

EQUITY AND MOBILITY ON DEMAND

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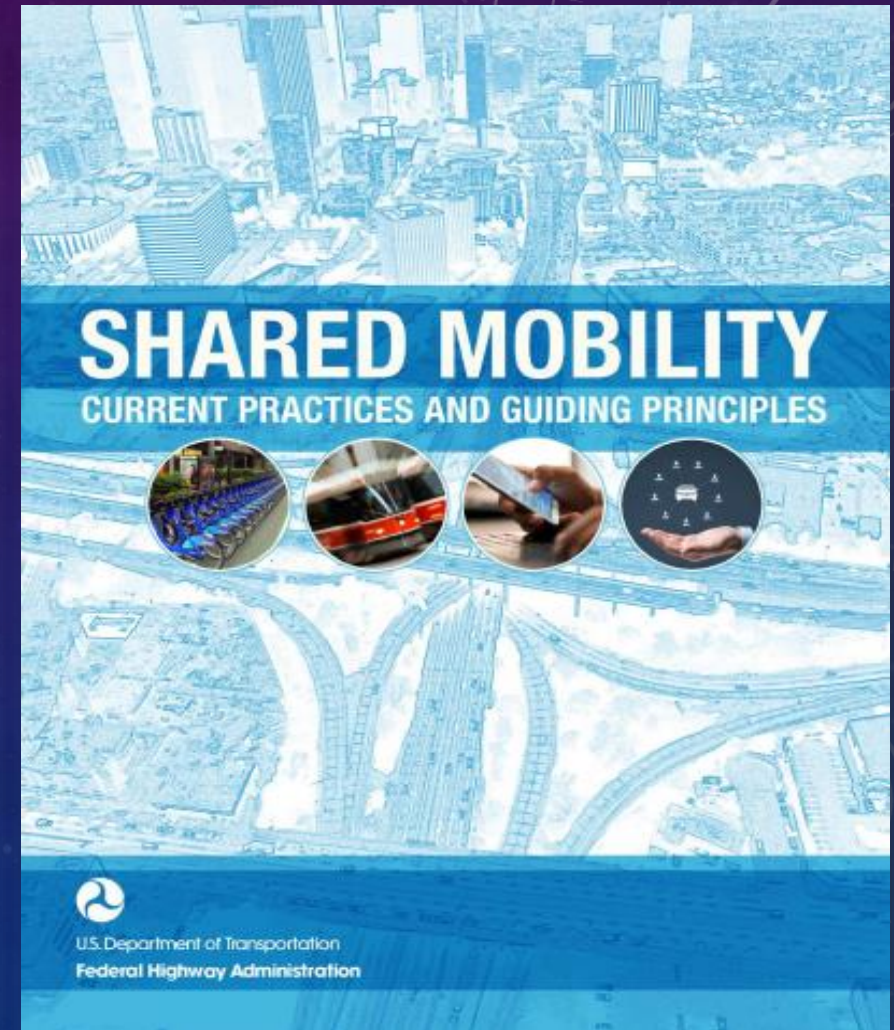
