

# **FACTORS AFFECTING THE VALUATION OF ELECTRIC VEHICLE COMPANY IN 2020**

**Case Tesla Inc.**

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## Abstract

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Title of the thesis <b>Factors affecting the valuation of Electric Vehicle company in 2020</b> Case Tesla Inc.		
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<p>Abstract</p> <p>During an uncertain period as 2020, various industries, including automotive &amp; transportation, which are commonly known to be the heart of the world economy, underwent huge impacts &amp; disruption due to worldwide lockdown, temporary layoff, and production discontinuity. This unforeseen scenario led several businesses to file for Chapter 11 of bankruptcy, liquidation, and bailouts or change their core performances to adapt to this uncertainty. However, few companies became shining stars from the darkness with colossal success during the last three quarters (Q2, Q3, and Q4) with exceptional performances, leading to stock price skyrocketing in several stock exchanges. In this paperwork, we will analyze and conclude by providing a comprehensive view of the reasons behind the successful performance and valuation of Tesla Inc. in the automotive sector. Altogether, the readers will see the picture inside out from:</p> <ul style="list-style-type: none"> <li>• The core values of the company</li> <li>• Its extensive enterprise-level activities and finally</li> <li>• The public &amp; institutional policies' effects,</li> </ul> <p>which caused the valuation boom of the California-based electric car producing leader, even during the pandemic.</p> <p>The main empirical part of the study is based on qualitative research, divided into two main branches: internal and external. The research will also include points of view from institutional banks, mutual funds, and experts in related deeds, e.g., material production, technology, administration, accounting, and finance.</p>		
Keywords Tesla, valuation, Electric Vehicle(s), financial analysis, the stock price		

## CONTENTS

1	INTRODUCTION.....	1
1.1	Research background.....	1
1.2	Objectives, Research question, and Limitations .....	2
1.3	Theoretical Framework .....	3
1.4	Research Methodology and Data Collection.....	3
1.5	Thesis Structure .....	4
2	INDUSTRY BACKGROUND .....	6
3	CORE BUSINESS.....	10
3.1	History and Business strategy .....	10
3.1.1	History.....	10
3.1.2	Business strategy .....	11
3.1.3	Leadership .....	12
3.2	Core contributors & Distribution channels.....	13
3.2.1	Core contributors .....	13
3.2.2	Distribution channels .....	14
3.3	Manufacturing, Supply chain, Service network, and Ecosystem .....	16
3.3.1	Supply chains & Manufacture.....	16
3.3.2	Service Network and Automation Ecosystem.....	18
4	PRODUCTS & SERVICES .....	19
4.1	Market trend and advantages of EV .....	20
4.2	Products .....	21
4.2.1	Battery.....	21
4.2.2	Automotive products.....	23
4.2.3	FSD (Full Self-Driving) Experience .....	28
4.2.4	Energy products.....	29
4.3	Services and others .....	31
5	COMPANY FINANCIALS.....	34
5.1	Income statement .....	34
5.2	Balance Sheet.....	40
5.3	Cashflow statement .....	42
6	EXTENDED ENTERPRISE BOOSTS & ACTIVITIES.....	45
6.1	5-1 Stock Splits & Continuous Stock Issuances .....	45
6.2	Asset value inflation .....	46
6.3	Battery Day .....	48

6.4	S&P 500 Joint .....	49
6.5	Climate Change .....	51
7	OUTBOUND PUBLIC SECTOR & INSTITUTIONS .....	54
7.1	Public influences (Fed) .....	54
7.2	Institutional influences .....	56
8	CONCLUSION .....	58
8.1	Answers to the research question .....	58
8.2	Ethics, reliability & validity .....	59
8.3	Suggestions for future research .....	61
9	SUMMARY .....	62
	LIST OF REFERENCES .....	63

## Appendices

Appendix 1. Global vehicle delivery in the first half of 2020 compared to the previous period.

Appendix 2. Subscriptions on Tesla Service Network

Appendix 3 Interview questions (Oral & Email messages)

Appendix 4. EnerGuide's label for battery-electric vehicles cost calculated per 100kWh

Appendix 5. Cost MPG of ICE cars & Electric cost for E.V

Appendix 6 Management Effectiveness (TTM) calculations (differences in 2019 to 2020)

## Terminology

E.V(s) = Electronic Vehicle (s)

ICE(s) = Internal Combustion Engine(s)

OEM(s) = Original Equipment Manufacturer(s)

YTD = Year-to-date

YoY = Year-over-Year; QoQ = Quarter-over-Quarter

TTM = Trailing 12 Months

NYSE = New York Stock Exchange

Gigafactory = a lithium-ion battery and electric vehicle component factory, named by Tesla

Supercharger = a 480-volt direct current fast-charging technology built to charge electric vehicles at less time than the normal charger

Full Self-Driving = technology package subscription offered by Tesla (beta) to enable automatic orientation driving to driver's initial destinations

Range = term in the automotive industry, indicating total distance a car can travel till it runs out of energy supplies

Short selling = investments that go against the market, usually made by hedge funds to bet against the targeted company by selling shares (debit) at the current price and buy it lower to return the loaned shares

EPS = Earning-Per-Share, company's profit divided by the total number of common stocks, measured in term of a quarter, half-year, full-year, or TTM

Fed = short term of Federal Reserves (USA)

Treasury Yield = return on investment on the U.S. government's debt obligations, in percent

Income Statement, Balance Sheet, Cashflow Statement = Three linking accounting fundamentals to report a company's principles & results quarterly or annually

P/E = Price-to-Earnings, a company's share price to its earnings per share

R&D = Research and Development

SG&A Expenses = Selling, General, and Administrative Expenses

Inflation = (economics term) the continual increase in the overall rate of goods and services over time and the devaluation of a currency

ETF = Exchange Traded Fund

Institutional investors = entity that merges investment monetary to invest in securities (Tesla stock) or other venture capital targets. Banks or Investment Advisors are examples of Institutional investors.

Mutual fund = a financial fund that collects monetary flow from different investment sources to form an investment vehicle through securities (stocks, bonds, treasuries, ETFs.)

## 1 INTRODUCTION

In the year 2020, one of the most catastrophic events occurred – the Coronavirus (COVID-19), which caused significant economic disruptions and remarkably in the stock market. According to John Hopkins's tracking data (February 2021), authorities had publicly confirmed more than 80 million positive cases worldwide, peaking at 700 thousand patients in a single day as of December 2020. Unfortunately, the number of fatalities and confirmed cases kept rising with time. As a result, the disease caused considerable disturbance to personal lives and threatened the world's economy.

In the meantime, the stock market has a significant disruption and volatility among various sectors. A well-known challenge for companies resulted from COVID-19 is employee layoffs and wage cuts to reduce overhead costs. Deloitte expert also pointed out that companies, especially auto companies, might need to redirect their capital flow to continue operations while reserving R&D funding to support advanced technologies, initiatives, and other discretionary schemes (Vitale 2020, 1). On a long-term scale, this drastic change puts auto enterprises under the pressure of surviving and innovating to compete with other competitors. Tesla became a pioneering technology candidate in the EV industry, and its stock price exploded. This jump left many questions for investors, fundholders, and the auto industry on what made Wall Street place such huge expectations on Tesla's valuation.

Is this valuation considered as a "huge bubble" and "ridiculous price" as Michael Burry identified in December same year? Alternatively, is it the combination of various reasonable aspects to let the stock soar well enough? This study will provide a multi-dimensional attribution on the reasons behind the valuation boost of Tesla, internally and externally.

### 1.1 Research Background

The automotive industry has a substantial boost in stock prices, starting in the latter half of 2020. It is noticeable that a newly founded company like Tesla has fueled a recent trend for the automaking industry with electric cars, self-driving, automatic transportation, and clean energy consumption. For six months, starting in mid-May 2020, the company's valuation had surpassed Toyota to become the world's most valuable company with a total of \$207 billion in the market. On the recorded trading history, Tesla tripled its valuation to \$630 billion at the end of 2020, with a surge of nearly 695% in stock price. At this level, Tesla's indexation was more than nine automakers' market values combined (GM, Ford,

Honda, Fiat Chrysler, Volkswagen, Toyota<sup>1</sup>, Nissan, Hyundai, and Peugeot) according to CNBC Pro. (Wayland & Kolodny 2020).

Based on our knowledge, we understand that companies must create fundamental values that meet customers' demands to gain a solid succession and stable position in the industry. The world is hoping for new energy sources and clean energy to help protect the environment; simultaneously, human mobility needs are gradually changing in a more environmentally friendly way. We are running out of non-reusable sources, and pollutions from vehicles, emissions, climate change, and global warming are undeniably the greatest challenges the world is facing. We believed that Tesla provides suitable solutions for these problems by applying modern technologies to its products with lithium-ion battery packs and solar systems, which is the company's most significant Unique Sale Point (USP). Tesla's value position is the benefits that its products brought to the environment and human beings; we assume that this is one factor that boosted the company's stock price even during the pandemic. However, considering many other factors that affected the valuation of a company, we conducted this research to understand this company case better.

## 1.2 Objectives, Research Question, and Limitations

Through our report, we aim to find out the reason behind Tesla's success during the pandemic. Since the world raises the awareness of climate change and global warming, Tesla has their vision right about clean energy and sustainable production. Our primary objective in this analysis report is to conduct market research on the factors that affected the stock price valuation of Tesla in 2020. From this, we could help investors and academic institutions to evaluate aspects that lead to the rise of Tesla stock in the Automotive sector.

The major research question is:

*"What are the internal and external factors affecting the rise in Tesla's valuation and their effects on the company's stock market in 2020?"*

By analyzing the growth of Tesla's stock price from Q1 to Q4, 2020, and annual development through years since establishment, we synthesize multi-dimensional perspectives on the related aspects that lead to the incredible growth in the company's valuation.

As the report's focus pertains to the Automotive sector, notably Tesla Motor Inc., we will only focus on the company itself without deep comparisons to its competitors in the industry.

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<sup>1</sup> Toyota Motor Corporation (TM) was evaluated on the stock exchange on the 1st July 2020 as of \$202,70 billions of market capital.

Due to limitations, the report will cover the Electric Vehicles industry in 2020 (past) for analysis, educational, and informational purposes in its valuation. As this suggestion only focuses on the previous years' research and past data, we do not recommend investors, primarily retail investors, to base any investment decisions in the future on this information. Hence, as a disclosure, this report does not signify a recommendation to sell or a solicitation of buying Tesla stocks.

### 1.3 Theoretical Framework

Theoretical frameworks strengthen studies by associating researchers with existing knowledge to identify the limits and examine research questions (University of Southern California 2021). There are many sources to extract literature usage for the theoretical framework in research, i.e., primary and secondary sources (Saunders et al. 2009, 68).

The theories and literature of Company Fundamentals & Financials Effectiveness have been used in the thesis, based on the Balance sheet, Operating/Income statement, and Cash Flow statement. We used theories on Business Segmentation to validate the Stock-ground of the company. For the company's core analysis, we applied Business Ecosystem Layers from Moore to follow steps of the study inside out. Regarding extended enterprise-level analysis, we applied theories on Asset Price Inflation and Interest rate policy theory. Counterargument includes the Monopoly position (Thiel 2014). Secondary sources of literature like journals, books, government publications, dictionaries, interviews, and more, are used as the stock price depends heavily on prompt news.

### 1.4 Research Methodology and Data Collection

The research might be inductive and deductive. The deductive approach of study is based on logical reasoning, whereas the inductive method is based on inference of particular instances from a general law. (Ghauri & Gronhaug 2010, 120.) We used both approaches to analyze data as the company's performances & news broadly influence the stock fluctuation. The deductive approach with logical flows is reasonable for non-numerical factors. At some points, results on the company's data & analysis are essential to measuring financial metrics in the view of value investing.

There are two principal research methodologies in empirical research: a qualitative method and a quantitative method, or a combination of the two. The qualitative method uses non-numeric data that have not been quantified to analyze the outcomes. A quantitative method uses numeric data to explore, present, and describe the results (Saunders et al. 2009, 414-480). A qualitative research approach is suitable to obtain multidimensional factors of the



stock exchange that lead to stock-based volatility. Due to the absence of primary data from banks and institutional units because of corporate security and general regulation from the National Bank of Finland, we used secondary data to analyze most of the research. Additionally, we will include primary data from interviews with experts in related industries. If there were preliminary data, this paper could apply another quantitative approach using a multivariate regression model to see how strong and weak each factor is.

We collected data on financial performances & core company fundamentals in corporate reports and public announcements. Market metrics in the analysis come from paid data of relevant organizational databases, distributed literature from industry research works, press releases, and aggregate information from professionals in related fields. Secondary data consists of theories on financial statements & corporate valuation. We interviewed Professors in Automation and Business Finance from the Aalto University of Finland and used their opinions and field suggestions as a primary basis used in our contexts.

## 1.5 Thesis Structure

At first, we explain the motives and interests that led to our research and the objectives we want to achieve, and its practical implications in the associated sector or educational purposes on investments made on the stock exchange. In the beginning, we introduce our approach related to methodologies used, data collections, and the framework as a reference for the research flow before reaching the Industry Background. The background on the Automotive Industry, the EV segmentation, and summary of the stock market fluctuations will give audiences a big picture of where they are in the research, what they would learn from, and which company they follow till the end. The analysis will be conducted inside out based on Moore's business layers. Audiences will learn about the core company from its starting points, the products that generate income, corporate-level management, core contributors (selling to whom), and distribution channels (how the company sells), as well as their supply chain, manufacture, and ecosystem. Then numerical metrics will take place as an inductive approach to Tesla's stock rises with a thorough analysis of its financial statements & calculations that investors use to determine whether a ticker is undervalued or over-price. After core business & data analysis from the company itself, audiences will direct enterprise-level information through what the company has done on the enterprise scale. On the other hand, the researchers will further analyze the influence of institutional and public effects on how they reacted to the pandemic through economic tools & general business regulations. Lastly, we will answer the main empirical question stated initially, suggest further research, and sum up essential information for the conclusion.

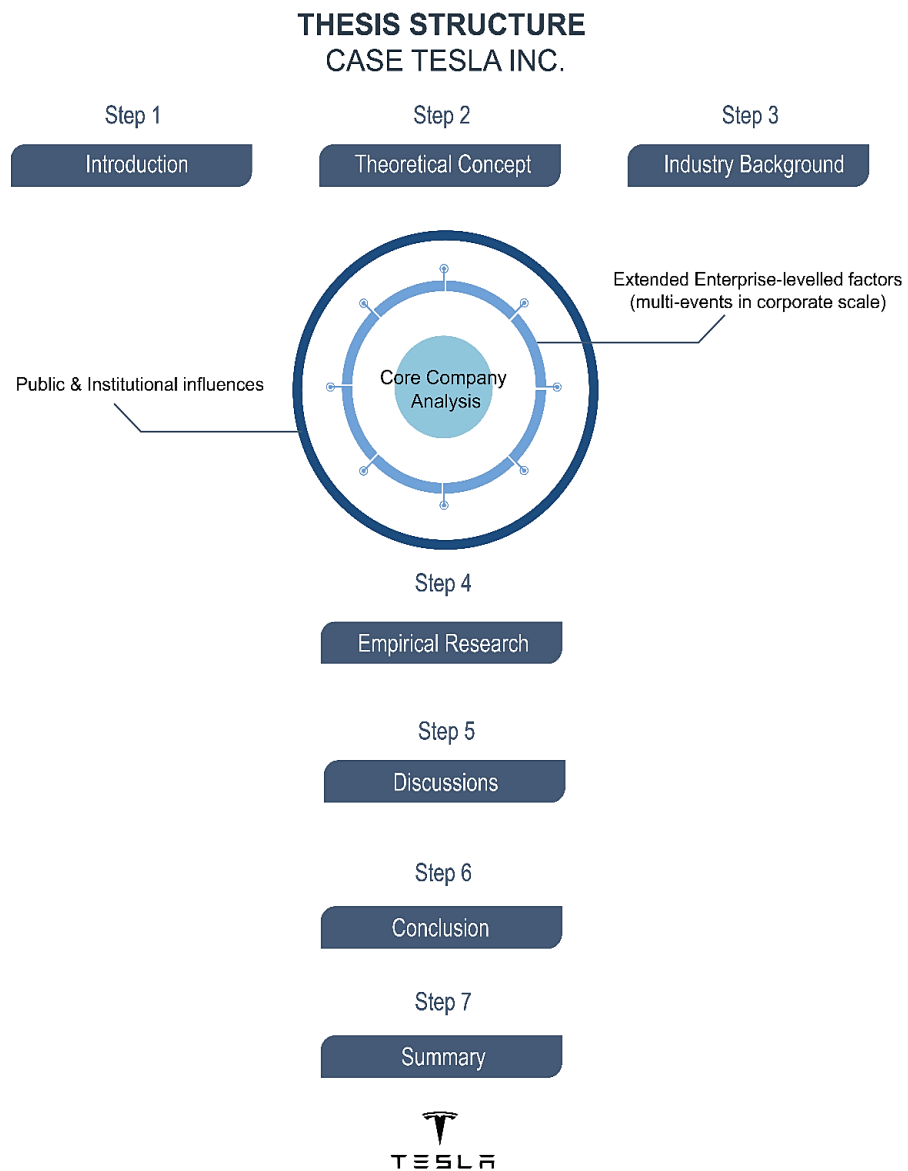


Figure 1. Thesis structure demonstration

## 2 INDUSTRY BACKGROUND

This part will cover three main points related to the thesis topics and link to basic knowledge for readers to understand the big picture before analyzing the company case.

### Stock Market Before and During Pandemic (COVID-19)

To have a better look at the U.S. stock market's volatility during the COVID-19 (till Q1), we can refer to a chart that Capelle-Blancard and Desroziers (2020, 14) have published an article on CEPR Covid Economics on June 16, 2020.

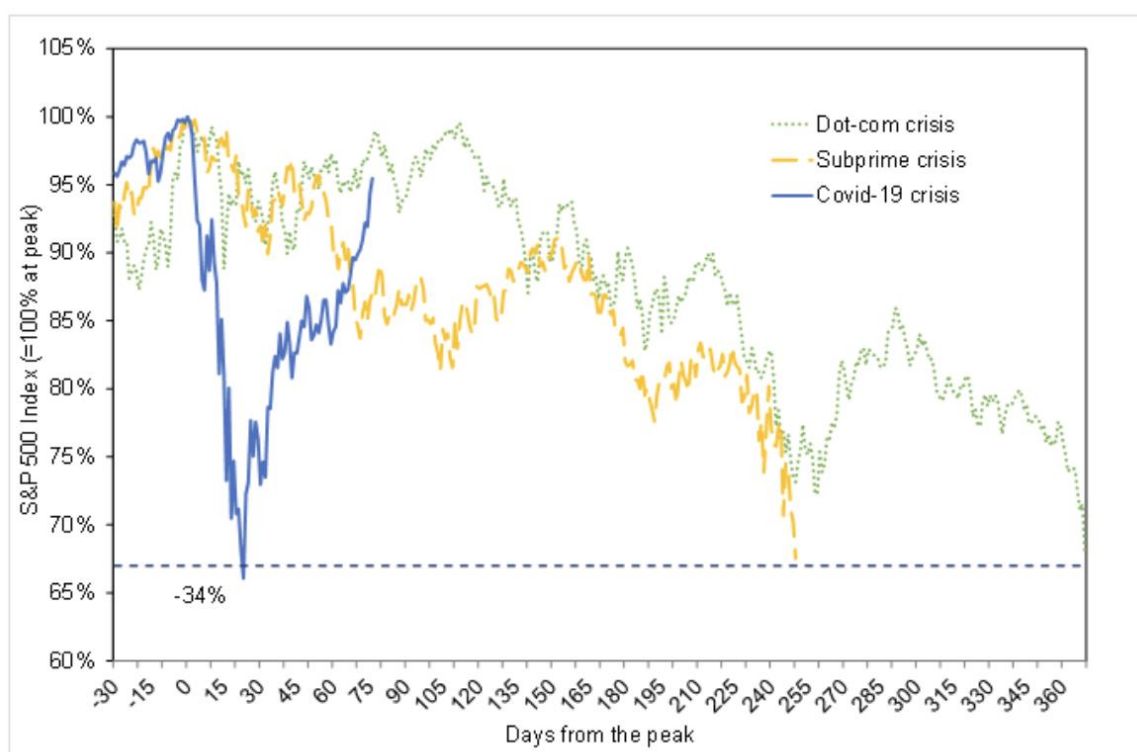


Figure 2. The USA stock market volatility during crisis time (Dotcom; Subprime, COVID-19 crisis) (Capelle-Blancard & Desroziers 2020)

Analysts can observe this disruption in March 2020 as the S&P 500 decreased one-third of its value in only one month, while the setting index for the crisis in "The Big Short - 2008"<sup>2</sup> took one year to decline at the same amount, and the Dotcom bust took one year and a half.

As the COVID-19's blue line recovered 95% - quickly after the panicked time, which two others could not do, it is strange how the stock market was affected by the disease. Since the Great Depression, the world had never suffered such a great economic challenge

<sup>2</sup> A famous financial crisis film by Adam McKay adapted from the true story of the 2007-2008 calamity, triggered by an accumulation of the mortgage market and a credit bubble.

(Lustig & Mariscal 2020, 187). However, the familiar and fundamental knowledge for those involved on the stock ground is that the stock market reflects the economy's indications but not the economy itself. As the economy dived deeply, experts say that stock markets caused a tremendous impact on companies that were more fragile in terms of financial stability. They would suffer from the disruption of supply chains, defenselessness in social responsibility, internal corporate adaptation, and the inability to adjust to social distancing than the whole market. (Alburque et al. 2020, 38.) The level of impacts on businesses also depends on governance activeness and how companies reacted to uncertain times.

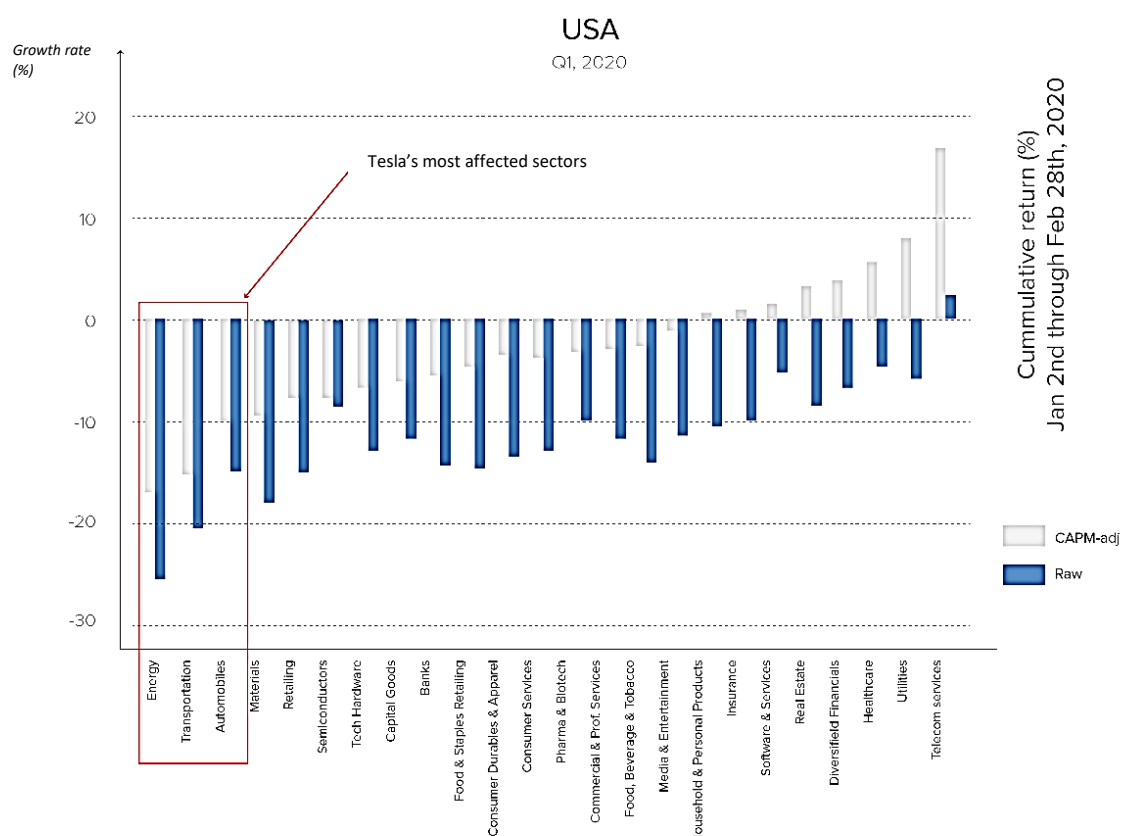


Figure 3. Stock returns by industry in the U.S. (Ramelli & Wagner 2020)

Going into specifics, scoped in the Q1, 2020 from Jan to March 2020, Ramelli & Wagner (2020) researched the stock returns between various industries of the U.S. (Figure 3). We can see that the Automobiles and Energy industries showed a continuous loss in Q1, 2020. Unfortunately, these sections are important for Electric Vehicle makers like Tesla.

### EV Market Overview

Electric Vehicle consists of three main categories:

- Battery electric vehicles or BEVs,

- PHEVs of plug-in hybrid electric vehicles, and
- HEVs, or hybrid electric vehicles

The total world supply of electric cars in 2018 reached the highest expansion with more than 3,27 million units added, made up to over 5 million in the world record. This deployment in the EV market gave 69,4% higher margins than in 2017. (Global EV outlook 2019, 32.) However, this extra annual capacity growth slowed down 40% in 2019 with 7,2<sup>3</sup> million stock units, when BEVs accounted for nearly 70% of the world's total EV shares (Global EV outlook 2020, 44). It is also visible that the world's EV sales reached an all-time high counted till the end of the year 2019, with fleets delivered landed up to 2,1 million marks.

