

# AMAZON AND THE REVOLUTION OF THE TRUCKING INDUSTRY



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## MEMORANDUM

**TO: Brian Olsavsky**

**FROM: Alex Bansil**

**DATE: July 1, 2019**

**SUBJECT: Reducing Cost and Processing Time for Amazon's Logistics**

Here is my report you requested June 20 on opportunities in reducing cost and processing times for Amazon's supply chain.

In my report, I found that the autonomous trucking is about to revolutionize the transportation industry. Autonomous-semis are expected to arrive within five years. It is expected to reduce cost and transportation times. Thus, it is a great opportunity for us to explore the possibility of investing in this new technology.

We can greatly benefit from autonomous-semis for several reasons. Since we are trying to delivery free one-day shipping, we need to explore areas where we can reduce the cost to justify free one-day say shipping. The trucking industry can be that cost-cutter we are searching for because most of our products are delivered by trucks. If we can remove the expensive cost of long-haul drives, trips that are over 150 miles, we can considerably reduce our costs.

In addition, we can expect reduced wait times from this autonomous-semis because we can design an efficient route. Adding to that, autonomous-semis can operate 24 hours a day, unlike a human operator. Thus, autonomous-semis can satisfy the logistic possibility of free one-day shipping.

I am thankful that you for giving me this opportunity to write this report. It has been very informative for me. If you have any questions, please contact me via phone or email.

Sincerely,



Alex Bansil

Supply Chain Manager

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## EXECUTIVE SUMMARY

This report is to analyze the autonomous-semi technology, to increase efficiency and reduce cost for Amazon logistics.

### THE E-COMMERCE INDUSTRY AND AMAZON'S GOAL

With the E-Commerce industry growing larger every year, we face very stiff competition from other firms such as Wal-Mart and Target. They offer free two-day shipping without the need for a subscription fee. Thus, we must focus on our core competence of fast, cheap, and friendly service delivery and making one-day shipping free for Amazon Prime users. We become less reliant on shipping and 3<sup>rd</sup> party logistics company by building more fulfillment centers. Thus, reducing costs and increasing efficiency. However, there are still areas that we need to improve in our supply chain. To achieve this goal, we need to focus on innovative ways to reduce costs and increase efficiency.

### THE IMPORTANCE OF THE TRUCKING INDUSTRY TO AMAZON

The E-Commerce and trucking industries depend on each other. Trucking literally moves everything we purchase. Trucking is the most common source of transportation, and yearly, they freight billions in tons of goods across the United States. Thus, as E-commerce increases, the demand for truckers increase. Currently, there is a shortage of drivers because of the low pay and hardship of trucking. Adding to that, trucking is a dangerous and high-pressure profession. Overall, as the industry becomes larger the supply for drivers cannot keep up with the demand.

### THE REVOLUTION OF SUPPLY CHAINS

Autonomous trucking is set to change the industry. By creating self-driving frights that can reduce cost and delivery times. Even though we are years away from the autonomous car, Autonomous-semis are predicted to arrive within five years. They are

not aimed towards replacing truck drivers, but they focus on tackling the long-haul, trips lasting 150 miles or more.

# INTRODUCING AUTONOMOUS-SEMI TO REDUCE COST AND INCREASE EFFICIENCY AT AMAZON

## INTRODUCTION

For Amazon to stay on top of the E-Commerce industry, we need to innovate and find solutions to reduce cost and increase efficiency; thus, autonomous semi-truck vehicles are a potential solution for Amazon's supply chain.

The purpose of this analytic report is to determine whether investing in autonomous semi-truck vehicles will improve the supply chain and logistics. The semi-truck industry is a huge part of the E-Commerce industry; it is believed that autonomous semi-trucks will revolutionize the industry by being more efficient, safe, and cost-effective. This research will primarily focus on the risk and opportunities of implementing this new technology. In addition, we will research how soon this technology will arrive, and what firms offer the best software.

However, the purpose of researching autonomous semi-trucks is not to enter the industry, it is to utilize this innovative technology to help relieve the high cost of transportation and help the logistics of free one-day shipping. In addition, we will not discuss how we will specifically incorporate this technology.

As huge competitors such as Wal-Mart and Target enter the E-Commerce industry with their free two-day shipping without the need for a subscription fee. Amazon is forced to innovate by differentiating itself from competitors. Amazon is introducing free one-day shipping; however, it comes as an expensive cost for the company and logistics issue. Therefore, Amazon needs to find innovative ways to improve its cost and logistics.

