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Shared-Use Vehicle Services: An Evolutionary Path to Leverage Vehicle Automation

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Overview

- Autonomous Vehicles (AVs)
- Shared-Use Mobility Services
 - Carsharing
 - On-demand ride services
- Scenario Planning Study
 - AV Applications
 - Evolutionary Path of AVs



Autonomous Vehicles (AVs)

- Self-driving car, driverless car, driver-free car
- Vehicle operation without active physical control or monitoring by human driver
- Senses environment with advanced technologies
 - Radar/lidar, GPS, mapping, computer vision



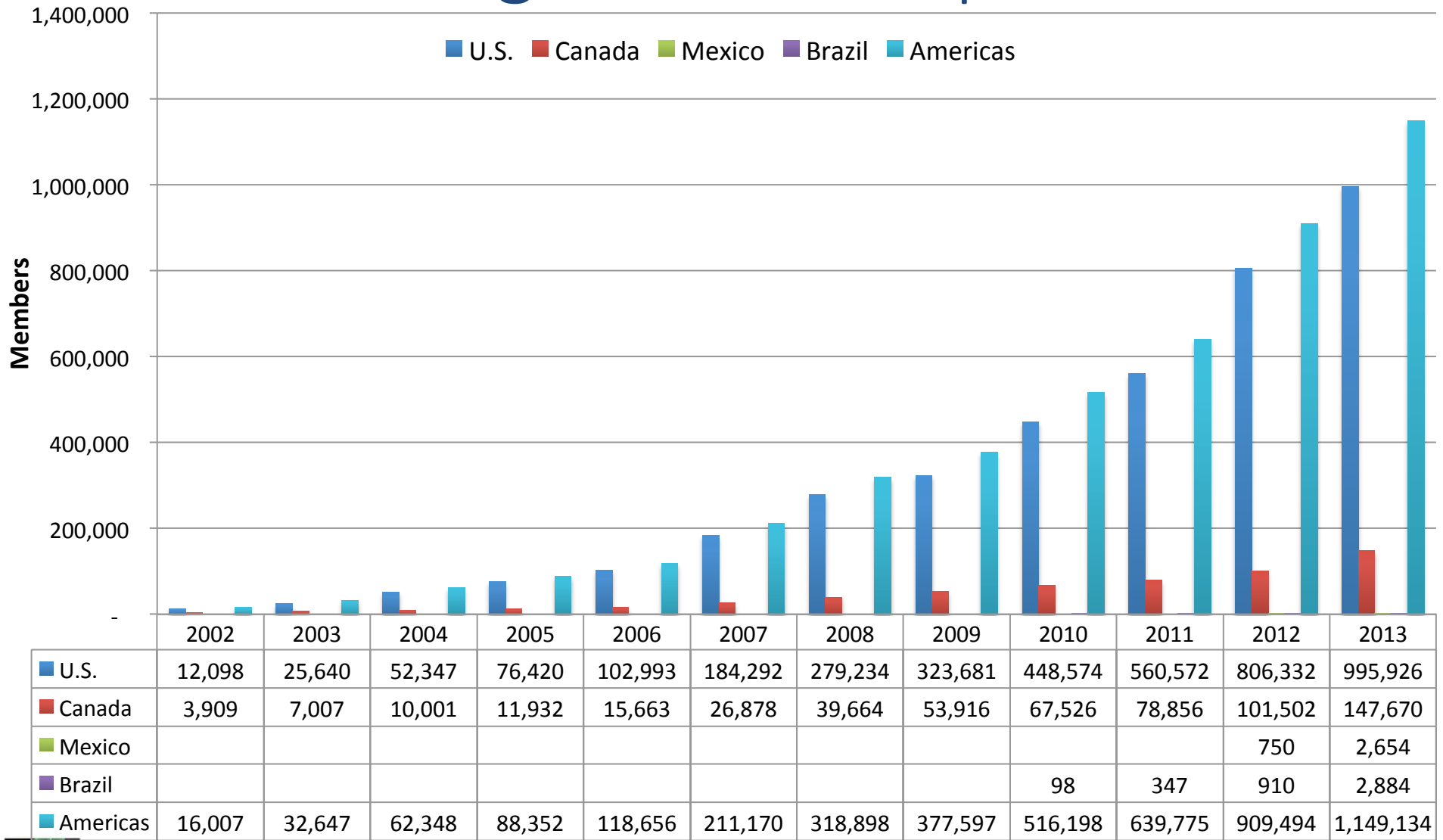
Shared-Use Mobility Services

Carsharing: Short-term vehicle access

- Members share a vehicle fleet maintained, managed, and insured by third-party operator
- Self-service available 24/7
- Rates include fuel, insurance, and maintenance
- July 2013: 1.15 million members sharing 21,000 vehicles in the Americas



