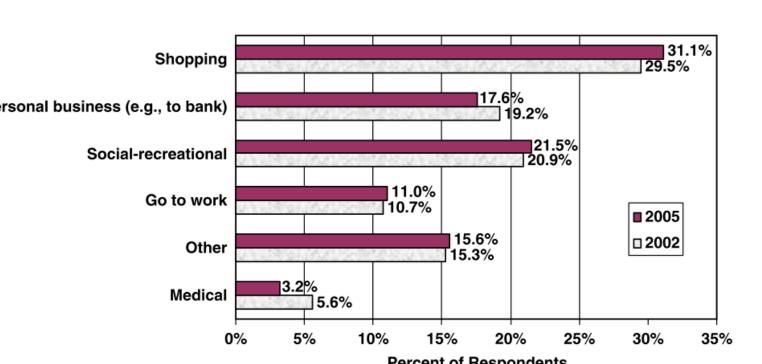## Research Question

Ride-hailing is becoming an increasingly popular mode of transportation, yet little is known about why people choose Transportation Network Companies (TNC's).

Can TNC origin-destination data be used to impute trip purposes and thereby help transit agencies compete or cooperate with this emerging mode?

What are the use cases, by trip purpose, in which public and private transit services are competing with or complementing one another?

Background

Distribution of trip purposes using City Carshare Vehicles, March 2005 and September-October 2002, in-vehicle survey.
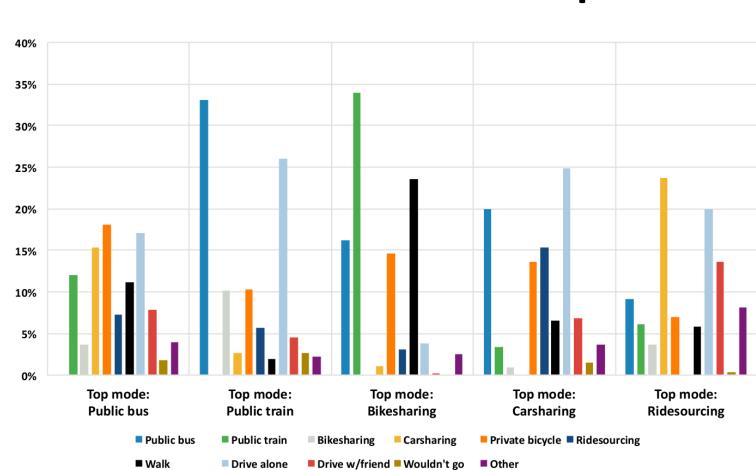

- People tend to use carsharing for shopping & personal business
- Uses changed slightly over time as service matured

Robert Cervero, Aaron Golub, and Brendan Nee. City CarShare: Longer-Term Travel Demand and Car Ownership Impacts. Figure 4. Transportation Research Record: Journal of the Transportation Research Board, 1992:70–80, Jan 2007.

Average Weekday Intra-SF Person Trips by Mode

Legend:
- Private Auto 34%
- Public Transit 16%
- Bike 3%
- Walk 37%
- Taxi 1%
- TNC 9%

SOURCE: TNC data: SF-CHAMP.

- TNC use is nearly as high as Public Transit in San Fransisco
- The two combined are one quarter of trips

Joe Castiglione, et. al. TNCs Today: A Profile of San Francisco Transportation Network Company Activity. Figure 4. Technical report, San Francisco County Transportation Authority, San Francisco, 2017.

Alternative for most frequent shared-mode trip if that service was not available—by top shared mode

- If one shared mode is not available, people still prefer other shared modes
- Driving alone is a common alternative among all modes

American Public Transportation Association. Shared Mobility and the Transformation of Public Transit. Figure 10. Technical report, Prepared for American Public Transportation Association by the Shared-Use Mobility Center, 2016.

