

# Drivers in a Driverless Future: The Impact of Autonomous Vehicles on Paid Drivers

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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## **Drivers in a Driverless Future: The Impact of Autonomous Vehicles on Paid Drivers**

Autonomous vehicles (AVs) have developed rapidly since DARPA's Grand Challenge competition in 2004, where the most successful AV navigated only seven miles. One year later, driverless cars completed the route (Eno, 2013). While some view AVs as a developing technology, most are preparing for their arrival. Groups in charge of paid drivers, specifically truckers, ride sharing drivers, and public transport workers, are reacting differently to AVs than the drivers they represent. AVs will impact all aspects of the transportation industry since current research aims for vehicles to travel in areas of high population density without a driver. Google spent \$1.1 billion on its autonomous research group Waymo between 2009 and 2015, which now has 600 AVs operating in four cities across the U.S. and five million miles driven (Boudette, 2018). AVs can offer reduced stress, mobility to those who cannot drive, and reduced costs for fleet operators. Non-users may benefit from increased road capacity. However, costs include more expensive cars, social inequities, employment losses, and possibly increased traffic (Litman, 2019). The American Trucking Associations (ATA) and American Truck Business Services (ATBS) represent truck drivers and welcome driverless technology, but truckers are not as confident their jobs are safe. Uber and Lyft have invested heavily in AVs while RideShare Drivers United and their drivers believe they are underpaid. The American Public Transport Association (APTA) is confident autonomous technology will boost public transport yet labor unions and drivers resist it. Those in charge of paid drivers will benefit from the integration of AVs into the transportation industry at the expense of the drivers themselves.

## **Review of Research**

There is substantial research on AVs given their lasting impact. Fagnant & Kockelman (2015) considered the costs and benefits of implementing AVs to the transportation industry. They looked at local and state government initiatives as compared to federal guidelines surrounding AVs. Tettamanti et al. (2016) consider the implementation of AVs from a traffic engineering perspective, focusing on future changes in traffic modeling as well as the possibility of hackers and cybersecurity. Instead of taking a macroeconomic approach, Bergvall & Gustavson (2017) analyzed the effects of AVs on the Swedish logistics industry. Applied to the transportation industry, their methodology reveals how technological improvements can generate comparative advantages for some over others. Kim (2018) considers the impact on drivers from an environmental perspective. He considers the impact of a decrease in demand for commercial vehicles with an increase in demand for lithium batteries and finds that congestion may not be strongly affected. Clark (1984) studied the introduction of a news gathering equipment into an independent television company and focused on the disruption that a new technology can have for a specific workforce. Applied to driverless technology, one can predict how paid driver groups may react.

Research also focused on the paid driver groups mentioned. Greenblatt & Shaheen (2015) studied the impact that AVs will have on ride sharing with a focus on environmental impacts. Clements & Kockelman (2017) considered how the trucking industry may benefit from driverless technology, focusing on how truckers may be one of the first groups affected by it. Meyer et al. (2017) analyzed the effects on urban sprawl and public transport. Their research focused on small Swiss municipalities and found public transport will be most prevalent in dense urban areas. When looking at the impact of AVs on public transport, Bagloee et al. (2016) found

that public transport will be prevalent since persons with mobility issues and from low-income households will benefit.

## **Truckers**

AVs may save fleet operators money, but professional drivers may lose their jobs. Sixty-five percent of US domestic freight is transported by trucks. The operating cost of fully autonomous trucks may be 45% less, saving \$85-\$125 billion (Chottani et al., 2018). Chris Spear, President and CEO of the American Trucking Associations, the largest national trade association for the trucking industry, anticipates autonomous trucks (ATs) that require human supervision. He claims that “the world of automated vehicles will still have an important role for drivers” (ATA, 2017). ATs may not replace truckers in the future but may change their roles. The ATA claims ATs will not displace drivers and contends that trucking companies should determine how to integrate automation (ATA, 2017). American Truck Business Service (ATBS), the nation’s largest tax and accounting firm for truck drivers, has served over 150,000 truck drivers since 1998. It provides services beyond taxes and accounting to “improve the lives of those that we serve every day” (About). It advises truckers to “put your mind at ease” regarding ATs since “truck drivers will continue to be extremely important in the industry” (Self-Driving, 2018).