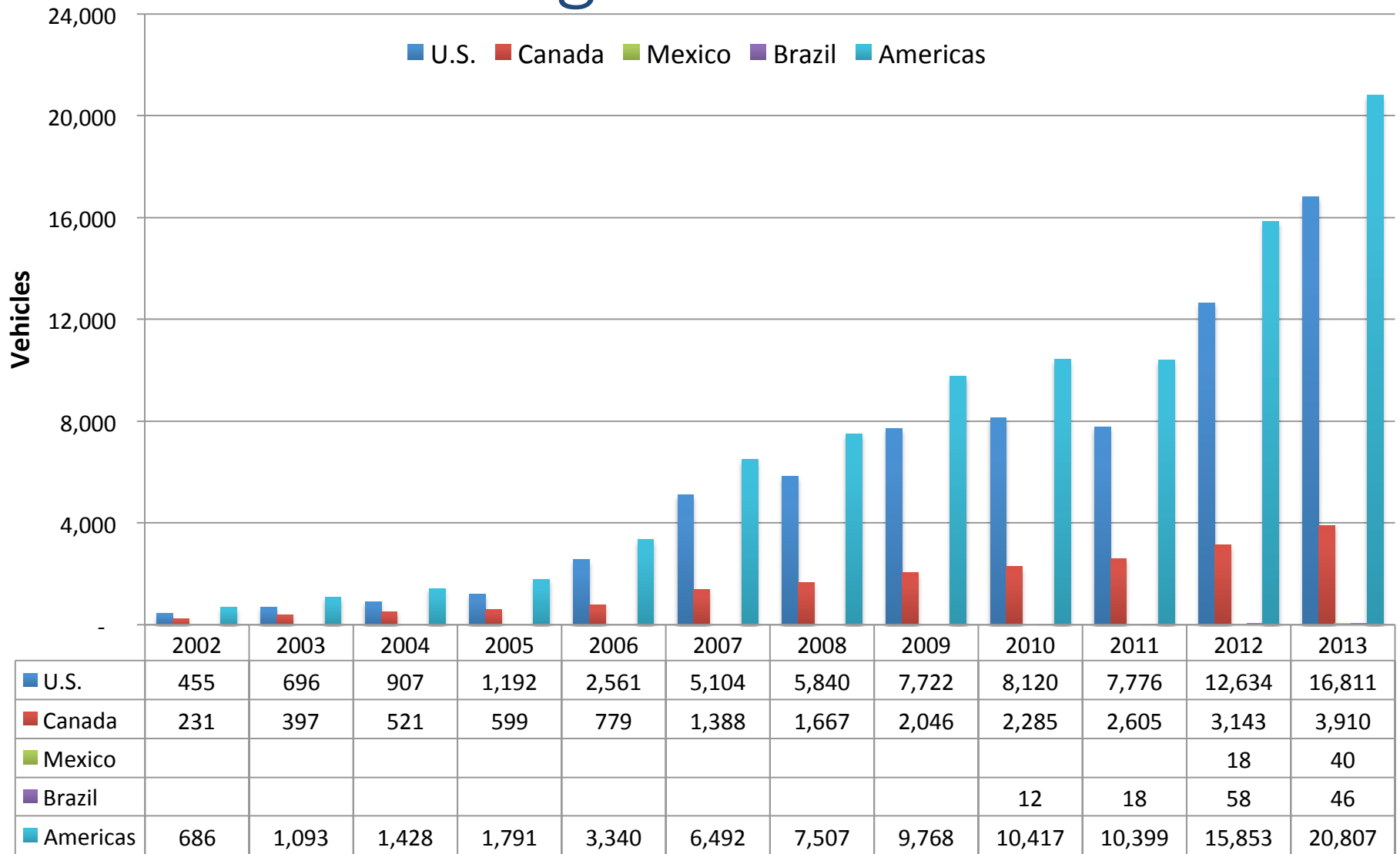
Carsharing Membership Growth



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Carsharing Vehicle Growth



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Shared-Use Mobility Services