For the last year, BEV deliveries rose 14% compared to 2018, while plug-in hybrid electric vehicles (PHEV) delivered was at only 90% number of fleets in the corresponding period. BEVs accounted for almost  $\frac{3}{4}$  of worldwide electric car sales in 2019 (Global EV Outlook 2020, 45). Despite the economic downturn in the first half of 2020, the global EV sales (mainly BEVs and PHEVs) reached an all-time high at over 3,2 million units with a gap margin of 55,8% YoY.

Separated by market shares of total sales, the USA, Norway, China, Japan are the top leading countries in EV deliveries and growth. Thanks to Tesla Model 3<sup>4</sup>, sales of BEV in America rose by 80% in 2018 (Global EV Outlook 2020, 44). However, with increasingly Tesla's overseas deliveries one year later, the EV pioneer slowed down its domestic delivery by 7% or 12,400 units. Meanwhile, the automaker has improved its primary foreign market in China with a slight increase (2%), topping 120,000 in the fleet, accounting for 47% of the total global electric cars.

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<sup>3</sup> Does not included HEVs as small portion & cannot be plugged in.

<sup>4</sup> Standard model version

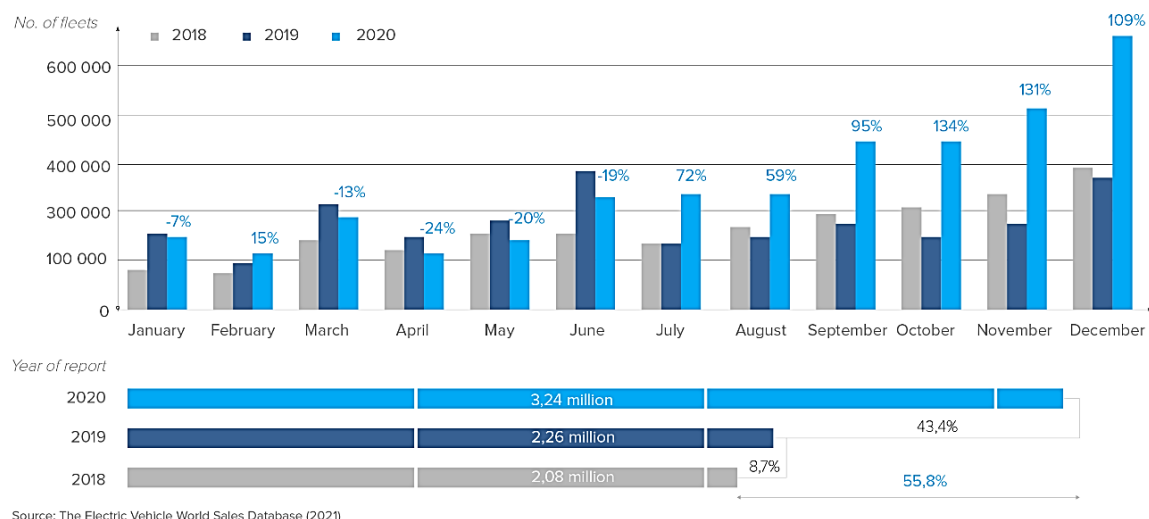


Figure 4. Global sales of EVs (general) month-over-month & the total sales growth from 2018-2020 (adapted from EV Volumes 2021)

After a considerable disturbance in the auto market, Europe up swung EV sales to record as it grew as much as 137% in Quarter 2nd. This record sale peaked at 285 000 units in December, with a cumulative growth plus 260 % (YoY) and a market share of 20%.

### Enterprise-scale Volatility in the EV Industry

In the first half of 2020, global auto enterprises suffered a devastating loss in deliveries and shortage due to temporary production cuts and demand drops. Enterprises saw damages through international deliveries between companies in the sector. Accordingly, to this deficiency in deliveries and production halt, the Automobile sector's stock prices (H1) plunged more than 50% their value (YTD) and gradually picked up at the beginning of August. According to Yahoo Finance real-time stock price tracking, Tesla broke even in early May and scaling up rapidly since then.

### 3 CORE BUSINESS

#### 3.1 History and Business Strategy

##### 3.1.1 History

In 2003, two American entrepreneurs Marc Tarpene and Martin Eberhard established an electric-automobile company named after the renowned inventor Nikola Tesla. Under the name Tesla Motors from 2003 to 2017, the company had its aim to develop electric sports cars with its chief executive officer (CEO) and chief financial officer (CFO), Eberhard and Tarpene. One year after the company's establishment, Elon Musk, who later made a massive evolution to the company, worked as the chairman of the company and co-founder of PayPal, became its most significant financial source with contributions reaching over 30 million dollars at the time.

A must-mention as Tesla's milestone in 2008 - the first electric car Roadster released, nailed a new record for an electric production car. When the world was thrilled with climate change and non-renewable energy, Roadster became the latest trend with its capability to compete with many gasoline-powered sports cars—powered by lithium-ion. (Schreiber et al. 2018.) A significant change happened to the Company's Board in the same year: Eberhard and Tarpene left the Company. Eberhard kept his title as a shareholder, and Musk officially became CEO of Tesla.

Since Elon Musk took over as the CEO of Tesla, the company gradually lifted its global value. Within two years, Tesla's initial public value increased to 226 million dollars. After 2011, Roadster production has suspended to focus on the model S sedan as the new product and the first EV car in the series of Tesla's later. Model S, following the Model 3 sedan model, Model X SUV, and Model Y crossover, are released respectively in 2017, 2015, and 2020. In 2012, Superchargers were developed in the United States and Europe to provide charging points for Tesla owners with no additional cost. Later, those Superchargers, referred to as Tesla Stations, got critical updates to have the ability to replace the Model S battery pack completely.

In 2017, Tesla Motors expanded its manufacturing of solar energy products by buying a SolarCity solar panel company in 2016 and then changed its company name into Tesla Inc. The Palo-Alto electric vehicle manufacturer declared that the company no longer only has electric cars as their products.

### 3.1.2 Business Strategy

In recent years, climate change and global warming have turned into severe problems for humanity. The more infrastructure developed, the worse the environment suffered. Therefore, scientists are eager to find other energy sources to use instead of non-reusable ones. Taking the world's desires, Tesla's long-term strategy focuses on the sustainability of their products and gradually replaces non-reusable and non-renewable sources with Solar Energy. The Tesla Board has actively driven critical decisions to accomplish long-tenured growth and prosperity. All in all, Tesla's mission is to accelerate the world's Transition to Sustainable Energy (Impact Report 2019, 52). Solving one of the world's most significant issues, Tesla gives its employees the feeling of being a part of something greater than simply a car company and has somehow managed to have a suitable strategy to satisfy the most ambitious ones with the best working environment.

#### Corporate Governance

Using the Unitary-form structure, like other companies, Tesla centralized its power on the Chairman and CEO, Elon Musk, while continued the hierarchy with many other units divided into four committees.

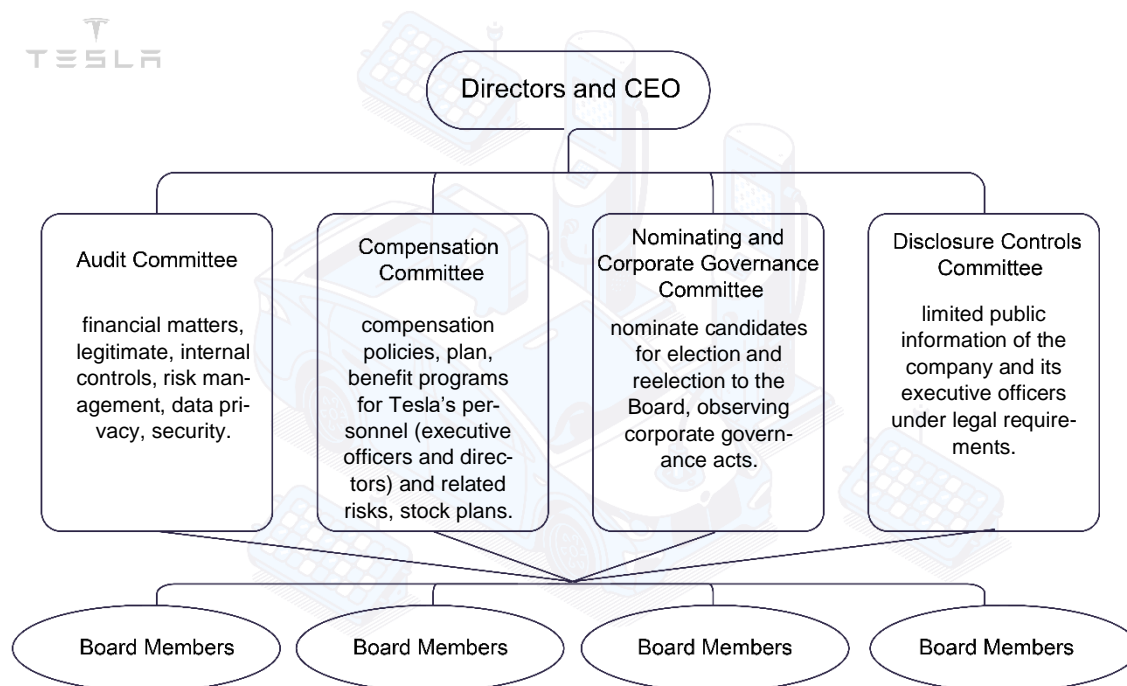


Figure 5. Tesla Corporate Governance Layout Illustration



As mentioned in the latest report, the four standing committees of Tesla are Audit Committee, Compensation Committee, Nominating Committee, and Disclosure Controls Committee (Impact Report 2019, 50). Besides, Tesla stated that the Board's response was overseeing the risks Tesla might have faced and fundamental day-to-day changes detailed by the management (Impact Report 2019, 49). The Board has delegated oversight of specific categories of risk to its independent committees, respectively reported to the Board. (Tesla Investor Relation 2020). Risks overseeing strategic decision-makers between board members play immense importance before March 2020 till after Corona's struck.

The Board of Directors had been called "shakeup" in 2020 when Hiromichi Mizuno (former CIO of a Japanese pension fund) stepped up. The audit committee replaced Musk's squat team – Antonio G., Steve J. from the independent Board. Hiromichi has had a long position against short-selling from hedge funds in the context that the company would face the risk of short-selling securities in Q1, 2020. (Trudell 2020.) The enterprise put its focus on technology and manufacturing rather than business trading. That the long-time trio in "Musk's team" left simultaneously was the "first good step," said Dieter Waizenegger, Executive director of CTW Investment Group.

### **Corporate Culture & Workforce**

In Tesla, a diverse and inclusive workforce highlights the company's working process. Tesla's employees are known for being talented and passionate about the company mission. The diversity in the workforce also provides various aspects and solutions to solve the problems more effectively.

Awarded Forbes Best Employer for Diversity in 2019, Tesla is committed to having its working environment inclusive. With one-fifth of Board members represented by women and led by Chairwoman Robyn Denholm, women in Tesla are guaranteed to be supported the most. Besides, over 48,000 team members of Tesla have a chance to work under commission units, such as Black at Tesla, Latinos at Tesla, Veterans at Tesla, LGBTQ at Tesla, and Intersectionality at Tesla, also showed Tesla's efforts to create an ideal working environment. (Impact Report 2019, 44.)

#### **3.1.3 Leadership**

CEO of Tesla – Elon Musk (2014-present) is famous for his odd but effective leadership. Elon is Tesla's largest investor with 227,131,935 shares, accounted for 22.4% of the company's ownership. The rising value of the company's stock price has made Elon Musk climb to the top 5 wealthiest people on the planet. Consequently, this notoriety had led Musk's tweets to affect stock price momentums through public comments. They made him face

many different lawsuits in the past, including his intentions to take the company privately owned and his opinions on the company's stock price.



Figure 6. Musk's tweet in May 2020 about Tesla's stock price sent the company tank 10,3% before the split (Tweeter 2020)

After hitting specific goals reflecting its rapid growth in recent years, Tecknoking's transformational leadership style helped him qualify for a compensation package worth about \$770 million in stock-based compensation. In management, Elon has an open-minded view and stretch goals that make people think of impossibilities. According to Harvard Business Review, "stretch goals involve radical expectations" that exceed existing competencies and performance, playing as "the building blocks for remarkable achievements in the long term" (Sitkin et al., 2017). His brain microchip project, underground tunnels connecting states, Planet internet surface (Starlink) seem like unachievable desires initially, but Musk has been making them workable as the way Electric Vehicles did. Along with Elon Musk, there have also been three prominent directors (till December 2020), together with 11 directors that report to Elon to make critical decisions:

- Zachary Kirkhorn (Chief Financial Officer since March 2019)
- Andrew Baglino (Senior Vice President, Powertrain and Energy Engineering since October 2019)
- Jerome Guillen (President, Automotive from September 2018 to March 2021)

## 3.2 Core Contributors & Distribution Channels

### 3.2.1 Core Contributors

Tesla achieved a 0,8% market share based on passenger car revenue in 2020 (Statista Mobility Market Outlook 2020). The most customer's fraction of Tesla came from the U.S and China, and the Asian country has been one of its strategic markets to contribute regionally.

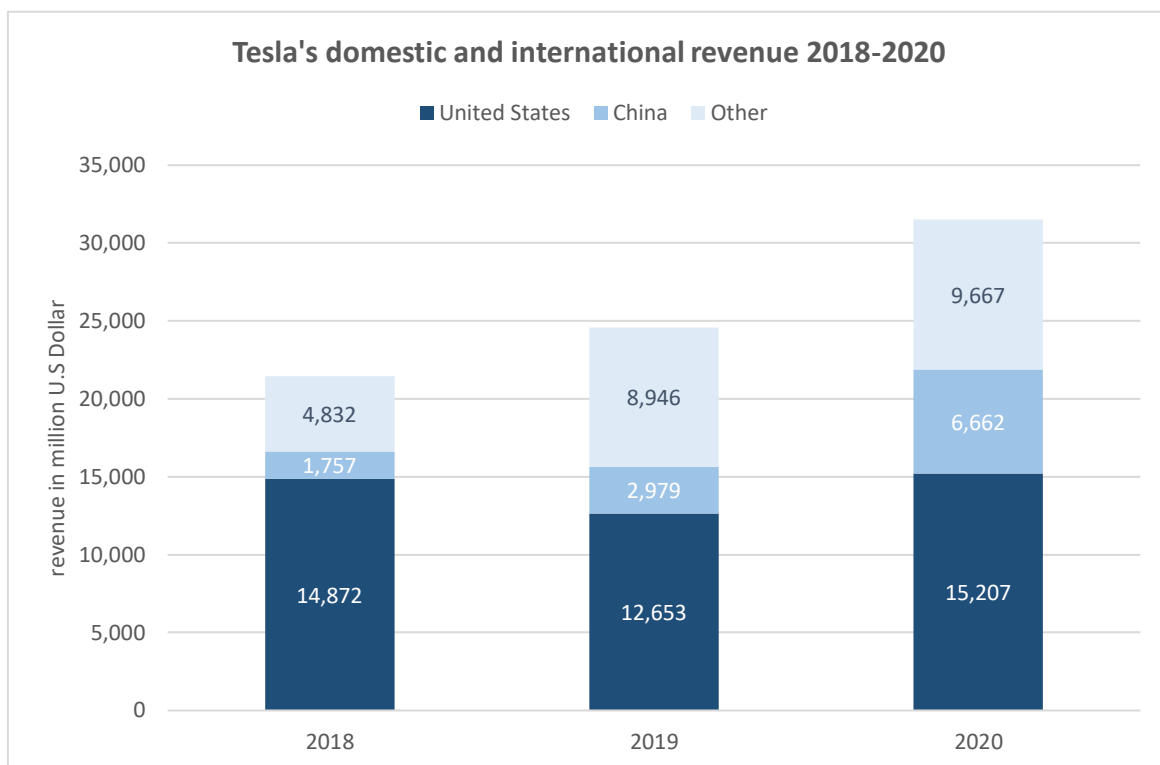


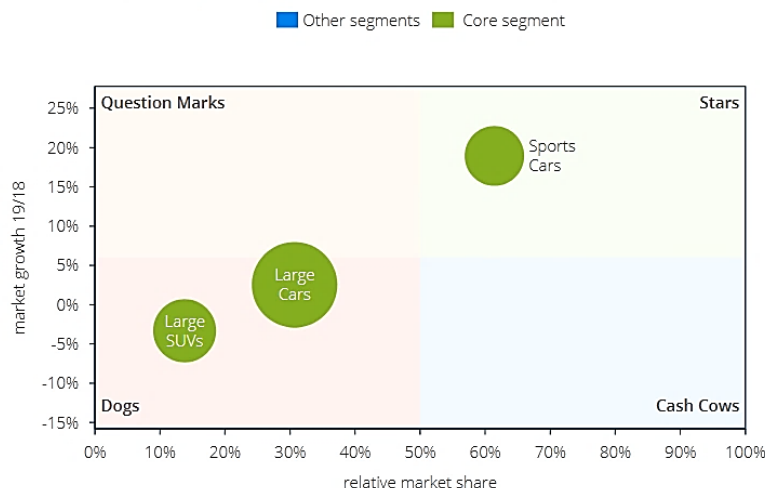
Figure 7. Tesla's domestic and international revenue 2018-2020

The year 2020 had been an excellent year for Tesla, where key revenue metrics strengthened among overall contributing countries, almost triple revenue came from China. The company's investment in the Gigafactory plan in Berlin will open its market towards the EU with better price competitiveness when the regional prices of average Tesla cars are still over 200% higher than standard vehicles sold in the US.

### 3.2.2 Distribution Channels

Tesla car types could be divided into three main categories, known as three main products on its distribution channels: Large SUVs, Large Cars, and Sports Cars. Sports cars showed their fast-growing adaptive rates and stood out between the groups, while Large vehicles – e.g., Model Y and SUVs show loss through investments.

Worldwide<sup>1</sup> passenger cars growth and market share comparison<sup>2</sup>



**Growth-share matrix**

The chart groups car segments by relative market share and growth rates. Relative market share is calculated by dividing the make revenue with the revenue of the largest make in the segment.

**Question Marks** – low relative market share in a fast-growing market. Segments in this section can grow fast, but at the expense of the company's resources. They should be analyzed closely and frequently.

**Stars** – large relative market share in a fast-growing industry. Stars should be invested in more in order to maintain their growth and fight competitors.

**Dogs** – low relative market share in a slow growing market. While dog-segments often break even, they are prime candidates when divesting.

**Cash Cows** – large relative market share in a slow growing industry. The segments here are the most "mature" and they contribute growth without additional investments.

Figure 8. Growth share matrix on EV products - Tesla (Statista 2021)

Tesla delivers its cars through direct showrooms in Tesla's stores, franchise premises (internal marketing and sales teams), and on-air (online). At the same time, it distributes services through facilities across countries (Store's checkpoint, Superchargers). Owning and controlling all aspects of distribution gives Tesla complete control over its marketed products, which means cars would only be sold exclusively through official premises. This distribution scale is what Kotler & Keller (2012) called Zero-Level Distribution in their marketing principal book.

**Zero-Level Distribution Channel**

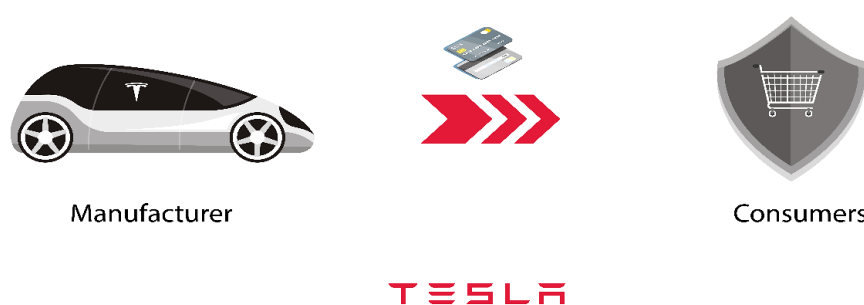


Figure 9. Tesla's Zero-Level Distribution channel illustration (Long Le 2021)

The no middle-man distribution supplies customers from A-Z service without intervention within internal sales efforts provided by official premises on the website, Tesla's stores, and franchised service centers. Because of its closed networks within the company, Tesla enables users to experience the service in its 523 total stores directly and openly from one server.

### 3.3 Manufacturing, Supply Chain, Service Network, and Ecosystem

#### 3.3.1 Supply Chains & Manufacture

Tesla has a closed-loop supply chain, which means the company owns the entire supply chain from production to distribution to minimize the cost and cost of goods sold, thereby assuring its sustainability.

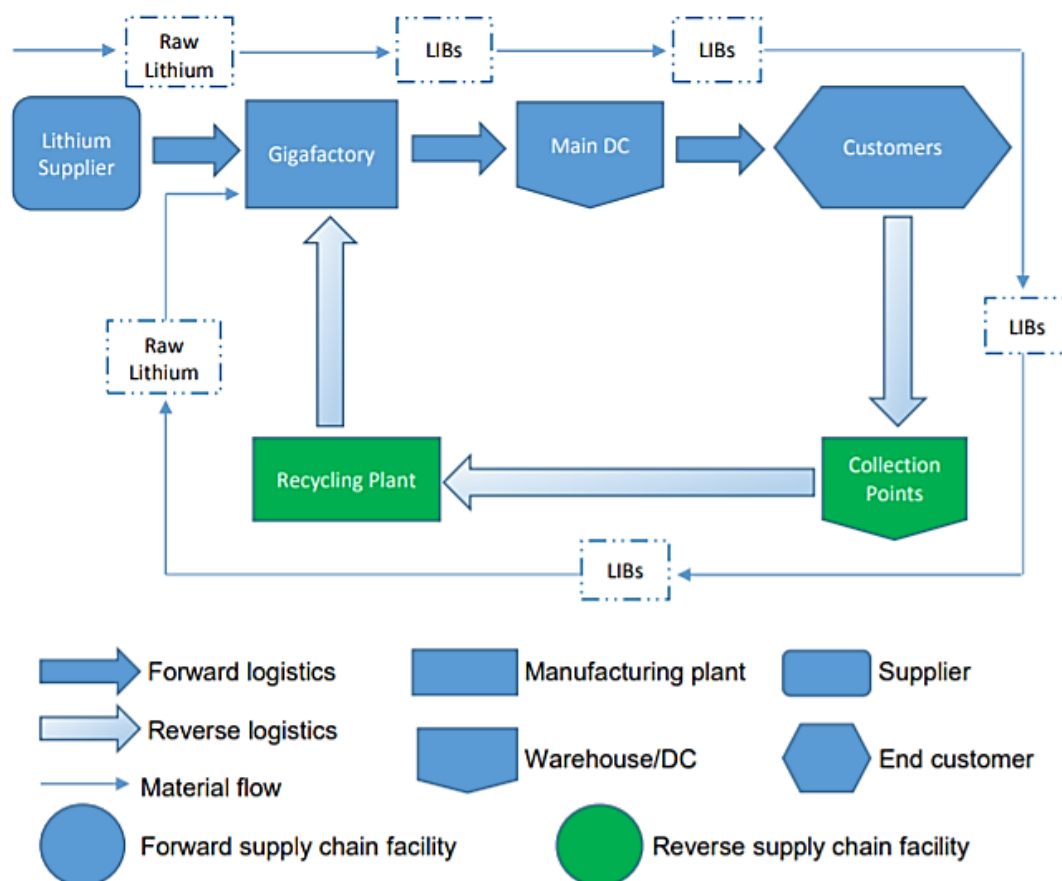


Figure 10. Closed-loop supply of Lithium in LIB production as a critical component of Battery (Ivanov & Battini 2017)

The Close-loop supply chain is growing in North America for its potential profitability. On the other hand, Europe opens opportunities for legislation profits. The closed-loop supply chain includes the returns processes, and the manufacturer intends to capture the additional value and further integration between supply chain activities. (Daniel & Guide 2003.)

Due to the importance of batteries in core products, Tesla Inc. had started different partnerships with several battery suppliers to ensure key inputs to battery production (i.e., lithium, cobalt). (Ivanov & Battini 2017, 10.) Pure Energy Minerals (Clayton Valley, Nevada), Pana-

sonics (Long-time partnership), Livent (lithium hydroxide suppliers), Contemporary Amperex Technology, and Gangfeng Lithium (China)<sup>5</sup> are the main key partners with Tesla in the ecosystem (Palandrani 2020). Tesla uses vertical integration in its manufacturing process, which generally means the company owns or controls its suppliers, distributors, or retail locations to curb its values in the supply chain. The major advantage of this integration is that it allows Tesla to control processes (product configuration with the demands of its in-house design), cut costs (towards customers and logistics for the manufacturer), and improve efficiencies (Benam 2020). Tesla once again showed investors their plans, which helped customers understand how the company shapes its production & technology utilization in the long run. Even though Vertical integration needs huge capital investments, audiences could see that Tesla has had enough savings to capture it with an abundance of cash on hands after each quarterly report.

