The Future of Transportation: Achieving Equity and Mobility through Self-Driving Vehicles

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"Through transportation, we can help ensure that the rungs on the ladder of opportunity aren't so far apart – and that the American dream is still within reach for those who are willing to work for it." – Secretary Anthony Foxx

Overview

Transportation plays a critical role in connecting American communities to economic opportunity. A multi-modal transportation system that includes self-driving vehicles can help Americans reach these opportunities by providing new or extended connections to employment, education, healthcare, and other essential services. This presentation will include a review of several motivating factors for and potential benefits associated with improved transportation connectivity, opportunities for self-driving vehicles to improve connectivity including examples of current and emerging systems, and potential challenges associated with implementation.

Motivating Factors for Improved Transportation Connectivity

The impact of transportation on economic opportunity is great. Second only to housing, transportation costs are the largest expense for American households – costing more than food, clothing, and health care (Bureau of Labor Statistics, 2015). Average American households individuals feel these costs most acutely; transportation costs account for 17% of all expenditures, a larger proportion than that of both wealthy and low-income households (International Business Times, 2013).

Over the past several decades, we've seen the development of communities designed with the car in mind. With this development, we've also seen an increase in urban sprawl. Urban sprawl makes it difficult to get anywhere without a car. Those outside urban areas spend the most for transportation, roughly $9,500 per year and exhibit the highest share of total spending on transportation, at 20% (AASHTO Census Transportation Planning Products Program, 2013). For those without a car in small towns and rural communities, nearly two-thirds of all residents have limited transportation options; 41% of residents have no access to transit and 25% have below-average transit services (American Public Transportation Association). Additionally, nearly 20% of African-American households, 14% of Latino households, and 13% of Asian households live without a car (Berube, Deakin, & Raphael, 2006).

Getting to work, school, the doctor's office, and even the grocery store can prove difficult, if not impossible without a car. Nationally, only about 25% of jobs in low and middle-skill industries are accessible via transit within 90 minutes (Tomer, Kneebone, Puentes, and Berube, 2011). Moving closer to jobs and services is not a realistic option for most and walking – especially in areas with inadequate and poorly lit pedestrian areas – poses its own challenges. In 2012, more than 5,000 pedestrians and bicyclists across the U.S. were killed in crashes with motor vehicles (U.S. DOT, 2014).

Moving forward, the focus should be on developing and supporting multi-modal transportation systems that work to unite communities and opportunities within a region rather than driving them further apart.

Benefits Resulting from Improved Transportation Connectivity

Improving transportation connectivity has many direct and indirect benefits. For example, a family making $35,000 a year, living in a walkable neighborhood with good transit can save $5,000 dollars each year (Reconnecting America). Transportation improvements can also help those with mobility limitations and those who are traditionally underserved (e.g., veterans) live as independently as possible for as long as possible. According to Fox-Grage and Lynott (2015), in a given year, about 3.6 million Americans miss at least one medical trip for lack of transportation; this population is disproportionately

female, older, poorer, and has a higher rate of multiple conditions (citing Wallace et al., 2005). Further adding to this problem, many people ages 70 and older will outlive their driving years; on average, men for 7 years and women for 10 years (citing Foley et al., 2002). Self-driving vehicles could help these individuals obtain services and remain active within a caring community, postponing or even replacing the need for institutionalized care. Improved access to medical care can reduce national health care costs, which would in turn, potentially offset the increase in transportation costs associated with an improved transportation infrastructure.

Opportunities for Current and Emerging Self-Driving Vehicle Applications

Systems incorporating self-driving vehicles can fill a need for specialized transportation services designed to aid those who have difficulty taking public transportation because of geographical or income constraints, disabilities, and age-related conditions. Some examples of opportunities associated with self-driving vehicles to be discussed include:

- **Group rapid transit**: public transportation, vanpools, and ridesharing
- **Personal rapid transit**: personal vehicles, last-mile services (including parking valet alternatives), taxi and on-demand services

Potential Challenges Associated with Implementation

While the potential for self-driving vehicles to improve connectivity and increase opportunity is great, several challenges remain. Challenges to be discussed include, but are not limited to:

- **Accessibility issues:** American's with Disabilities Act (ADA) compliance for paratransit vehicles, curb to door services
- **Cooperative issues:** multi-jurisdictional collaboration necessary for the implementation of regional solutions
- **Policy-related issues**: regulatory or statutory restrictions associated with the deployment of automated vehicles, licensing requirements, fitness-to-drive determinations

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