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Wi-Fi ONBOARD

Mobility on Demand

How is Technology Changing the Way we Deliver Transit Service?

DART, like many transit agencies, has begun to explore the ways in which emerging technology and new mobility providers can help to better serve our customers and improve the efficiency and productivity of the system. This section presents an overview of different Mobility on Demand (MOD) modes and how transit agencies are leveraging these tools as part of their overall service offerings.

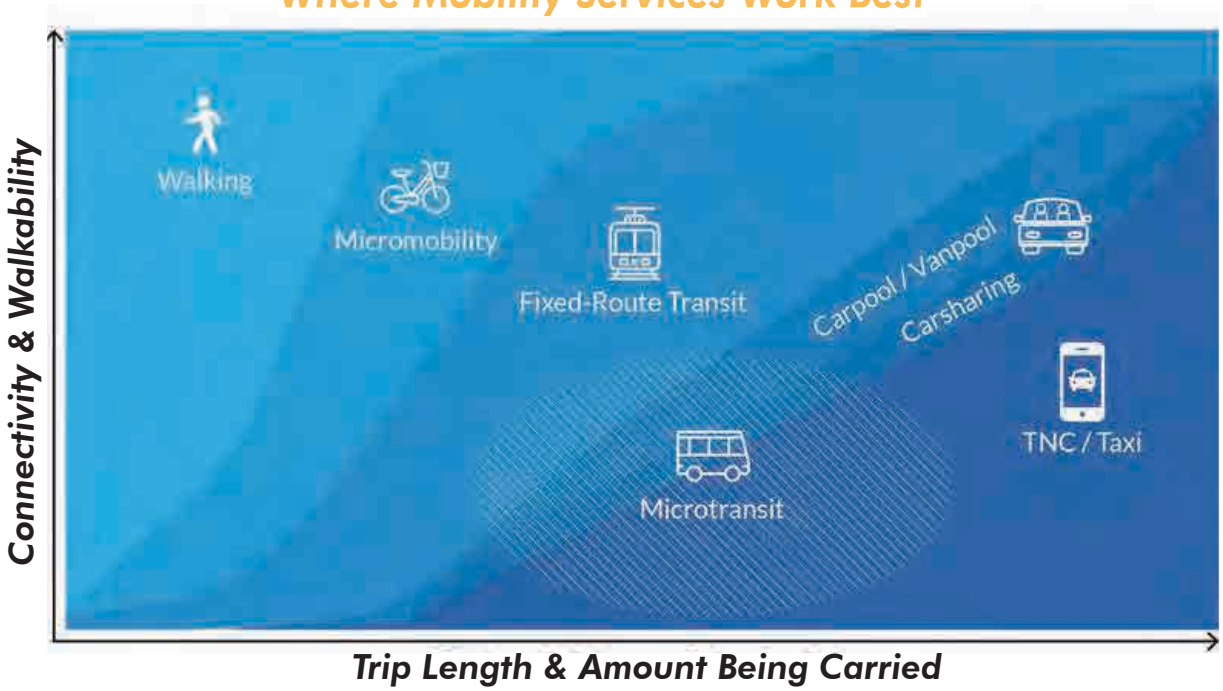
What is MOD?

MOD refers to a **multimodal system of transportation services where the user can take advantage of transportation when and where they need it, without depending on their own private vehicle.**

It may include micromobility, such as bike-share and scooter-share; microtransit and demand-responsive transit; taxis and transportation network companies (TNCs); and car sharing. For-hire taxicabs have been a form of MOD for more than a century. New technology has vastly increased the variety of MOD options and the convenience of finding, using and paying for them. While many MOD services are run by the private sector, a number of transit agencies have begun to experiment with emerging technology to introduce new MOD offerings of their own, as well as modernizing traditional transit MOD such as paratransit and dial-a-ride services.

