



Allianz Global Artificial Intelligence

Active is: Investing in the future

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A DEEPER LOOK INTO THE PORTFOLIO: TESLA

What about Tesla?

In the portfolio since: March 2017

Country of origin: United States of America

Core business: High-performance electric vehicles, powertrain components, battery packs

Market target: Private individuals, transportation industry

Business Strategy: Tesla is the leading provider of electric vehicles that is aggressively working to deliver autonomous vehicles

The company is both a beneficiary of Artificial Intelligence (AI)-enabling technology such as sensors and compute technology as well as an AI software platform company in terms of its development of autonomous driving and other tech-oriented capabilities.

The company first used AI (deep learning) to train its radar system to see the world with a level of detail previously not possible. The company used this technology to enable a new form of advanced collision avoidance that works through varying weather conditions.

Next, the company has been gathering billions of miles of driving data through

its fleet of cars that are all connected to Tesla's servers. This driving data provides the company with a vast trove of information to train for its future autonomous driving system – something other auto manufacturers are struggling to acquire.

The move toward electrification and self-driving combined will likely change the relationship between the manufacturer and car owner in meaningful way. Electric cars, due to fewer moving parts, have different maintenance requirements than internal combustion engines. This leaves less opportunity for dealerships to make money on service. As such, traditional auto Original Equipment

Manufacturers (OEM), with dealer distribution models, will find it difficult to push fully electric models in a way that is consistent with their current distribution strategy.

In short, we believe we are entering a period of meaningful disruption in the entire automotive and transportation value chain.

Tesla is an automotive company that is using AI to enable advanced driver assist and self-driving cars. Tesla's efforts in this area has the potential to impact the automotive, energy, transportation, and insurance industries.

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Application examples:

AI software to “see the world in radar”:

This AI software allows the car to use its radar as a primary sensor for enabling safer “autopilot” experiences and avoiding collisions, even against objects the cars vision system may never have seen before. This autopilot software, which is developed and constantly improved using AI technologies, is a key feature of the company’s products that drive sales volume.

Connected vehicles:

All its vehicles are connected to Tesla’s servers via a wireless connection. The company collects driving data from the vehicles that is used to train its AI autopilot. Currently Tesla has over 3.8B miles of data driven by its fleet including 1.3B miles of autopilot enabled miles. This data serves as key asset for the company in training its AI under a variety of driving conditions and roads. Tesla’s fleet of connected vehicles are acquiring data that can be used to train future self-driving cars.

Sophisticated battery management and cooling technology:

This technology enables it to safely deploy high capacity battery packs. The software managing the packs uses algorithmic software / AI to ensure the proper care of the individual battery cells. Without this the company’s vehicles would have impaired range.

Metrics

| Share Class | Three months ended | | | Change | |
|---|--------------------|------------------|---------------|--------|---------|
| | March 31 2018 | December 31 2017 | March 31 2017 | QoQ | YoY |
| Automotive revenue (\$000) (USD) | \$2,735,317 | \$2,707,195 | \$2,289,600 | 1% | 19% |
| Automotive gross margin - GAAP | 19.7% | 18.9% | 27.4% | 81 bp | -766 bp |
| Automotive gross margin excluding SBC and ZEV credit - non-GAAP | 18.8% | 13.8% | 27.8% | 498 bp | -904 bp |

Source: Tesla. GAAP stands for Generally Accepted Accounting Principles.

- Automotive revenue in Q1 2018 increased by 19% over Q1 2017, mainly due to Model 3 deliveries and adoption of the new accounting standard.
- Non-GAAP Automotive gross margin improved significantly to 18.8% in Q1 as compared to Q4 2017. Gross margins of Model S and Model X increased to slightly above 25% due to cost reductions, mix management, FX gains and pricing actions compared to Q4.
- Model 3 gross margin remained negative in Q1 due to temporary underutilization of Tesla’s manufacturing capacity, in line with the company expectations.
- GAAP Automotive gross margin improved to 19.7%.



The investment team's analysis regarding Tesla:

Key drivers of Tesla share gains

- Distribution advantage
 - Unique distribution model aligned with reduced maintenance needs for EVs
- Autonomous driving
 - Tesla has over 3.8B miles of data from its fleet including 1.3B miles driven with autopilot
 - Autonomous driving will become a key differentiator for Tesla to drive incremental demand
- Manufacturing advantage
 - US \$5B investment in battery giga factory gives Tesla significant advantage over other OEMs
 - Tesla's factories are highly automated with production lines leveraging robotics and AI extensively



Grassroots® Research Input

- June 2017: Despite only 0.2% share of EV vehicles of US vehicles sold in 2016, our consumer survey results indicate 34% of US consumers are considering an EV for their next vehicle purchase.
- January 2016: In an online survey of ~1,000 US consumers, nearly half indicated they would pay extra for highway-only self-driving technology as featured in Tesla vehicles in the next vehicle they purchase.

Outlook:

- Tesla is one of the leading innovators in making autonomous vehicles a reality. The company leverages artificial intelligence throughout its products, from algorithms for battery management to automating manufacturing processes to self-driving capabilities.
- Tesla is on track to demonstrate a car driving from California to New York in full autonomous mode in the next year and also recently showcased a prototype of its first commercial self-driving semi truck.

Grassroots® Research is a division of Allianz Global Investors that commissions investigative market research for asset-management professionals. Research data used to generate Grassroots® Research reports are received from independent, third-party contractors who supply research that, subject to applicable laws and regulations, may be paid for by commissions generated by trades executed on behalf of clients.

Allianz Global Artificial Intelligence - invest in the future today

1 The first fund to make the broad potential of Artificial Intelligence available to investors¹

Allianz Global Artificial Intelligence gives investors access to all sectors in the AI segment. It offers a flexible way of participating in developments in this area.

New trends are included in the portfolio at an early stage as a result of the fund management team's research and expertise.²

2 Global research and technology specialists join forces to identify the most attractive businesses

More than 500 of Allianz Global Investors' investment experts at the world's most important trading centres monitor the markets, the businesses and how they are evolving.

They establish the decision-making basis for the specialists in the specific tech team, who in turn have their own practical experience in the IT sector as well as financial expertise, and hence have a sound basis on which to select the most promising businesses for Allianz Global Artificial Intelligence.²

3 Promising companies and strong demand - a good starting position for investors³

The market for businesses in the artificial intelligence sector is growing every day, and many products are now ready for the market, while others are in development and will be launched in the near future.

At the same time, demand for products from the artificial intelligence sector is high. With Allianz Global Artificial Intelligence, you can capitalise on the players with products that have a future.

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1 Source: LuminAM competitor research, as of February 2017.

2 A performance of the strategy is not guaranteed and losses remain possible;

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