Research Report

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### Stage 1: Background research

Before making contact with any Norwalk residents or experts, we were able to locate a number of local news publications, social media posts, and analyses of other cities’ transportation systems to begin to identify some common themes.

For the first stage of our research, we focused primarily on the risks and benefits associated with microtransit systems. The Norwalk Transportation, Mobility, and Parking team has expressed to us intentions to eventually replace the city’s fixed route bus/shuttle system with their new Wheels2U microtransit program, so we felt this was an especially valuable opportunity to provide additional research and analysis. Some of the common themes we identified included:

* There have been very few if any successful attempts to make the sort of full-scale transition from fixed route transit to microtransit, and little evidence to date to suggest that such a project could be successful at this time.
* Microtransit struggles to attract sufficient ridership to match the cost effectiveness of fixed route transit options.
* The highest value use of microtransit is in supplementing fixed route transit, particularly in addressing “first mile, last mile” scenarios.
* Microtransit tends to subsidize transit for the wealthiest residents at the expense of the poorest.
* Microtransit appears to a promising alternative to fixed route for certain underserved populations (ADA, older individuals, etc.).

Representative Quotes/Excerpts

“[Micro transit] does little besides package dial-a-ride-type services in an app. The interface may be convenient, but it can’t overcome the geometric efficiency of fixed-route service. To pretend otherwise will make transit service less equitable. “On average, microtransit seems to trigger an upward redistribution of the benefits of public subsidy,” Walker writes. “This is a Very Bad Thing for the public sector.” ([Streetblog.org](https://usa.streetsblog.org/2018/06/26/the-story-of-micro-transit-is-consistent-dismal-failure/))

“Bad outcomes also loom, including the possibility that traditional transit service, traffic congestion, and low-income riders will all suffer.” ([Citylab.com](https://www.citylab.com/transportation/2015/04/how-the-microtransit-movement-is-changing-urban-mobility/391565/))

“Micro transit may have a place in city transportation systems, but experience so far suggests that it’s a very small niche, like an app-enabled version of dial-a-ride service.” ([Streetblog.org](https://usa.streetsblog.org/2018/06/26/the-story-of-micro-transit-is-consistent-dismal-failure/))

“There is **no one-size-fits-all** solution as every city is different and even different neighborhoods in cities have different demand profiles and traffic patterns. Understanding service performance in a given city with its unique geography, demand profiles and traffic characteristics involves many unknowns, including the number of vehicles needed, the ideal locations for services and the tolerance of riders for extra ride and wait times.” ([Forbes.com](https://www.forbes.com/sites/forbestechcouncil/2019/02/27/how-to-use-data-to-get-micro-transit-right/#41e2fdc4467f))

“Being armed with this data can give micro-transit providers the powerful knowledge of potential performance, so that they can **best optimize their fleet prior to being deployed**. New and existing service providers can run similar simulations using available vehicle and transit utilization data to create more predictable services that stand a better chance of working for riders and operators alike.” ([Forbes.com](https://www.forbes.com/sites/forbestechcouncil/2019/02/27/how-to-use-data-to-get-micro-transit-right/#41e2fdc4467f))

### Stage 2: Interviews

In the next stage of our research, we were able to speak with a transportation and mobility policy expert at CMU about our project. Some key takeaways from that conversation:

* Public transit is **federally subsidized** based on ridership, so cities have an interest in making sure that their ridership numbers stay high
* Smart phone access may not be as large of a barrier to using services as we may think, even for poor and elderly residents
* An app that allows people to **compare and integrate modes of transportation** is considered the “Holy Grail” of mobility, but not easy to accomplish

We next were able to speak with Denis from Norwalk Transit, who was able to provide more details of the implementation of Wheels2U. Some insights:

* The city structured the **Wheels2U deployment to avoid overlap with fixed routes**
* Wheels2U service has to **shut down during heavy traffic events**, like the Oyster Festival
* Many people have **downloaded the app but have yet to use it**
* The city has sought to improve buy-in from local businesses with discounts for Wheels2U riders

And finally, we spoke with a Norwalk resident involved in their neighborhood advocacy group about transit / mobility issues. Some concerns we took from that conversation:

* Norwalk residents **lack knowledge of cultural assets** in the city. An app (OtoCast) directing people to the arts hasn’t been effective
* **Physical signage** in the Arts District could help improve wayfinding. Good locations would be the lot behind the Wall Street Theatre or the metal SONO sign
* The resident knew about Wheels2U and had seen the shuttles around, **but did not know how to use the service**

### Stage 3: Tools for ongoing research

As we began to develop prototypes based on our user feedback, we realized that ongoing user research tools could help the city continue to assess questions of wayfinding and mobility. As a result, we created two prototypes focused on helping planners in Norwalk assess mobility needs:

* A decision-tree model to help Norwalk planners think through the various use-cases for mobility assets
* An interactive map to help Norwalk planners visualize public transit limitations

### APPENDIX

#### Appendix 1: Insight and “How Might We” statements

**Insight Statements**

Design Challenge

Our design challenge is to provide guidance to the city of Norwalk to make it easier for residents to wayfind using the city’s transit infrastructure.