MOD fits within and depends on a broader transportation landscape, which includes walking, biking, and scheduled transit services. Different forms of mobility are suited to different trips, with variables including trip length, number of travelers, children or heavy items, and the comfort or walkability of the built environment. The chart below suggests how transit and shared mobility services work together to satisfy a wide variety of trips, and the following section provides an overview of key mobility on demand services.

Where Mobility Services Work Best

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Microtransit

Flexible Demand-Response Service Providing Shared Rides within a Determined Zone

Microtransit is a technological evolution of dial-a-ride and paratransit, with flexible pick up and drop off areas and on-demand availability, typically using small transit buses or cutaway vans with capacities of 6-20 passengers.

Unlike other MOD modes, these services require trained commercial drivers, typically employed through a vendor or directly by a transit agency. Microtransit works best in environments where fixed route transit cannot operate productively, either due to low density, dispersed trip patterns, or lack of pedestrian infrastructure. It is best suited for short-to-medium range trips (3 to 15 miles) and **typically serves 3-5 passengers per vehicle revenue hour.** Microtransit can serve the "whole trip" or as a first/last-mile connection to fixed route transit.

Microtransit can be agency-operated using a dedicated fleet, or outsourced to a private operator. SWPrime uses agency-owned and -driven vehicles; Denver uses vendor-owned and operated vehicles with agency branding; others co-brand with a turnkey operator.

KCATA: Freedom On-Demand program serves paratransit customers at lower operating cost

How have transit agencies deployed microtransit?

As a potential substitute for low-productivity fixed route service

SWPrime microtransit in Twin Cities – expands mobility to low density suburban areas that couldn't support fixed route service.

KCATA's RideKC Micro Transit provides connectivity within Kansas City, Kansas and in suburban Johnson County. Passengers can take short trips within a defined service area or transfer to fixed routes at select transfer facilities.

As a first-mile/last-mile link from low-density employment hubs to the fixed route network.

The Village of Bedford Park, IL, created a microtransit service to serve shift workers across a large warehousing/intermodal district, connecting them to frequent transit service too distant to walk to. Discounted Uber rides are available as another option.

Modernizing existing On Call or deviated fixed-route services

Denver RTD modernized its network of suburban call-and-ride routes with a zone-based on-demand system that users can book online via a dedicated app, or by phone, boosting the service's availability and usefulness.

DART launched its first microtransit pilot, called DART On Demand, to enhance the Ankeny On-Call service in late 2021.

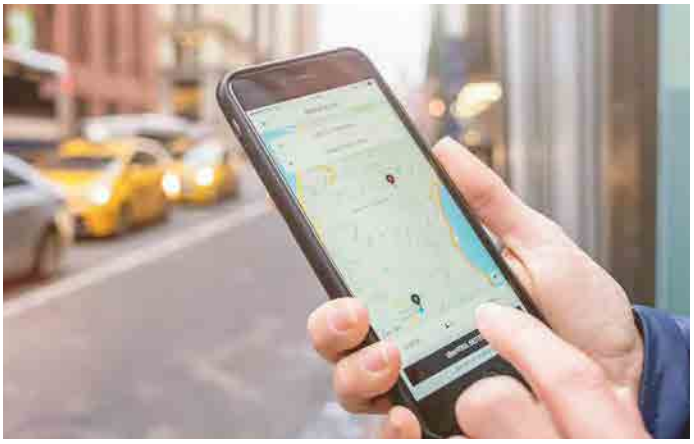
Ridehailing/TNCs

Rides On-Demand Using TNCs or Taxis

Ridehailing services are tech-enabled versions of taxicabs that have existed for over a century. Best exemplified by transportation network companies (TNCs) like Uber and Lyft, ridehailing typically uses passenger vehicles with capacities up to about six passengers.

Trips can service individual trips or may pool multiple trips in the same vehicle. Pooled services are mostly available in larger cities with sufficient density of riders and vehicles. Pooled services can work in smaller markets for specific users, destinations, or programs, though this may require subsidy or support through a public-private partnership. Ridehailing is an effective choice for low to moderate density contexts (including suburbs and semi-rural areas), especially in car-dependent landscapes with poor pedestrian connectivity and infrequent transit.