Data & Methodology

RideAustin Dataset:
- 10 months in 2016 and 2017
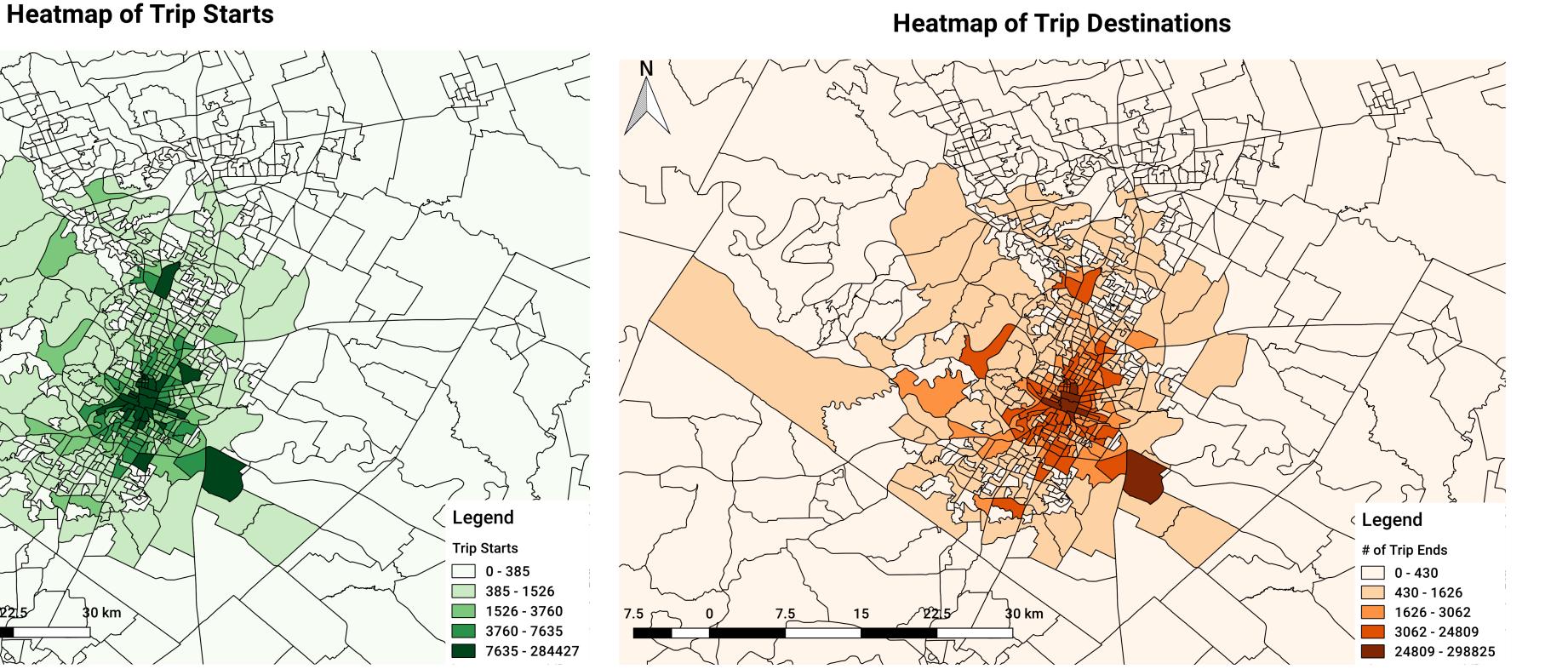- 1.5 million trip records
- Includes wait time & cost

City of Austin Land Use dataset

Census Employment Opportunities & Household Socioeconomic Characteristics

CapMetro GTFS data

1. Match origins with land use & socioeconomic factors
2. Match destinations with employment
3. Impute purpose based on analysis of origin and destination, time of day
4. Compare with transit patterns in high-volume areas
5. Draw conclusions regarding areas of competition and complementary service based on trip purpose

Heatmap of Trip Starts

Legend
Trip Starts
- 0 - 385
- 385 - 1526
- 1526 - 3760
- 3760 - 7635
- 7635 - 284427

Heatmap of Trip Destinations

Legend
# of Trip Ends
- 0 - 430
- 430 - 1626
- 1626 - 3062
- 3062 - 24809
- 24809 - 298825

Texas Innovation Alliance: New Mobility WG

The Texas Innovation Alliance is an action network of transportation agencies, cities, and research institutions in Texas working together to solve common challenges. There are four Working Groups: 1) Equity & Access, 2) New Mobility, 3) Operations & Infrastructure, and 4) Freight & Logistics. The New Mobility Working Group is relevant to this research and is focused on ways for public agencies to keep pace with technological development. It has identified Open Data Sharing and Seamless Planning as priority action items to be addressed. This project aims to answer the New Mobility Working Group's questions around actions cities can take in this space by analyzing the Ride Austin dataset and evaluating its suitability for transit planning operations.