**Theme 1:** Cost Effectiveness

Insights

1. There are various metrics for cost-effectiveness to consider including cost-per-revenue-hour, cost-per-revenue-mile, revenue-cost per hour, and riders per hour
2. Cost-effectiveness seems to be highest as a first-mile or last-mile solution, but almost certainly can’t compete with fixed routes in the middle-mile
3. Who’s paying - federal/state subsidies vs end-users - can make a big difference

**Theme 2:** Equity

Insights

1. Smartphone requirements may not be as large of a barrier to usage for underserved communities as we originally envisioned
2. Guaranteed service, serving people/areas where it isn’t profitable, is a policy decision
3. The cities may prioritize bringing people to commercial sectors while underserved residents may prioritize access to public services
4. If microtransit does displace fixed routes, how will populations who relied on fixed routes get around

**Theme 3**: Handling uncertainty

Insights

1. Norwalk is trying to anticipate and adapt to the way people may move around in the future
2. Future funding streams depend on current ridership for public transit, and not all streams may continue going forward
3. Usage of microtransit within the pilot zone may not reflect potential usage outside that zone, especially if users have to eventually pay for the service
4. If service isn’t guaranteed, users may not be able to rely on services

**‘How Might We’ Statements**

Insight: There are various metrics for cost-effectiveness to consider including cost-per-revenue-hour, cost-per-revenue-mile, revenue-cost per hour, and riders per hour

How might we provide Norwalk with an evaluative framework that they can use to assess the microtransit pilot success and make future pilot expansion decisions

Insight: Guaranteed service, serving people/areas where it isn’t profitable, is a policy decision

How might we help the city understand the costs of deploying transit services to underserved areas relative to the moral need not to lead residents behind?

Insight:Future funding streams depend on current ridership for public transit, and not all streams may continue going forward

How might we help the city navigate the transition away from the current grant/funding stream toward new sources of funding including user payment.

#### APPENDIX 2: Background Research Notes and Excerpts

**Excerpts from articles**

“A recent study showed Connecticut and Rhode Island have the worst roads in the country. A [White House report](https://www.nancyonnorwalk.com/2014/07/himes-calls-for-major-long-term-infrastructure-funding-in-norwalk-visit/%20http://www.whitehouse.gov/sites/default/files/docs/economic_analysis_of_transportation_investments.pdf) says 41 percent of state roads are in poor condition.” (<https://www.nancyonnorwalk.com/2014/07/himes-calls-for-major-long-term-infrastructure-funding-in-norwalk-visit/>)

→ Can we map poor roads / crumbling infrastructure?

“Senate Majority Leader Bob Duff, D-Norwalk, said he favors creating an independent transportation authority that would concentrate on fixing the state’s roads and bridges. The authority would be able to sell bonds and install tolls if warranted. “It takes the politics out of it,” Duff said. “This goes back to decades of neglect on our transportation system.” Duff also favored a measure that will be before voters in November authorizing a constitutional lock box on transportation funds. That lock box would prevent lawmakers from raiding the STF.” (<https://www.nhregister.com/metro/article/Gov-slams-brakes-on-4-3B-transportation-projects-12489336.php>)

“Unless Congress acts, the Highway Trust Fund, which reimburses states for highway and transit projects, will go bankrupt later this summer. That could mean significant delays for planned repairs on the Yankee Doodle Bridge and thousands of other road and transit projects nationwide – and cost the U.S. economy up to 700,000 construction jobs in the next year. “The Highway Trust Fund is absolutely vital to Southwest Connecticut’s economy and safety, and keeping it solvent is a basic responsibility,” Himes said. “But we can no longer afford short-term fixes that inevitably cause more uncertainty and push us from crisis to crisis.” (<https://www.nancyonnorwalk.com/2014/07/himes-calls-for-major-long-term-infrastructure-funding-in-norwalk-visit/>)

“Traditionally, a federal excise tax on gasoline is how we’ve always done it,” Himes said. He pointed out that increased vehicle fuel efficiency combined with a bad economy that caused people to drive less were the “prime driver” in the current deficiencies in the highway budget.” (<https://www.nancyonnorwalk.com/2014/07/himes-calls-for-major-long-term-infrastructure-funding-in-norwalk-visit/>)

→ How will the move to microtransit affect the feasibility of these funding schemes for longer-term investments in transportation infrastructure?