DART: Flex Connect connects low-density areas to the fixed route network



How have transit agencies deployed ridehailing?

Ridehailing can connect outlying areas of housing and/or job growth centers to high-capacity fixed route transit using TNC or shared taxi programs.

DART's existing Flex Connect zone connects to three transfer points on the fixed route network, providing a more flexible and cost-effective last-mile solution for workers to reach their jobs. The service replaced a low-frequency bus route.

Ridehailing can augment traditional paratransit by providing improved customer experience while also controlling costs for transit agencies.

KCATA's Freedom On-Demand program began as an initiative to encourage eligible ADA customers to use on-demand taxis and TNCs using an app, instead of the traditional paratransit service that required advanced booking, increasing convenience and reducing operating costs. KCATA built on this success to expand the service to the general public with a premium distance-based fare.

Since TNCs often have trouble guaranteeing wheelchair-accessible vehicle (WAV) availability, agencies often contract with a separate WAV provider for accessible rides. Example: PSTA Direct Connect.

TNCs can also be utilized as a "backstop" for dedicated microtransit service, offering customers a backup option when the microtransit service is at capacity and wait times exceed a predetermined service standard, or during hours when the microtransit service is not operating.

Micromobility

Flexible short trips to provide better first-and-last mile connectivity to transit, or for circulation within districts

Micromobility includes shared fleets of small, low-speed vehicles (bikes and scooters), either human-powered or electric.

Micromobility is best for short trips in areas with good connectivity and a density of destinations. It serves as a first/last-mile option that is faster than a taxi, walking, or transferring to low-frequency transit. Typical trips are 1-3 miles, but some can be as long as 10 miles, especially with an electric assist. Micromobility includes docked bikeshare, dockless bikeshare, and scooter sharing. Bikeshare systems rapidly grew in the U.S. in the early 2010s. By 2018, scooter trips had surpassed station-based bikeshare trips in the U.S.[1] The key to success of micromobility is a supportive network of safe and comfortable routes for cycling and scootering. This requires extensive protected bicycle lanes, slow streets, and/or off-street paths and trails.

Capital Metro: Metrorail Station with MetroBike share station in Austin.

1 NACTO 2019. https://nacto.org/shared-micromobility-2018/

How have transit agencies integrated their services with micromobility?

Micromobility helps solve the "first and last mile" gap to transit and provides enhanced community connectivity and access to other modes.

MetroBike share in Austin – The transit agency and city partnered to enhance the existing B-Cycle network and will be expanding services in conjunction with planned investment in high-capacity transit, as well as implementing in underserved areas. The transit agency also offers combined bike + bus passes.

Dayton RTA in Ohio – Scooter pilot and docked bikeshare operated directly by the transit agency (using vehicles provided by a private vendor). The transit agency's role as a "mobility manager" is supported by the City's policy framework and data sharing/API requirements.

Carsharing

A car when you need one

Carsharing features a network of cars available for short-term use.

Carsharing is ideal for mid- to long-range trips (5 to 20+ miles), especially when shopping, transporting passengers, or carrying cargo. Rentals are self-service, relying on apps and transponders to access the vehicles. Carsharing requires moderate to high density around the vehicles, as users still must walk to the vehicle. It thrives in walkable residential and employment centers. **Round-trip or station-based carsharing** was the earliest service configuration, with vehicles picked up and returned to set parking spots. **One-way carsharing,** allowing users to pick up and leave cars anywhere within a service area, is more flexible, but requires higher-density land use.

How have transit agencies integrated their services with carsharing?

Carsharing can provide additional support to a transportation ecosystem in which people can make most trips using transit, but still have access to a car when they need one.