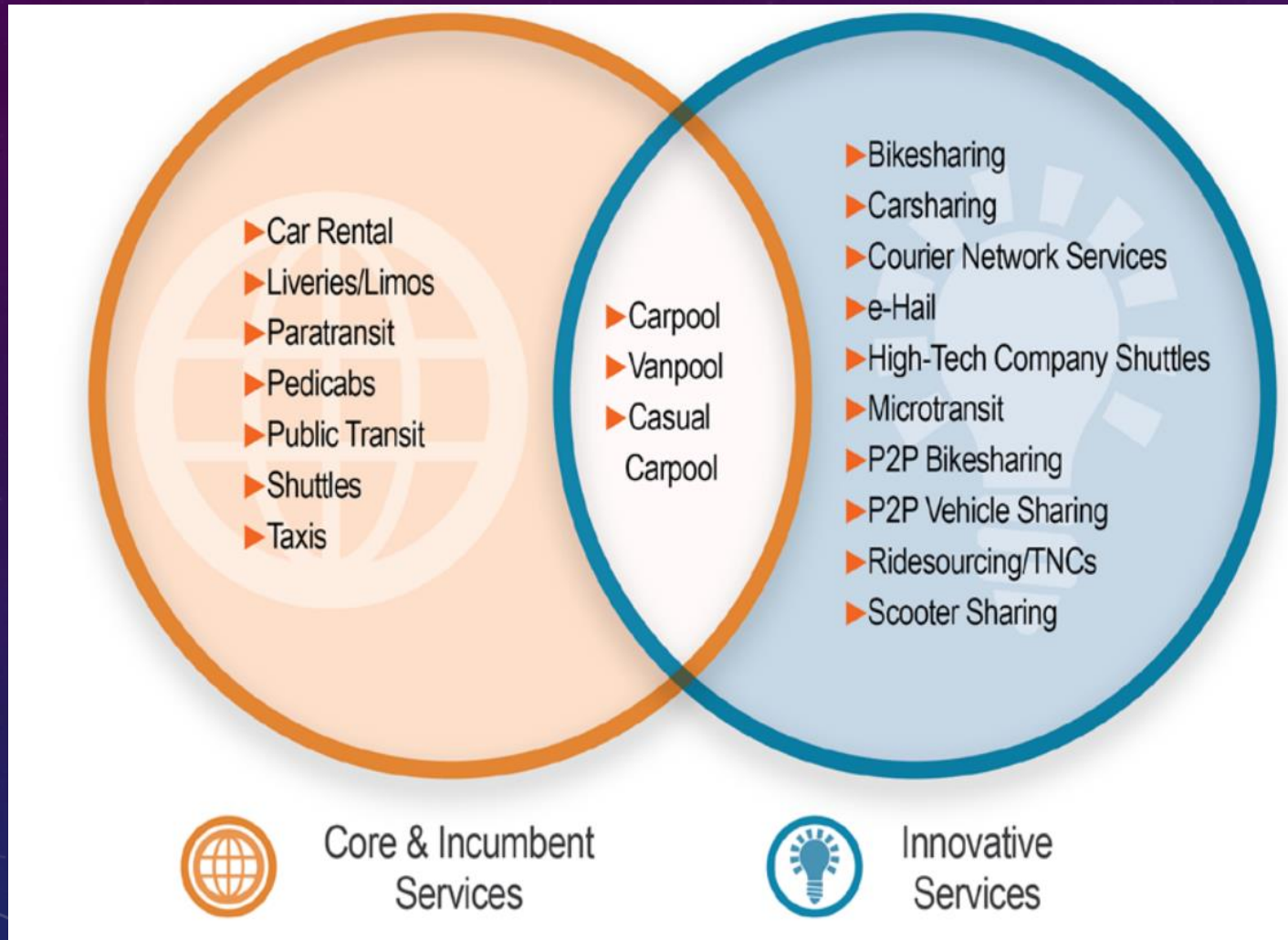
UNIVERSITY OF CALIFORNIA Berkeley
Transportation Sustainability
RESEARCH CENTER