“The [microtransit] service is currently a six-month pilot program that began Thursday, Sept. 13 and will run Thursday through Sunday each week. The service does not have routes or stops like a typical bus system. There is a designated service area where the bus operates. The cost of a ride is free during the pilot period but will have an associated ticket price if the service is successful and rolled out permanently or on a larger scale.” (<https://patch.com/connecticut/norwalk/new-app-based-bus-system-launches-norwalk>)

“The program has been for free for riders [since September 2018](https://www.thehour.com/news/article/Norwalk-rolling-out-Uber-like-bus-service-this-13218404.php), four days a week. Users can download the program’s app to request a ride on Thursday through Saturday from 5 p.m. to midnight and on Sunday from noon to 9 p.m.” (<https://www.thehour.com/news/article/Wheels2U-pilot-extended-for-two-months-13727306.php>)

→ Is the new system limited in the same way? What’s the reason for the limitations in the first place?

→ Are these hours decided by confirmed high-demand periods? If so, this is likely a best case scenario not generalizable to other zones or schedules.

“Wheels2U is a new on-demand shuttle service in Norwalk that provides a unique and convenient alternative mode of transportation,” a statement from the transit district reads. “The Wheels2U service is intended to improve the connection between South Norwalk, Maritime Aquarium, the Sono Collection, Wall Street area and other attractions. This month [March 2019], the service expanded to include areas near Merritt 7 as a way to link the upper part of Norwalk to “downtown” destinations.” (<https://www.thehour.com/news/article/Wheels2U-pilot-extended-for-two-months-13727306.php>)

“Overall, the program has generated about 600 to 700 trips per month, Liotta said...[a lot of effort has gone](https://www.thehour.com/news/article/Norwalk-s-Uber-like-bus-service-sees-steady-13302588.php) into getting the rides up from 0 to over 600 a month” (<https://www.thehour.com/news/article/Wheels2U-pilot-extended-for-two-months-13727306.php>)

“There is no one-size-fits-all solution as every city is different and even different neighborhoods in cities have different demand profiles and traffic patterns. Understanding service performance in a given city with its unique geography, demand profiles and traffic characteristics involves many unknowns, including the number of vehicles needed, the ideal locations for services and the tolerance of riders for extra ride and wait times.” (<https://www.forbes.com/sites/forbestechcouncil/2019/02/27/how-to-use-data-to-get-micro-transit-right/#41e2fdc4467f>)

“One way to get micro-transit and other services like it right is to use data and analytics to test services in advance by using existing ride matching and dispatching algorithms. It is possible to simulate how services might perform in advance of deployment, giving planners and operators invaluable information to help increase the odds of success.” (<https://www.forbes.com/sites/forbestechcouncil/2019/02/27/how-to-use-data-to-get-micro-transit-right/#41e2fdc4467f>)

“being armed with this data can give micro-transit providers the powerful knowledge of potential performance, so that they can best optimize their fleet prior to being deployed. New and existing service providers can run similar simulations using available vehicle and transit utilization data to create more predictable services that stand a better chance of working for riders and operators alike.” (<https://www.forbes.com/sites/forbestechcouncil/2019/02/27/how-to-use-data-to-get-micro-transit-right/#41e2fdc4467f>)

“The pitch to public agencies is that micro transit can be a more cost-effective way to provide service in some travel markets than fixed-route buses.” (<https://usa.streetsblog.org/2018/06/26/the-story-of-micro-transit-is-consistent-dismal-failure/>)

“Micro transit may have a place in city transportation systems, but experience so far suggests that it’s a very small niche, like an app-enabled version of dial-a-ride service.” (<https://usa.streetsblog.org/2018/06/26/the-story-of-micro-transit-is-consistent-dismal-failure/>)

“Only a third of riders [~500] kept using the service after the free rides expired.” (<https://usa.streetsblog.org/2018/06/26/the-story-of-micro-transit-is-consistent-dismal-failure/>)

→ Is Wheels2u going to stay free? If so, at what cost to the city?