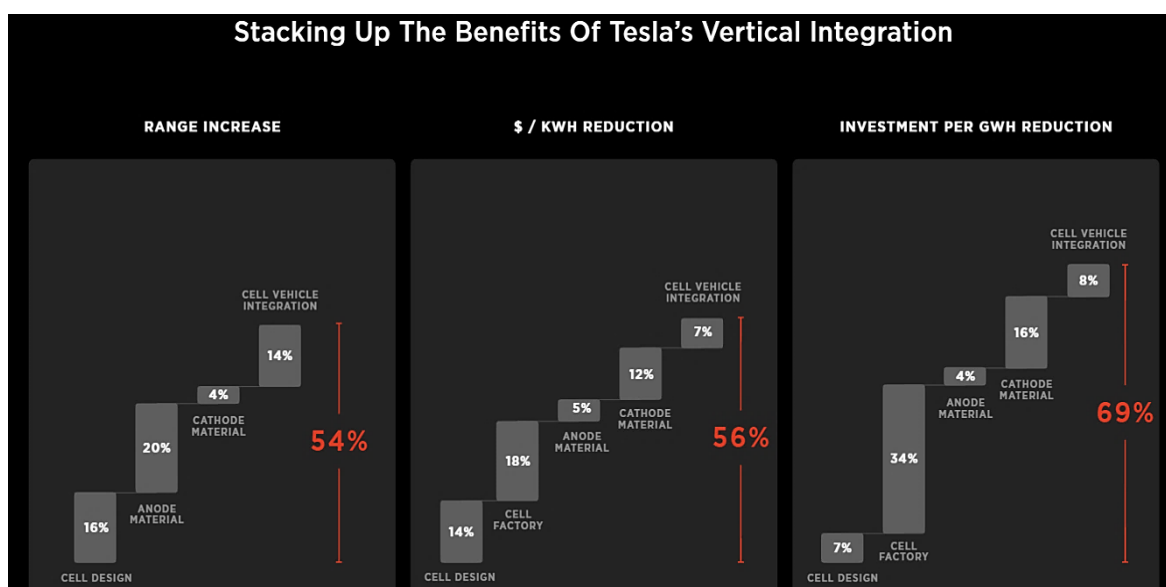


Image 1. Summary of Tesla's Vertical Integration (Battery Day 2020)

During the surge of COVID-19 infection cases, Tesla brought a better company image through its supplies of ventilators in ICU (Intensive Care Unit) for COVID-19 patients. Musk stated that the company planned to resume Gigafactory New York to produce ventilators. It would also work with Medtronic to make ventilators at its Fremont factory. "We have extra FDA-approved ventilators. Will ship to hospitals worldwide within Tesla delivery regions. Device and shipping costs are free." Musk said. (Lambert 2020.)

<sup>5</sup> Tickers: Pure Energy Minerals - NASDAQ: PEMIF; Panasonic - NYSE: MC; Livent – NYSE: LTHM; Contemporary Amperex Technology – CNY: 300750.SZ; and Gangfeng Lithium – CNY: 002460.SZ.

### 3.3.2 Service Network and Automation Ecosystem

#### Service Network

Tesla has been ramping up to open more service networks in its targeted and potential geographical locations/markets. Service network access varies by region. Based on subscriptions made (See Appendix 2), customers can access Tesla's online and directed service: Personal Access for individuals, Business Access for companies, Industry Access for Insurance, and Body Shop Access. In Finland till December 2020, there have been four service centers authorized by Tesla located in Turku, Lempäälä, Vantaa, and Järvenpää. (Tesla Support 2021.)

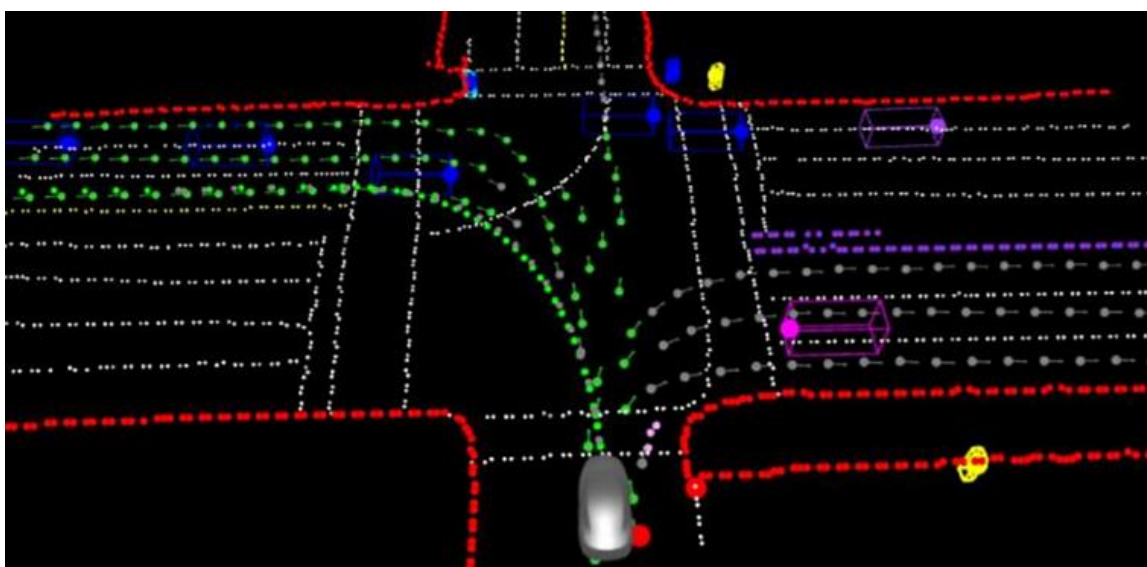


Image 2. Neural Net understands the same intersection (Tesla Q3 2020)

#### Automation Ecosystem

Services are connected to the Tesla app, where the service menu helps drivers locate, book in advance, check car conditions, and access online damage instructions, together with the external telecommunications network.

## 4 PRODUCTS & SERVICES

The current path to automatic and digitally operated transportation system looks more promising than ever with the fact that more customers are considering buying EV products, and regulators from major metropolitan countries are pushing automakers for greener, environmentally friendly, and compliance with zero-emission-regulation products. This revision leads OEMs, including Tesla, to reach more than 100 new models in the cadre of EV. Global sales peaked at 2 million units in 2018 alone (Baik et al., 2019). Tesla's main products are EV cars with four segments<sup>6</sup>, namely Large Cars - Model 3 (2017), Sports Cars - Model S (2012), Roaster, and Large SUVs - Model X (2015), and Model S (2012), Small SUVs - Model Y (2019)<sup>7</sup>. Apart from electric cars, energy or solar energy facility installment is the other inventory that generates Tesla's revenue stream. Solar products include solar roof installments (for energy power through the solar system), solar panels' installments for existing roofs (extra panels on top of housing roof), and leasing. Along with its physical products, Tesla offers a wide range of vehicle services and external ones for the energy niches, described in detail accordingly.

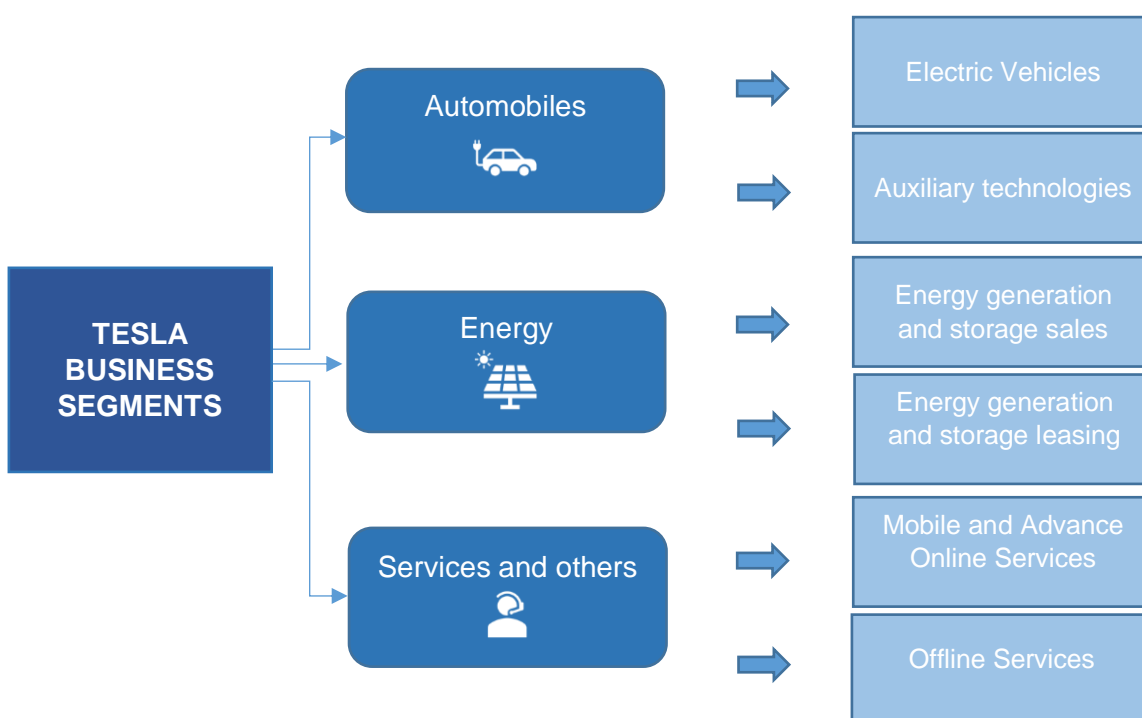


Figure 11 Tesla Business Segments Summary for Products & Services

<sup>6</sup> till 2019, there are only three main segments, known as: Large Cars (largest segment), Large SUVs, and Sport Cars

<sup>7</sup> years of production of each model



## 4.1 Market Trend and Advantages of EV

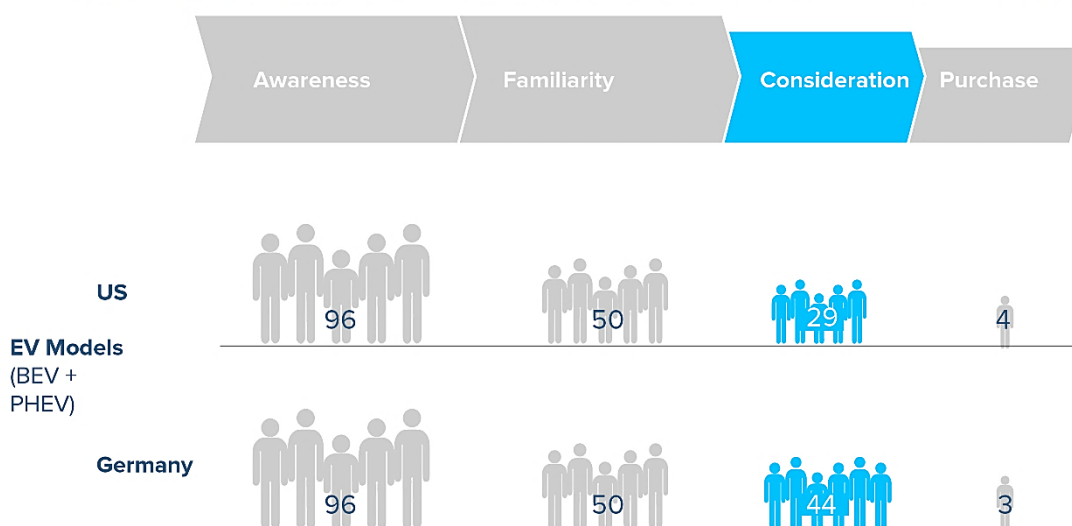
### Shifting Demand

Consumer demand is shifting, supporting e-mobility between almost 30% and 45% of vehicle buyers in the US and Germany, respectively, considered by EV purchase intention (McKinsey National Survey, 2017). Since half of all consumers currently are not yet familiar with the idea of electric vehicles and related technology, OEMs could rapidly increase the number of potential buyers reasonably by running a centered marketing/consumer education crusade.

In a national survey in the United States, approximately 30% of consumers showed interest in buying an EV as their next four-wheeled purchase. In Europe (Germany), consumers considering EV purchase were higher, between 40-60 percent. It was more than 70% in mainland China, given solid government incentives to adopt these vehicles. (McKinsey National Survey 2017.) As new candidates in a new market, Nordic countries, such as Norway, have recently been given robust data on market share, with 54% (2020) vehicles belonging to the EV group (Oslo Reuters 2021). Followed by Norway, Sweden and Finland transformed 32,2% and 18,1% respectively of its total car units into electric powered ones. Demands of EVs between different countries and upward trends have been observed before the pandemic began and even after the virus struck globally.

Response fraction, US and Germany, 2016

#### Percentage of consumers that identify themselves at each purchase funnel stage



Source: McKinsey Sustainable Mobility Initiative - 2016 Electrified Vehicle Consumer Surveys

Figure 12. Purchase funnel percentage of EV models in U.S. & Germany (McKinsey 2016)

## **Incumbent Concept**

Compared to last year's statistics, Tesla Model 3 rose 47% in 2020, with total vehicles delivered from 271,624 to 449,551 units (Q4 & FY Tesla Report 2021). As our interviewer – Bossuyt Sven (2021), described, the general idea of the Electric Car of Tesla is "definitely not new." Nonetheless, the company has found a way to describe its intellectual property position through an "innovative & patentable incumbent.". This opinion is suitable for the fiercer competition and growing threats from domestic companies in China during 2020 when homegrown companies are ramping up the fast regional market and new EV interests<sup>8</sup> are high. Still, deliveries from those mainland China companies, including BYD, Nio, Xpeng, and Li Auto, came short of Tesla's numbers.

## **4.2 Products**

### **4.2.1 Battery**

The Battery is the core product success of Tesla as of its designated honeycomb structure & critical materials. Tesla pays colossal efforts to improve vehicle range for those who got used to combustion engines and later switched to Electric vehicles. Tesla has been improving the EPA-power range through investing in cell design, formation, materials, and integration. According to the newest report, there are two significant core developments of Battery in 2020.

### **Cell Design**

For most automakers, the integration approach relies on many suppliers for both design and component production, known as horizontal integration. In contrast, Tesla utilizes vertical integration when their design belongs to in-house technical talents while outsources the rest of production plans for partners. Tesla invested billions of dollars in capital expenditures (CapEx) on cell design, first to have unique and patentable prototypes, second to open better access to other purposes: range increase, energy storage, and power pump. The battery pack employs the car's total size on the bottom platform with a honeycomb design, allowing manufacturers to calculate, assemble, and scale-space each car model with flexible pack sizes. If some batteries perform at a lower level than designed for, then the OEM can bundle those into a larger volume to have better consumption for their vehicle. (Sven 2021.) One of the cylindrical cell's disadvantages is that they easily get overheated during supercharging. On Battery Day Webinar (2020), Tesla identified a tabless design

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<sup>8</sup> 45% of current NEV owners would purchase another NEV, demonstrating customers' belief in the future of NEVs (KPMG China 2017)

solution, with heat output placed at the bottom, near the cooling layer, enabling heat removal. These features have answered numerous questions from individual investors, institutional ones, and existing users on the battery cell's current problematic shortcomings.

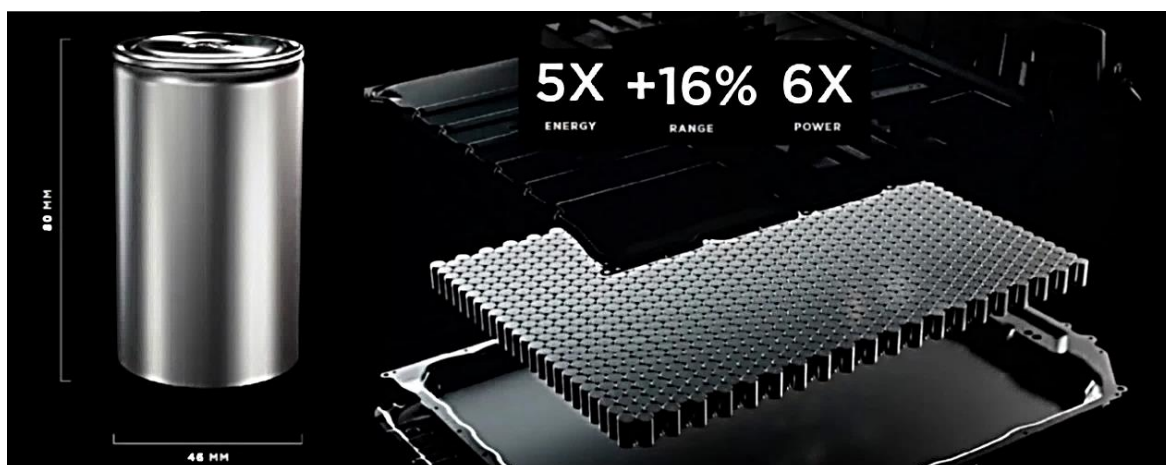


Image 3. Cylindrical battery cell (80x46 mm) and honeycomb structure (Battery Day 2020)

## Materials

According to Prof. Sven (Aalto University), lithium used in battery storage of Tesla's cylindrical structured series is currently the best solution. It has several electrode chemicals and electrode energy storage capacity, enabling atoms to operate entirely. The Battery, in general, includes two extremes: cathode (-) & anode (+). Tesla has replaced traditional anode pole materials with silicon<sup>9</sup> as high availability (known as sand) and higher lithium-ion absorbance (9x more lithium). As a result, anode performance will improve 20% in a better power range, 5% to 12% lower cost between poles, and 6 to 10 times cheaper than their existing methods (\$1,20/kWh). (See Table 1)

Table 1. Anode methods and cost-related information in the Tesla battery plan in 2020 (Battery Day, 2020)

Anode methods	Cost (per kWh)
Silicon structure in Sio glass	\$6,60
Silicon structure in Graphite	\$10,20
Silicon nanowires	\$100
<b>Tesla silicon</b>	<b>\$1,20</b>

However, the silicon itself can have particle cracks and passivation declining energy retention. As Musk explained in Battery Day in Q3, 2020 (Figure 13)

<sup>9</sup> According to SVP Drew Baglino, they will “not enable all of silicon as they're not scalable enough”.

*"I was going to say it's tough to exactly figure out what the right analogy is to explain a cathode and anode. But a bookshelf is probably a pretty good one in the sense that you need a stable structure to contain the ions. So you want a structure that does not crumble or get gooey, or basically that that holds its shape in both the cathode and the anode. As you're moving these ions back and forth, it needs to retain its structure. So if it doesn't retain a structure, then you lose cycle life and your battery capacity drops very quickly."*

Figure 13. Musk's presentation subtitle in Battery Day (Musk 2020)

People do not need as much range as they think they need; for most of the trips, they take far less than the range users want – Prof. Sven pointed out. However, for end-users and investors, better power range and cost reduction mean more profits. The new Battery news was announced during the company's much-hyped "Battery Day" event in California when the stock was already escalating around \$400/share after the split.

#### 4.2.2 Automotive Products

In *How Tesla Sets Itself Apart*, Lou Shipley (2020) - former CEO of Black Duck Software, indicated how easy it was to buy automotive products from Tesla: "You go online, pick a model, add your features, place your deposit, and schedule pickup. Done." This process highlighted the Unique Sale Point technology in purchasing, where customers are in the center of control, and the OEM directly transfer the buying process. (Shipley 2020.) We will focus on product impacts that influence expectations on the future sustainable development bringing stock effects.

#### **Socio-Technical Transition (Sustainability Transition)**

Nieuwenhuis (2018) has restated from Geels (2005) about the existence of several competing power train technologies, notably; steam, electric traction, and petrol I.C transition, in the transport system from the principal use of cattle carriage (horses) to vehicle's transmission. The automotive community sees Tesla as a transition phenomenon in this social-technical evolution. However, Tesla was not the first EV producers leader as other mainstream producers (i.e., Mitsubishi, Nissan, and Renault) fueled this tendency for a decade ago with limited versions. Tesla positioned itself as a premium maker, designed-led followed by how Apple products align within its sector. (Nieuwenhuis 2018, 34-35.) Tesla hits customers and investors with a strong belief in renewable energy that brings sustainability, greenhouse gases, and CO<sub>2</sub> reduction in the economic sector and savings through storage and components ecosystem. Tesla ecosystem was reaffirmed in 2020, especially during the COVID-19 pandemic with many Tweets on carbon captures, carbon-dioxide reduction, the real-time counter on the issue. Till 2020, Tesla has been saving more than 5M tons of CO<sub>2</sub> emission in total by different automotive models in the USA alone. (Realtime Carbon

Impact 2021). Customers/outside are paying attention the most to environmental issues. However, those are usually overlooked<sup>10</sup> by investors, as investors analyze market trends based on customer behaviors. Tesla delivered their ecological stories and using lines through direct user experience. In Impact report 2019 (2020, 8), Tesla addressed its carbon reduction amount compared to emissions from being released into the environment from ICE vehicles (from over 500K tons with a fuel economy of 22 miles per gallon (MPG)). Environmental protection on consumer's beliefs is one of the potential factors shaping their purchase decision of environment-friendly products (Wang & Zhou 2019, 12). Purchase decisions have been increasing, and market trends and regulations have provided Tesla with opportunities in target markets, emerging markets, and new penetration for potential ones.

### Technical Aspects

Apart from product rangeability, car consumers rely massively on savings in energy costs, performance, efficiency, and reliability. Since 2013, Tesla has focused on utilizing key technology as the OEM realized the critical success for the emerging market are on product performances & transition networks. Model S (average model of Tesla) has significantly enhanced its vehicle range from 107 to 249 miles per charge within five years (Department of Energy EPA 2017).

## EV range of selected MY 2020 electric vehicles (in miles)

Electric vehicles - range of selected models 2020

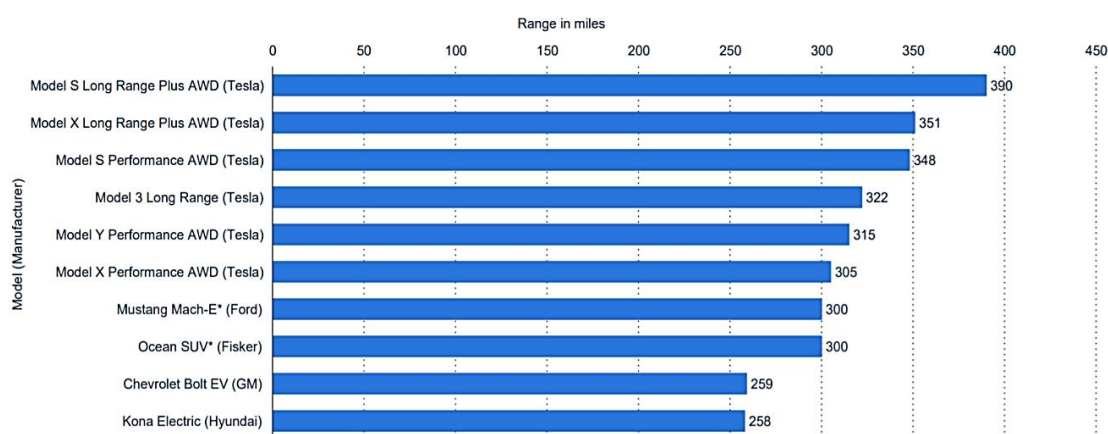


Figure 14. EV ranges of selected models year 2020, in miles (Statista 2021)

<sup>10</sup> Counter arguments on whether emission reduction is "real" or not, by taking closer look to the emission of CO<sub>2</sub> and chemicals through manufacturing process of battery.

This endurance in Model 3 (Standard) is higher at 263 miles/charge, while the Long-Range version could go up to 353 miles for each filled-up nowadays.

Taking a closer look at the update in Q3 of Tesla regarding battery material and structural improvement as in 4.2.1 section, hypothetically, with Tesla's coating design, using raw silicon, various cars' models will improve 20% more increase in range (See Figure 13).

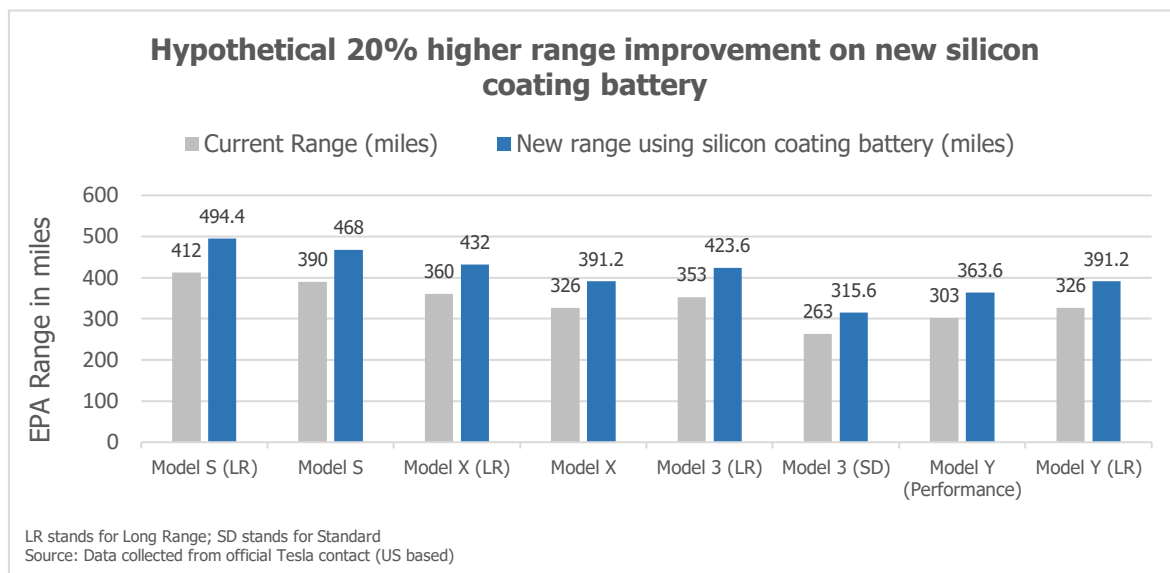


Figure 15. Hypothetical 20% higher range improvement on new silicon coating battery

Electric vehicles economically cost less than half of the operating cost compared to their combustion-powered counterparts (University of Michigan's Transportation Research Institute 2018). Vehicle selection and driving style can substantially impact electricity usage as it does on fossil fuel demand. EnerGuide estimates that the cost of electricity per 100 kilometers is well below €4 and even €3 for some vehicles (See Appendix 4). The average price to operate an EV in the United States is \$485 per year, while the average gasoline-powered car is \$1,117.