The data collection will be conducted with exclusively secondary research such as the use of articles published by reputable news organizations, public financials, and

published research. The research will primarily focus on the autonomous semi-truck industry; specifically, a cost, benefit, risk analysis.

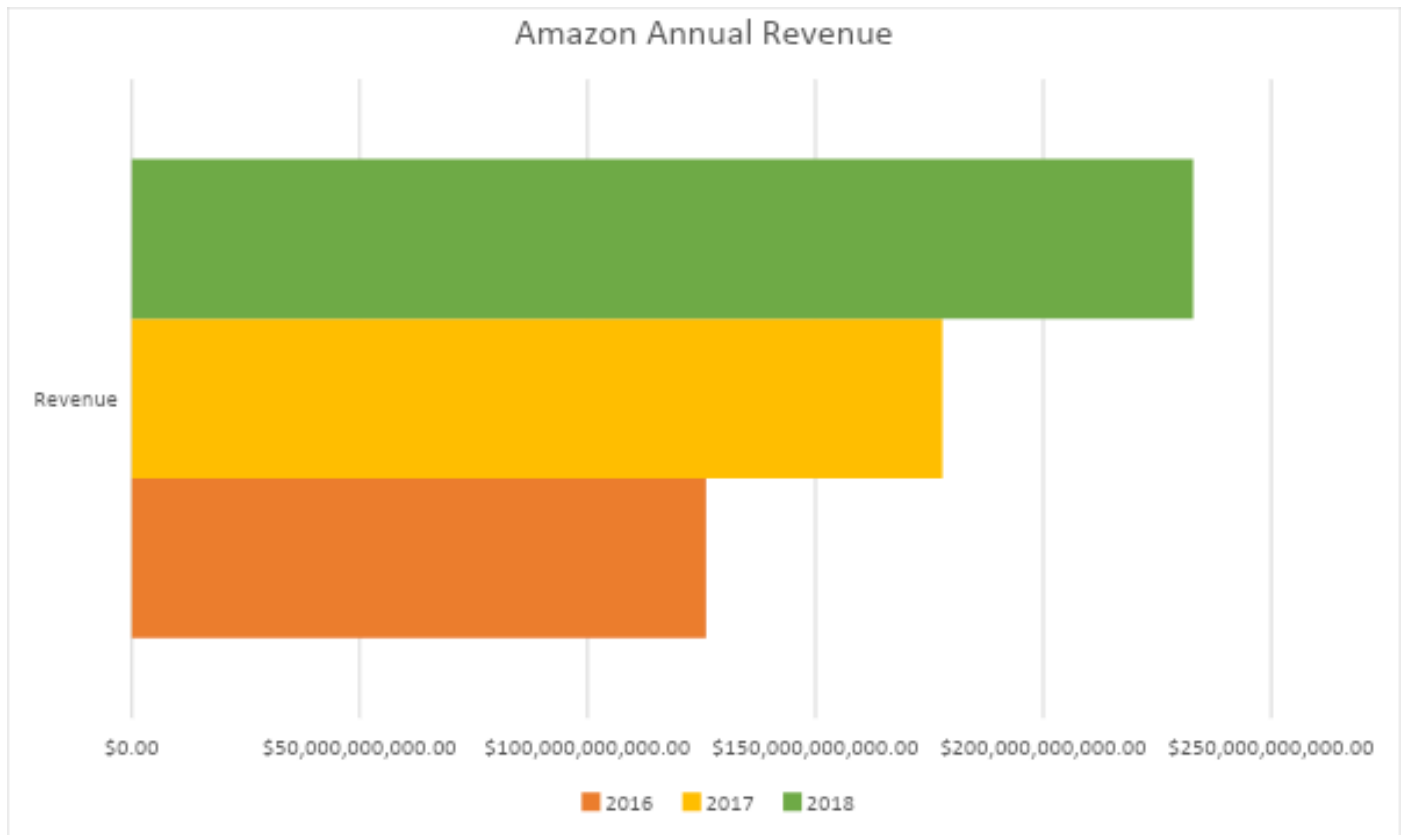
This report will cover Amazon's needs for improvement. I will also discuss the area of freight transportation and the issues it currently possesses. Thus, this report talks about opportunities that autonomous semi-truck vehicle can change for Amazon. Lastly, this report suggests solutions for semi-autonomous trucking.