“The flex rides served just three passengers per hour, reported AC Transit planner John Urgo in a post for [TransitCenter](http://transitcenter.org/2018/05/15/adding-flexible-routes-improve-fixed-route-network/), “less than half of the fixed route it replaced” (<https://usa.streetsblog.org/2018/06/26/the-story-of-micro-transit-is-consistent-dismal-failure/>)

→ at 700 riders/month and 30 hours of operation per week, Wheels2u serves a maximum of 5.5 riders/hour. How does this compare with existing service?

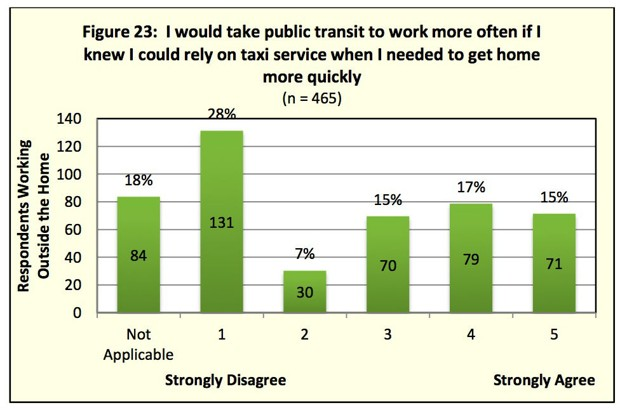
→ Could the real value proposition for microtransit perhaps be in more flexible (on demand), lower cost fixed routes, e.g., commuter routes or popular destination routes?

“micro transit” does little besides package dial-a-ride-type services in an app. The interface may be convenient, but it can’t overcome the geometric efficiency of fixed-route service. To pretend otherwise will make transit service less equitable. “On average, microtransit [seems to trigger an upward redistribution](http://humantransit.org/2018/02/is-microtransit-a-sensible-transit-investment.html) of the benefits of public subsidy,” Walker writes. “This is a Very Bad Thing for the public sector.” (<https://usa.streetsblog.org/2018/06/26/the-story-of-micro-transit-is-consistent-dismal-failure/>)

“bad outcomes also loom, including the possibility that traditional transit service, traffic congestion, and low-income riders will all suffer.” (<https://www.citylab.com/transportation/2015/04/how-the-microtransit-movement-is-changing-urban-mobility/391565/>)

3 ways that microtransit might be great: (<https://www.citylab.com/transportation/2015/04/how-the-microtransit-movement-is-changing-urban-mobility/391565/>)

1. As the feeders to public transportation's core routes. They'd address what experts call the "first-mile, last-mile" problem—that gap at the start and end of every trip that's difficult for traditional transit operators to serve in a cost-effective way.
2. As a boon to public transportation. If micro- and public transit do function as an integrated system, the result should be less car traffic on the road and more fares for trains and buses. That revenue should lead to better service, which in turn generates more riders.
3. As a niche service. Private microtransit outfits can target certain niche populations in a way public agencies with a mandate to serve as much of the public as possible cannot.



“opportunities for microtransit companies to collaborate with rather than compete against public transit systems”: (<https://www.routematch.com/a-goldilocks-system-the-microtransit-solution/>)

* Microtransit solutions can address the “first-mile, last-mile” problem, acting as a bridge that serves consumers from far off areas and feeds them into the public transit system.
* Microtransit can operate in low density or remote areas that public transportation has a hard time reaching, increasing the reach of the network.
* Microtransit can also attract niche populations that public transportation has a hard time reaching; because of its small-scale service.
* Microtransit has strong potential for replacing the costly paratransit services that many city public transportation systems currently run.

**Recommendations from the Norwalk POCD**

**Fix the institutions that are failing us**

Transform the way we govern and pay for transportation

1. Reduce the cost of building rail transit
2. Restructure the Port Authority to function as a regional infrastructure bank
3. Create a Subway Reconstruction Public Benefit Corporation
4. Modernize transit systems outside New York City
5. Charge drivers to enter Manhattan, price highways, and transition to vehicle-miles tolling

**Create a dynamic, customer-oriented transportation network**

Create a fully integrated, regional transit system

1. Build a second bus terminal under the Javits Convention Center
2. Build new rail tunnels under the Hudson and East Rivers
3. Expand, overhaul, and unify the Penn Station Complex
4. Combine three commuter rail systems into one network

Rebuild the subway system

1. Adopt new technology for fast, reliable subway service
2. Modernize and refurbish New York City’s subway stations
3. Build new subway lines to underserved areas of the city

Adapt streets and highways for a technology-driven future

1. On city streets, prioritize people over cars
2. Improve bus service, and introduce new light rail and streetcar lines
3. Expand suburban transit options with affordable, on-demand service
4. Reduce highway congestion without adding new lanes
5. Remove, bury, or deck over highways that blight communities