PRESENTATION OVERVIEW

- Shared Mobility Ecosystem
- The Commodification of Transportation
- Recent Declines in Transit Ridership
- The Relationship Between Shared Mobility and Public Transit
- Who Is Not Using Shared Mobility
- Equity Challenges
- Steps to Transportation Equity Framework
- The Government Role



SHARED MOBILITY ECOSYSTEM

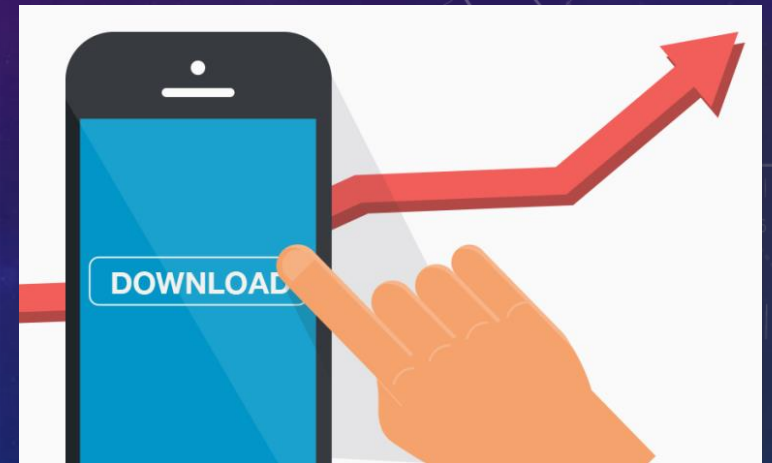


Shaheen et al. 2016

<https://ops.fhwa.dot.gov/publications/fhwahop16022/fhwahop16022.pdf>

THE COMMODITIZATION OF TRANSPORTATION

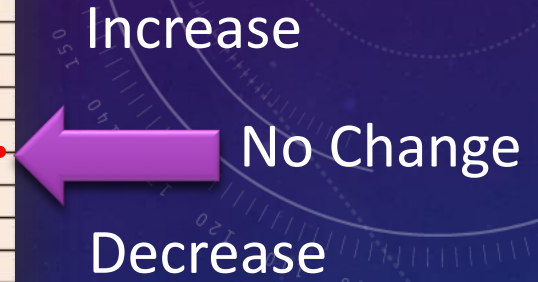
- 1) **Today's Travelers Are Part of the "Experience Economy"**
- 2) **Public Transit Operators Cannot Afford Bad Experiences**
- 3) **Travelers Expect Personalization**
- 4) **Unlocking the Power of Data Analytics**