Supporting carsharing as part of a mobility ecosystem with transit as its backbone requires that carshare vehicles be conveniently accessible using transit or on foot. Some agencies set aside space at major transit centers, park-and-ride lots, or on other agency-controlled real-estate for carshare vehicles. As DART considers expansion and upgrades to its transit facilities and mobility hubs throughout the region, carshare space could be reserved if and when an operator launches service in the region.

Transit fare media can also be integrated with carshare operations, boosting the utility of both services. These were among the earliest fare-integration implementations with transit and MOD. Should a carshare operator launch service in Des Moines, DART could work with them to incorporate DART fare media and/or transfer policies with the carshare payment platform.

Chicago's CTA first accomplished fare integration with local carshare operator I-GO in 2009. Other farecard integrations include the Twin Cities' Hourcar and Los Angeles' BlueLA.

Valley Metro in Phoenix is pursuing full fare integration between transit and carshare.

A limited number of transit agencies have directly contracted with private carshare operators to bring carshare service to their communities where it might not otherwise be available. These partnerships are often funded through grants with electric utilities and involve the deployment of electric carshare vehicles.

DART has already partnered with MidAmerican Energy to implement several battery-electric buses. A similar partnership could be pursued to launch an electric vehicle carshare program. This was recently piloted in Chattanooga, TN.

Mobility on Demand Vision

Transit agencies incorporate MOD into their family of services, primarily through **microtransit** and **ridehail,** to provide a more tailored, flexible, and accessible approach to mobility. DART can leverage MOD to:

1. **Replace some fixed routes**, providing shorter wait times and better first/last-mile connections **at a similar cost**
2. Respond to customer needs by offering **short trips between origins and destinations** that are **not directly linked by DART's existing fixed route network**
3. Provide a more convenient, **customer-friendly upgrade to current On Call service** that no longer requires advance reservations
4. Extend the reach of the network by offering **night and weekend service** on corridors where fixed routes don't operate during these times

Best Uses for Microtransit and Ridehailing

Microtransit

- First/last-mile connection to fixed route transit
- Point-to-point community circulation

Ridehailing

- First/last-mile connection to fixed route transit
- Night/weekend substitute for fixed route transit
- "Backstop" to guarantee availability and reasonable wait times for microtransit service
- Supplement/alternative to traditional paratransit

In the DART spring 2021 public outreach survey, both riders and non-riders cited transit access closer to their home as the #1 factor that would lead them to make greater use of DART service. Frequency was the #3 factor for both groups. In low-density areas currently served by low-frequency circulator bus routes, MOD can potentially address both concerns.

What does MOD success look like?

When substituting MOD for current service offerings or upgrading existing On Call service, the new service should consider the following pillars of success:

Reliability
Customers find MOD services to be reliable and meet their needs at least as well as the services they replaced.

Transfers to DART fixed route
MOD services enhance the mobility ecosystem in the Des Moines region and support DART's fixed route network by facilitating seamless transfers to fixed route services and continuing to increase ridership.

Average wait time
DART users have access to a flexible, on-demand service that equals or reduces the time spent waiting for replaced fixed route transit services.

Potential cost savings
DART and member communities can realize cost savings and efficiencies over low-productivity fixed routes while maintaining or improving the overall quality of service.

User satisfaction
Customers are satisfied with DART services and their ability to access transportation options.

Market share
New customers are attracted to DART services who currently choose not to or are unable to use it.

MOD Operating Model

There are many details to consider when implementing MOD and integrating it with the larger transit network. All of these considerations revolve around the need to **fully integrate MOD into DART's family of services, allowing customers to complete a full trip supported by comprehensive trip planning, fare payment, and transfers.** Some key topics include:

Operator

MOD may be operated with DART-owned vehicles and DART employees supported by a vendor-provided dispatch and customer-facing software solution; may be entirely privately operated; or may be a mix of both. Using agency staff to operate the service allows DART direct control over the service, superior quality control, and better cost control. Private operations, especially through the TNC model of independent contractors, may be more quickly scalable. Due in part to TNC driver availability issues during the COVID-19 pandemic, **DART's customers have expressed a preference for a direct agency-operated service to guarantee service availability.**