Create world-class airports and seaports

1. Expand and redesign Kennedy and Newark airports
2. Build fast and affordable rail service in the Northeast Corridor
3. Modernize the region’s seaports and expand rail freight access

#### APPENDIX 3. User Research and Interview Notes

Possible sources of feedback include:

* Public comments for plan rollouts, etc.
* Local news publications, especially opinion pieces and interviews with stakeholders related to (check dates of big rollouts / City press releases)
* Local social media
* Recommended articles/links at the bottom of relevant publications

**Interview Notes**

Lisa Kay, Traffic21 (Interviewed 9/20/19)

* Tips on implementing an equity assessment?
* Tips on implementation climate assessment?
* National Transit Database
* Money allocated to area from public transit system (partially funded by federal subsidy) to invest in auxiliary transportation services; public transit cheapest for users (perhaps not [operate) for this reason. → microtransit more expensive for users. Additional assistance for special needs users (equity issue).
* No federal subsidy for microtransit
* Not guaranteed a ride from microtransit providers (because no rules for transportation company apply; these are “technology companies”) → how to prevent discrimination against certain areas (without safeguard of regulation)?
  + Always pick up people?
  + Guarantee no price gouging?
  + Guarantee wheelchair accessibility?
  + How to manage transition off subsidy (retain usership)?
* Wayfinding - integrate price for parking for input destination to nudge toward public transportation
* Your audience are those ***not*** using transit
* What are the big destinations of the underserved populations (are these connected by transit system) → look at destination end of equation.
* → question for prospective users: where do you go? How do you get there?
* → Can direct question to these offices / destinations via phone call (senior services center, etc.)
* Can we order a ride for a friend/loved one
* Methodology for answering the questions we’ve identified
* What service are you trying to provide and what level of investment can you make? What is the problem statement that microtransit answers?
* Urbanized Area … Funds through ; through local municipal planning association → determines amount of subsidy per ridership

Dennis O’Connor, Norwalk Transit District (Interviewed 9/24/19)

* Downticks due to:
  + Weather
  + Events (increases in traffic in coverage area)
* Assumptions
  + Buy-in from commercial partners will keep costs low (“we’re bringing people to your front door”)
  + Ridership will stay steady through transition from free to $2.50/ride
* Challenges
  + Need city buy in
  + End of fiscal year (Aug. 1, 2020) - around $2.50/ride (heavily subsidized)
* Spiked to ~1100 riders in July, came down a bit in August
* Why parking data only in microtransit area?
* Data layers?
  + Shapefiles (raw data for microtransit)
  + Parking?
  + Bus routes and stops
  + Demographics of riderships
* No microtransit servicing between zones / self-contained

Norwalk Arts District resident (Interviewed 10/719)

* Art District / Historical district
* Serves on board of Arts Commissions, Wall Street Neighborhood Association
* Within City Hall - within a building (especially cultural assets)
  + Have been attempts (pages on an Otto/AutoCast app? - directing to public art, etc. Usage low.)
* Branding with signage
  + Downtown branded as the arts district (with flags, etc.) - no competition, just insufficient promotion?...No real designation by the city other than the banners
  + Help promote cultural tourism (what are the districts, what’s their unique brand)
  + City’s question: *What else does it mean to be the Arts District (besides branding)?*
* Don’t have “You are here” signage that tells you what’s IN YOUR AREA
* Imagine “Downtown becoming a friendly, open air mall”
* “Could be a physical sign, an app on a phone, or a pamphlet.”
* Attractive SoNo metal sign under metro North train, photo opp for people, corner of Main Street and Washington Street; Nothing as obvious in Downtown Norwalk, except maybe Wall Street Theater. Parking lot behind it surrounded by 6-8 arts-based business. Branded by locals “Isaac Square,” b/c of Isaac St.
* Trying to get them to reopen the train station on Wall Street
* Do have a bus “hub” (not a terminal - just a street where they converge). Haven’t used buses much.
* “I like the idea of Wheels2U a lot, never felt the need to get on one, or where the stations are where’d get on one. I see them passing on the street. Don’t know anyone who actually uses it personally, or how it differs from the regular buses...Most people I know have cars.”
* “Not like NYC where you can catch the bus 24/7; if you’re on my schedule, you’re taking an Uber.”
* Wall Street Theatre area more of an evening destination (for use case for transit difficulty map)
* Michael McQuire study of --- on Wall Street (train station). Better person to speak to on public transit issues.