Meanwhile, based on European Union data about gasoline price & electricity, we have calculated the average cost of a Tesla car in Europe with its cost-related efficiency. To run an E.V<sup>11</sup>, specifically Model S<sup>12</sup>, wheel handlers need to spend from 411,49€ to 933,74€ (between highest and lowest electricity cost on 2020) with an average price of 601,717€ while the average cost of an ICE model is approximately 2036,09€ a year/20,000km. According

<sup>11</sup> Time frame calculated in 2020.

<sup>12</sup> Model S as the intermediate product range of Tesla

to our calculation comparison, Germany is among the most expensive candidates to use Tesla due to high electricity prices (See Appendix 5).

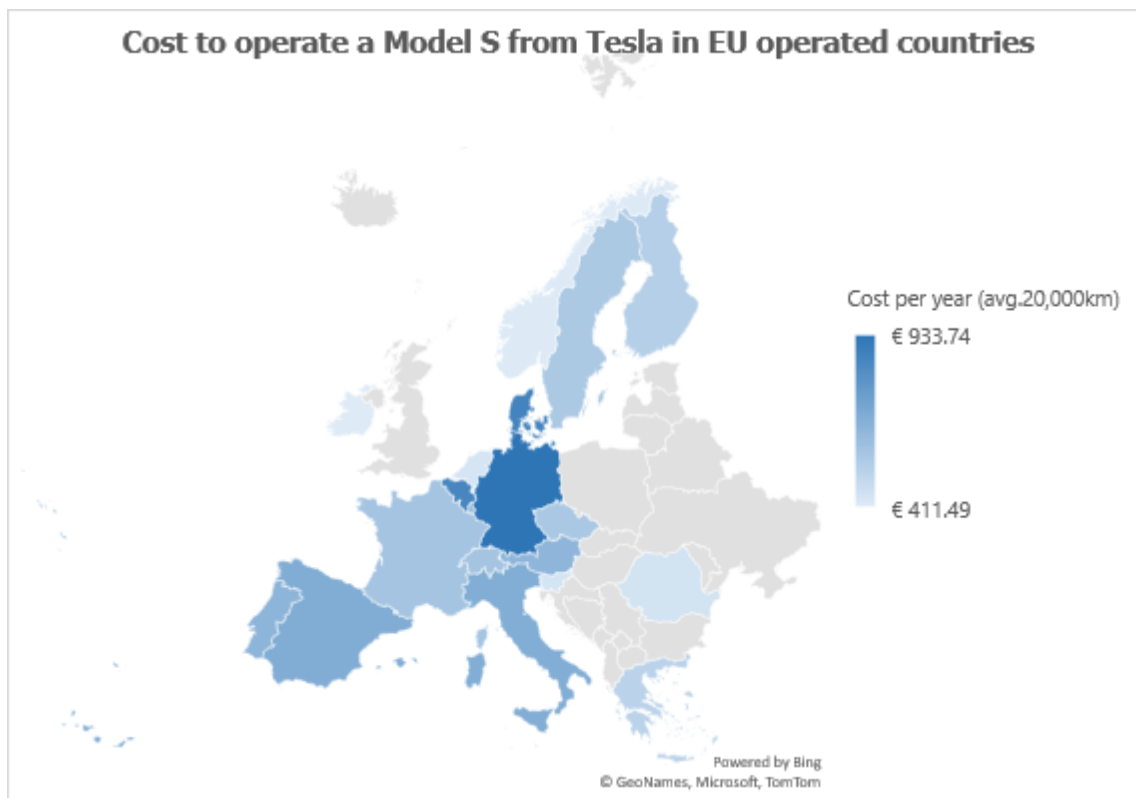


Figure 16. Cost to operate an EV between countries in Europe - Tesla Model S in 2020

### Infrastructure Auxiliary

One disadvantage of the EV car is that it has a limited travel time & long gap time between each charge. Taking Model S into account, the total hours to fully charge a 70kWh Model S with a standard wall outlet would be up to 50 hours and up to 11 hours with a 220-volt, 6.6 kW line. Charging infrastructure needs to be accessible, user-friendly, and relatively inexpensive to ensure the commercial success of EVs (Lee & Clark 2018, 18). Tesla has been focusing on upgrading the Supercharging points and home chargers. Till 2020, Tesla had operated more than 23,000 supercharger stalls with over 2,500 stations worldwide (Q4 Tesla 2020). This growth encountered 112,78% and 150,29% over two years for supercharger stations and booths accordingly. (See Figure 17)

Supercharger brings three benefits that attracted the most to users: *Convenience* (20,000+ Global Superchargers); *Time-savings* (15 min recharge up to 200 miles); *Cost reduction* (less expensive<sup>13</sup>). These three main improving benefits reduced and adapted

<sup>13</sup> see Technical Aspects section

to its limitation on operating procedure during and before travels, bringing better competitive factors to their counterparts.

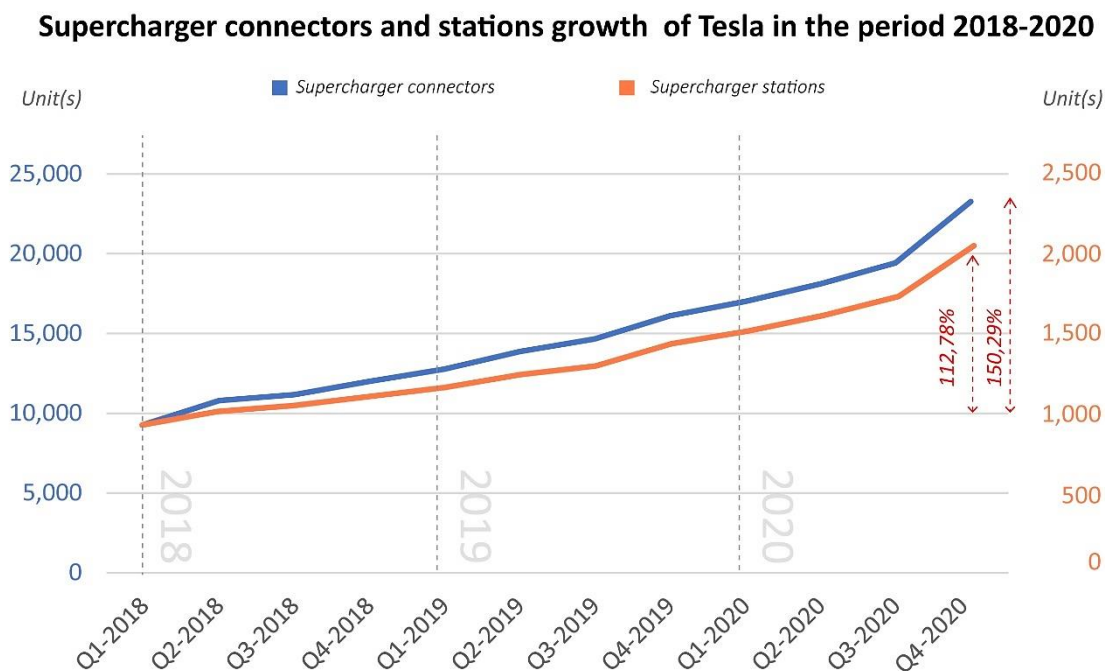


Figure 17. Supercharger connectors and supercharger station worldwide of Tesla between 2018-2020

Additionally, the improvement in its value-added auxiliary signaled its healthy business operation during uncertain times. Arguably, the network of charging stations achieves Tesla's foreseeable future problem of selling electric cars. Moreover, Tesla enables its user to access Service stores/centers, growing<sup>14</sup> geographically and online. This retail footprint enables Tesla to access brand image, familiarity, convenience to users, and boosting demand for products through store availability to generate better income.

### Manufacturing Pledge

Capacity and production plans from Tesla had been ramping up at high speed. Over four quarters in 2020, Tesla achieved positive production scales with an increase in annual capacity, model production, & construction progress. Manufacturing expenditure & expansion have provided a better approach for users from the targeted markets and adapted the enterprise to the increasing demand of customers worldwide.

<sup>14</sup> As of 31st December, there were total of 162 stores in US, more than 120 units in China alone, and other 34 countries (Tesla Find Us, retrieved 12/2020).



Table 2. Manufacturing progress of Gigafactory plants (Tesla Q1-Q4 2020)

PLANTS	EV TYPES	CAPACITY (Units/year)	STATUS
Fremont, California	Model S/X	100,000 (90,000)	Production
	Model 3/Y	500,000 (400,000)	Production
Shanghai	Model 3/Y	450,000 (200,000*)	Production (Construction)
Berlin-Brandenburg	Model Y (Model 3/Y)	-	Construction (Development)
Texas	Model Y	-	Construction
	Cybertruck	-	Construction (Development)
To-Be-Determined (TBD)	Cybertruck, Tesla Semi, Roadster, and Future Products	-	In development

Noted: Contents in "()" reflect Q1's progress

\*Capacity for Model 3 only from Q1. Total 450,000 unit/year included for both models listed

#### 4.2.3 FSD (Full Self-Driving) Experience

The idea of FSD was first publicly mentioned in Musk's conversation with Google in 2013, reported by Bloomberg (Ohnsman 2013). After several years, developing Autopilot features (later known as Enhanced Autopilot – E.A.), the Full Self-Driving beta version was released in early October 2020 – Q3 Earning call and promised to be on subscription in early 2021 during December same year. It is noticeable that this technology was at first only available in luxury vehicles. Research from McKinsey in 2016 showed that drivers, on average, would rather spend an extra \$500 – \$2,500 for their cars to have different advanced driver-assistance systems (ADAS). (Heineke et al. 2017.) This willingness to pay and reduce cost in distance travel through time indeed benefits both end-users and OEMs, in this case – Tesla. Pertain to the report, fully autonomous vehicles would not be available in the next ten years, counted from 2017, which means Tesla has been gradually stepping up to this technology earlier than expected. This excitement caused even higher hype to the shareholder's deck, referring to Musk's Master Plan 4 years ago (07/2016). The Master Plan suggested that once autopilot cars can drive themselves, car owners can generate passive income from them through Tesla's fleet sharing system when not using it (generally known as Automatic Shared Transport/Robot-taxis).



Image 4. Elon Musk discussing 'Autopilot' systems to Google (Beck 2013)

#### 4.2.4 Energy Products

Solar Energy will provide an indispensable position in the future, where reducing dependence on fossil fuels and resolving environmental problems will be at the top precedence (Singh 2013; Moosavian et al. 2013; Tagliapietra et al. 2019).

#### Value of renewable energy capacity investment in Europe in 2019, by sector (in billion U.S. dollars)

Europe: renewable energy capacity investment by sector 2019

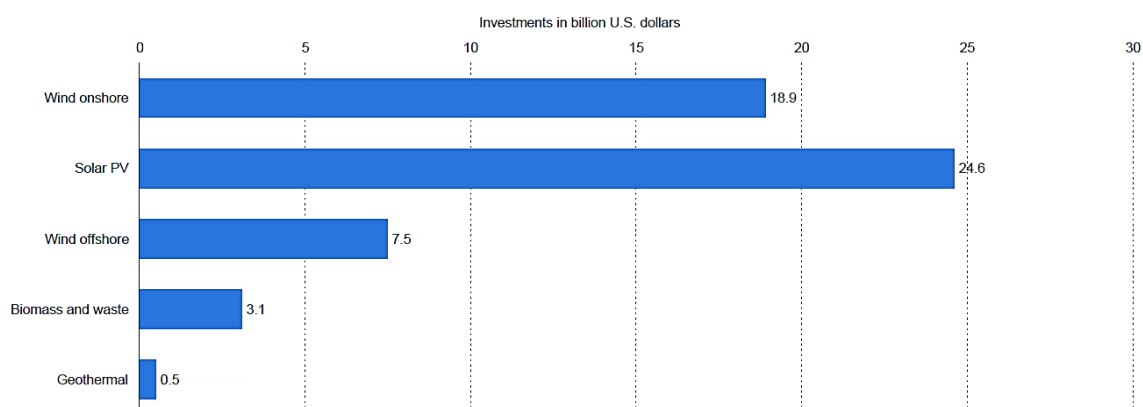


Figure 18. The investment value of renewable energy in Europe in 2019, by sector (in billion U.S dollars) (Statista 2021)

Among different renewable sources, solar energy has attracted better awareness world-wide due to its availability (Khajepour & Ameri 2020). According to the world's renewable energy investment trend, Tesla has been growing with solid movements from the European market, specifically (Figure 18) along with the targeted market installment of renewable energy (Figure 19) in China, USA, and Europe accordingly. Wind and Solar power accounted for 90% of the world's newly added renewable energy (IRENA 7/2020).

The increasing capital expenditures and capacity installments in solar energy reflect the potential signal for companies that work in the field with applications using renewable energy like Tesla. China showed tremendous progress in Solar energy and renewable energy. Growth in 10 years surpassed 242 times in solar power production (PROD) from 730 GWh to 178,071 GWh<sup>15</sup> over 200 times in solar energy capability (CAP) from 1,022 MW to 205,493 MW<sup>16</sup>. Meanwhile annual CAGR (Compound Annual Growth Rate) in CAP of the US is near 8% (3,382MW in 2010 & 62,298MW in 2019. (IRENA 7/2020, 40-47.)

#### Leading countries in installed renewable energy capacity worldwide in 2019 (in gigawatts)

Renewable energy capacity 2019, by country

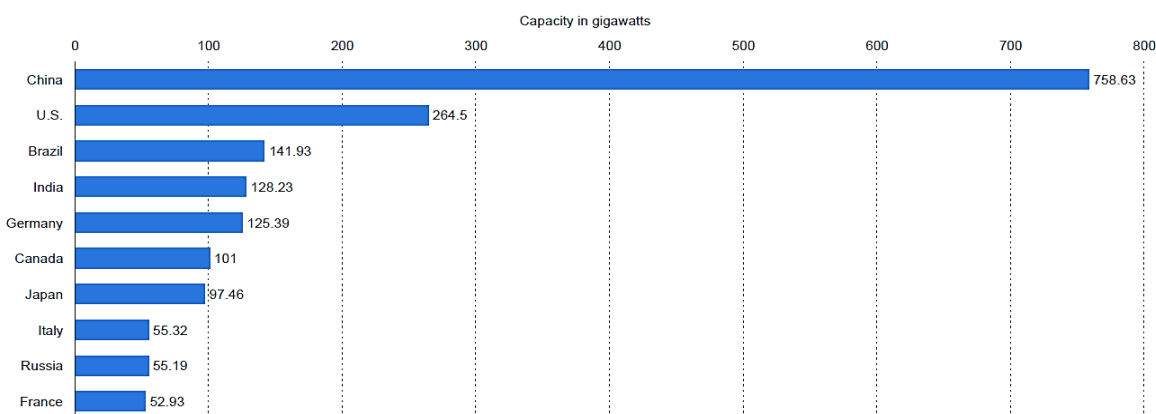


Figure 19. Leading countries by capacity renewable installment in 2019 (in gigawatts) by countries (Statista Renewable Energy Dossier 2020, 3)

Tesla's top products in the Energy business include energy storage (Powerwall, Powerpack, and Megapacks), and Solar Deploy (Solar Roofs, Solar Panels, Solar glass Roof), together with Leasing plants of all above.

Although the current Energy business & Deployment of Tesla accounted for a small part of its revenue stream – only 6.32%, the segment has proved its significance to the whole

<sup>15</sup> Gigawatt hours (GWh)

<sup>16</sup> Megawatt =MW

ecosystem, regulation amendment, and potential growth rate. The world's energy consumption adjustment in targeted markets left optimistic between long-term investors.

Table 3. Solar Products in Energy Sector of Tesla till 2020 (Tesla Official)



#### 4.3 Services and Others

Like other automakers, Tesla's Service & Others comprises Customer mechanicals and Counter & Wholesale service point, Warranty, Internals, and further related assistance specialized for E.Vs. The firm operates its services offline at Tesla's franchised Service points and online with mobile applications for Automobile and Energy. Tesla tells apart its

EV service with tech-savvy applications, also known as a tech-heavy stock due to its progress in over-the-air and seamless mobile applications. Service infrastructure provided more than triple capacity in 2020 than the previous year, at 80% problem solved outside service center (B2C), and 100% mobile coverage. According to figures from further research by the National Automobile Dealers Association (NADA) (2017), service and part sales accounted for over one-third of the gross profit. They continued year-over-year to nearly half of its significant (46,3% in 2019) at franchised auto dealerships (B2B), even though they typically only encompass about 12% of total sales. (NADA 2017-2020.) By the first half of 2020, growth in services between car dealerships dropped quickly (16.96% down to 51,9B\$) due to closures & a significant portion of cancellation between services units early in the pandemic.

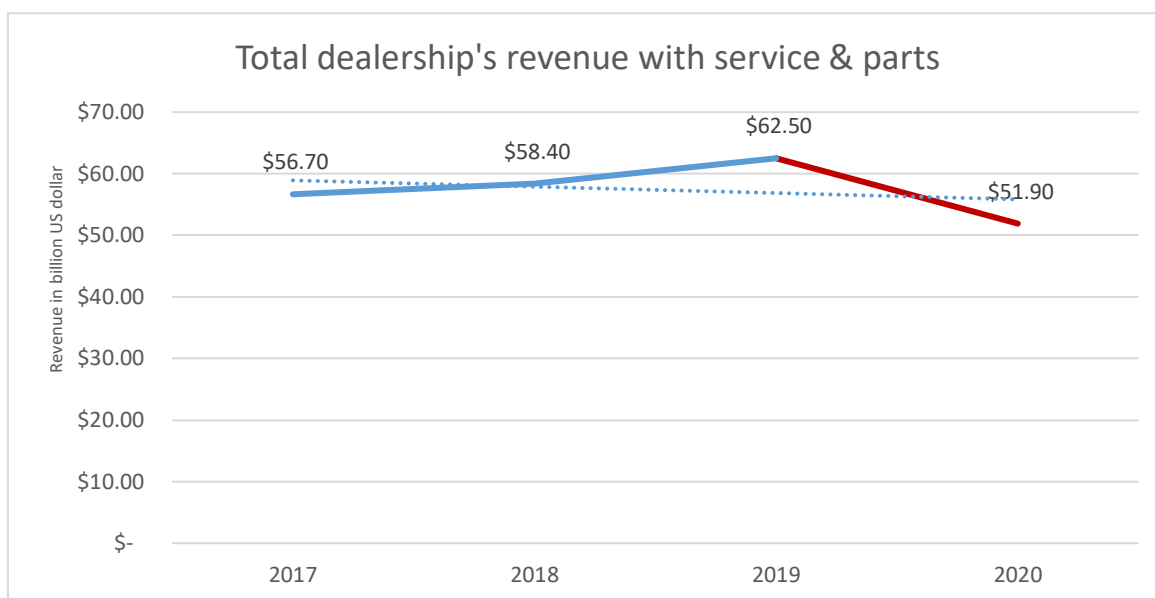


Figure 20. Revenue of service & parts sales of Automakers worldwide from 2017 to 2020 (NADA 2020)

Meanwhile, Tesla also dropped its service operation mildly in Q2<sup>17</sup> then quickly rebound its service venture two quarters after that. However, service operations brought negative turnover compared to Energy service despite higher revenue generated, extracted from Financials part.

<sup>17</sup> Q2 dropped by 13.03% with revenue generated at \$487 million, compared to Q1's result at \$560 million.

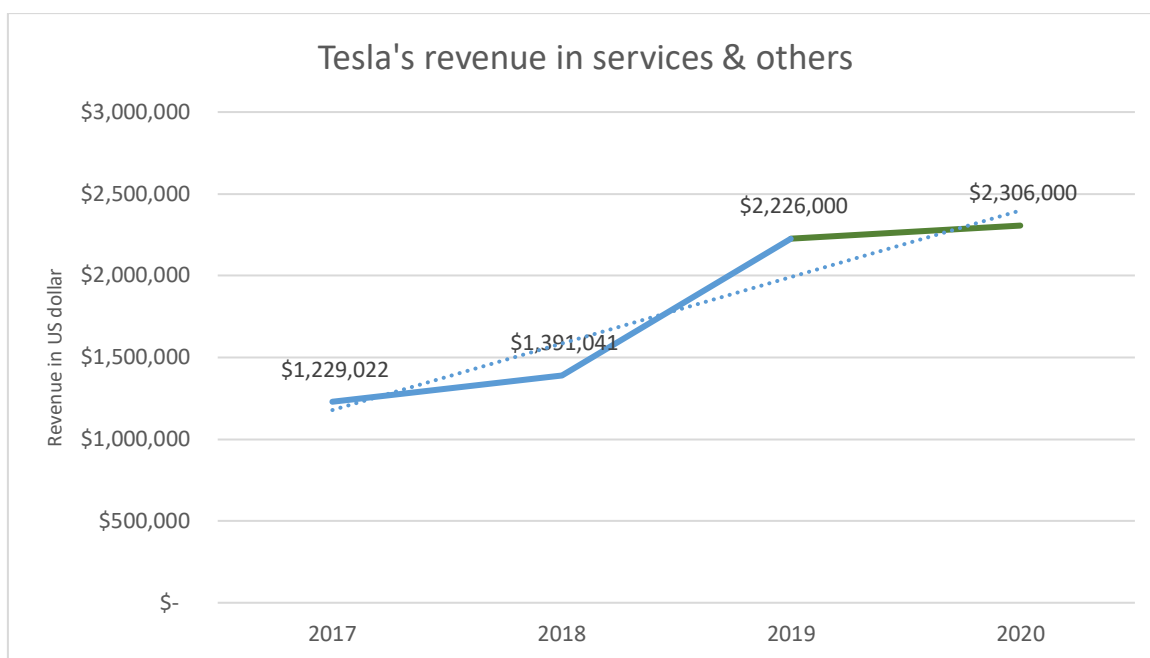


Figure 21. Service and others' revenue of Tesla from 2017 to 2020 (Tesla 2021)

## 5 COMPANY FINANCIALS

Due to the limited research scope in 2020, we provide critical highlights of Tesla's financial health in vertical analysis with three basic monitors: Operation and Income statement, Balance sheet, and Cash flow statement. We will go through key points analysis, which is considered necessary for a tech-automotive sector during the journey and differentiating Tesla from its counterparts. To emphasize the effects of Tesla's financials' actual figures, we included opinions from our researcher's interview & their counterarguments.

### 5.1 Income Statement

The income statement presents the company's business activities' financial results over a specific period, which are quarterly results, half-year, or full-year one (Robinson et al. 2009, 6).

#### Revenues & Cost of Revenues

In 2020, Tesla's revenue improved nearly 100% (1), from \$5,985 to \$10,744 million<sup>18</sup> in Q4 compared to the beginning quarter of the year. For the full year, Tesla generated over \$31,5 billion while growing YoY over 28% of total revenue compared to 2019 (\$24,5 billion). Fleet counts or units sold growing with ranges from 80 to 180 thousand units has made Tesla's total deliveries of EV at near 500 thousand cars, including nearly 90% of Model 3/Y as main the company's products. Fleet's sales quarterly, additionally, grew constantly from over 88,000 to over 180,000 vehicles, at 104,1% (2) higher margin.

Tesla bumped later 20% of its worth in July and tripled up its listed price until December 2020. Meanwhile, other Automotive groups were still scaling up to break even, yet the rates were relatively sluggish and insignificant as most of them turned green since mid-November. In the same month, Tesla had almost 600% up in its assessment. From the lowest point till the end of the year, Tesla had risen its value from range 70s dollar per share up to 700s in counterpart unit. That Tesla's value was strengthening helped the enterprise market capital increase by around \$620 billion (620B) of flat value from \$79B market cap of the lowest point in March since the virus broke out.