RECENT DECLINES IN PUBLIC TRANSIT RIDERSHIP



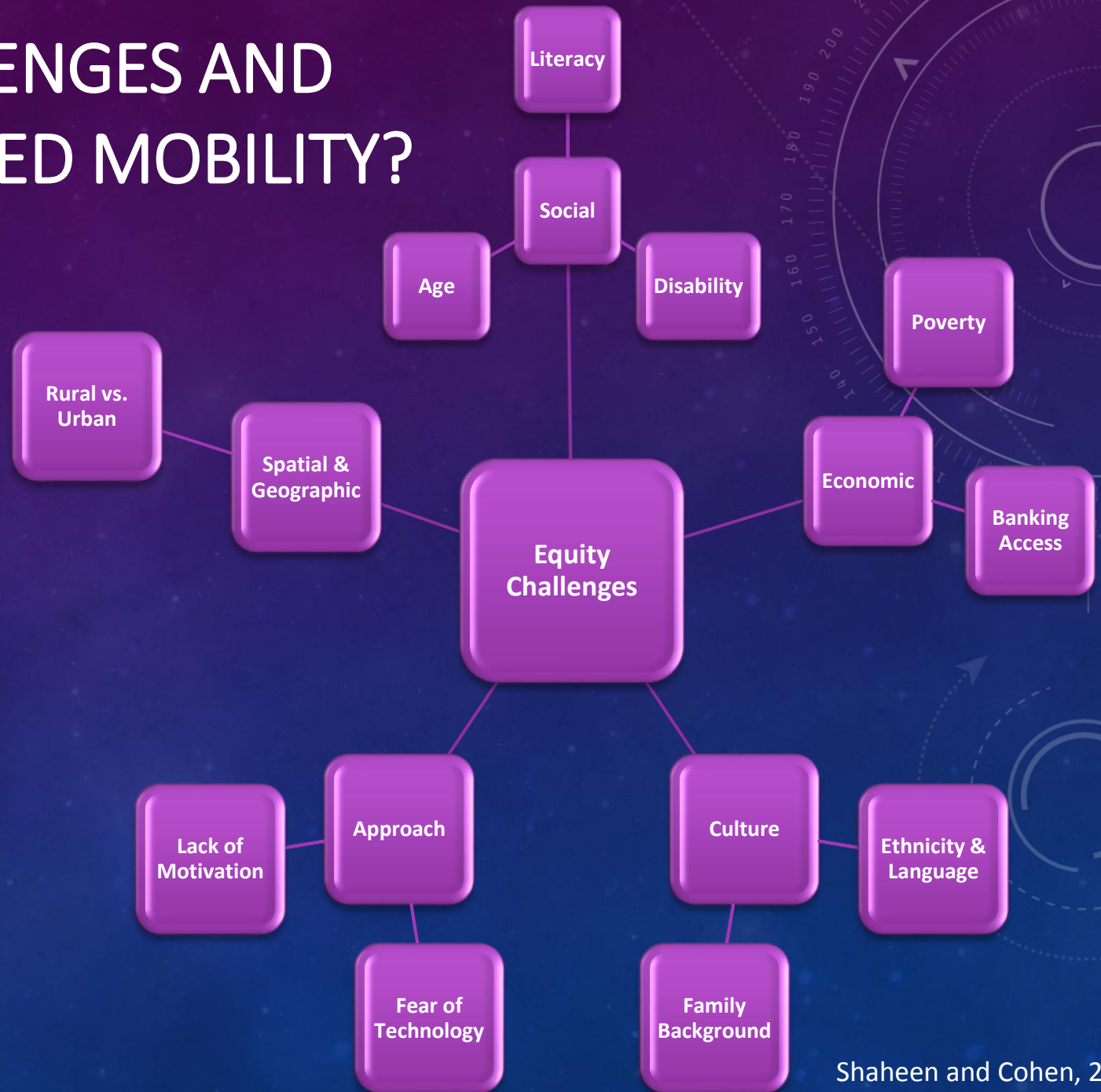
UZA Name	Sum of 2015	Sum of 2016	Change
Seattle, WA	178,640,154	185,913,534	4.1%
Houston, TX	83,285,295	85,180,489	2.3%
Milwaukee, WI	40,610,851	41,476,982	2.1%
Detroit, MI	36,734,180	37,079,598	0.9%
New York-Newark, NY-NJ-CT	4,222,700,561	4,241,214,495	0.4%
San Francisco-Oakland, CA	454,952,418	454,996,256	0.0%
Boston, MA-NH-RI	403,464,723	402,554,159	-0.2%
Pittsburgh, PA	63,990,430	63,570,697	-0.7%
Denver-Aurora, CO	101,021,365	99,777,407	-1.2%
Portland, OR-WA	112,440,100	110,985,034	-1.3%
San Antonio, TX	37,983,886	37,290,201	-1.8%
Salt Lake City-West Valley City, UT	44,909,741	43,776,825	-2.5%
Minneapolis-St. Paul, MN-WI	96,636,368	93,716,857	-3.0%
Chicago, IL-IN	623,466,948	603,747,357	-3.2%
Urban Honolulu, HI	68,587,549	66,361,162	-3.2%
Las Vegas-Henderson, NV	72,044,767	69,420,973	-3.6%
Dallas-Fort Worth-Arlington, TX	75,998,371	72,137,725	-5.1%
Baltimore, MD	111,070,976	105,214,371	-5.3%
Atlanta, GA	141,154,134	132,925,293	-5.8%
Philadelphia, PA-NJ-DE-MD	369,644,085	346,276,496	-6.3%
Phoenix-Mesa, AZ	69,525,177	64,898,486	-6.7%
San Diego, CA	94,921,830	88,507,937	-6.8%
St. Louis, MO-IL	47,250,866	44,020,031	-6.8%
Cleveland, OH	46,844,074	43,507,057	-7.1%
Los Angeles-Long Beach-Anaheim, CA	619,459,557	572,589,716	-7.6%
San Jose, CA	44,718,244	40,763,554	-8.8%
Miami, FL	156,449,301	141,556,090	-9.5%
Washington, DC-VA-MD	441,222,366	396,260,838	-10.2%
Austin, TX	32,795,531	28,893,986	-11.9%
San Juan, PR	38,853,326	32,289,221	-16.9%