## BODY

### THE E-COMMERCE INDUSTRY AND AMAZON'S STATE

For the past 3 years, Amazon has been growing at an accelerated pace. Currently, Amazon is dominating the E-Commerce industry and retail industry. Amazon offers Prime Members a variety of services such as free two-day shipping, Amazon Video, Wardrobe, etc. Many American people are opting for the fast shipping, convenient order method, and cheap prices of Amazon instead of going to retail stores. Thus, traditional retail stores are dying across the United States, many of which are filing for bankruptcy.

**Figure 1**



- Amazon annual revenue for 2018 was **\$232.887B**, a **30.93% increase** from 2017.

- Amazon annual revenue for 2017 was **\$177.866B**, a **30.8% increase** from 2016.
- Amazon annual revenue for 2016 was **\$135.987B**, 27.08% **increase** from 2015 (Amazon, 2019).

However, major companies are adapting to Amazon's business model. For instance, major retailers, such as Wal-Mart, Target, and Best Buy are joining the E-Commerce industry, and they are matching the service of Amazon without the need for a subscription fee. These industries have the infrastructure to set-up fulfillment centers in their retail stores. For example, Wal-Mart and Target offer free two-day delivery, and Best Buy provides customers with product knowledge and can price match Amazon's inexpensive prices.

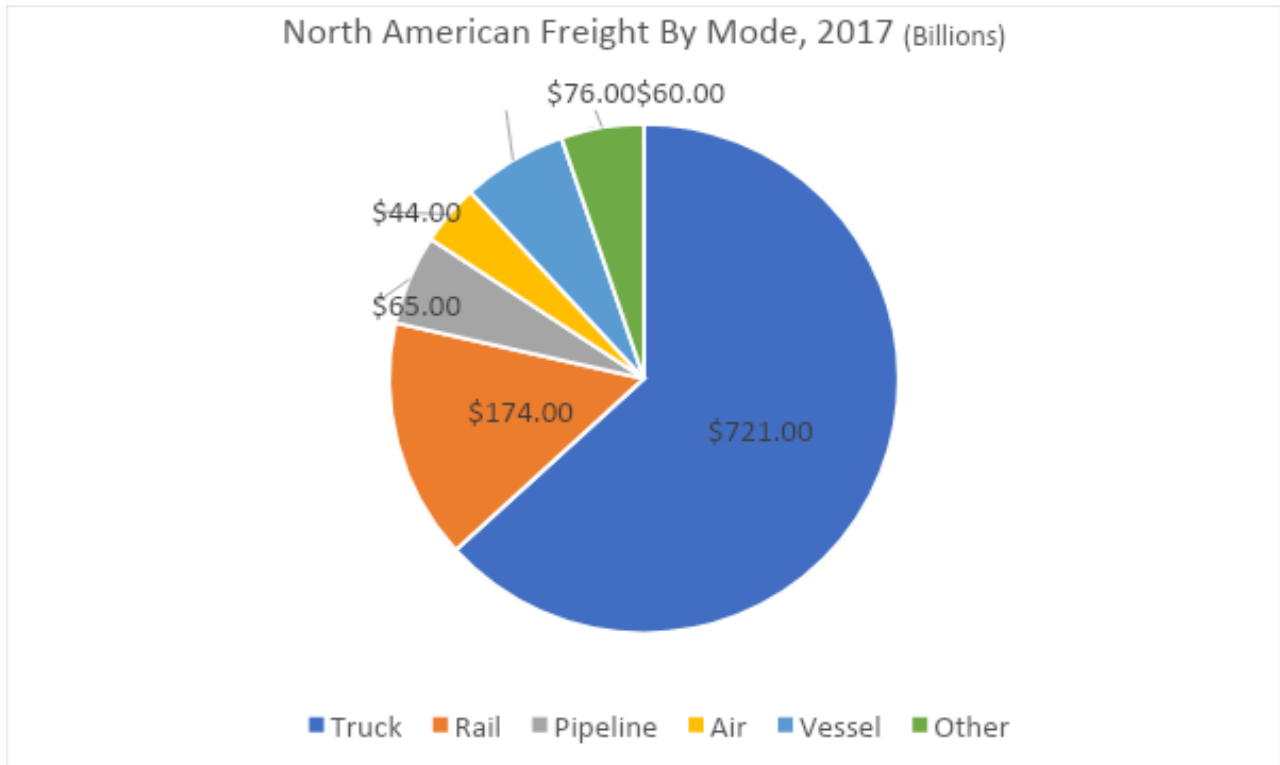
As a result of this competition, Amazon needs to differentiate itself from the competition to justify their Prime Membership fee. Amazon is now trying to attract customers with the promise of adding free one-day shipping. This is a difficult challenge because free one-day shipping is very expensive and logistically difficult to execute. As of today, Amazon is offering many of its products free one-day shipping because they are becoming less dependent on third-party logistics group. Amazon relies less on FedEx and UPS to deliver packages because they built more fulfillment centers to do their deliveries. They almost entirely do their supply chain in-house. Thus, this can reduce cost and increase efficiency. To achieve free one-day shipping, Amazon needs to find innovative ways to sustain their one-day shipping promise. One area Amazon can focus on is the trucking industry.

