**Public Transit Issues since 2010 and the Impact of Emerging Technology**

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| **Public Transit Issue** | **Cause(s)** | **Potential Emerging Technology Opportunities** | **Potential Emerging Technology Competition** |
| **Declining Ridership**   * Mixed-traffic (bus) transit ridership declined more than dedicated right-of-way (rail) transit ridership * AM and PM peak ridership was declining the least and night-time ridership was declining the most, and most sensitive to changes in frequency | * Transit level of service did not increase, which especially impacted ridership in small- and mid-size regions. * Service improvements located in car-oriented regions saw less increase in ridership than service improvements in transit-oriented regions, in both large- and mid-size metro areas. * Higher incomes, rates of car ownership, increase of people working at home (decrease 2% in ridership) * Fares increasing (7% - 13% increase in average fares resulting in ridership declines of up to 4%) * Driving became less expensive (average gas prices decreased by 30%, resulting in a 4% ridership decline) | * Micromobility partnerships to address first mile-last mile connectivity issues, particularly with rail: studies have found a 2.8% rail ridership increase for a 10% increase in bikeshare ridership * Demand-responsive services (potentially autonomous or through a TNC) could address other first mile-last mile connectivity issues * Car-sharing enables a car-light lifestyle, some studies finding that car-sharing members’ transit usage increased 13.5-54% after becoming members. | * Ride-hailing was the biggest contributor to lower bus ridership between 2012 and 2018: contributing to a ridership decrease of 10-14%. This might have particularly impacted night-time ridership. * Bikeshare and e-scooters had a smaller impact: about 1%. They may be equally as likely to substitute as they are to compliment bus transit ridership. * Telecommuting, online shopping, and delivery services could reduce the total number of trips generally * If electric vehicles are more widely owned and fueled less expensively than gasoline, might contribute to a ridership shift to personal electric vehicles |
| **Driver Shortage**   * Recent APTA reports (Oct 2022) stated 84% of transit agencies have had to cut transit service or delay service increases because of worker shortfalls * About 45% of departing employees left to take jobs outside the transit industry, more than retirees and those leaving the workforce combined * Job offers are rejected 35% of the time | * Wages aren’t always competitive or livable in the cities they operate in * Operator assaults per passenger trip between 2009 and 2020 increased fourfold * (From metro transit presentation) Split shifts for peak routes are unattractive to new hires * From Oct 2022 APTA report: survey indicates that concerns about schedule and compensations were responsible for more departures than assault and harassment or concern about contracting COVID-19 * Hiring process is hampered by drug/alcohol testing, CDL requirements, criminal background checks, and driving records | * Autonomous transit vehicles could supplement fixed routes lacking operators | * Ride-hailing might be seen as a suitable alternative job for potential transit operators * If level of transit service is impacted, the modes discussed above may draw riders away from transit systems |

The following figures come from TCRP Research Report 231, published in 2022.Table

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