COMMON EQUITY CHALLENGES AND WHO IS NOT USING SHARED MOBILITY?

Lower Rates of Use:

- Seniors
- Minorities
- Low-income
- Rural



COMMON CHALLENGES

Some common challenges ...

- **Un- and under- banked households** (cannot pay)
- **Digitally Impoverished** - No smartphone (cannot access)
- **Low-income users** (cannot afford)
- **Low-income / minority neighborhood** (lack of service availability)
- **People with disabilities** (cannot access / lack of service availability)

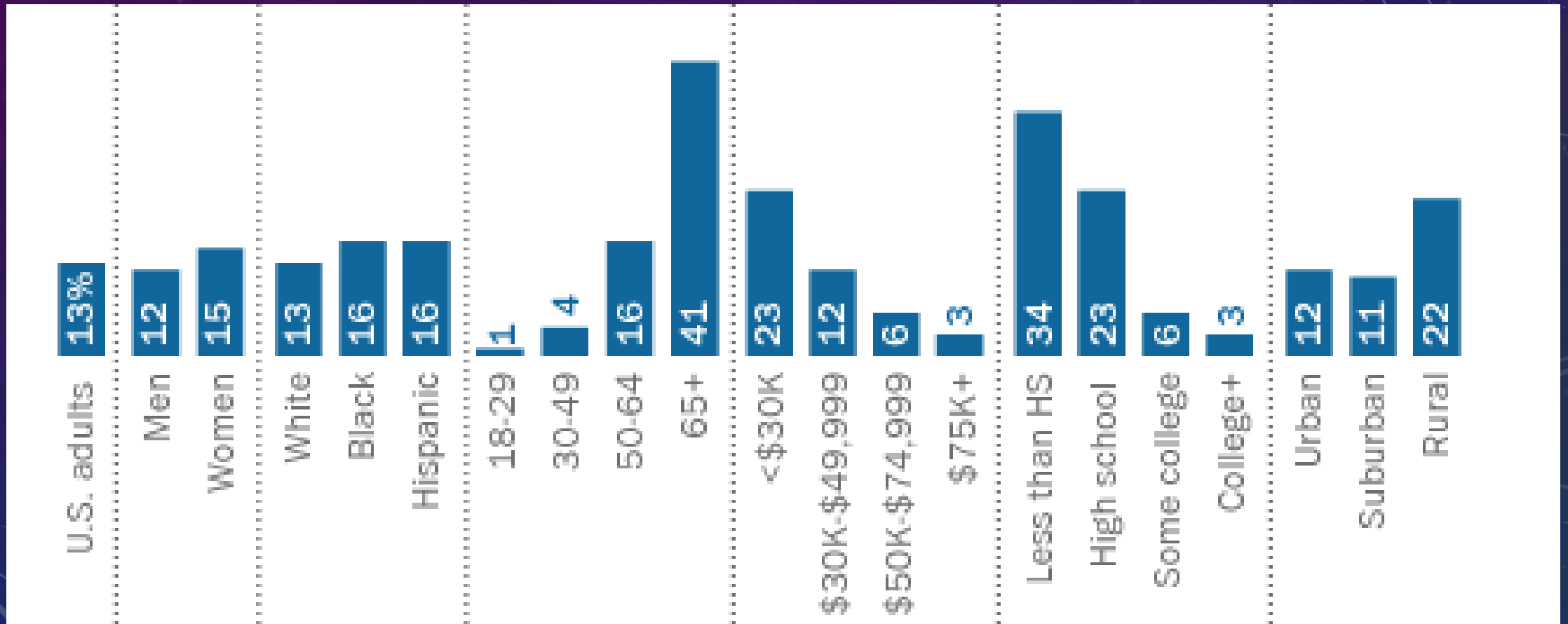
Affordability: “It’s too expensive”

Predictability: “Will surge pricing make it too expensive?”

Availability: “The services aren’t available in my neighborhood”

Payability: “I don’t have an acceptable payment method”

DIGITAL DIVIDE: PERCENT OF U.S. ADULTS WHO DO NOT USE INTERNET



STEPS TO TRANSPORTATION EQUITY FRAMEWORK



SPATIAL EFFECTS



TEMPORAL



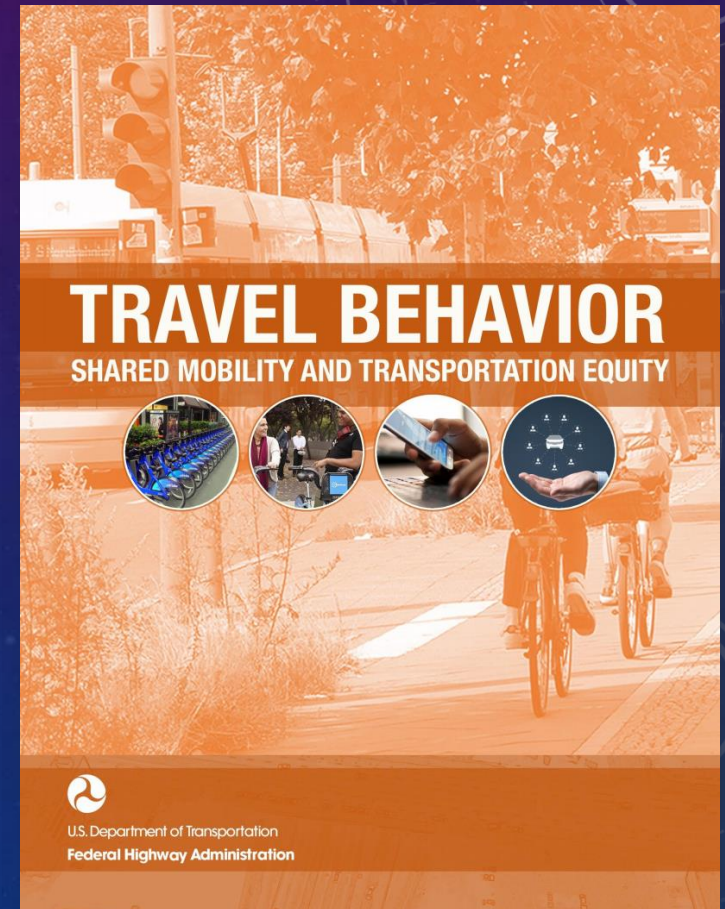
ECONOMIC



PHYSIOLOGICAL



SOCIAL



https://www.fhwa.dot.gov/policy/otps/shared_use_mobility_equity_final.pdf

Shaheen et al., 2017

STEPS TO TRANSPORTATION EQUITY FRAMEWORK



SPATIAL EFFECTS

Spatial factors that compromise daily travel needs (e.g., excessively long distances between destinations, lack of public transit within walking distance)