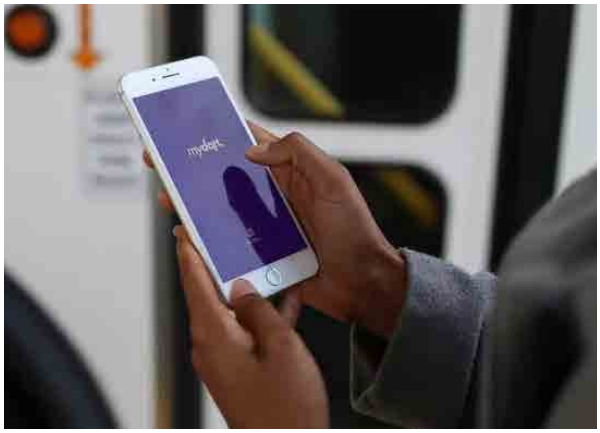
Network Integration

Though MOD may offer the opportunity to eliminate some very low-productivity fixed routes, **successful deployment of MOD as a cost-effective public transit service depends on a robust complementary fixed route network.** For longer trips and trips to and from higher-density areas, **MOD will interchange with the fixed route network at designated mobility hubs** to cost-effectively carry passengers where they need to go. This integration requires a thoughtfully designed route network, to include the following elements:

1. Investments in physical infrastructure to create hubs where transfers are planned to happen.
2. High-capacity premium fixed route transit corridors that are time-competitive with driving for MOD customers to transfer to and from.
3. Service standards that ensure reasonable wait times at MOD-to-fixed-route transfer points.

Booking and Payment

During DART's Flex Connect pilot, many customers continued to book their trips by calling DART Customer Service, rather than booking through Uber's mobile app. This may not be sustainable as service expands. DART should expand its mobile app and/or work with third-party mobile apps to **integrate trip planning, MOD booking, and fare payment** in a way that is customer-friendly and demonstrates MOD's role as part of the overall DART network. DART also needs to consider how to integrate MOD fares with its conventional fare collection system, something not yet addressed in the Flex Connect pilots. App-based payment solutions can better integrate fixed and MOD service, including free or discounted transfers, reduced fares, etc. Including subscription-based booking in a booking app may induce more customers to use it. Alternative approaches for serving unbanked customers will need to be provided—services to accomplish this through account reloading at retail locations or online are becoming more widely available. If the service is operated using DART-owned vehicles, onboard fareboxes can be used as well. **By integrating booking, trip planning, and fare payment across all of its services, DART can market new services with an emphasis on their ease of use.**

