



Automation Will Change the Trucking Industry Forever

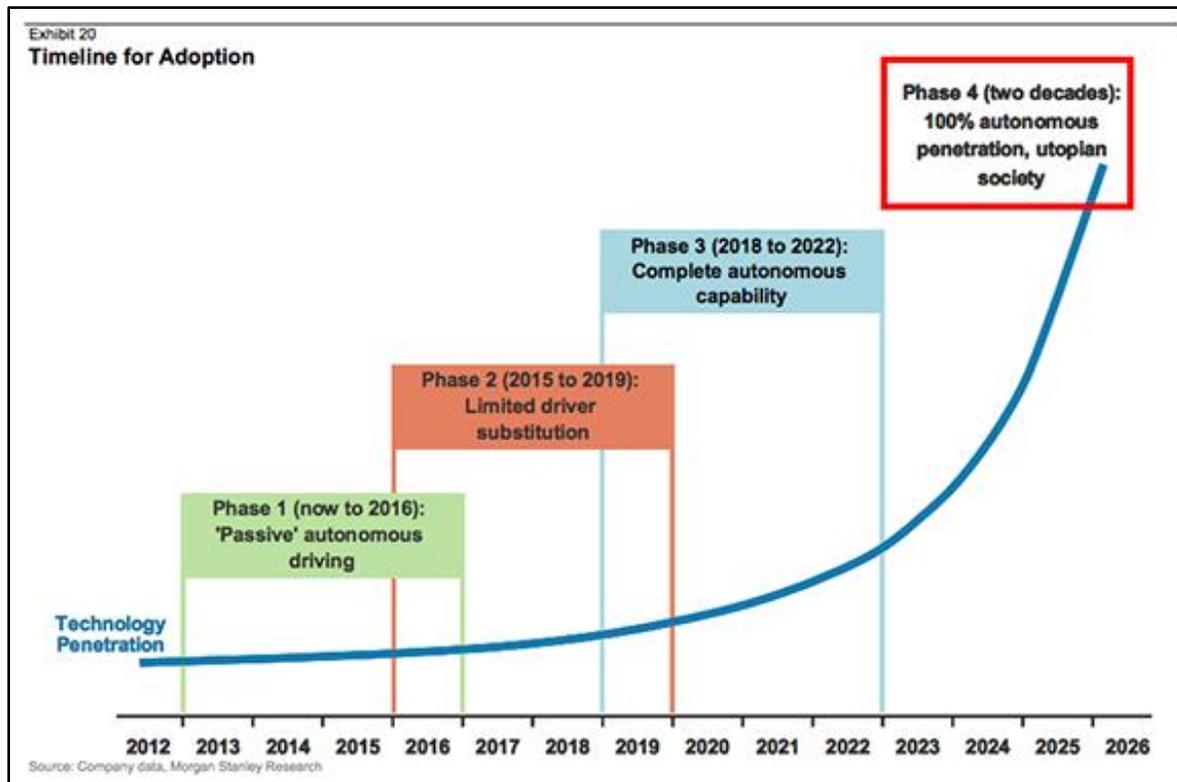
Automation is set to disrupt one of the largest employment sectors in the United States, and many are worried about the effect this will have on the economy. Advancements in the driverless truck industry are occurring at a rapid pace, and this disruption will reach far further than simply those sitting behind the steering wheel. Communities across the country will feel the effects as driverless trucks will use far fewer goods and services that are central to fueling these economies.

State of the Trucking Industry

The United States trucking industry employs 1 out of every 15 workers, with more than 8.7 million employees nationwide. There are currently 3.5 million truck drivers and an additional 5.2 million employed within the industry. These people work together to manage 70% of the 9.2 billion tons of freight transported annually in the U.S. by truck. Truck driving was the most common job for 29 states in 2014. The Bureau of Labor Statistics cites a median income of \$40,206 per year for these drivers while the lowest 10% earned less than \$26,240 and the highest 10% earned more than \$62,010. The industry is viewed as exceptionally stable because the U.S. economy is expected to grow and more goods will need to be transported. The U.S. Department of Labor expects the number of truck driving jobs to expand 5% throughout the decade ending in 2024. Today, there is a shortage of truck drivers as continued rising demand calls for more trucks on the road. A 2015 report by the American Trucking Associations forecasts more than 100,000 driver job openings will be left unfilled in 2018 and the gap will increase thereafter.

Automation & Truck Drivers

Industry experts differ in their predictions, but most agree that the automotive industry will experience a massive disruption, in the form of autonomous vehicles, between 2020 and 2030. Morgan Stanley projects that these trucks will be fully integrated by 2026, with complete autonomous capability available by 2022. Meaning that vehicles will soon be able to transport goods between destinations without human intervention at the wheel. This could cause more than 3 million drivers to lose their jobs or be repositioned within the industry. The effects ripple outward from there, and the true impact is difficult to estimate. The disruption of truck drivers does not end with only those behind the steering wheel, but will dramatically affect workers at hotels, restaurants, convenience stores and more in communities across the country. For example, the economies of America's small cities rely heavily on the money spent by truck drivers that stop to refuel, eat, and sleep to keep their communities thriving. In his article "*Self-Driving Trucks Are Going to Hit Us Like a Human-Driven Truck*," Scott Santens estimated that well over 10 million American workers and their families depend entirely or partially on the incomes of truck drivers.