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<sup>18</sup> Of which \$9,314 in auto revenue alone (Q4, Tesla 2020)

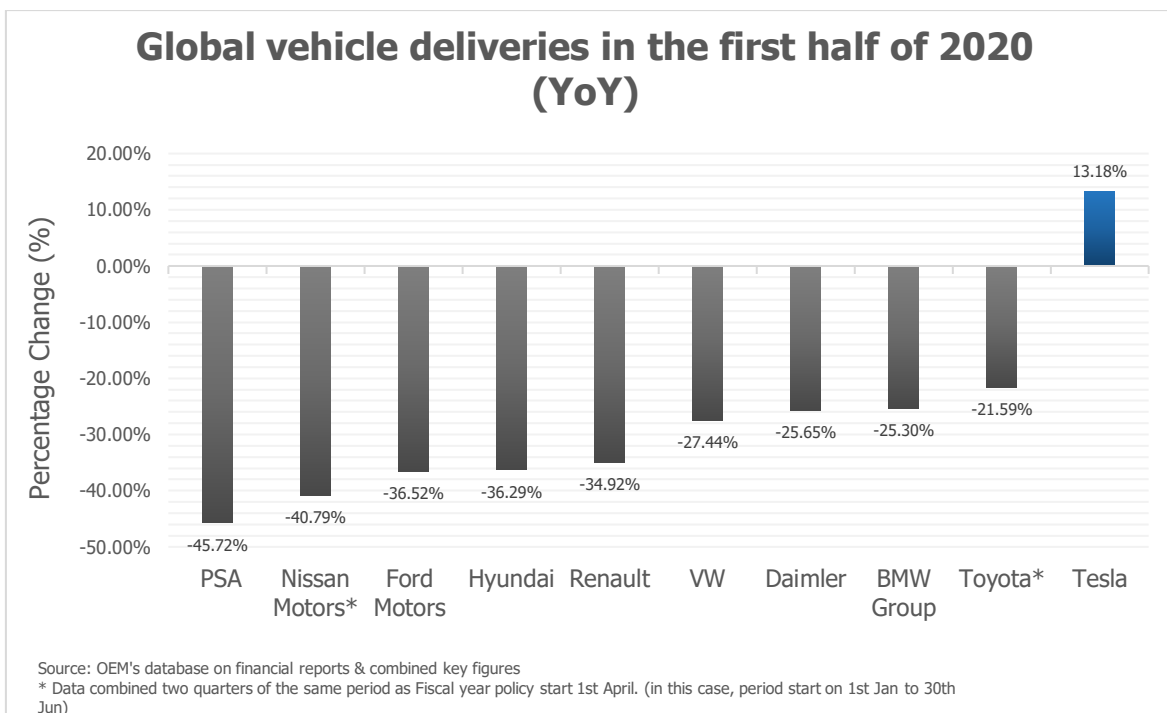


Figure 22 Global vehicle deliveries in the 1st half of the 2020 year over year (Appendix 1)

The revenue growth is related to an increase in units sold (Figure 23); however, the scale of Tesla's production is relatively tiny compared to other manufacturers in terms of quantity.

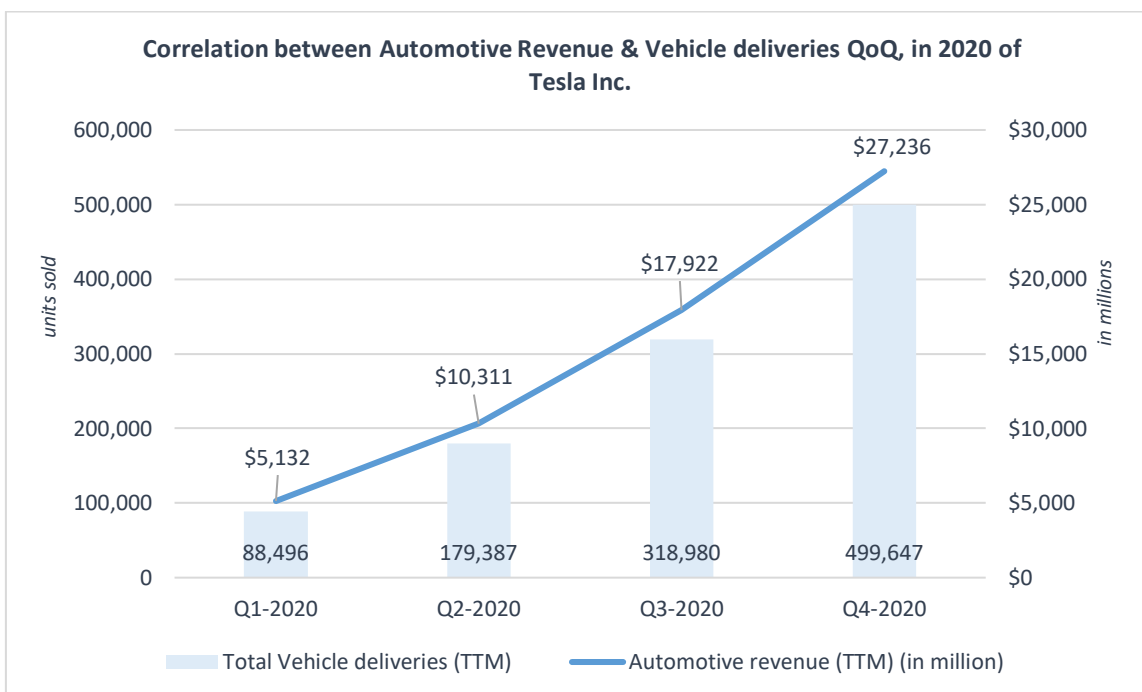


Figure 24 Correlation between Automotive Revenue & Vehicle deliveries QoQ, in 2020 of Tesla Inc. (FY Report 2021)



The price of EV models did not change much compared to the previous year, as Model 3 (SD), for example, rose 990\$ in 2020, compared to 2019, while general depreciation is low, under 10% a year/20,000 mile.

Tesla showed considerable progress in supporting its premises, with nearly 100 stores & service locations added over the year worldwide, with additional 19% growth. We already discussed Supercharger's connectors and stations related (Figure 17), 40% growth in the automatic service margin.

From usual business operation, Tesla's EBIT showed substantial expansion with gross profits strengthen starting from later half year at more than \$2 billion for both later quarters, making its gross profits for the entire year near \$6,5 billion. The company is still profitable over time, with net income Q4 ended near \$300 million and overall, \$862 million despite the high costs in R&D and SG&A Expenses.

### **Operating Expenses**

It is good to know that Tesla had spent over 1,2 billion U.S. dollars researching and developing its product and manufacturing process. According to Prof. Sven, once Tesla successfully expands its manufacturers in Europe and Asia, it can access huge profits in product cost deduction from applied assembly geographically.

Spending on SG&A Expenses swelled more than one-third of expenses in Q4 than Q1 means Tesla had been spending more on lease payments, marketing, promotion, bookkeeping, legal action, holiday compensation, and more in the last quarter. Rationally, the company's profits from the previous quarter are considerably less than Q3 even though revenue generated better from automotive sales. Besides, energy business and services caused loss due to higher costs from the operation, store openings, manufacturing expansion than total revenue generated. Net income peaked in Q3 with a total of \$369 million thanks to the high-profit margin<sup>19</sup>, then dropped 19% in the final quarter at \$296 million due to higher operating costs.

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<sup>19</sup> Margin 28% (Balance Sheet, Figure 24)

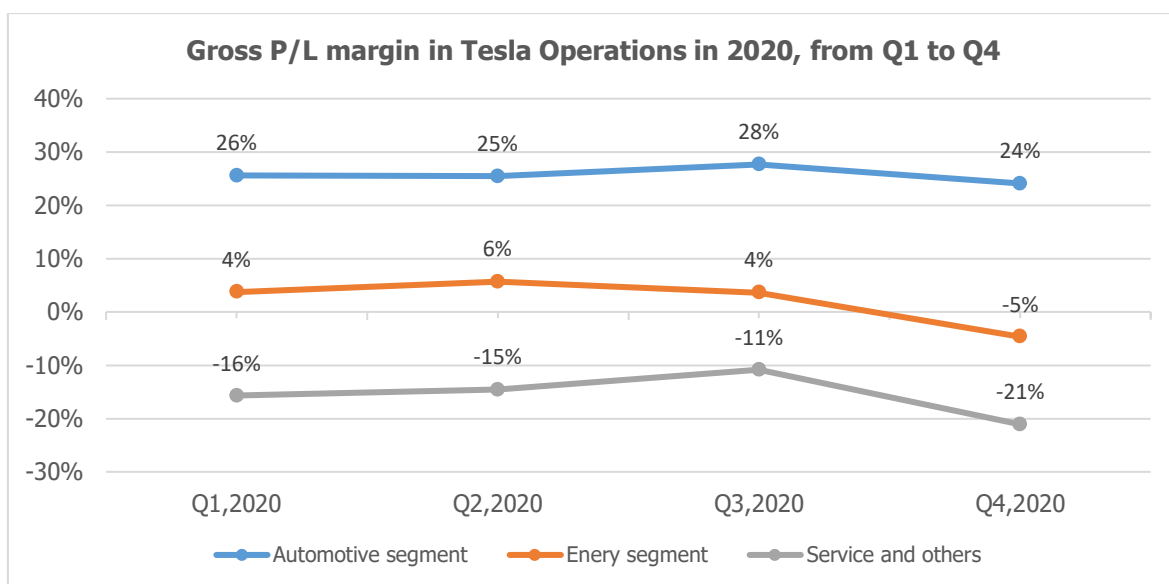


Figure 25 Gross P/L margin in Tesla Operations in different segments in 2021, Q1-Q4 respectively (Tesla Q4 2020)

### Income from Operations

As a result, figures explicitly reflect through Earning-Per-Share (EPS), in this case, diluted EPS<sup>20</sup>, as diluted EPS busted from \$0,02/share in Q1 to strengthen up to \$0,27 (16 times) in Q3, and gradually cut by \$0,03 in ending term at \$0,24/share (after the split).

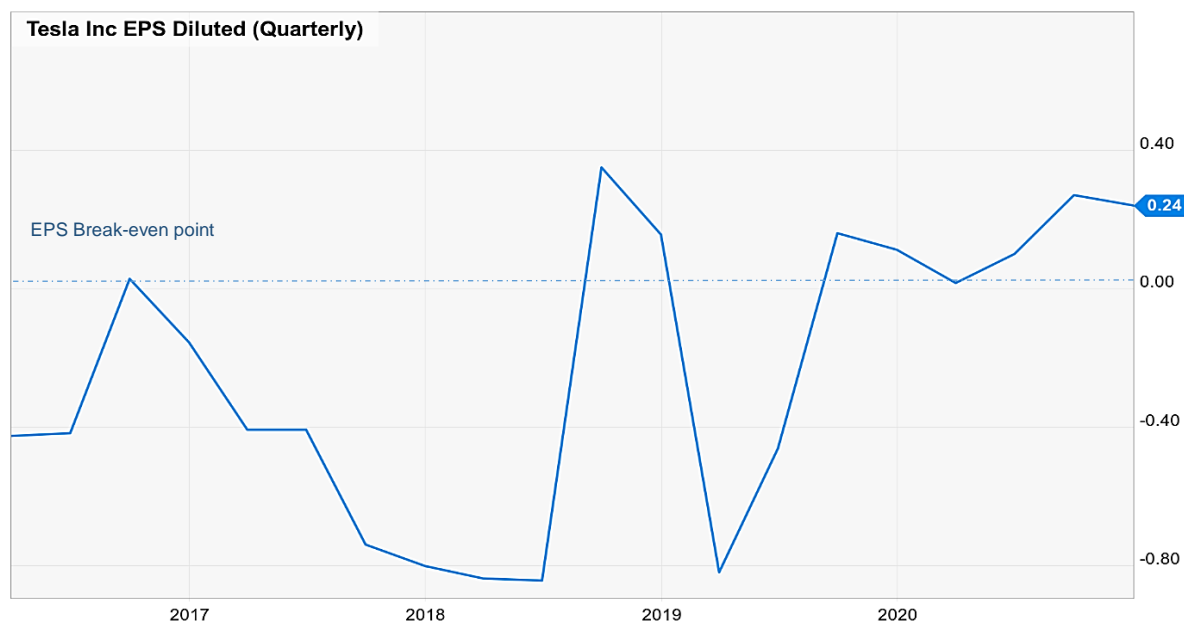


Figure 26 Quarterly EPS (Diluted) quarterly reported from 2017 to 2020 (retrieved in March 2021, Ycharts 2021)

<sup>20</sup> Diluted EPS reflects overall monetary value per shares as all convertible securities are exercised to convert into common stocks and tends to be lower than normal EPS.

We must notice that even during the pandemic, Tesla paid positive EPS for stockholders, compared to the past three years (quarterly diluted EPS stayed above 0 points)

Taking a tighter glance into the company's valuation during the period from Q1 to Q2, Tesla received high appraisal from investors where stock price climbed after each quarter's earnings call (noted as E), respectively and gradually with valuation added triple from ~\$120B in late March up to \$330B range. Tesla showed minor damage than other manufacturers in the same sector and even profited from positive vehicle deliveries (Figure 4, Global Deliveries). By the time Tesla's data also beat analysis expectations on deliveries and advanced diluted EPS of 525% from \$0,08/share up to \$0,5/share before the split. However, the boost during the time was likely not rational enough as the company's indestructibility during the pandemic did not suggest its profits during operations. We could see that Q2 Tesla's net profit and EPS were reasonably the same as in Q4,2019, where valuation in Q4/2019 was only \$100B range compared to ~\$330B range. In this period, the company's investors assumed to rely mainly on the company's data on Vehicle deliveries and consecutively beat estimations from analysts/financial institutions rather than operation key metrics. Higher momentum trading stockpiles at larger volume during pandemic also brought higher positive-feedback trading and a robust upbeat relationship between the trading rate of recurrence and investor sentimentality beyond traditional expectation. (Hu et al. 2015, 112.)



Figure 27 Tesla valuation chart Q1-Q4 2020

## Earnings

PER or P/E ratio is also a great tool to measure a company's valuation after EPS got released using trailing-twelve-month data (TTM)<sup>21</sup> updated regularly. High P/E suggests that the stock's price is exceedingly evaluated compared to its actual earning returned. Investors are paying more than what they expect to make based on their past or future earnings. As EPS (TTM) in Q1 considered previous data from 2019, it stayed below zero even though the quarter EPS was 0,02. After Q2's earnings surge, accounting for positive data (TTM), Tesla was traded above 0 P/E for the first time, fueling trading interests on the stock, despite a high P/E ratio. The number stayed much exceedingly compared to the whole sector (8,9 on average). It could be reasonable when looking into past performance, where EPS diluted (TTM) numbers were far below positive earnings data of 2020.

Table 4. EPS diluted (TTM) of Tesla from 2018 to 2020

Quarter	2018	2019	2020
Q1	-2.788	-1.158	-0.174
Q2	-3.224	-0.776	0.388
Q3	-2.134	-0.966	0.498
Q4	-1.176	-1.01	0.626

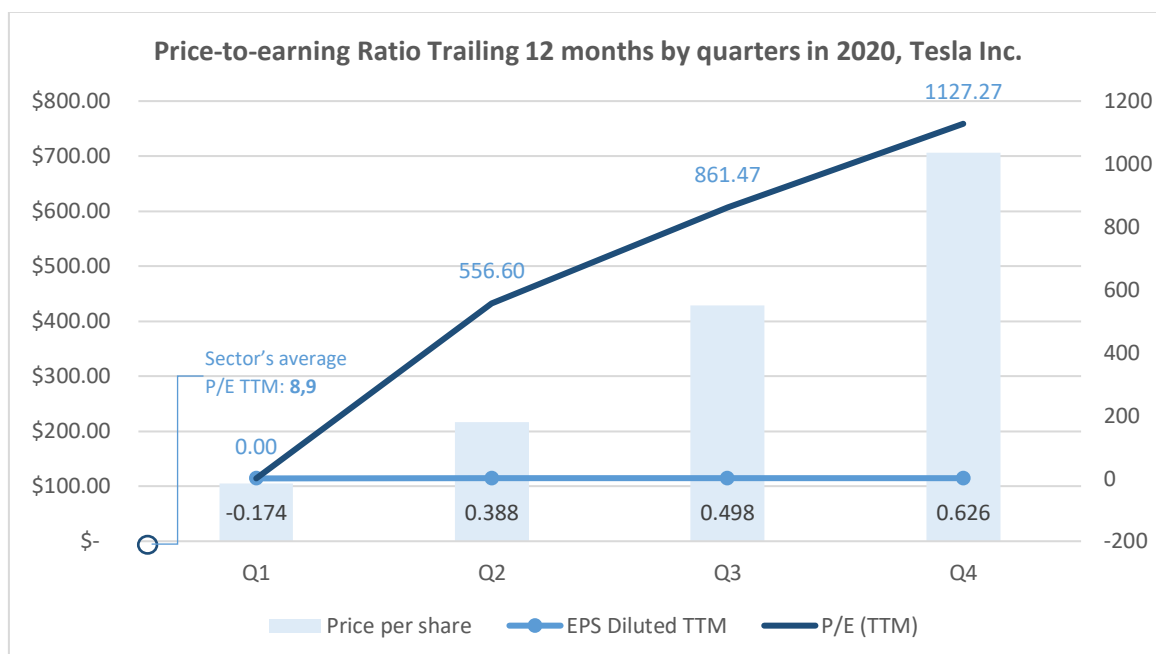


Figure 28 Price-to-earnings Ratio Trailing 12 months by quarters in 2020, Tesla Inc.

<sup>21</sup> EPS diluted (TTM) is different from reports as it accounted for previous quarter's data known as total earnings or profits the company has made over the last 12 months.

However, in this case, prices traded per share were extraordinarily elevated. As a result, they led to the ratio at extremely high. Nevertheless, we must remember that many companies in history have also been trading at such high P/E points.

## 5.2 Balance Sheet

### **Assets**

Total Tesla's current asset in 2020 strengthened from \$14,893 to \$26,717 million (Q1-Q4) in value with a kickoff starting in Q2 of 139.90% growth in Cash and Cash Equivalents (CCE) value at \$19,384 million in ending term. The abundance in CCE showed its flexibility in the instant need for money flow generated from checking accounts, funds, treasury bills, and securities, which can immediately turn into Cash. With higher liquidity ratios thanks to the growth in CCE in Q2, investors considered Tesla as healthier and poses less risk probability, which contributed to the development of stock's value in late Q2 onwards. Provided that liquidity was getting improved, Tesla would have a better ability to meet short-term obligations and bring better firm's ability to pay its short-term debt. Tesla reinforced its Property/Plant/Equipment regarding physical assets, not including accumulated depreciation and depletion gross metrics, at more than 2 billion dollars with a 22.61% increase year-over-year. Solar business & Inventory saw a minor drop in the assets at over \$100 million and \$350 million. For a whole year, Tesla's total assets saw a constant expansion from \$37,250 to \$52,148 million, hoarded of more than \$15 billion in total assets, mainly fresh CCE. The boom in late Q2 is related to this burst in CCE, where the company is determined to be an abundance in Cash known as a low-risk asset (liquidity) and likely to pay off its short-term debt at rapid speed (solvency).

### **Liabilities**

Regarding Liabilities, Tesla's long-term debt for the fourth quarter of 2020 was \$9.607B. A 17.42% decline year-over-year with Account Payables (A.P.) from suppliers nearly doubled at \$6,051 million compared to \$3,970 million in Q1. With debt reductions and abundance in Cash on the company's scale, Tesla is solvent, which means it has adequate resources to cover its obligations. Meanwhile, Tesla's equity's jump mainly driven by shareholder's equity, which was \$23.075B, a 209.03% increase year-over-year, operated by a 5-1 stock split and retained earnings. The news is a factor propelled by investors and institutional funds invested in the company through capital stock, accumulated earning reinvestment, and expected stock exchange surplus. Higher stockholders' equity indicates more balanced fi-

nances and fewer surprise losses thanks to unconstrained payment obligations in the litigation of an economic or financial depression, in this case, COVID-19. This financial cushion implied Tesla's health during the economic suspension in every corner of the world.

Taking a closer look into the Book Value of Tesla when the company liquidates all its assets to pay off all liabilities, we could see that Tesla's stockholders were trading at a high Price to Book Value ratio (P/B). Tesla's 45.53 % institutional investors and public traders had been increasingly loading up their portfolio with a higher-than-expected liquidation rate (P/B) and having firmer belief on future earnings – 33.12 P/B at the end of the period. (Figure 18). For tangible investors, such high and growing P/B means the stock is overvalued, especially in the case that the P/B ratio of the automotive industry (Auto & Truck Manufacturers Industry) ranges only from 7,74 to 8,23 in 2020 (CSI Market 2021)

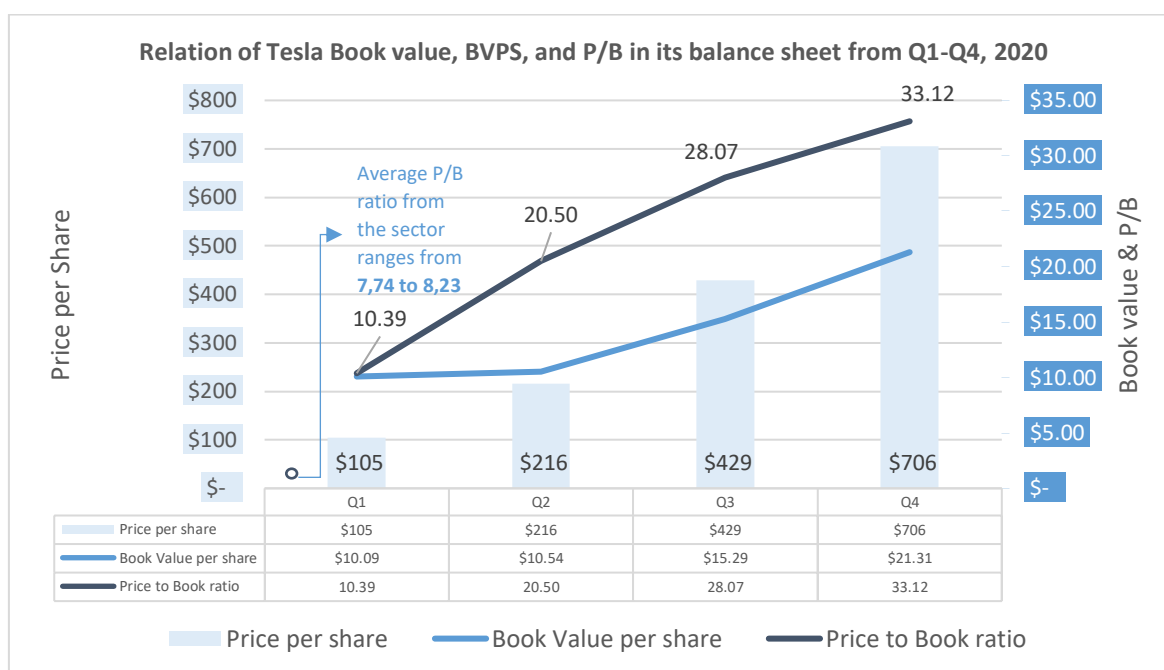


Figure 29 Relation of Tesla's Book Value and P/B in Balance Sheet from Q1-Q4, 2020 (Tesla FY 2021)

ROI (TTM) displays the company's yield on the Long-term Investments during straight years, one of the factors that formulate investor's expectations. In the fiscal year 2020, ROI (TTM) improved to 2.33 % compared to the previous year, due to net income growth and Investments (TTM) strengthen generated by Total Long-Term Debt, Other Long-Term Liabilities, Shareholder's Equity, and Noncontrolling interests & others from \$24B to near \$37B (See Appendix 6)

ROI (TTM) Formula = [Income After Taxes (TTM) / Average of Investment (TTM)] \*100%

ROE (TTM) Formula = [Income After Taxes (TTM) / Average of Equity (TTM)] \*100%

ROA (TTM) Formula = [Income After Taxes (TTM) / Average of Assets (TTM)] \*100%

*Note: Average of Investment, Equity, and Assets (TTM) is the division between sum of previous year's figures and the accounting year's ones combined*

ROE (TTM) shows a business's profitability relative to shareholder's equity during the continuous year. Tesla Inc.'s ROE deteriorated from Q2 2020 to Q3 2020 and from Q3 2020 to Q4 2020, where values were strong in the second and third quarters, and gradually sluggish its ratio in the final quarter.

In Tesla's case, annual ROA (TTM) development was 3,88%. In the fiscal year 2020, ROA (TTM) improved Q2 to Q3 and from Q3 to Q4 to 1.65 % compared to the previous year, due to annual net income growth of 211.23 % to \$862.00 million, while the value of Tesla Inc's overall assets grew by 53.76 % to \$52,148 million. (See Appendix 6). However, the return on assets below 15% might signal very conservative company management, which could also warn of trouble.

Table 5. Summary of ROI, ROA, ROE (TTM) of Tesla versus the Automotive Industry, quarterly 2020

	4 Q		3 Q		2 Q		1 Q	
	<i>Tesla</i>	<i>Industry</i>	<i>Tesla</i>	<i>Industry</i>	<i>Tesla</i>	<i>Industry</i>	<i>Tesla</i>	<i>Industry</i>
Return on Assets (TTM)	<b>2,88%</b>	1.05%	<b>2.62%</b>	0.92%	<b>2.07%</b>	0.35%	-	1%
Return on Investment (TTM)	<b>1.99%</b>	2.07%	<b>1.78%</b>	1.92%	<b>1.37%</b>	0.72%	-	1.82%
Return on Equity (TTM)	<b>5.98%</b>	5.62%	<b>6.30%</b>	5.46%	<b>6.20%</b>	2.10%	-	4.44%

### 5.3 Cashflow Statement

The primary source of Cash for Tesla Inc. was operating activities (\$6,823 million in total). The secondary source of Cash was from investing activities (\$3,132 million in total). Most of the cash flow was spent on Financing activities (\$9,973). The primary source of Cash is from Operation, which was considered a good sign.

#### Operating Cashflow

Tesla reported Cash from operations of \$6,823 million for the latest twelve months ending December 31, 2020, on its cash flow statement. Cashflow in operating profit strengthened from \$440 to \$3,019 million in 2020 alone with noticeable growth starting from Q3 at \$2,400

million, jumping more than double net cash flow generated by operations compare to the previous quarter depended mainly on the Automotive segment. (Figure 21). This expansion was contributed primarily by net income progression, asset price and liabilities, and stock-based compensation from the outer business model. Operating cash flow exceeded net income with huge discrepancy growing continuously (QoQ), a favorable sign for investors when the company provided better earning quality and generated more than enough cash for the business. (Robinson et al. 2009, 244-246.)

