shared use of vehicles among multiple programs: In this type of coordination effort, one agency may provide transportation for patrons of multiple programs, or each program may own its own vehicles but allows them to be shared by other programs. In Arizona, vans from one county’s vocational rehabilitation center travels to a neighboring county to pick up program clients. Costs are split equally between the participating program authorities.

Effects of a Lack of Coordination: Examples of overlapping services have been found in areas where some populations are eligible to receive transportation services from multiple programs. This lack of coordination between provider’s results in duplication and inefficiency. In areas where it is too difficult to mix clients due to complicated fee structures and paperwork requirements imposed by the state, some providers have experienced two vehicles overlapping service on the same route at the same time, one for medical trips and one for paratransit.

Workforce development programs have suffered from a lack of coordination, resulting in high average cost per trip, due to low ridership and diluted ridership (each program utilizes their own separate vans for service).

Other consequences may include fragmented services and confusion in localities without coordinated programs. A lack of coordination results in fragmented services, placing a burden on people who receive transportation through many different programs/jurisdictions, depending on trip purpose, because they must be familiar with multiple systems, rules, and requirements. Fragmentation also occurs when adjoining counties do not coordinate their public transportation routes leaving riders stranded due to unconnected transit systems. In some states, paratransit services do not extend beyond county lines, so people have to schedule two separate trips with usually two different programs to successfully complete their planned trips.

For providers in other states that have contracts to provide transportation services for clients in multiple human service programs, a lack of coordinated efforts has led to the need to purchase separate dispatching and reservation systems for its vehicles to comply with differing reporting and eligibility requirements.

Strategic Planning Efforts: One reason that coordination efforts have not been more effective is because the Council is not a federal executive branch agency, the Coordinating Council is not subject to the requirements of the Government Performance and Results Act (GPRA) of 1993 and, therefore, does not have to follow the act’s guidance for producing strategic plans, annual performance plans, and annual reports.

However, there are some best practices in strategic planning that could be applied to the next update of the Councils strategic plan and action plan. For example, the current plan does not have an overall mission statement for the Council or performance measures that clearly relate to its long-term goals and objectives. In addition, there are no explicit links between the stated goals and objectives in the strategic plan and the activities in the action plan.

The Council’s dependence on HHS and DOT is also an issue. Because the Council has no funding or full-time staff of its own, it is dependent on support from HHS and DOT. However, neither of these departments
APPENDIX

considers coordination of services for the transportation-disadvantaged as a priority in its long-term strategic plan or annual performance plan.

The strategic and annual performance plans of many federal agencies that fund transportation services for the transportation-disadvantage generally do not mention coordination of services, i.e., DOT’s and HHS’s most recent strategic plan and performance plan do not explicitly mention the Council.
Innovative State and Local Planning for Coordinated Transportation

*Source: United States Department of Transportation, Federal Transit Administration, 2002.*

Congress has directed the Secretaries of the Departments of Transportation (DOT) and Health and Human Services (DHHS) Coordinating Council, to work together to develop guidelines for state and local planning agencies to achieve transportation coordination objectives." These include but are not limited to:

- Joint identification of client transportation needs;
- Identification of the appropriate mix of services to meet these needs;
- The expanded use of public transportation to deliver human service transportation; and
- Cost-sharing arrangements for program clients transported by paratransit systems.

In support of this process, the U.S. DOT's Volpe National Transportation Systems Center (Volpe Center), working with the Federal Transit Administration’s (FTA) Office of Planning, undertook this study of "Innovative State and Local Planning for Coordinated Transportation."

The study examines seven specific planning strategies that can be used as part of a flexible regional planning process for coordinating transportation services of health and human service and transit agencies. The DOT/DHHS Coordinating Council on Access and Mobility has also authored "Planning Guidelines for Coordinated State and Local Specialized Transportation Services," which complements this report and is cross-referenced.

This report focuses on 15 case studies of transportation coordination. On a statewide level, in urban areas, and in rural communities, various organizations come together through many different forums to take advantage of the benefits of greater coordination of local transportation services. As the case studies presented illustrate, coordination can occur through many different forums including:

- Statewide task forces and coordinating councils
- Local health and human service agencies
- Local advisory boards
- A grass roots coalitions
- MPOs
- Transit agencies
- Local brokers

Through these forums, coordinated transportation planning is occurring to improve access to transportation through inter-agency coordination resulting in more efficient uses of available resources, cost savings, and expanded services.

In each of the case studies, coordination has resulted from a combination of the seven planning strategies examined in this report. Because these strategies are interdependent and often blended together, in many cases it is difficult to single out specific strategies.