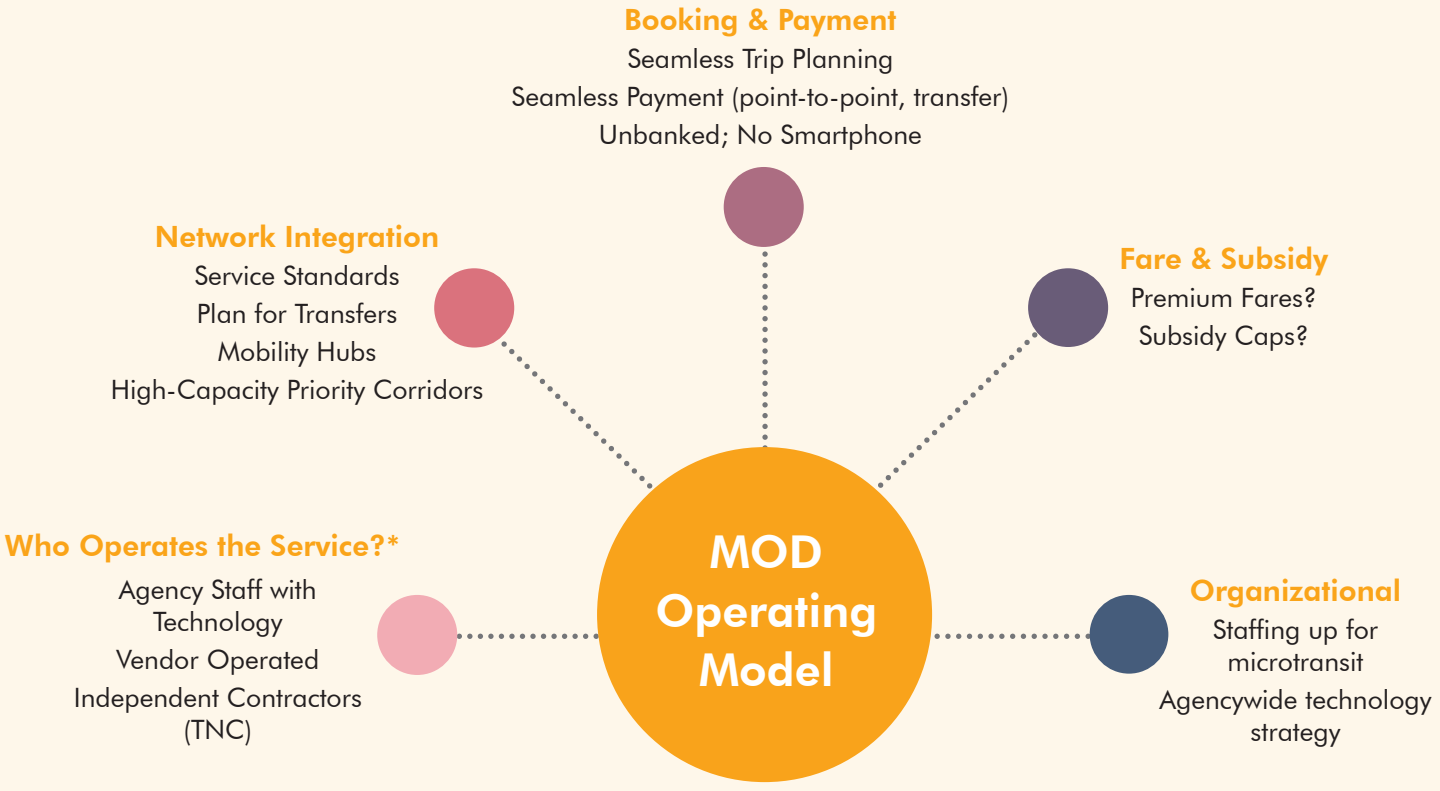


Fare Structure and Subsidies

Because of the real-time pricing model utilized by TNCs, where prices vary by trip length and time of day, DART must consider operating cost uncertainty and how to manage this risk. When utilizing TNCs to deliver mobility, many transit agencies set a subsidy ceiling for TNC rides, above which the customer is responsible for additional charges. A typical fare approach may start with a rider-paid base fare around the level of a bus fare, agency coverage of a set amount (often based on existing levels of subsidy per ride), and rider responsibility for charges beyond the subsidy cap. If offering both TNC and agency-operated operations in the same service area, DART may also consider premium fare structures that incentivize the use of the more cost-effective option.

Organization and Staffing Considerations

Many of the above considerations will affect broader agency strategies including technology procurement, fare structures, and customer service and administrative staffing. While the use of private vendors and an emphasis on app-based trip planning can reduce startup costs and staff resource needs, there will still be an increased customer service call volume, contract and vendor management needs, and operational support. Expanding DART's MOD offerings could result in the need for 2 additional administrative staffing positions to oversee operations, manage technology platforms, and support the new services. Additionally, for microtransit service, bus operators, mechanics, and road supervisors will be needed in proportion to the size of the service, similar to existing fixed route and on-demand services, and are reflected in its operating cost.



DART riders express a preference for DART-operated service, and have observed reliability issues with TNC substitute service and Flex Connect during the COVID-19 pandemic.