Researchers agree with ATA and ATBS that truck drivers will persist. While there are 3 million truck drivers in the U.S., only 456,000 are vulnerable to automation, or about 15% of the total trucker population (Gittleman & Monaco, 2019). Of truck drivers’ tasks, 85% are non-driving, such as customer service and freight handling (Gittleman & Monaco, 2019). Complex safety regulations will likely keep human drivers in ATs. ATs could eliminate nearly 2 million

long-haul truck driving jobs, since they are better suited to drive long distances in highways. Local and shorter distance drivers' jobs are more secure. E-commerce growth could create more truck driving jobs. Lower costs and quicker delivery expectations will cause much worse working conditions than truckers face today (Viscelli, 2018). Freight trucking accounts for a disproportionately high share of local air pollutants, greenhouse gas emissions, and fuel consumption and therefore will be more likely to be replaced by ATs (Slowik, 2018).

Many truckers perceive ATs as threats to their jobs. Most agree that tech companies exaggerate their feasibility. Daniel McCreary, a 47-year-old truck driver from Maryland, has been in the industry for decades. He believes "that at some point we have to do something else because some of our jobs will be replaced" (Premack, 2019). Meanwhile, Mark Puente, a truck driver for 15 years, hopes that truck drivers are irreplaceable since "reports about autonomous trucks mention nothing about how the technology will handle age-old issues" (Puente, 2017). On TruckingTruth, a website started in 2007, truckers discuss their jobs. Discussions of ATs often turn argumentative as readers disagree whether automation will enhance drivers' jobs or replace them. In a 2018 post titled "Possible Self Driving/ Autonomous Trucks Opinions and Time Frame," site moderator Brett Aquila said: "Self-driving trucks are not going to have any impact on trucking for a very long time.... All of the 'news' about self-driving vehicles is little more than tech companies and universities trying to build hype to raise money for their startups" (Possible, 2018). User Mack T. disagreed: "It's coming faster than you think," drivers have ten more years in the industry before "getting squeezed out" (Possible, 2018).

## **Ride Sharing Companies**

Ride sharing companies like Uber and Lyft entered the market as competitors to taxi companies. They are unprofitable due to high labor costs, mainly drivers' salaries. In the first quarter of 2018, Uber spent \$8 billion of its \$11.3 billion in revenues on drivers (Nunes, 2019). AVs may reduce costs by displacing paid drivers. Lyft filed for its IPO with the SEC on March 1, 2019, stating it has "incurred net losses each year since our inception and we may not be able to achieve or maintain profitability in the future" (United States, 2019). Lyft has not reached profitability, in part due to high labor costs. It has therefore invested heavily in AVs. According to one outdated forecast, shared electric AVs may account for 25% of miles driven in the U.S. by 2030, generating higher profits (BCG, 2017). Lyft currently employs 400 engineers on its AV initiative (Schoolov et al). Current research focuses on integrating AV technology and drivers. Lyft's Director of Product, Taggart Matthiesen, is in charge of autonomous development and believes vehicles will always require a driver, explaining, "If you get into the world of autonomous, we may need someone in that vehicle to help that person. There are things we're doing beyond getting a passenger from point A to point B, additional services that we as a company can look at" (Swisher & Bhuiyan, 2017). Even with low future automated expectations, Lyft invests heavily in its development hoping to establish profitability.

Uber's autonomous business, known as Advanced Technologies Group (ATG), has reported losses of between \$100 million to \$200 million per quarter (Isaac et al., 2017). In 2017 Uber announced plans to begin testing autonomous taxis in Phoenix, chosen for its wide streets and low pedestrian traffic. Uber stopped the program after a pedestrian was run over and killed by one of the AVs, then reinstated it just nine months later (Bensinger, 2017). It is a testament to the expected profitability of autonomous vehicles that Uber has retained the AV research

business and the Phoenix pilot program despite their cost. Even with these fallbacks ATG is valued at \$7.25 billion, over 10% of Uber's market cap (Somerville, 2019). Following the incident in Phoenix, Uber's strategy changed to only deploying vehicles in small neighborhoods at much lower numbers (Shetty, 2020). Toyota Motor Corporation, DENSO Corporation, and SoftBank Vision Fund announced a \$1 billion investment in ATG. Toyota executive Shigeki Tomoyama hopes the investment will create the next generation of autonomous vehicles that will "accelerate the timeline for and early success of automated ridesharing services" (Staff, 2019).