#### THE IMPORTANCE OF THE TRUCKING INDUSTRY

The trucking industry is the most important form of transportation in the United States. It is a critical industry for the economy. Thus, the E-Commerce industry relies heavily on trucking. The rise of the E-Commerce industry resulted in a boom in the trucking industry. According to the American Trucking Association in 2018, the industry generated over 700 billion in revenue. They freight over 79% of goods for the United

States (2018). As a result, finding innovative solutions to reduce cost and increasing efficiency will heavily impact the Amazon supply chain.

**Figure 2**



This graph illustrates the importance of the Trucking industry in North America. Currently, 57% of valuable freight is transported by truck, and it is the largest industry with a \$721 billion market value (Bureau, 2018).

Consequently, as the demand for trucking increases, the supply of drivers cannot keep up. Today, there is a massive shortage of truck drivers. According to Heather Long from the Washington Post, she interviewed many trucking drivers asking why many people do not want to be drivers. Many stated that the pay is very low, such that starting pay is around only 44 thousand a year. But the biggest complaint drivers have is the time away from home. For example, many drivers experience marital problems. Drivers rarely get to see their families, especially drivers who drive long-hauls, trips that are 150 miles or

more. As a result, many have a hard time maintaining a social life outside of their job (Long, 2018).

Currently, Amazon is projected to be the largest logistics firm in the world (Maharaj, 2019). They have made steps to become more independent from other logistic firms such as FedEx and UPS. However, Amazon does not do their own freighting; they hire third-party trucking firms to do their transportation. This is an area were Amazon can improve in their supply chain. They create or acquire a transportation company.

#### THE REVOLUTIONARY CHANGE TO THE SUPPLY CHAIN

As mentioned before, there is a shortage of drivers in the industry, such that many semi-trucking manufacturers and software companies plan to resolve these issues by introducing autonomous-semis. Firms are planning to have this technology ready a couple of years. This technology is set to change transportation by reducing cost and duration time for deliveries. In addition, this technology plans not to replace drivers, but it is a way to relieve them from long-haul drives.

#### WHY IS THIS TECHNOLOGY COMING SOONER THAN THE AUTONOMOUS CAR?

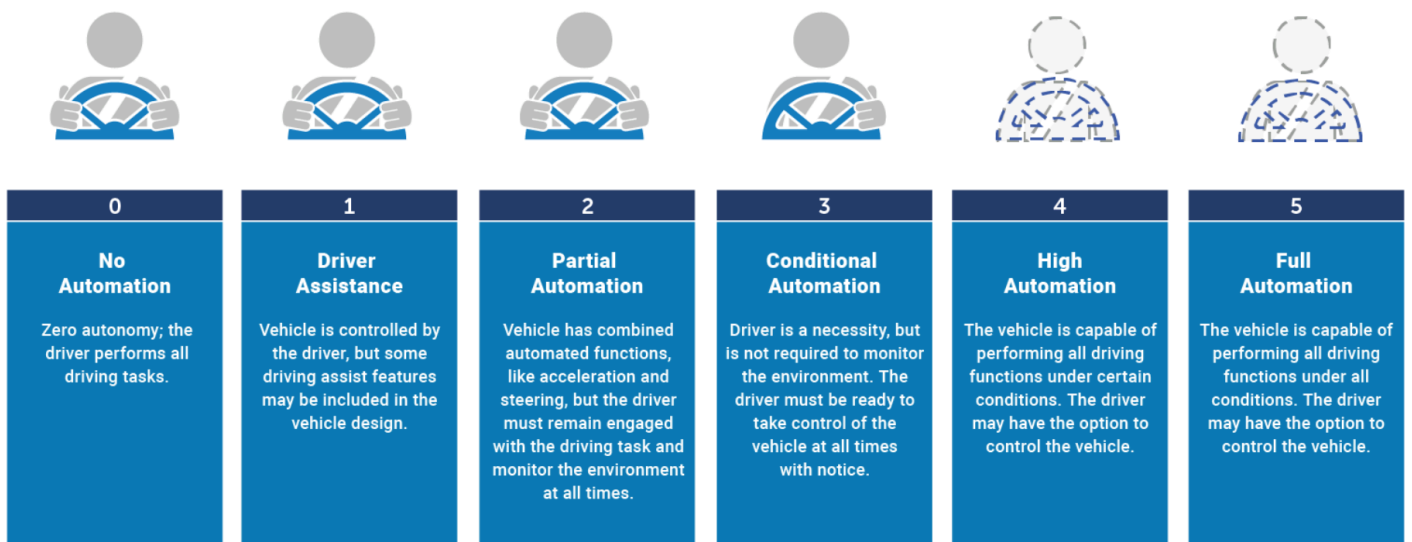
Currently, the autonomous car is decades from being fully autonomous because autonomous cars would always have to guess the movement around its environment from pedestrians, other cars, and bicyclists. This technology is very complex. However, for the autonomous-semi industry, they aim to achieve level 4 autonomous driving. This technology is easier to implement because it is highly controlled. For autonomous-semis, they are on a predetermined route at a predetermined time. For instance, if we set the truck to drive exclusively on a very straight highway at night because there are fewer cars. It is easier to develop than an autonomous car at a busy intersection during rush hour. Thus, this technology can run more efficient on fuel with the idea conveying. Also, this software can run 24 hours at a time, unlike humans.