Opportunities:

- Public transit operators and ridesourcing first- and last-mile partnerships
- Microtransit for lower-density areas



STEPS TO TRANSPORTATION EQUITY FRAMEWORK



TEMPORAL

Travel time barriers that inhibit a user from completing time-sensitive trips, such as arriving at work (e.g. public transit reliability issues, limited operating hours, traffic congestion)

Opportunities:

- Dynamic microtransit
- Late-night ridesourcing and shuttle services
- Commuter carpooling services



STEPS TO TRANSPORTATION EQUITY FRAMEWORK



ECONOMIC

Direct costs (e.g., fares, tolls, vehicle ownership costs) and indirect costs (e.g., smartphone, Internet, credit card access) that create economic hardship or preclude users from completing basic travel

Opportunities:

- Shared mobility subsidies for low-income users
- Multiple payment options for shared mobility services
- Multi-modal hubs with Wi-Fi access



STEPS TO TRANSPORTATION EQUITY FRAMEWORK

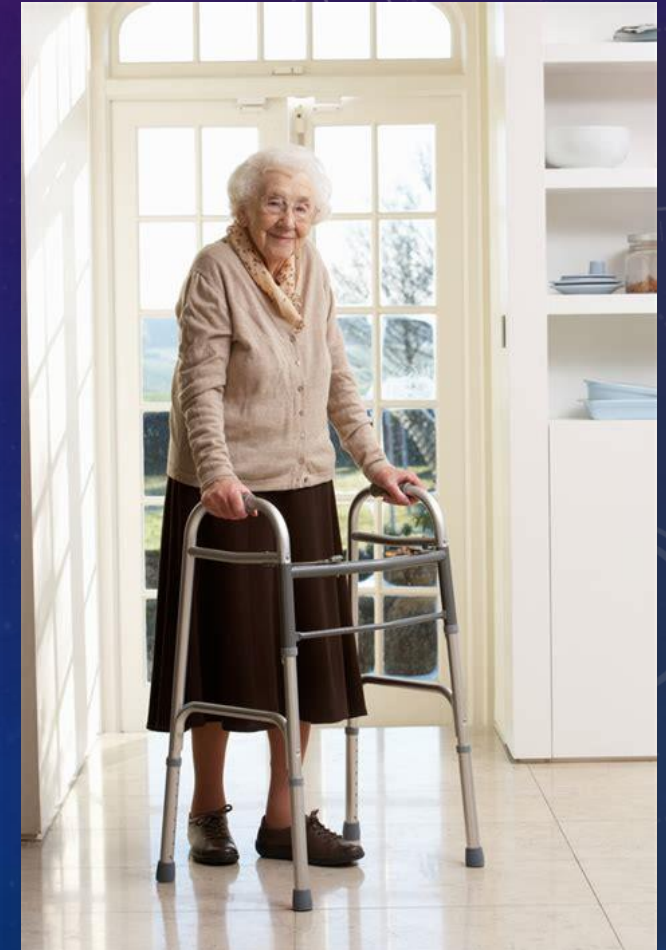


PHYSIOLOGICAL

Physical and cognitive limitations that make using standard transportation modes difficult or impossible (e.g., infants, older adults, and disabled)

Opportunities:

- Older adult focused shared mobility services
- Voice activated mobility app features



STEPS TO TRANSPORTATION EQUITY FRAMEWORK

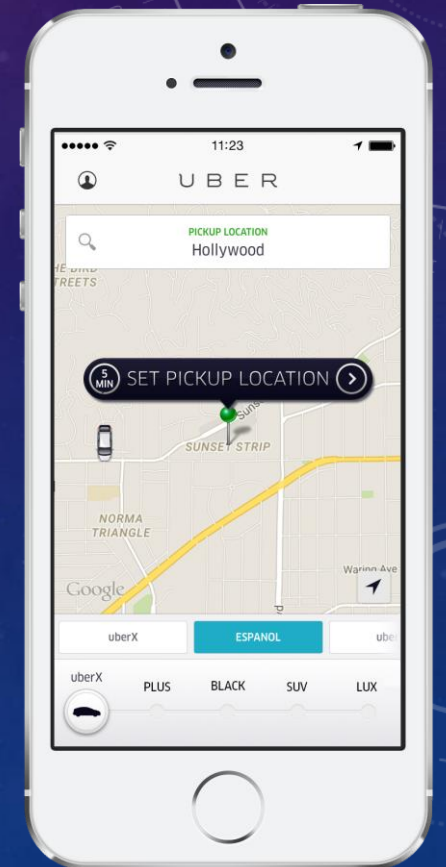


SOCIAL

Social, cultural, safety, and language barriers that inhibit a user's comfort with using transportation (e.g. neighborhood crime, poorly targeted marketing, lack of multi-language information)