Transportation Network Companies (TNCs): on-demand ride services

- Matches drivers and passengers minutes before the trip is to take place
- Uses Internet and mobile platforms
- Driver rating system
- Cashless payment, credit card on file



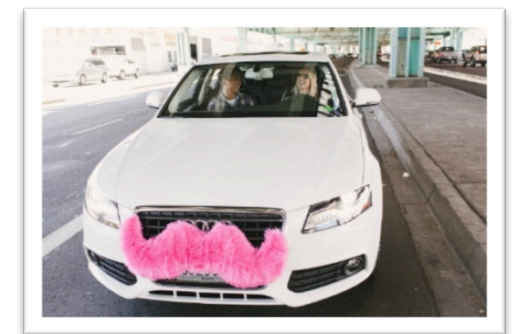
U B E R



summon
formerly InstantCab



Side•car



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Shared-Use Mobility Services



Ridesharing services

- Target commute and social trips, incidental



RIDESHARE

Traditional taxis: vehicles for hire

- Rides via passenger hail or prearrangement
- Recent development of mobile e-hail/
payment apps



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IATS Scenario Planning Study

- Research sponsored by FHWA
- Decreased use of personal vehicle a common theme in scenario worlds – linked to limited energy, population in cities & envt'l concern
- Examine exemplars to demonstrate AVs

2020

2030

2050



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2030 & 2050 Scenario Worlds

2030 Scenario Worlds:

- I. Natural Disaster World
- II. Changing Economies World
- III. Cyber-Terrorism World

2050 Scenario Worlds:

- I. Climate Catastrophe World
- II. Changing Production World
- III. Resource Constrained World



AV Applications

- Potential future impacts on carsharing, on-demand ride services, and taxis
 - Drive up to carsharing users
 - Self-park, self-charge
 - Door-to-door service (like taxis/TNCs)
- Provide first- and last-mile connectivity to public transit
- Fill gaps in the transportation network





Evolutionary Path: 2020

- Scenario: Major automakers will have developed and released Level 3 AVs
 - Level 3 AVs: partially automated; driver can yield some control to vehicle, but still required to pay attention and take control in certain situations
- Impacts to carsharing industry
 - Augmented safety features could decrease insurance costs
 - Increased user convenience (self-park/charge)
- Impacts to taxis/TNCs uncertain
 - Insurance likely impacted



Evolutionary Path: 2020

- Scenario: Level 4 AVs (fully self-driving) available for lower speeds in certain rights-of-way
- Provide public early exposure to fully-automated tech
 - First- and last-mile connectivity to transit
 - Ride services in office complexes, retirement communities
- Establish future models for fully-automated fleets and services



Evolutionary Path: 2030

- Scenario: Level 4 AVs more readily available
- Benefits to taxis/TNCs and carsharing
 - Autonomous repositioning to increase efficiency and meet customers needs
 - Self-refueling/charging
 - Return for routine maintenance
 - Communicate with smartphones for ridesharing; locate and pick up passengers along the way



Evolutionary Path: 2030

- Shared fully-autonomous vehicles could merge taxis, TNCs, and carsharing into one mode
- Carsharing users would be driven rather than driving
- Point-to-point mobility in shared autonomous taxi/TNC fleet
 - Eliminates labor costs
- Remain in cities with highest demand



Evolutionary Path: 2050

- Scenario: Increased production of AVs, decreased costs will make more affordable to general public
- AV owners incentivized to rent car out via p2p carsharing service when not in use
 - Augment on-demand point-to-point mobility
 - Penetrate into suburban and rural areas
- Effect of shared AVs
 - Reduce energy/environmental impact of private vehicle travel
 - Repurpose parking lots to parks and housing





Conclusions



AVs implemented into shared-use mobility can make a major impact on the future of transportation

- Public education and exposure
- Links to public transit
- Self-fueling, charging, and parking
- Full automation to integrate carsharing and ride services into one mode
- Point-to-point mobility for general public





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