Table 6. Difference between Operating Cash flow and Net Income, quarterly in 2020 (Q4 Report 2021)

	Q1-2020	Q2-2020	Q3-2020	Q4-2020
Total operating cashflow	440	964	2,400	3,019
Net income	68	129	369	296
<b>Difference</b>	<b>372</b>	<b>835</b>	<b>2031</b>	<b>2723</b>

However, the difference in Net Income and Free Cash flows is mainly due to higher non-cash expenses over the last two quarters, including Depreciation and Amortization and Stock-based compensation, and Operating assets and liabilities. The determinants of changes of operating net assets and liabilities largely depend on Account payables in the Balance sheet for short-time obligations and ending year interest liabilities.

Operating cash flow was higher than CAPEX in the last three quarters, showing improvement during the post-COVID strike, funding capital expenditure for its operation.

### **Investing Cashflow**

In Q3, Tesla showed promising signs of investing activities, with Capital expenditure pleated from \$455 to \$1,005 million each quarter compared to the beginning of the period, totaling \$3,232 million (10.2% of Revenue). This expenditure in properties upgrades and plans mainly generated by the expansion in Shanghai Factory and Berlin one and the growth in technology in battery and automotive fix assets. Financing activities mainly generate capital investments. However, the updated Investing Cashflow in 2020 remained a lack of information in some business combinations, purchasing intangible assets.

### **Financing Cashflow**

Financing cash flow has an extraordinary boom with the common stock issuances in public offerings from \$2,309 to \$4,987 thanks to stock-split effects, although a significant jump in debt activities during the last quarter to re-acquisition of debt and bond matured at \$2,074 million. In the final offering of the year, Tesla has raised \$12.27 billion from issuance of common stock in public offerings in 2020, together with \$417 million as net of issuance costs (Form 10-K Tesla 2020, 47). In the Balance sheet, Cash & Cash equivalents soared



triple effects from \$6,783 to \$19,901 with massive more than \$13 billion indifference, showing dominance in generating cash flow while running the business.

Free cash flow - TTM (non-GAAP<sup>22</sup>) Reinforced quarter-over-quarter with an ending total amounted to \$2,786 million compared to \$1,103 million at the beginning of the year. During the early pandemic, we noticed that new trading apps (Robinhood Markets, Inc., e.g.), which allows free trading fees, have set off new cost savings for stock traders, especially newcomers injecting new monetary flows into the stock exchange.

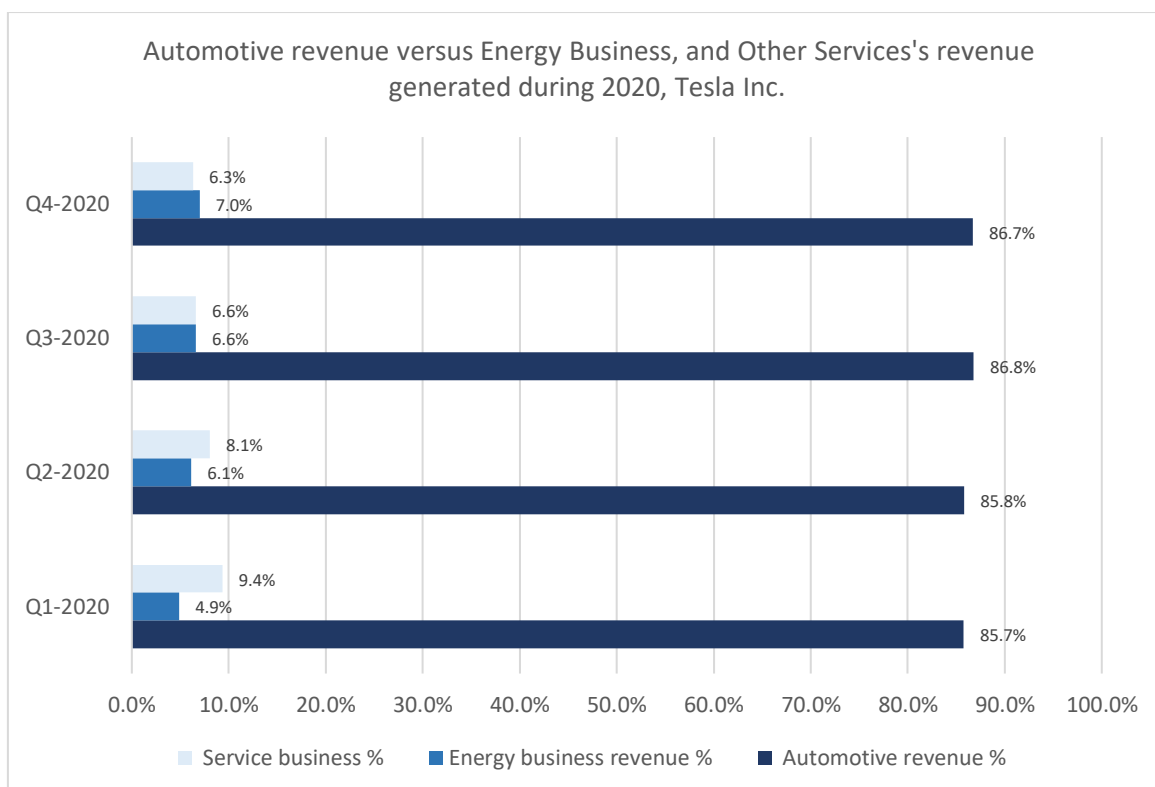


Figure 30 Automotive revenue versus Energy Business revenue generated during 2020, Tesla Inc.

Tesla did not provide stock buyback programs or pay dividends; on the other hand, issuing public offerings. These immediate responses could indicate that the company reduced costs for capital spending and focused on investments in the future while debt payment was solvent and paid on time.

<sup>22</sup> GAAP = Generally Accepted Accounting Principles

## 6 EXTENDED ENTERPRISE BOOSTS & ACTIVITIES

### 6.1 5-1 Stock Splits & Continuous Stock Issuances

Stock-split is an arithmetic exercise by reducing the par value of a company stock's initial share price to increase the proportion of shares compared to the previous amount while having no impact on capital accounts (Baker et al. 1980, 73). On August 11, Board Members of Tesla endorsed and affirmed a five-for-one stock splits of Tesla's common stocks (Globe Newswire 2020) while its premium was around \$2000 area/share as a stock dividend program. In short, Tesla stock is a cake for three people, while after the split, that cake is divided for five times more the number of people – 15 people, while the cake remains the same portion. According to Tesla's Board, the initially stated reason for the split was to "provide better ownership of company's capital proportion for Tesla's employees and investors" (Tesla Investor 2020). By lowering the share price to make it affordable for potential investors for securities diversification purpose, Tesla attracted smaller investors through its "fundamental variable implied" by the company, causing the jump of more than 13% on the division to about \$498/share (Baker et al. 1980, 73). Baker also pointed out that small investors tend to have greater diversification with the same amount of money and keep the stock at the optimal price range with a more negligible cost to buy a stock.

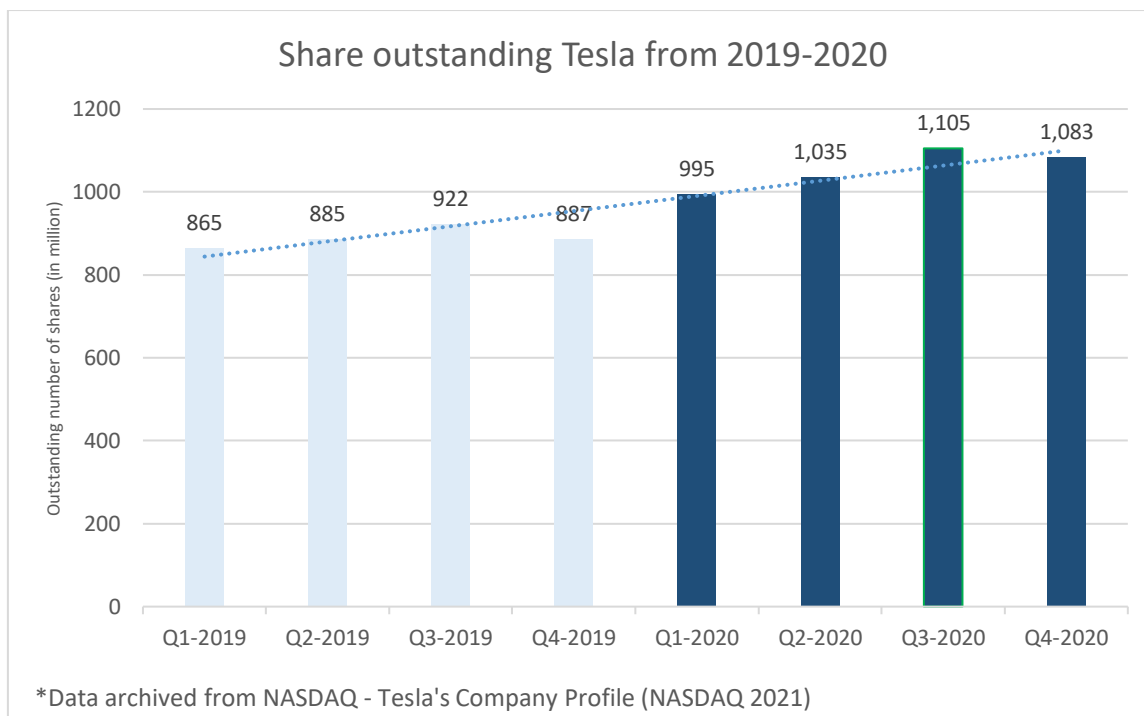


Figure 31 Share outstanding Tesla from 2019 to 2020

Through the company's financial statement, we could find out that Tesla's outstanding share has been strengthened significantly during the period after August 31 (final stock split deadline). In Q3 with extraordinary claims increased by 1,3%, mainly rely on issuance and compensations through the stock base.

Tesla stock issuance is a tool to raise capital before and during pandemics. In Q1,2020, Tesla had entered \$2 billion in standard stock value offering (equivalent to 3 million stock units at \$767/share), with an extra 300 million additional option purchase, raising more than \$2,31 billion in cash. The numbers of claims have strengthened till Q4, with different 8 million standard stock units valued at \$5 billion in Cash thanks to another issuance of stock outstanding (Stevens 2020). Tesla applied Equity Incentive Plans as compensations for employees, consultants, and the director's performance. Additionally, Tesla's employees can deduct a maximum of 15% of their payroll in exchange for the company's stock compensation, recorded on December 31, 2020, at 34.3 million shares available. As a result, Tesla's common share outstanding was affected due to the increasing of continuous stock issuance and compensation of the internals.

This outstanding share growth significantly affected the stock price as increasing share excellent results in decreasing share par value, which helps broaden the ownership base and lowering the float held by institutional investors. In contrast, more individual investors can possess the stock equity. (Baker et al. 1980, 75.) The higher possession of retail investors, the less dominance of big institutional investors to the stock, which stabilizes the stock's price positively and prevents supremacy control over large institutional investors on the company. However, the stock split effect does not always follow the positive trend as stock outstanding brings stock dilution for existing holders, and compensation policy contributing to this exceptional brings lower net income, reducing Earning-Per-Share. Stock dilution means reducing possession that current investors can have, symbolic meaning that cake's portion three people at the beginning could eat would be less than usual as more people join in. In this case, even though Tesla's more liquid and accessible after the split, Daniel Sparks believed that Tesla stock's rise during the period was also primarily due to its business performance (early sales growth and healthy financials), together with analyst's outlooks of Wallstreet.

## 6.2 Asset Value Inflation

Central Banks and the Fed provided a massive monetary flow into the system by buying Treasuries and risky assets like Bonds, or loans, to bid up all asset prices and support the flow of credits into households and businesses. According to Powell, the lending authority's ability has no limits for the Federal Reserve when it aggressively replaces possible riskier

assets like mortgages and car loans (not flowing capital) into lending emergency power to support the credit float temporarily (Powell 2020). Asset price inflation denotes a rise in the price of assets, opposed to ordinary goods and services. Consequently, it sends a giant yank into the economic machinery. Later, the central bank and the long-term need to face the reality of overall solid inflation (asset markets and goods markets together). (Brown & Brendan 2017, 429–442.) Excessive money supply can substitute for the overall financial asset inflation rate under medium and long-term scales (Andersson 2014), leading to the relations between Asset Price Inflation and Share price Index, overall. The overflow primarily impacts the equity market known as corporate share's price volatility, notably Tesla Inc. According to Anderson's conclusion, all price, including asset price, responds parallelly to money growth (Monetary pump in Q2-2020), consequently follows money inflation horizontal trend. Prof. Jouni Juntunen (Aalto University) stated in our interview that the boom of Tesla was very much related to the asset price bubble that central banks created. We can see the M2 monetary support during the COVID-19 strike, known as household notes, that President Trump passed last year, when Real GDP plunged, followed by Stock Index (NASDAQ) in Q1, 2020. This cushion resulted in higher Asset price value while shortly reduce in assets production, leading to Asset Price Inflation due to monetary flow provided by Fed into the market. As "share price fully absorb monetary shocks within short, and middle-term," NASDAQ indexes received a boost from Central Banks in their asset price of the Balance sheet, leading to higher stock exchange movement in price at higher stock values. For instance, in the early 1980s, asset prices were soaring thanks to the financial market deregulation of banks' subsequent drive to compete for market share in consumer and corporate credit (Berry & Dalton 2004, 76–77).

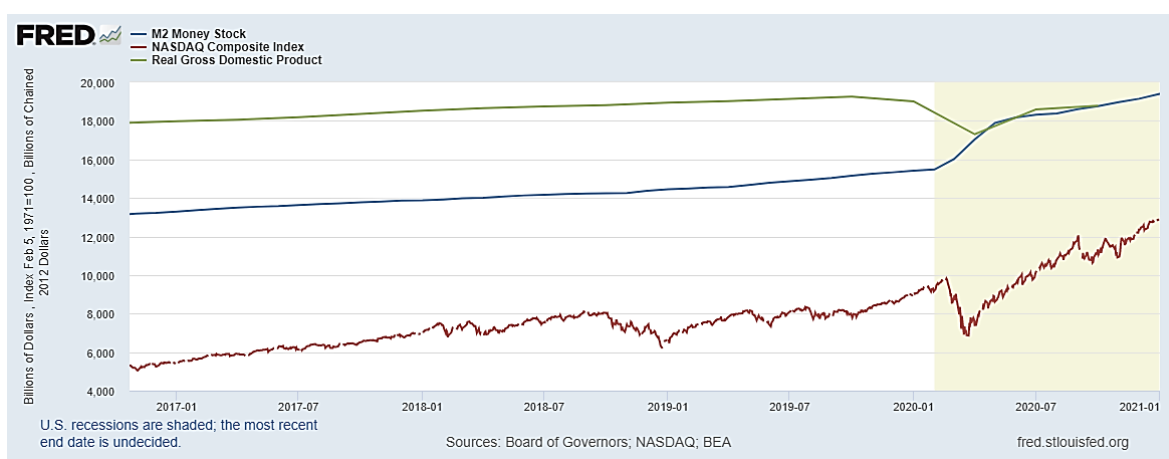


Figure 32 M2 Monetary support, NASDAQ Index, and Real GDP in the U.S correlations. (FRED 2021)

The momentum of increasing stimulus check to grant financial supports two times of the year in March and December has fuelled short and middle-term unstoppable upward trends for indexes.

We could not predict any crashes that will happen shortly where no attempt is considered to normalize monetary policy. Still, the credit supports have provided a big pillow to the market for the period and reflect the stock price. On the vice versa, the statement is also right in another way round when stock and property price can reflect asset price. For instance, Mishkin (1990) uses stock price to measure asset price while Segoviano et al. (2006) use property price (Yao 2015, 275–284). The overall market positivity had been bringing tech stocks to the record level in 2020. Tesla was near 700% higher as investors believed that Tesla could do what tech startups usually do. (Junni 2021.)

### 6.3 Battery Day

The rise of Tesla's valuation starting in Q2, 2020 was fueled by the Battery Day announcement expectation more than a month before launch day on September 22. Battery Day received investor's presence under exceptional circumstances where shareholders invited inside Tesla's different car models following the authority's guidance. Musk touted company update and year-in-review, together with new battery improvements that could make manufacturing cheaper and provide more power than influenced product's costs.

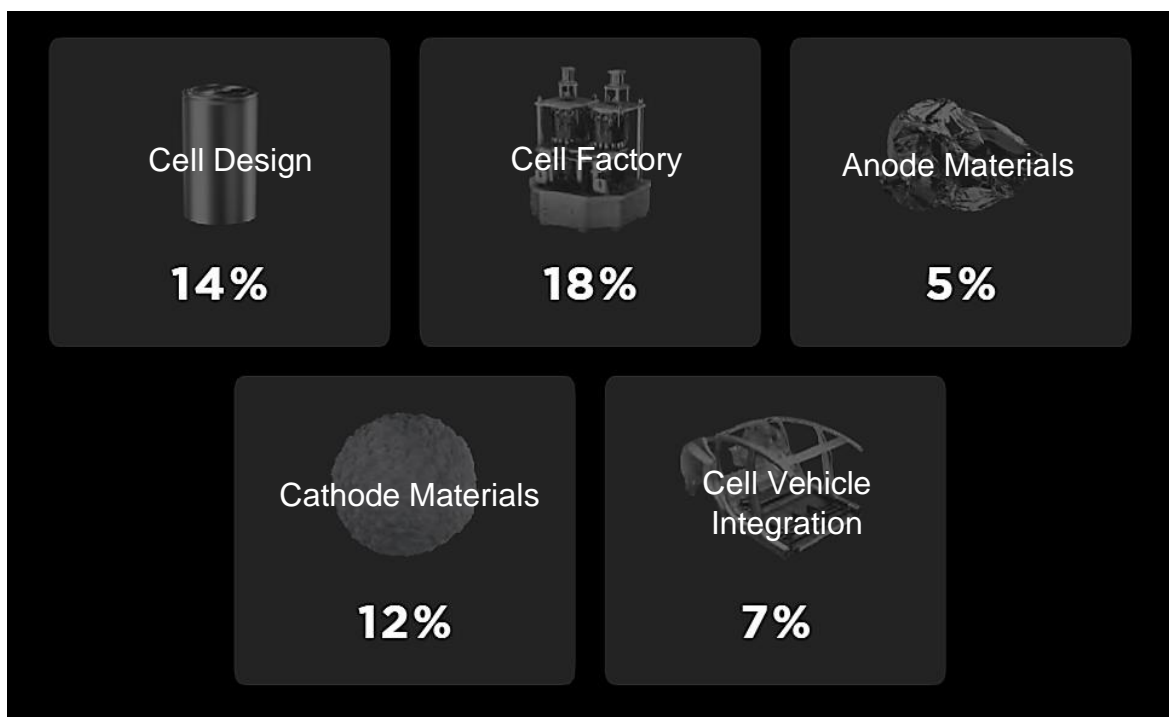


Figure 33 Cost Per kWh Saving Plan on Battery Day Summary (Battery Day 2020)

The company has provided optimistic plans for core products (battery and car plans), manufacturing and material development, utilization and cost-savings, volume scaling, and prototypes.

More specifically, Tesla provided updates in its lithium battery with higher energy storage, assembly plans for cost savings, materials related to own designed raw silicon anode in battery, car intervention, and sustainability in production footprints. Tesla also declared its abundance in lithium access to its untapped lithium in clay (Nevada) which is enough to produce for the entire U.S fleet. In the wake of Battery Day, Emmanuel Rosner from Deutsche Bank upgraded Tesla's price target to \$500, moving from "Hold" to "Buy" with better than anticipated battery development (Tenebruso 2020). This battery upgrade could materially boost its volume (2 million) and margin outlook (\$15 EPS) due to battery cost reduction by 2015. As for the battery improvement claims, Tesla promises a 54% gain in the driving range. Besides, it also aims to reduce 56% cost regarding production usage per kilowatt-hour. However, the rise was boosted as the expectation period earlier when its price plunged near 10% due to missing near-term elevated expectations. In this context, investors had been expecting too much from Battery Day to cause "buy on rumors, sell on news" when Tesla showed its reality of stagnancy in a price reduction on car sales and lithium battery difficulties. Overall, Battery Day gave investors a knock for its long-term developments and expectations related to its core values and profitability, contributing to the stock-based value since selling after a 5-1 stock split took effect. In long-term growth, Tesla would be successful and gain more profitability when it scales enough of its manufacturing process, driven by EV sales, Prof. Sven stated.

#### 6.4 S&P 500 Joint

Tesla stock price was affected tremendously with momentum provided by the S&P 500 index, where the company's valuation saw sharp changes in value within related index's updates. The stock has soared more than 70% since its inclusion in the S&P was announced in frantic November, together with other large-cap companies within wide market breadth. Because the index can reflect a better state view of economic health between large-caps companies (Beers 2020), more prominent investors prefer to participate in well-established enterprises. The benchmark concluded that Tesla is on its enclosure on November 16. The stock has got a prolific notice of index buyers, and potential investors across media channels after a rejoice in vain earlier in October of possible missing the S&P 500 train. As a result, large investors officially sent the stock to record reflected by the index's stock effect after the official inclusion. (every \$11.11 Tesla moves, the index changes 1 point) (Reuters 2020). Index tracking funds expectedly spent approximately \$80 billion to

buy Tesla shares on Friday night — an “enormous amount” — and put on sale shares of other stocks to invest in the EV stock acquisition, explained analyst Howard Silverblatt. The over exhilarated joy had set the stock’s price to the moon at \$600 key points, with a market capitalization of more than \$600bn, making Tesla ranked as the most valuable carmaker in the world and top sixth in most valuable companies of the planet. In this case, the rise has very little to do with its financials or sales, but rather than the crowd anticipation forcing funds tracking the index to buy the equity. The stock was later settled to be broadly over-valued by investors and received warnings from J.P Morgan’s analysts. “Tesla shares are in our view and by virtually every conventional metric not only overvalued but dramatically so,” concisely answered Ryan Brinkman. The analyst provides additional indicators to give examples for his statement related to the vast gap between automotive companies versus Tesla’s consensus regarding price-to-Earnings ratios (P/E-1,325x LTM P/E; 291x 2020E) and EPS versus Bloomberg’s compromise (175x NTM). The boost of near \$30 billion within a month with continuous solely does not respond to its financial performance.

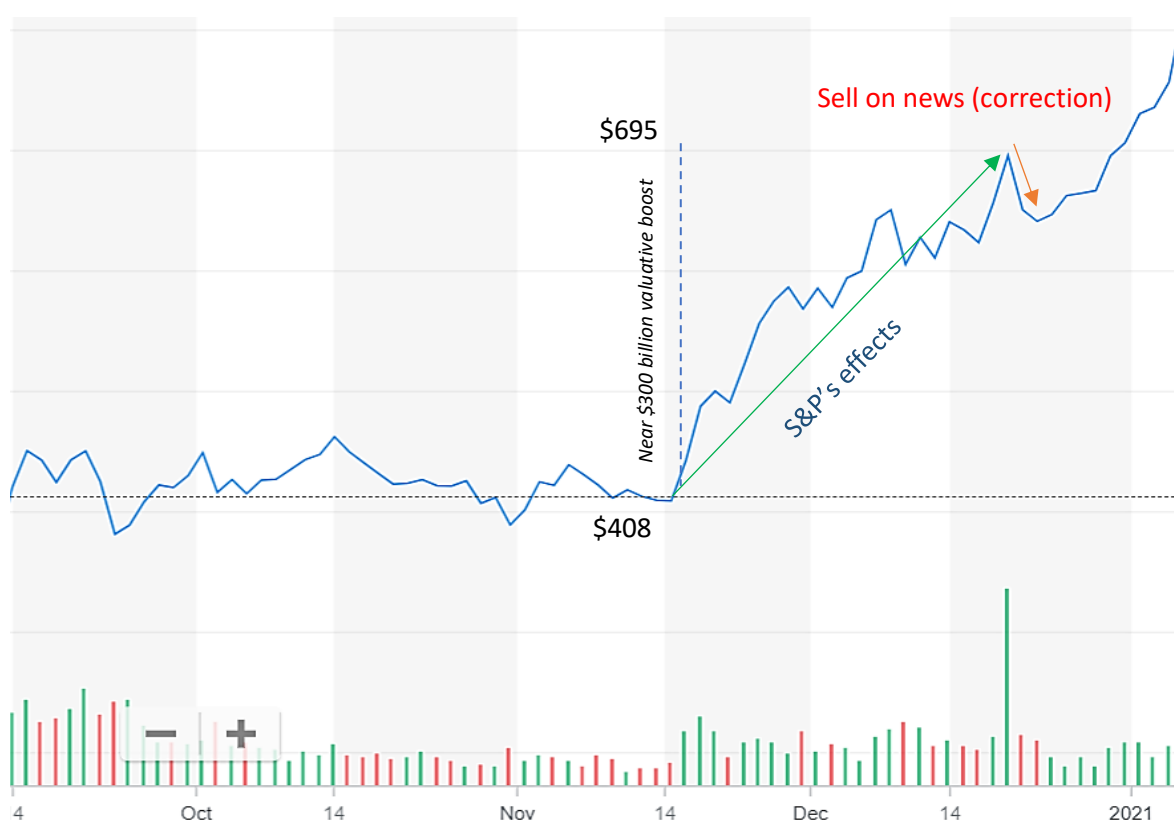


Figure 34 Price value of Tesla got a boost during S&P 500 expectation satisfied (Yahoo Finance 2021)

“Buy on rumors, sell on news” practice settled on the first official trading day on S&P Global with a correction from the market, driving the stock edged lower to test level at \$643/share after the market closed. However, the store stayed over the float for a nearly \$250 billion

market cap through the news fueled by exceptional pumps from institutional and retail investors, resulting in a valuation boost to its price.