While Uber and Lyft hope AVs will help reach profitability, experts disagree on their impact on ride sharing. AVs may have greater implications than ride sharing on transportation. A report from BCG indicates ride sharing is not significant on its own since most drivers will not forgo car ownership, while AVs will "change the game dramatically" (Self-Driving). Research in Boston suggests an average ride sharing trip consists of 1.5 passengers and driverless technology is unlikely to raise this number (Gehrke et al., 2018). Meanwhile, analysis from Moody's indicates that "ride-sharing holds much greater potential to disrupt" since self-driving cars may not change driving habits (Hughes, 2017). Some agree with Uber and Lyft's outlook that they may increase profitability. Ride sharing and AVs may be complements to each other in a new transportation system offering end-to-end transportation to users (Corwin & Pankratz, 2017). Fagnant & Kockelman found that ride-sharing will reduce average service times and travel costs for AVs when looking at their interaction in Austin, Texas (Fagnant & Kockelman, 2016).

Uber and Lyft have undermined the rights of drivers as they have grown. Harry Campbell, founder of the RideShare Guy, a website designed to provide guidance to drivers, explains that "there's always been an inherent tension between drivers and ride-hail companies" since "the companies have the ability to implement changes without any feedback from drivers"

(Siddiqui & Bensinger, 2019). Such changes include unfair compensation and benefits. On March 2019, Uber slashed per-mile-pay by twenty-five percent, meaning drivers earned sixty instead of eighty cents per mile. Demonstrations ensued throughout Southern California. Sinakhone Keodara, one of the drivers striking, explained this was aimed to “help us end this neo-indentured servitude” (Campbell, 2019). Rideshare Drivers United (RDU) is a union for Uber and Lyft drivers and was founded to “fight for the dignity of our work and better lives” (About). Due to their low benefits, Alvaro Balainez, driver-organizer for RDU, explains, “We will have no choice but to keep driving. We don’t have medical or savings” (Hitzik, 2020). Peter Ashlock has driven for Uber since 2012 yet makes \$40,000 per year. He claims taxi driving was better for drivers since “Uber’s big innovation” was to “make the drivers absorb the overhead” (Streitfeld, 2019). Uber and Lyft use bonuses to incentivize drivers to keep driving but have been spending too freely as they prepare their IPOs. In a recent S-1 filing, Uber defended its investments in autonomous and other technologies by stating, “As we aim to reduce Driver incentives to improve our financial performance, we expect Driver dissatisfaction will generally increase. Often, we are forced to make tradeoffs between the satisfaction of various platform users” (United States, 2019).

Given these tensions, ride sharing drivers are not as confident their roles will persist as AVs are developed. Uber’s strong investment in autonomous is a chief complaint among drivers protesting. A recent open letter to Uber by one of its employees called for better job security arguing that drivers “will not remain silent as drivers are squeezed in order to shore up initial offerings to investors” (An Open, 2019). As Uber invests more money in ATG prior to its IPO, drivers’ benefits will continue to decrease. On UberPeople, a blog that facilitates ride sharing drivers’ interactions, there is frequent disagreement about their role with AVs. In a post titled



“Autonomous vehicles will spark the end of humanity,” “Well-Known Member” @tohunt4me stated that “AI will surely kill us all,” to which other “Well-Known Member” @goneubering responded “In the history of the world there has rarely been anything sold with more hype than the ‘self-driving’ car” (Monkey, 2020). These tense exchanges are indicative of the uncertainty with which ride sharing drivers view AVs.

## **Public Transport**

Unlike private ride sharing companies, public transport has an obligation to make safe and affordable transit available to all, regardless of age, income, or ability, while also improving mobility in its area (How, 2019). Public transport also focuses on reducing carbon emissions and improving environmental conditions. If they meet these expectations, public transport services receive funding from local and federal agencies (Public, 2018). In the US, public transport services have declined in the past decade. North America carries 3.7 billion passengers of the 53 billion worldwide, the fewest passengers of any region. Ridership in most large American cities besides New York has declined in the past decade (International, 2018). Competitive factors and the diminishing supply of transit services explain these trends. Lower gas prices over the last decade and the rise of ridesharing companies, combined with the higher growth of transit fares over inflation, have hurt public transport (Mallett, 2018). Deteriorating conditions, such as the increase of violence in the Chicago transit system, diminish public perceptions (Wisniewski, 2018). If properly integrated, some believe AVs could help revitalize the public transport industry.