Opportunities:

- Ridesourcing app interface that minimizes sociodemographic profiling
- Targeted outreach to low-income and minorities
- App information in user's native language



POLICY QUESTIONS

- How do we ensure access to all and equivalent level of service among shared mobility providers?
- How do we prevent discrimination against protected classes (i.e., minority, people with disabilities, etc.)?
- How do we make all shared modes affordable and accessible to low-income, digitally impoverished, and un/under-banked users?



GOVERNMENT ROLE

Knowledge Transfer & Facilitation

- Higher levels of government can facilitate partnerships between lower levels of government and the private sector
- Government agencies at the same level can engage in public-public sharing of knowledge and experience

Funding

- Governmental agencies can attract private sector partners by providing in-kind subsidies in exchange for meeting community goals
- Direct subsidies and taxes were viewed more cautiously by public sector experts

GOVERNMENT ROLE

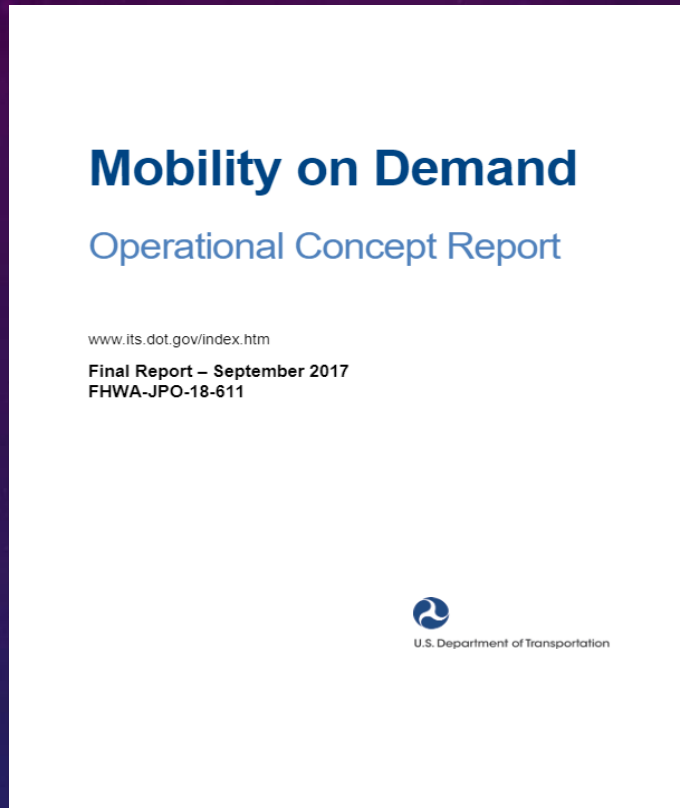
Regulation & Legislation

- More pilots and evaluation are needed before standards and regulations are set
- The rapid evolution and varying impacts of the shared mobility services make developing general best practices difficult
- The public sector needs proactive goal-based policy instead of reactive mitigation-based policy