Benefits of Automated Trucking

While millions of drivers will lose their jobs, many experts see this new technology initiating a healthy repositioning inside the industry. Job descriptions will shift, and new positions will be created. This change is already in motion, and it is easy to understand the many benefits of automated trucks:

- **Optimal Fuel Usage:** The most conservative estimations suggest that driverless trucks will consume upwards of 10% less fuel compared to human drivers. These savings will be possible because the machines will maintain optimal cruising speed using computer-controlled acceleration and braking. The trucks will be manufactured to be more aerodynamic, and multiple vehicles will be able to optimize following distance for drafting benefits.
- **Crashes Significantly Reduced:** In 2012, 330,000 large trucks were involved in crashes that killed almost 4,000 people and about 90% of those were caused by driver error. In 2014, 835 truck drivers were killed in crashes, more than any other occupation in the U.S. A Nasdaq report noted that automation would reduce such accidents by 90%.
- **Savings for the Economy:** McKinsey & Co. approximated that widespread adoption of autonomous vehicles can save the U.S. economy \$190 billion annually because of the decreased damage to vehicles, passengers, and cargo.
- **Savings on Driver Labor Cost:** An article called "The Driverless Truck is Coming, and It's Going to Automate Millions of Jobs" states that it costs about \$4,500 to ship a full truckload from Los Angeles to New York. Labor cost represents about 75% of this.
- **Machines Bypass Restrictions:** Current federal laws restrict the maximum hours that truck drivers can drive consecutively as well as over specific periods of time. There is also a minimum amount of

time off to be given in between shifts. Day or night, automated trucks will operate with little interruption.

When Will They Hit the Road?

In a June 2016 Nasdaq article titled “*Self-Driving Trucks Could Revolutionize The Industry,*” it was noted that full automation might be further off than reported above since most of the companies developing the technology are currently aiming for a level of limited self-driving automation. The U.S. Department of Transportation’s National Highway Traffic Safety Administration (NHTSA) now calls this SAE Level 4. The current international levels of automation are:

Levels of Vehicle Automation	
SAE Level 0:	The human driver does everything;
SAE Level 1:	An automated system on the vehicle can <i>sometimes assist</i> the human driver to conduct some parts of the driving task;
SAE Level 2:	An automated system on the vehicle can <i>actually</i> conduct some parts of the driving task, while the human continues to monitor the driving environment and performs the rest of the driving task;
SAE Level 3:	An automated system can both actually conduct some parts of the driving task and monitor the driving environment in <i>some instances</i> , but the human driver must be ready to take back control when the automated system requests;
SAE Level 4:	An automated system can conduct the driving task and monitor the driving environment, and the human need not take back control, but the automated system can operate only in certain environments and under certain conditions;
SAE Level 5:	The automated system can perform all driving tasks, under all conditions that a human driver could perform them.

The Nasdaq report continues by inferring that trucks operating at Level 4 would mean that the requisite skills of the human truck driver may change significantly. The truck driving industry may soon draw younger, more tech-savvy workers that would monitor the convoy or complete other tasks instead of focusing on the road. These changes would not lead to massive driver job loss in the near term because certain conditions may still require the human to act as a fail-safe. In the long term, truck drivers could be completely replaced as the autonomous trucks will drive themselves at a lower cost.

Industry Players

There are many companies investing heavily in R&D for driverless technologies. This includes many of the automotive industry giants such as Ford, BMW, GM, Audi, Toyota, and Tesla. There are also a lot of technology firms leading the way including Apple, Microsoft, Baidu and Google. Some of the companies that are focusing on self-driving vehicle technology specifically for the trucking industry are Peloton Technology, NXP Semiconductor, and Otto. Peloton Technology is focusing on a platooning system that links safety systems between multiple trucks, allowing fleets to travel with less fuel and increased safety. In October 2016, Qualcomm announced that it will acquire NXP, which has released a few products this year improving radar computing power as well as a “vehicle-to-everything” (V2X) system allowing autonomous platoons to react to unexpected events 30 times faster than humans. Uber purchased Otto in 2016 for about \$680 million. Their trucks are equipped with \$30,000 worth of software and hardware which

currently works on the highways, achieving Level 4 autonomy. At least for now, an Otto truck has a driver in the cabin who is a necessary part of the transportation process. Earlier this year, Otto partnered with Budweiser to transport 50,000 cans of beer on a successful 120-mile trip from the Fort Collins, CO brewery down to Colorado Springs. Otto says that driverless technology is more practical for the trucking industry than for the average commuter. Due to current industry demand, the technology for driverless trucks will be here sooner than for driverless cars. Next up for Otto will be tackling issues related to construction zones, human driver behavior predictions, and weather hazards.

Conclusion

Driver automation technology is already available and progressing quickly. Google's website states that they have already self-driven for more than 2 million miles; their cars can be seen on the streets of major U.S. cities. Select consumers can already get their hands on a Tesla with autopilot capabilities. Over the next fifteen years, many industry experts predict driverless cars and trucks will be the norm, not the exception. The trucking industry is expected to be an important early adapter to self-driving technologies. While upwards of 3 million truck drivers stand to lose their jobs and millions more will be affected by the shift in the industry, new jobs will emerge and thousands of lives can be saved annually. As Scott Santens said, "No one should be asking what we're going to do if computers *take* our jobs. **We should all be asking what we *get* to do once *freed* from them.**"