## 6.5 Climate Change

Climate change issues threaten the way how we live and our future behaviors towards its consequences. It is worth access Climate change as a factor that led Tesla's stock on the rise as its core values are related to renewable energy and carbon footprints – elements that shape a company's impact in the direction of environmental influence. Customers benefit from Tesla with lower environmental tax (the E.U. benefits the most). Simultaneously, Tesla can sell regulatory credits to its partners or even competitors to satisfy the ecological credits to prevent states' penalties.

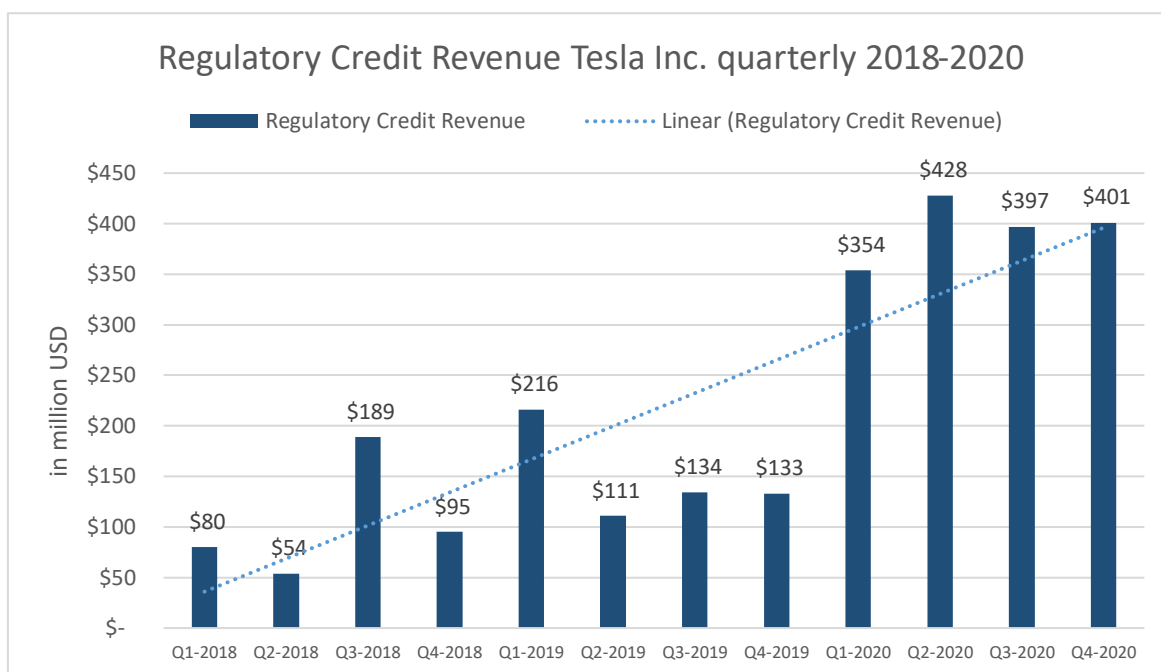


Figure 35 Regulatory Credit Revenue Tesla Inc. quarterly 2018-2020

la's abundance of regulatory credits through 100% EV production has significantly increased its sales, available from Financial Summary. While more states in America are starting to follow the environmental program, so-called Zero Emissions Vehicle (ZEV), Tesla turned its lavish credits into 100% profit-margin sales, helping generate higher income, and boosting investor's expectations. According to TechCrunch reporter Kirsten Korosec, the company had gained nearly \$2 billion in its income statement ten years ago when it started selling regulatory credits to carmakers that desired to qualify minimum environmental credits in the U.S. (Korosec 2019.) As the U.S and Europe's stricter limits on automotive carbon-



dioxide emissions have been leading the ecological race in using renewable energy, investors see the potential in those regulator credits towards the company's profits as they are accessible due to the business's core products. Regulatory Credits sources include ZEV and GHG (Green House Gases) in the U.S., while the European rely mostly on European Environmental Regulations (2021) principles. In 2019 and 2020, Fillings from Investor relations revealed that G.M. Motors and Fiat Chrysler Automobiles (FCA) have agreed to buy green credits from Tesla. FCA Europe was estimated to spend EUR 300 million (\$362 million) on purchase green credits from its EV counterpart. From 2015 to 2020, Tesla has received over \$3.3 billion in regulatory credits in total, while the Elon Musk-led company generated more than \$1,58 billion in 2020 alone, leading by 166% in 2019.

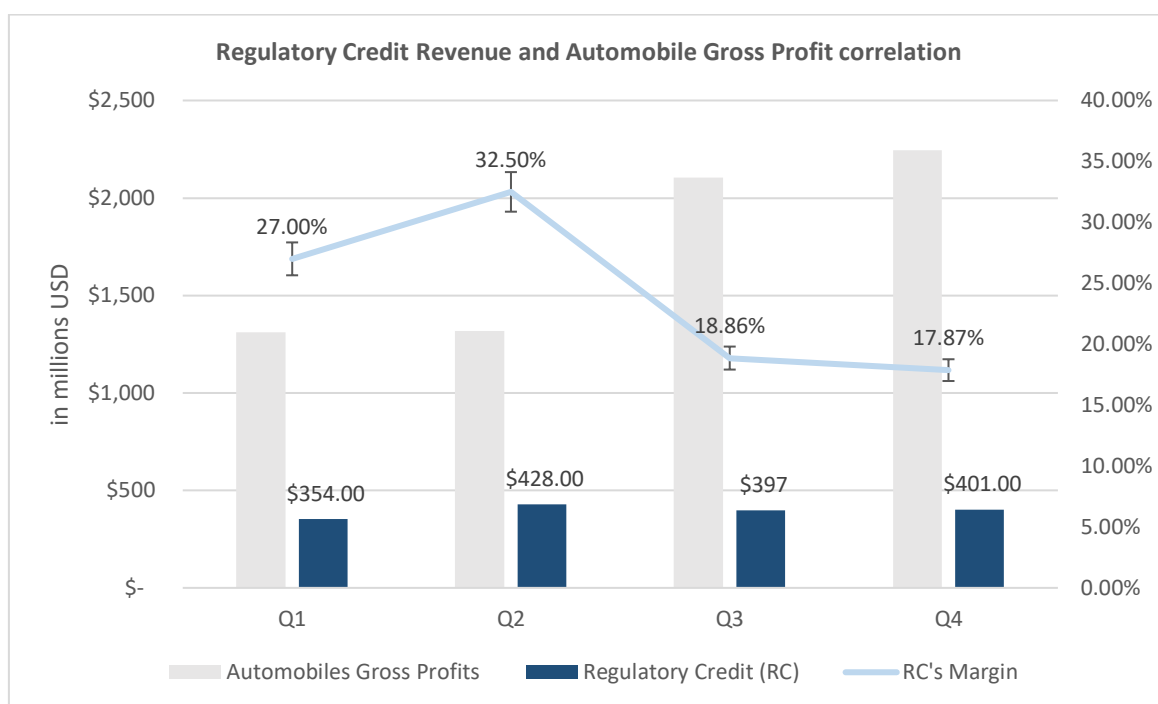


Figure 36 Regulatory Credit Revenue and Automobile Gross Profit correlation

While the Paulo-Alto-based company has been aggressively pricing its vehicles to increase its market share, the billion-dollar sales of regulatory credits in 2020 have aided Tesla in boosting its gross margin and profitability. As Tesla receive four consecutive quarters of GAAP that greatly depended on these green credits, the EV leader achieved enough qualifications for the S&P 500 towards its listing. As Tesla does not produce ICE cars, the more EV s than Tesla has, the higher credit quantities they would achieve through regulatory brokerages from states. Regulatory credits are unlimited to the states; that is why the Berlin manufacturing unit and the expansion from Shanghai Gigafactory could prime the firm towards green credit abundance. In conjunction with the new updates of production plants and manufacturing developments, Tesla brought into investor's eyes the critical metric for

the company to generate sales through these credits. Regulation credits offset its non-existent internal combustion lineups while achieving net-zero carbon goals to support climate change.

More than that, the share price was affected by the fact that demand for electric vehicles will grow, sparked in part by climate-friendly policies from new U.S. president Joe Biden (Nelson 2020). When there is still room for green energy consumption, Tesla's core value's comprehensive effects still help the company cope with potential environmental policies and satisfy consumer demand.

## 7 EXTERNAL PUBLIC SECTOR & INSTITUTIONS

### 7.1 Public influences (Fed)

The Fed lowers the target rate to maintain economic growth under downwards circumstances and raises it to fight inflation when the economy usually returns. In 2020, The Fed used policy tools to boost the economy, battered by the coronavirus pandemic immediately during early and mid-March, to influence what consumers are charged on credit cards, loans, and mortgages maintain business operations across the world.

Table 7. Fed Interest changes in 2020 (Federal Reserve 2020)

Date	Increase	Decrease	Level (%)
March 16	0	100	0-0.25
March 3	0	50	1.00-1.25

Due to signs of the potential negative economic outlook, the Fed has reduced interest rates from 2,5% (2019) to 0,00%-0,25% range in response to the coronavirus. These responses help individuals and businesses get either less expensive or easier to borrow funding (discount rates) from institutional levels. Head of U.K. equities at money manager Schroders, Ms. Noffke, commented that cheaper money boosts financial assets' valuations, which globally supports the stock market (BBC 2020). With two times money supplies, the economy received a bolster to stimulate economic activities, including the stock exchange. Because with lower interest rates, a business can boost its income registered through lower interest expenses, boosting EPS and future cash flow, making the company more profitable to invest in.

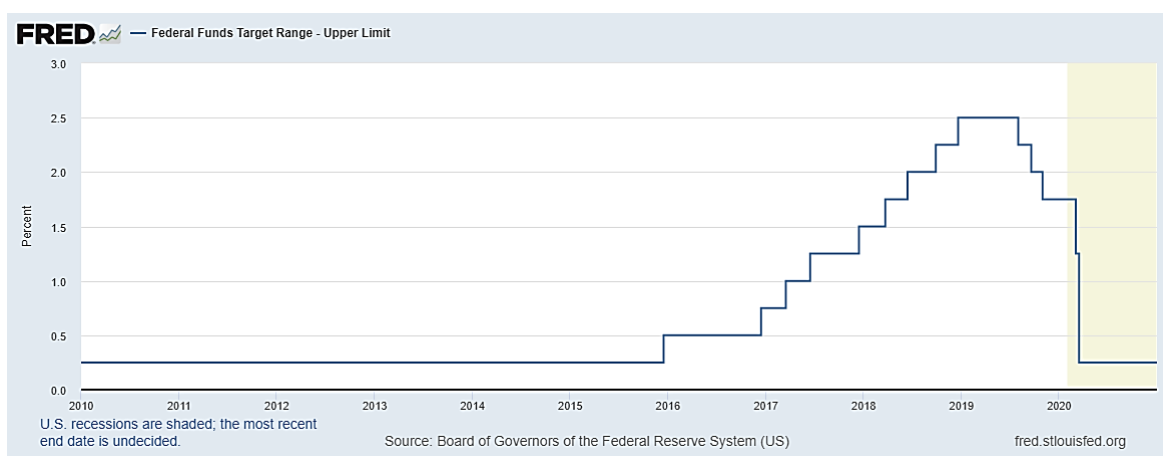


Figure 37 FOMC's target federal funds rate or range, change (basis points), and level (FRED Economics Data, based on Federal Reserves' Policy Tools 2020)

According to Barron (2021), every 1% rise in interest rates slashes Tesla's value by about \$200 billion, or 25% of the \$800 stock price target (Root 2021). This policy change from Fed proves the importance of interest rates on the company's stock price overall.

The other indicator that may indicate stock effects on stocks, especially tech stock, is the Treasury Securities Yield (10 years) controlled by the federal government, which was watched closely by investors as a sign of investor outlook about the economy. The 10-year yield is used as a representation for credit rates on mortgages, affecting interest rates as above. Rising in Treasury Yield means the economic outlook is upward while bringing inflation rate and depressing gross domestic product growth. The purchase and sell auction of securities in the open market by a central bank - is a crucial instrument used by the Fed in executing monetary policy. When Treasury Yield was below 1.0%, it served as an exciting test of stock-market strength, especially Tech stocks.

### U.S. Treasury yields remain well below pre-pandemic levels



Figure 38 10-year Treasury Yield from 2016 to early 2021, real-time data (Bloomberg 2021)

The market considered Tesla can do what tech startups usually do, take a monopoly position in the specific needs – EV (Junni 2020). Lower Treasury Yields provide better profit space for gigantic tech stocks in a monopoly position, including Tesla, to generate profits. Zero to One suggested building a monopoly position; the company needs to offer its niche market, prevent competition, and scale up it faster over status quos in shifting customer behaviors. (Thiel. P, 2014) This broader scale of the economy precisely works the way Tesla and other Silicon Valley-based companies have been doing. Tesla dominates its market with untapped EV design technology and scaling up fast during uncertain times. To

investors, avoiding inflation rises provides better investment opportunities rather than investing in a higher Treasury Yield. This economic outlook results in higher stock value during the time Treasury yield slip trend and vice versa.

## 7.2 Institutional Influences

Public influence, especially central banks' interventions, have played a vital role in the recovery illusions through stock buying. "Tesla case connects to much wider institutional context, and it cannot be separated from the institutional context now.", Professor Junni gave his thought. As more and more index funds (ETFs) linked to Tech-related and Environment funds buying Tesla, the exchanges sent the stock towards different new highs. Due to the research scope and lack of information from National Banks (Bank of Finland), we do not give further comments regarding central banks' policies and their overall market effects on the equity market as Tesla Inc. The Bloomberg data shows, and it is strongly suggestive that something apart from standard indexes to the abstract fervor is driving Tesla's shares higher (Brinkman, J.P. Morgan 2020)

Till December, there was a total of 45,20% of institutions had been holding the float of company stock, with the highest buying rate at the end of Q4, 2020 (worth \$35 billion). Tesla has 2,178 Institutional holders, accounted for 433,876,231 shares of the total 960 million shares till December 2020. (NASDAQ 2021.)

### INSTITUTIONAL OWNERSHIP CHANGES (13F FILINGS) FOR TESLA (NASDAQ:TSLA)

Institutional Ownership Percentage: 45.20 %

#### INSTITUTIONAL BUYING AND SELLING BY QUARTER

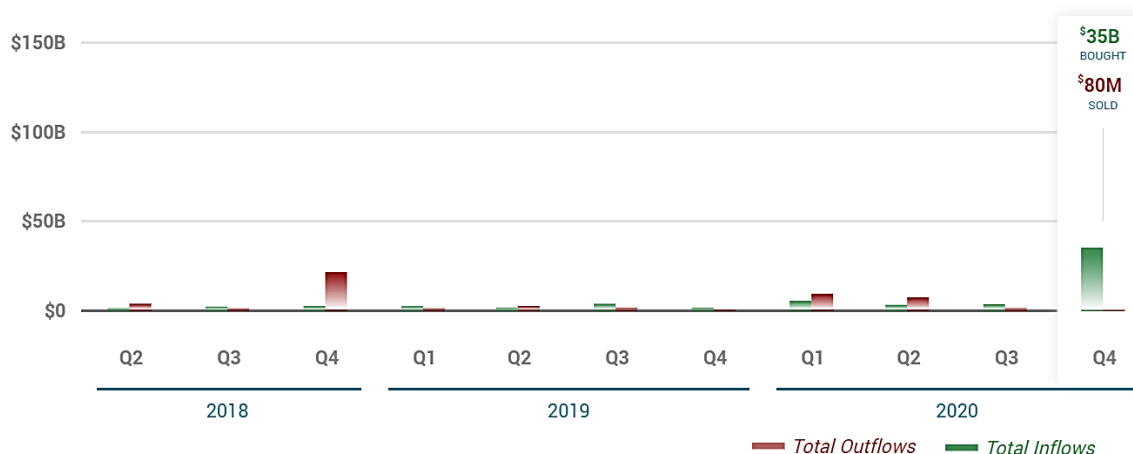


Figure 39 Institutional Ownership of Tesla based on 13F Filings Q1-Q4 from 2018 to 2020 (Marketbeat 2021)

After the Joint, the accelerations in buying effects had led the stock to achieve memorable milestones in Q4, 2020, leading the stock price to reach an all-time high at a near-record \$700 per share. Market capital improved over \$530B at \$649.84B. “In terms of valuations, Tesla is a stock that ranks in the higher extremes, and we have to accept that this is not a company that is valued as an automotive company as it could end up becoming something very different in the future,” said Andrea Cicione, Head of Strategy at TS Lombard (Davies 2020).

## 8 CONCLUSION

### 8.1 Answers to the Research Question

The main research question is to find the inside and outside factors affecting the stock price of Tesla Inc. in the year 2020. The empirical research from part 3 till part 5 answered the front part of the research question about the internal factors, while later parts played as external influences on the company's valuation. We also determined stock price effects during the research journey.

Internal factors consist of the business ecosystem, known as core values, that built the strong base for the business. Tesla stands out from other competitors with its Core Products & Services. Tesla positions itself as a market leader in the social transmission business ecosystem with applications in renewable energy and fully electric vehicle. Through updates in Tesla's lithium-ion battery, we could understand the usage of battery and technology indication to core development in 2020. Tesla released its updated quarterly automation products and plans to improve product range, product efficiency as core support, and leverage for value investors. Investors established investment decisions additionally through how the company provided customers value-added auxiliary technology developed in 2020. FSD & Power Substitution/Superchargers were expected to increase the company's value, at least as the company promised, till early 2021. The research gave audiences information on how Tesla strengthened its Services & Others and upgraded Energy products in 2020.

In the business ecosystem, we summed up significant developments in Tesla's business strategy in response to pandemic 2020 and how Tesla utilized its logistics, contributions, and manufacturing plans of its Gigafactories across targeted segments. Berlin Gigafactory would bring Tesla closer to EU consumers with competitive prices across the region. Financial statements and data provided Tesla with firm ground on market beats despite uncertainty. During the early days of the pandemic, Tesla showed its invincible deliveries with vital critical metrics in sales, revenue, and net income boost. Starting from Q2, Tesla pounded market expectations through its EPS (TTM), necessary Cash in hand, solvency, and liquidity through Balance sheet data, together with management effectiveness indicated by Return on Investment, Equity, and Assets (TTM). From the Cashflow report, the Musk-led enterprise saw a significant boost in Operating and Investing activities while continuously paid its debt in the last two quarters to free the business from loans and credit risks. In the reports, we also provided extra calculations to other enhanced financial metrics, illustrated by charts, to better view the company data itself, known as Book Value, P/E, P/B, and more.

For the first previous two quarters, Tesla had done an excellent job maintaining and building a basement for its business during the economic strike-through internal activities & changes, providing a public offering to strengthen its cash flow, for instance. Regarding external factors during the year, the last two quarters played a crucial role in raising Tesla's stockpiles. Tesla released its long-term investments during Battery Day, with substantial product improvements and consumption for manufacturing plans for savings & procurement purposes. Data showed that Tesla could improve its product range in the long run and save the company abundant manufacturing materials. Our interviewee suggested the correlation between the manufacturing process and income generated once the company utilized its production plans. In late October, Tesla got acceptance to join S&P 500 – extensive capital company index only. The news that broke out had given Tesla a mega stock boost at near 300 billion US dollars in market capital in a short while.

Moreover, as the suggestion by our interviewee, we found a significant relation between Asset Value Inflation from the U.S government's financial supports in 2020 with two budgetary plans. This economic cushion fuelled the big rally of Tesla as of asset boost and shock absorbance. We additionally mentioned the importance of Climate change, and possible nuance on the new president's regulations, also counterarguments related to the Monopoly position in the industry that Tesla has been doing. We found out that external factors from regulation credits brought Tesla a free-from-investment revenue stream by selling them to other automakers. In the long run, this matter benefits Tesla due to upcoming policies from the EU, for instance, to green energy usage & environmental taxation. Federal Reserve used economic tools to reduce interest rates in public influence, which benefited big corporates with better net income and EPS due to less payment in income tax & related interest payments, including Tesla. As Treasury Yield had been rising gradually from well below the virus, panic signified a possible returning point of the economy (including inflation risks). It stimulated the rise of Tesla in the quarter of 2020.

## 8.2 Ethics, Reliability & Validity

Ethics in researching an excellent academic study obey a strict commitment throughout the research period till the last part. It should follow different responsibilities across the study program. The research data should get consent from potential research participants and inform them in advance. To avoid possible upside or downside effects in Tesla's valuation, the research should minimize the risk of harm to the target company and even its competitors in the market by providing even-handed facts and academic findings only. Moreover, it should follow anonymity and confidentiality. (Laerd Dissertation 2021.) As a result, this is



one factor that leads to the research primary data source limitation. We need to follow institutional guidance from the Bank of Finland on a corporate data scale. We received consent from our interviewees related to primary data used in the opinion part and strictly conduct them with privacy. With our research scope, we avoided possible comparisons between competitors in the Automotive industry to bring the research outcome as a reference only to undermine or promote Tesla itself or its competitors. The study initially focuses on academic research and provides educational purposes or reference only through our disclosure and guidance. We ensured that audiences understand and not base any assumptions or findings on the logical outcomes to invest or divest their financial funds on the stock exchange. To ensure the manners of the opinions and conclusions, we also keep the study's integrity without modifying data in the direction of only benefit or disadvantage, resulting in honesty and impartiality.

Reliability and validity are concepts used to evaluate the quality of research. They indicate how well a method, technique and examine research measurement for its outcomes. Reliability is about the consistency of a measure, and validity is about the accuracy of a standard. (Middleton 2020.) The research uses a multi-method approach under deductive and inductive weight to provide the flow of arguments and quotes from start to the end with a qualitative methodology. The objective of this approach is to find out factors affecting the stock price. As the nature of the stock exchange's volatility depends on various factors in the company itself and outer elements, the approaches provide better reliability and validity to how information was being handled. The research scope used state-of-the-art information within years of research and findings and remarks from 2021 to rewind & validate data in the year of study. This extra data collection brought better updates of the information that perhaps, was misconducted to validate the authentication of statistics used. Internal factors of the company used official information and well-known paid sources to confirm the article's credibility better. With limited primary data, external enterprises & public influences parts served as an essential outward indication for the stock price. External factors analysis on logical impacts of significant developments showed visual information. Effects and logical inferences gave possible results based on related economic laws and validated the stock movements based on their performance to confirm this effectiveness. We used primary research data from experts related to automation and financial economics to help strengthen the reliability of factors drawn from analysis. Because securities and securities trading are also influenced by external factors, such as trader's psychology and organized trading in the form of block trading for other purposes, there would also include unknown factors, which cannot be found in the research due to scope of the study, but conceivably instituted in future research through our future suggestions

### 8.3 Suggestions for Future Research

With a narrow scope of the research, several future research ideas and recommendations occurred during the study. With more and more companies in the sector competing with Tesla in the race of the EV industry, future research on competitor companies suggests an auspicious point for educators and investors to understand the different approaches between those companies on how they differentiate from others. Geographical research for the EV industry is another suggestion for foreign market penetration in the future when Electric cars become popular worldwide. Nordics, South America, Southeast Asia, could be the subsequent potentials market for OEMs, which need more research before settling up a strong base in investments, both for manufacturers and investors. The research year was confirmed in 2020, future research for the coming years to come could bring a solid base to learn how Tesla develops and determine if it would achieve its short-term & long-term plans. This research is related to company analysis in the empirical section. Future research on product implementation & value-added service for Tesla's automotive products is another topic for further research. This proposal would fulfill Tesla's options for future product development and suggest improvements in their core values.

## 9 SUMMARY

In conclusion, many factors made Tesla's stock price violate the upside trend internally and externally. The company has prepared itself core technologies, which align with market trends economically and environmentally from core operations and segments. During uncertain times through strong financials & vehicle implementations, Tesla showed its substantial undertakings as keys to draw investors' attention. The year 2020 has been a sanguine year for Tesla with a significant milestone when getting included in S&P 500 index as well as achieved the expansion targets of its production plants, battery technologies, and E. V's related improvements. The core management of Tesla has proved its effectiveness during a difficult period with reasonable decisions. The calm inside the company when influencing outside the company creates tremendous pressure along with the stock rise. The company received gigantic supports from investors through capital flows of a stock-related block trade in different public offerings and the stock-split event. Factors outside the business ecosystem, such as Fed decisions on interest rates & monetary policies, central banks' interventions on asset prices, and related consequences, have also fueled the hype of the company's valuation. It is also noticeable that the changes of government's policies in green credits and the acceptance worldwide of EV diversification in different potentials markets also help the stock's valuation strengthened through an uncertain time.

## LIST OF REFERENCES

### Printed Sources

Alburque et al. 2020, Ding et al. 2020, Fahlenbrach et al. 2020, Pagano et al. 2020, Ramelli and Wagner 2020. COVID economics vetted and real-time papers. Centre for Economic Policy Research (CEPR) Press. London UK, 38.

Baker, K & Gallagher, P. 1980. Financial Management (pre-1986); Tam-pa Vol. 9, Iss. 2, 73-75.