The American Public Transportation Association (APTA) represents over 1,500 member organizations and is the only association that represents all modes of public transportation in

North America. The APTA believes public transport will play a key role in cities' futures, reporting that every \$1 invested in public transportation generates \$4 in economic returns, while saving Americans 4.2 billion gallons of gas and 37 metric tons of carbon emissions annually (Hughes-Cromwick, 2019). They believe AVs could serve as transit vehicles. APTA is conducting research on the integration of AVs, hoping it will "lead to improved operations, more efficient cost structures, and enhanced safety" (Hughes-Cromwick, 2019). Results indicate that seventy-four percent of millennials would use a multi-transit app, which would coordinate all available options for a rider. The APTA views public transportation agencies' roles in this new environment as mobility managers, advising local governments how to prioritize travel modes and technological solutions (American, 2018).

Labor Unions for public transport workers believe AVs may jeopardize their jobs. The Amalgamated Transit Union (ATU) represents over two-hundred-thousand members in the US and Canada. Then-President Larry Hanley believed that drivers would need to find new functionality "as jobs and workers are replaced by machines," concluding that they "cannot assume that our industry and jobs are safe" (Hanley, 2018). The Transport Workers Union of America (TWU) represents over 150,000 workers and shares these reservations. TWU launched the People Before Robots campaign in Columbus, Ohio following the announcement of a low-speed driverless shuttle (Ferenchik, 2018). TWU Local 208 President Andrew Jordan explained that they "are not opposed to technology" but refused to "stand by and let machines replace human bus operators and decimate middle class jobs" (TWU, 2018). The campaign consists of a boycott and local shutdown and highlights their disbelief in a successful integration of drivers and driverless technology.

Drivers are equally as skeptical that their roles will remain unchanged. Many fear unemployment as AVs are introduced, while others view their future roles with AVs as a step-down. Kevin, a bus driver for the Washington Metropolitan Area Transit Authority, believes his job “provides meaningful satisfying work” and is afraid that without it he “would more than likely have to take on multiple jobs in order to provide the lifestyle I currently enjoy.” Bus drivers on average earn \$31,000 annually and roughly four million could be unemployed with the introduction of AVs (Center, 2017). John Samuelsen was a New York City track worker for twenty-six years. He does not believe AVs could replace drivers since his role extends beyond driving. He explains: “Folks have heart attacks on buses, children get lost on buses... a robot’s not going to help, a robot’s not going to care” (Lindeman, 2018). Most Americans don’t trust driverless technology. A Pew Research Center survey showed that over half of Americans would not ride in a driverless vehicle, with a lack of confidence in the technology being their main concern (Smith & Anderson, 2017). Some drivers have adapted to the change. Driverless buses were introduced to the Netherlands in 2004. Bram Moelker transitioned from driver to controller and now “takes care of everything,” coordinating six driverless buses through 1.8 kilometers in Rotterdam. He believes “being a controller now is something special” since more jobs were displaced than introduced (Lim, 2016).

Experts are more optimistic about the future. AVs could reduce labor costs, which account for most of transit’s operating costs. This would allow more frequent service and flexible routes. However, AVs may compete with transit for passengers. Such a diversion would worsen congestion and emissions (Litman, 2019). Carla Bailo, President and CEO of the Center for Automotive Research, believes public transit agencies shouldn’t fear AVs since they will help get passengers to their public transit destination more easily (Denham, 2019). An outdated

report by the International Transport Forum suggests that if properly integrated, AVs and public transit could eliminate nine out of ten commercial cars in a European city (International, 2015). Measures such as a per-mile tax could help discourage empty AVs, further lowering traffic congestion (Shaver, 2019). In 2014, the average cost per transit passenger trip was \$3.68, while the average cost of a paratransit trip for a disabled passenger was \$34.43. AVs could greatly reduce the cost of public transit for disabled passengers by providing door-to-door service and precision docking (Lutin, 2018).

## **Conclusion**

The integration of AVs into society will impact innovators and drivers differently. While companies hope to reduce labor costs while finding a new role for drivers, individuals are not so confident. Drivers and riders will not be the only ones affected since the overall economy will likely change as cities and highways are reinvented. While AV developers and those who will benefit from them claim there will be a role for drivers in this new transportation landscape, it is imperative to also consider the opinions of drivers. As driverless technology progresses, their roles and day-to-day activities change as well. Therefore, AVs represent not only a technological advancement, but a social one as well.

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