In addition, the government is on board with this technology. They are increasingly allowing fully autonomous-semis tests to run on highways. Currently, there are no fully autonomous car or truck allowed on our roads. The National Highway Traffic Safety Administration is believed to allow level 4 autonomous trucks in a couple of years. Level 4 autonomous is categorized as fully autonomous driving under certain conditions. Level 5 is a fully autonomous vehicle without the need of help or assistance from a driver. This technology is years away due to the self-driving sensor being unable to see during snow or rain.

**Figure 3**

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE) AUTOMATION LEVELS

Full Automation



New vehicles are required to have at least an automated level of one; levels 4 and 5 are full automation, but this technology for passenger vehicles are predicted to arrive by 2025 (Lynberg, 2019).

## So HOW WILL THIS TECHNOLOGY BE IMPLEMENTED?

Many firms such as Embark are planning to freight trailers by using truck drivers and self-driving trucks. This will usually be implemented with cargo that is 150 miles or more called long-hauls.

1. First, the cargo will be carried from its facility by a truck driver.
2. Then, the driver will proceed to drive it to a facility near the highway or on the side of the highway. The truck driver will be incorporated because they handle the complex city driving which the computer cannot handle.
3. The self-driving truck will then proceed to carry the cargo with other self-driving trucks-- they would go in convoys. Because they are driving in a convoy, they will drive closely together like tailgating. This type of driving is very dangerous for humans, but not for the computer since they are synchronized. The benefit of this is the reduction of drag; reducing drag will increase the fleet's fuel efficiency thus saving time and money (Switkes, 2014).
4. Then, they will drive on a predetermined route on the highway, usually, one that is fast and fuel efficient. Next, its destination will be on a highway side or a facility on the side of the highway.
5. Lastly, a truck driver will pick up the cargo to deliver it to its destination (CNBC, 2019).

Daimler AG, the leader in automotive semi-trucks, is believed to be the closest in a level 4 autonomous-semi, but the project is very secretive. Other companies such as TuSimple, Embark, and Tesla are jumping in the industry (Self-driving, 2019). All have stated that the technology will come in the very near future. Overall, these companies are on the race to the first autonomous-semi to gain first-mover advantages in the market.

## RECOMMENDATIONS AND CONCLUSION

Finding innovative ways to increase productivity is a value Amazon cherishes. Amazon needs to find solutions to reduce their cost and wait times for shipping. With the promise of free one-day shipping, autonomous-semi is a solution that will help make that promise true. The introduction of autonomous-semi predicted to be revolutionary and it is set to change the whole economy and supply chain.

As Amazon becomes more independent from other third-party companies such as UPS and FedEx, I recommend Amazon to have their own freight firm as well. In addition to starting one, incorporating self-driving trucks will be an advantage because the more they test this technology, the more they can improve this technology and reduce their cost. Thus, this will create a first-mover advantage in the logistics company. Overall, this recommendation will reduce cost, time, and increase productivity.

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