For more info: http://txinnovationalliance.org

How Results will be Used

Public Agencies:
- Advisory document to assist planning in an uncertain future
- Optimize transit routing
- Develop innovative paratransit programs
- Improve mobility for all citizens

Private Sector:
- Garner interest in public programs
- Open access to new markets
- Partner with public agencies to serve low-density areas
- Improve public image by assisting vulnerable populations

Potential Recommendations

Benefits and Disadvantages from Societal vs. Individual Perspectives

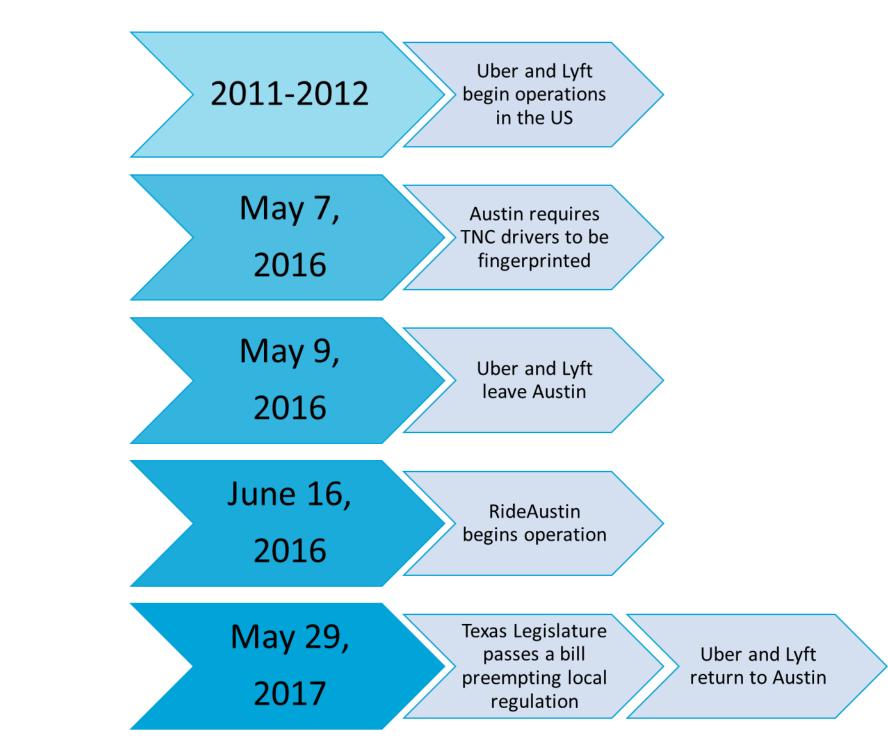Other conclusions that emerge during research process

Complementary Areas:
- Paratransit operations
- Low-density communities w/ poor service
- First/Last mile connector
- Festivals/Events/Disaster Response

Competitive Information:
- Transit ridership dropping
- Areas & Trips well served by TNC's
- Replace/eliminate underused routes
- Selectively improve service to increase ridership

Transportation Network Companies

- TNC: ride-hailing company like Uber, Lyft, & RideAustin
- Increased popularity of new mode raises questions:
  - Decreasing transit ridership
  - Automation
  - Effects on Vehicle Miles Traveled
- Learning why people choose TNC's informs:
  - Labor & VMT Regulations
  - Transit & Paratransit Service
  - Curb Space & Urban Design

Date	Event
2011-2012	Uber and Lyft begin operations in the US
May 7, 2016	Austin requires TNC drivers to be fingerprinted
May 9, 2016	Uber and Lyft leave Austin
June 16, 2016	RideAustin begins operation
May 29, 2017	Texas Legislature passes a bill preempting local regulation / Uber and Lyft return to Austin