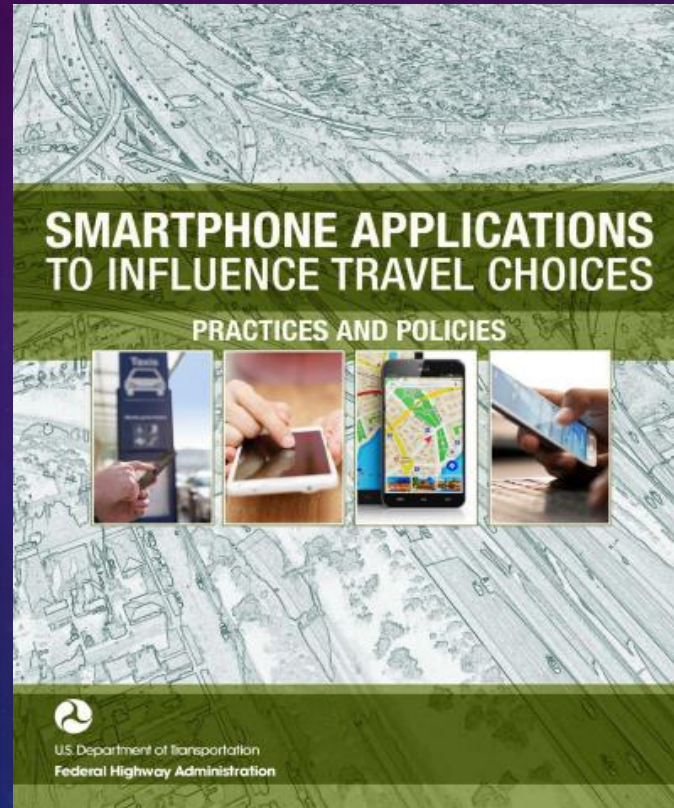
Data Metrics

- Standard data sharing requirements for all shared mobility operators would ensure fairness between providers
- Equity metrics should strive for more than minimum legal requirements

ADDITIONAL RECENT RESOURCES



<https://rosap.ntl.bts.gov/view/dot/34258>



<https://ops.fhwa.dot.gov/publications/fhwahop16023/fhwahop16023.pdf>



<https://www.planning.org/publications/report/9107556/>

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ADDITIONAL INFORMATION

**THE RELATIONSHIP BETWEEN SHARED MOBILITY
& PUBLIC TRANSIT SLIDE APPENDIX**



THE RELATIONSHIP BETWEEN SHARED MOBILITY & PUBLIC TRANSIT



First-and-Last Mile Connections



Public Transit Replacement



Late Night Transportation



Others ...

*No Service/
Limited Service
(Headways)*

*High-Density
Built Environment*

Cities: Provide more connections via shared mobility

Cities: Important to reduce congestion, emphasize HOVs (transit and shared modes)

*Peak/
High Levels
of Service
(Headways)*

Suburbs, rural areas: Fill gaps, first and last mile, transit replacement

Suburbs, rural areas: Replace underperforming routes, fill gaps, first and last mile

*Low-Density
Built Environment*

SHIFTS TO RIDESOURCING/TNCS PREDOMINANTLY FROM TAXI AND TRANSIT

Study Authors Location Survey Year	Rayle et al.* San Francisco, CA 2014	Henao* Denver and Boulder, CO 2016	Gehrke et al.* Boston, MA 2017	Clewlou and Mishra** Seven U.S. Cities***** Two Phases, 2014 – 2016	Feigon and Murphy*** Seven U.S. Cities***** 2016	Hampshire et al.**** Austin, TX 2016
Mode						
Drive (%)	7	33	18	39	34	45
Public Transit (%)	30	22	42	15	14	3
Taxi (%)	36	10	23	1	8	2
Bike or Walk (%)	9	12	12	23	17	2
Would not have made trip (%)	8	12	5	22	1	-
Carsharing / Car Rental (%)	-	4	-	-	24	4
Other / Other ridesourcing (%)	10	7	-	-	-	42 (another TNC) 2 (other)

SUMMARY OF SHARED MOBILITY IMPACTS ON PUBLIC TRANSPORTATION

Mode	Decrease/Increase	Public Transit Impacts
Roundtrip Carsharing (N. America)	Net decrease	For every 5 members that use rail less, 4 ride it more; For every 10 members that use the bus less, 9 ride it more.
One-Way Carsharing (N. America)	Net decrease, although an exception in Seattle	In Seattle, where a small percentage of respondents increase their use exceeding the smaller percentage of respondents decreasing their rail use. Across the other four cities, more people report a decrease in their frequency of urban rail and bus use than an increase.
P2P (N. America)	Not a notable net increase or decrease	There was not a notable net increase or decrease in public transit usage. Those increasing and decreasing their bus and rail use were closely balanced in number, with 9% increasing bus and 10% decreasing use. Similar effects were found with rail, as 7% reported increasing rail use, while 8% reported decreasing it.
Station-Based (or Docked) Bikesharing (N. America multi-city studies)	Net increases in bus/rail in small- and medium-sized cities Small net decreases in bus/rail in larger cities	-Small net increases in bus and rail use in small- and medium-size cities (e.g., Minneapolis) -Small net decreases in bus and rail use in larger cities (e.g., Mexico City)
Pooling (Casual Carpooling in Bay Area)	Net decrease	Majority of casual carpoolers were public transit users. In the Bay Area, 75% were casual carpoolers.
Ridesourcing/TNCs (SF Bay Area)	Net decrease	-33% competition with public transit, 4% first mile and last mile (destination or origin is public transit stop)