Brendan, B. 2017. "Goods Inflation, Asset Inflation, and the Greatest Peacetime Inflation in the U.S." Atlantic economic journal 45.4, 429-442.

Hu, W., Huang, C. & Chang, H. 2015. The Effect of Investor Sentiment on Feedback Trading and Trading Frequency: Evidence from Taiwan Intraday Data. Taylor & Francis Group, LLC Emerging Markets Finance & Trade, 112.

Kotler, P. & Keller, K. L. (2012) Marketing management. 14. ed., global ed. Harlow: Pearson, 450.

Lee, H. & Clark, A. 2018. Charging the Future: Challenges and Opportunities for Electric Vehicle Adoption. Faculty Research Working Paper Series Harvard Kennedy School, 18.

Nieuwenhuis, P. 2018. Alternative business models and entrepreneurship: The case of electric vehicles. The International Journal of Entrepreneurship and Innovation 2018, Vol. 19(1), 33-45.

Robinson, T., Greuning, H., Henry, E. & Broihahn, M. 2009. International Financial Statement Analysis. Hoboken, N.J.: Wiley CFA Institute Investment Series, 244-246.

Statista Renewable Energy in Europe Dossier. 2021. Paid Statista Dossier. Available at <https://www.statista.com/study/43575/renewable-energy-in-europe/>, 3-14.

Statista Tesla Dossier. 2021. Paid Statista Dossier. Available at <https://www.statista.com/study/23072/tesla-statista-dossier/>, 8.

Tran, H. & Zhang, Y. 2017. KPMG Consumer Insights on New Energy Vehicles in China. KPMG China and AutoForesight - KPMG Advisory (China) Limited, 7-8.

Wang, J. & Zhou, W. 2019. Factors Influencing the Purchase Willingness towards Electric Vehicles in China. Department of Business Studies, Uppsala University, 12.

Ghuri, P. & Gronhaug, K. 2005. Research Methods in Business Studies: A Practical Guide. 3rd Edition. England. Pearson Education Limited., 120.

Saunders, M., Lewis, P. & Thornhill, A. 2012. Research Methods for Business Students. 6th Edition. Harlow: Pearson, 68 & 414-480.

Andersson, F. January 2011. Monetary Policy, Asset Price Inflation, and Consumer Price Inflation. Lund University Economics Bulletin, Sweden, 5.

Yao, W., Wu, H. & Kinugasa, T. January 2015. Financial Deepening, Asset Price Inflation, and Economic Convergence: Empirical Analysis Based on China's Experience. Emerging markets finance & trade 51.sup1, 275-284.

Ivanov D. & Battini, D. January 2017 Closed-loop supply chain simulation with disruption considerations: a case study on Tesla. International Journal of Inventory Research 4(4). 257, 8-10.

Heineke, K., Kampshoff, P., Mkrtchyan, A. & Shao, E. May 22, 2017. Self-driving car technology: When will the robots hit the road? McKinsey Automotive & Assembly. Retrieved on 1 April 2021. Available at <https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/self-driving-car-technology-when-will-the-robots-hit-the-road>, 7-10.

Baik, Y., Hensley, R., Hertzke, P. & Knupfer, S. 8 March 2019. Making electric vehicles profitable. McKinsey Automotive & Assembly. Available at <https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/making-electric-vehicles-profitable>, 4-5.

International Energy Agency IEA. May 2019. Global EV Outlook 2019 Scaling-up the transition to electric mobility, 32-33.

International Energy Agency IEA. June 2020. Global EV Outlook 2020. The electric car market in 2019. Entering the decade of the electric drive? 44-45.

Impact Report 2019. 10 Jun 2020. Tesla Investor Relation. 8-52

Capelle-Blancard, G. & Desroziers, A. June 16, 2020. The Stock Market Is not the Economy? Insights from the COVID-19 Crisis. CEPR Covid Economics Paper SSRN, 14.

Balwin, R. & Mauro, B. July 2020. Mitigating the COVID Economic Crisis: Act Fast and Do Whatever It Takes. University and Columbia University VoxEU Centre for Economic Policy Research. London, UK, 187.

SEC Form 10-K Tesla, Inc.. 31 December 2020. United States Securities and Exchange Commission. Washington, D.C. 20549. Retrieved on 4 April 2021, 47.

## Electronic Sources

Autotraveller. 2021. Fuel prices in Europe in April 2021. Russia. Retrieved on 27 February 2021. Available at <https://autotraveler.ru/en/spravka/fuel-price-in-europe.html#.YDtqdR9MRnl>

BBC. 18 December 2020. Tesla to join key share index as it defies critics. BBC Business. Retrieved on 24 March 2021. Available at <https://www.bbc.com/news/business-55368382>

Benam, B. 24 October 2020. Why Vertical Integration Made Tesla More Powerful. A Medium Corporation USA. Available at <https://medium.com/the-innovation/why-vertical-integration-made-tesla-more-powerful-8b33b6aee773>

Center for Systems Science and Engineering (CSSE). 2020. Global Map of Corona cases. John Hopkins University Medical School. Retrieved on 20 Feb 2021. Available at <https://www.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6>

CSI Market. 2021. Consumer Cyclical Tesla Fundamentals & Financials. CSI Market Inc. Florida USA. Retrieved on 1 April 2021. Available at [https://csimarket.com/stocks/fundamentals\\_glance.php?code=TESLA](https://csimarket.com/stocks/fundamentals_glance.php?code=TESLA)

Davies, M. 21 December 2020. Reuters. Available at <https://www.marketscreener.com/quote/stock/TESLA-INC-6344549/news/Tesla-debuts-into-S-P-after-frantic-Friday-trading-32060119/>

Fiona Middleton. Revised on June 26, 2020. Reliability vs. validity: what's the difference? <https://www.scribbr.com/methodology/reliability-vs-validity/>

Schreiber, B. & Gregersen, E. October 4 2018. Tesla, Inc. Encyclopedia Britannica. Retrieved on 16 April 2021. Available at <https://www.britannica.com/topic/Tesla-Motors>

Irle, R. 2020. Global Plug-in Vehicle Sales Reached over 3,2 Million in 2020. The Electric Vehicle World Sales Database - EV volume. Available at <http://www.ev-volumes.com/country/total-world-plug-in-vehicle-volumes/>

Klesty, V. 5 January 2021. Electric cars rise to record 54% market share in Norway in 2020. Reuters Oslo. Available at <https://www.reuters.com/article/us-autos-electric-norway-idUSKBN29A0ZT>

Kolodny, L. & Wayland, M. 2021. Fiat Chrysler spent over \$300 million on green credits in Europe last year — mostly from Tesla 2. CNBC Technology. Retrieved on 15 March 2021.

Available at <https://www.cnbc.com/2021/03/03/fiat-chrysler-spent-eur-300-million-on-green-credits-mostly-from-tesla.html>

Korosec, K. 4 June 2019. G.M. and Fiat Chrysler are buying Tesla's regulatory credits. Techcrunch News. Retrieved on 3 February 2021. Available at <https://tcrn.ch/2JUyAuL>

Laerd Dissertation 2021 <https://dissertation.laerd.com/principles-of-research-ethics.php>

Marketbeat. Tesla Institutional Ownership. Marketbeat Screener. American Consumer News, LLC dba MarketBeat®, USA. Retrieved on 31 March 2021. Available at <https://www.marketbeat.com/stocks/NASDAQ/TSLA/institutional-ownership/>

Mustoe, H. & Palumbo, D. December 31, 2020. Why have global stock markets gone up this year? BBC Business. Available at <https://www.bbc.com/news/business-55301996>

NASDAQ. 2021. Tesla Company Profile – Institutional Holdings, Shareoutstanding. Retrieved on 24 April 2021. Available at <https://www.nasdaq.com/market-activity/stocks/tsla/institutional-holdings>

Ohnsman. 2013. Tesla CEO Talking With Google About 'Autopilot' Systems. Bloomberg Technology. Retrieved on 24 April 2021. Available at <https://www.bloomberg.com/news/articles/2013-05-07/tesla-ceo-talking-with-google-about-autopilot-systems>

Palandrani. 9 Dec 2020. Four companies leading the rise of lithium & battery technology. Global X ETF Research & Insights. Retrieved on 10 Feb 2021. Available at <https://www.globalxetfs.com/four-companies-leading-the-rise-of-lithium-battery-technology/>

Ramelli, S. & Wagner, A. March 12 2020. VOX EU Centre for Economic Policy Research (CEPR). Retrieved on 20 March 2021. Available at [https://voxeu.org/article/what-stock-market-tells-us-about-consequences-covid-19?fbclid=IwAR1ldV5X45SY6SNLXHDL0LZSw3WV9FRN7HpSkmTDqjTAPQCuE1vI4\\_XI5Yg](https://voxeu.org/article/what-stock-market-tells-us-about-consequences-covid-19?fbclid=IwAR1ldV5X45SY6SNLXHDL0LZSw3WV9FRN7HpSkmTDqjTAPQCuE1vI4_XI5Yg)

Randewich, N. 22 December 2020. Tesla tumbles 6.5% from record high in S&P 500 debut. Reuters. Retrieved on 11 March 2021. Available at <https://www.reuters.com/article/usa-stocks-tesla-idUSL1N2J10QC> Reuters

Research Guides. 2021. University of Southern California, USA. Available at <https://libguides.usc.edu/writingguide/theoreticalframework>

Root, A. 5 March 2021. Tesla is Cratering. This Is How Much Interest Rates Hurt. Dow Jones & Company, Inc. USA. Available at <https://www.barrons.com/articles/tesla-is-cratering-this-is-how-much-interest-rates-hurt-51614973530>

Shipley, L. February 28, 2020. How Tesla Sets Itself Apart. Harvard Business Review. <https://hbr.org/2020/02/how-tesla-sets-itself-apart>

Sim B. Sitkin, C. Chet Miller, and Kelly E. 2017. The Stretch Goal Paradox Audacious targets are widely misunderstood—and widely misused. Harvard Business Review. Available at <https://hbr.org/2017/01/the-stretch-goal-paradox>

Steven, P. 1 September 2020. Tesla to sell up to \$5 billion in stock amid its incredible rally. CNBC Business. Retrieved on 23 March 2021. Available at <https://www.cnbc.com/2020/09/01/tesla-to-sell-up-to-5-billion-in-stock-amid-rally.html>

Tenebruso. 2020. Tesla Stock Will Surge 27% to \$500, According to This Analyst. NASDAQ. Available at <https://www.nasdaq.com/articles/tesla-stock-will-surge-27-to-%24500-according-to-this-analyst-2020-09-24>

Tesla Investor Relation. Feb 13, 2020. Tesla Announces Offering of Common Stock. Palo Alto, California, USA. Retrieved on 17 February 2021. Available at <https://ir.tesla.com/press-release/tesla-announces-offering-common-stock>

Tesla Press Release. 11 August 2020. Tesla Announces a Five-for-One Stock Split. Palo Alto, California USA. Retrieved on 5 April 2021. Available at <https://ir.tesla.com/press-release/tesla-announces-five-one-stock-split>

Tesla Support. 2021. Tesla Inc. Retrieved on 15 April 2021. Available at <https://www.tesla.com/support/body-shop-support>

Trudell, C. April 23, 2020. Tesla Adds Former CIO of World's Largest Pension Fund to Board. Bloomberg Economy. Retrieved on 14 March 2021. Available at <https://www.bloomberg.com/news/articles/2020-04-23/tesla-adds-former-cio-of-world-s-largest-pension-fund-to-board>

Vitale, J. March 2020. Understanding the COVID-19 impact on Automotive sector Guidance for automotive executives. Retrieved on 31 March 2020. Available at <https://www2.deloitte.com/global/en/pages/about-deloitte/articles/COVID-19/understanding-COVID-19-s-impact-on-the-automotive-sector.html>

Wayland, M. Kolodny, L. 14 December 2020. Tesla's market cap tops the nine largest automakers combined — Experts disagree about if that can last. Retrieved on 31 March



2020. Available at <https://www.cnbc.com/2020/12/14/tesla-valuation-more-than-nine-largest-carmakers-combined-why.html>

### **Other Sources**

Sven, B. 2021. Associate Professor. Department of Mechanical Engineering, Alto University. Interview on 28 Jan 2021.

Beck, R. 2013. Tesla CEO Elon Musk is in talks with Google to develop a new autopilot system for its electric cars. Retrieved on 24 April 2021. Available at <https://thenextweb.com/news/tesla-ceo-elon-musk-is-in-talks-with-google-to-develop-a-new-autopilot-system-for-its-electric-cars/amp>

EnerGuide. 2021. EnerGuide label for battery-electric vehicles. Government of Canada. Retrieved on 28 February 2021. Available at <https://www.nrcan.gc.ca/energy/efficiency/energy-efficiency-transportation-and-alternative-fuels/choosing-right-vehicle/tips-buying-fuel-efficient-vehicle/energuide-vehicles/energuide-label-battery-electric-vehicles/21379>

Juntunen, J. 2021. Professor of Practice (Sustainable Production and Consumption), Dr. S. (Economics and Business Administration). Email messages. Recipients Le & Quynh. Sent on 24 January 2021.

Musk, E. 2020. Battery Day Presentation. Paulo Alto, California, USA. Available at <https://www.tesmanian.com/blogs/tesmanian-blog/tesla-silicon-the-new-4680-battery-cell-anode>

@elonmusk 2021. CEO Tesla Inc. Tweet 1 May 2020. Twitter microblog service. Retrieved on 4 April 2020. Available at <https://twitter.com/elonmusk/status/1256239815256797184>

Realtime Carbon Impact. 2021. United State. Retrieved on 14 March 2021. Available at <https://www.tesla.com/carbonimpact>

NADA Data. 2017-2020. National Automobile Dealer Association. Available at <https://www.nada.org/nadadata/>

Powell 26 March 2020. Youtube video. Retrieved on 20 March 2021. Available at [https://www.youtube.com/watch?v=WjCAoPYefQ4&ab\\_channel=TODAY](https://www.youtube.com/watch?v=WjCAoPYefQ4&ab_channel=TODAY)

## APPENDICES

Appendix 1. Global vehicle deliveries in the 1st half of 2020 compared to the previous period.

Company	H1 2020 Volume	H1 2019 Volume	Percent age changes (%)	Source(s)
Groupe PSA	1,033,000	1,903,000	-45.7%	Presentation: 2020 First Half Results.  Available at <a href="https://www.groupe-psa.com/en/publication/resultats-1er-semester-2020/">https://www.groupe-psa.com/en/publication/resultats-1er-semester-2020/</a>
Nissan Motors Inc. (fiscal year starts on 1st April)	1,096,397  Q1 2020: 281,654; 795,522 (From April 1, 2020 To June 30, 2020)	1,851,799  Q4 2019 814,743; 1,056,277 (From Jan 1, 2020 To March 31, 2020)	-40.79%	Nissan reports H1 results for the fiscal year 2020.  Available at <a href="https://www.nissan-global.com/COM-MON/DOCS/IR/2020/FINANCIAL/DATA/20201st_datasheet_397.pdf">https://www.nissan-global.com/COM-MON/DOCS/IR/2020/FINANCIAL/DATA/20201st_datasheet_397.pdf</a>
Ford Motors	2,790,000	1,771,000	-37%	Ford Records Better-Than-Anticipated Q2 Operating Results as Company Manages for Both Coronavirus and Long Term.  Available at <a href="https://media.ford.com/content/dam/fordmedia/North%20America/US/2020/07/30/2q-fin-ford.pdf">https://media.ford.com/content/dam/fordmedia/North%20America/US/2020/07/30/2q-fin-ford.pdf</a>
Hyundai	703,976	1,104,916	-36.3%	Hyundai Motor Announces 2020 Q2 Business Results.

				Available at <a href="https://www.hyundai.com/worldwide/en/company/newsroom/hyundai-motor-announces-2020-q2-business-results-0000016495">https://www.hyundai.com/worldwide/en/company/newsroom/hyundai-motor-announces-2020-q2-business-results-0000016495</a>
Renault Group	1,256,668	1,931,052	-34.92%	Renault Earnings Report First-Half 2020  Available at <a href="https://group.renault.com/wp-content/uploads/2020/07/groupe-renault_earnings-report-h1-2020.pdf">https://group.renault.com/wp-content/uploads/2020/07/groupe-renault_earnings-report-h1-2020.pdf</a>
BMW Group	485,464	649,856	-25.3%	Quarterly Report to June 30, 2020.  Available at <a href="https://www.bmw-group.com/content/dam/grpw/websites/bmwgroup_com/ir/downloads/en/2020/q2/Q2_2020_BMW_Group_EN_Online.pdf">https://www.bmw-group.com/content/dam/grpw/websites/bmwgroup_com/ir/downloads/en/2020/q2/Q2_2020_BMW_Group_EN_Online.pdf</a>
Volkswagen (VW)	3,893,100	5,365,300	-27,4%	Volkswagen Group - Deliveries to customers - June 2020.  Available at <a href="https://www.volkswagenag.com/en/InvestorRelations/news-and-publications/Deliveries_to_customers.html">https://www.volkswagenag.com/en/InvestorRelations/news-and-publications/Deliveries_to_customers.html</a>
Daimler	1,186,149	1,595,462	-26%	Daimler Fact Sheet for Q2 and H1 2020. Available at <a href="https://www.daimler.com/dokumente/investoren/berichte/zwischenberichte/q2/daimler-ir-factsheet-q2-2020.pdf">https://www.daimler.com/dokumente/investoren/berichte/zwischenberichte/q2/daimler-ir-factsheet-q2-2020.pdf</a>
Toyota (fiscal year starts	5,210,000	5,312,000	+1,95%	FY2020/2019 2Q Financial Results (November 7, 2019).  Available at <a href="https://global.toyota/pages/global_to">https://global.toyota/pages/global_to</a>

on 1st April)				<a href="https://global.toyota/ir/financial-re-sults/2020_2q_summary_en.pdf">yota/ir/financial-re-sults/2020_2q_summary_en.pdf</a> & <a href="https://global.toyota/pages/global_to_yota/ir/financial-re-sults/2019_4q_presentation_en.pdf">https://global.toyota/pages/global_to_yota/ir/financial-re-sults/2019_4q_presentation_en.pdf</a>
Tesla Inc.	179,050	158,200	+13.18 %	Tesla Q2 2020 Update. Available at <a href="https://tesla-cdn.thron.com/static/DK2EWG_TSLA_Update_Letter_2020-2Q_G6S6GG.pdf">https://tesla-cdn.thron.com/static/DK2EWG_TSLA_Update_Letter_2020-2Q_G6S6GG.pdf</a>

Appendix 2. Subscriptions on Tesla Service Network

24 HR.  
SUBSCRIPTION  
**\$100.00**

MONTHLY  
SUBSCRIPTION  
**\$350.00**

ANNUAL  
SUBSCRIPTION  
**\$3000.00**

Figure 40. Tesla Subscription Plans on Service Network (Tesla Service 2021)

### Appendix 3 Interview questions (Oral & Email messages)

Question 1: In your opinion, what makes Tesla hold a stable position in the current EVs market?

Question 2: What do you think will be the advantage and disadvantage if Tesla's technology is applied to the transportation facilities?

Question 3: Is the manufacturing process of cars and batteries (buying from third companies & manufacturing) in 2020 considered a bit low? In your opinion, can this technology be ramping up on a bigger scale, and how is it applied to the current transportation facilities, any problems arise in technical issues?

Question 4: What are the internal factors in Tesla's sustainability/innovative automation affecting the rise in Tesla's valuation in 2020 (last year)?

Question 5: What makes Tesla stand out from other companies in the same sector, for example, NIO Inc., Nikola Inc.?

Appendix 4. EnerGuide's label for battery-electric vehicles cost calculated per 100kWh.

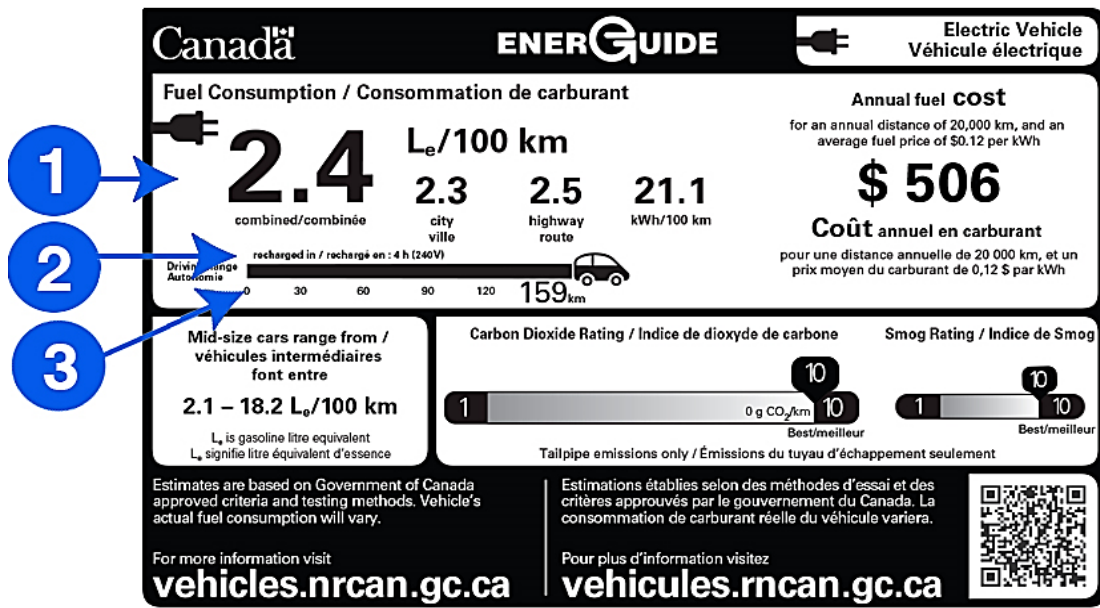


Figure 41 EnerGuide EV label on costs and related figures (EnerGuide 2021)

Appendix 5. Cost MPG of ICE cars & Electric cost for E.V

Country	Cost per kWh	Cost per 100 miles	Cost per year (avg.20,000km)
Germany	€ 0.304	€ 7.51	€ 933.74
Denmark	€ 0.283	€ 7.00	€ 869.31
Belgium	€ 0.279	€ 6.89	€ 856.73
Spain	€ 0.224	€ 5.53	€ 687.04
Italy	€ 0.223	€ 5.50	€ 683.05
Portugal	€ 0.212	€ 5.23	€ 650.52
Austria	€ 0.210	€ 5.19	€ 645.00
Luxembourg	€ 0.199	€ 4.90	€ 609.40
Switzerland	€ 0.190	€ 4.69	€ 583.01
France	€ 0.190	€ 4.69	€ 582.71
Czech Republic	€ 0.184	€ 4.55	€ 564.91
Sweden	€ 0.183	€ 4.51	€ 560.31
Finland	€ 0.174	€ 4.30	€ 533.92
Greece	€ 0.168	€ 4.15	€ 515.81
Romania	€ 0.146	€ 3.60	€ 447.69
Slovenia	€ 0.145	€ 3.58	€ 444.32
Netherlands	€ 0.143	€ 3.52	€ 437.87
Norway	€ 0.136	€ 3.35	€ 415.78
Ireland	€ 0.134	€ 3.31	€ 411.49
<b>EU in Average*</b>	<b>€ 0.196</b>	<b>€ 4.842</b>	<b>€ 601.717</b>

Average miles/gallon	26.4 mpg (high est.)	
	High	Low
Average cost of 1 litter	€ 1.30	€ 0.99
The average cost of 1 gallon	€ 4.90	€ 3.75
Cost per 100 miles	€ 18.57	€ 14.19
Cost per 20,000 km	€ 2,308.27	€ 1,763.92

\*Price on average 12 months in EU 2020, E5 & Diesels (Autotraveler RU 2021).

\*For consistency, all calculations are based on a Tesla Model S (100 kWh battery charge & 259 miles per charge).



Appendix 6. Management Effectiveness (TTM) calculations (differences in 2019 to 2020)

	<b>Q1/2020</b>	<b>Q2/2020</b>	<b>Q3/2020</b>	<b>Q4/2020</b>
Net income (TTM)	-39	479	698	862
Investment (TTM)	24,337	24,952	31,480	36,999
Other longterm liabilities	14,532	14,484	14,841	14,170
Total Stockholder's Equity	9,173	9,855	16,031	22,225
Noncontrolling interests & other	632	613	608	604
ROI (TTM)	N/A	2.07%	2.62%	2.88%
<b>Annual Return on Investment</b>				<b>2.33%</b>

	<b>Q1/2020</b>	<b>Q2/2020</b>	<b>Q3/2020</b>	<b>Q4/2020</b>
Total Assets (TTM)	37,250	38,135	45,691	52,148
Net income (TTM)	-39	479	698	862
ROA (TTM)	N/A	1.37	1.78	1.99
<b>Annual Return on Assets</b>				<b>1.65%</b>

	<b>Q1/2020</b>	<b>Q2/2020</b>	<b>Q3/2020</b>	<b>Q4/2020</b>
Net income (TTM)	-39	479	698	862
Equity (TTM) in Millions	9,173	9,855	16,031	22,225
Return On Equity (TTM)	-0.6%	6.2%	6.3%	5.98%
<b>Annual Return on Equity</b>				<b>3.88%</b>

	<b>Q1/2019</b>	<b>Q2/2019</b>	<b>Q3/2019</b>	<b>Q4/2019</b>
Investment	18,807.70	21,428.98	21,807.00	22,793.00
Total Asset	28,913	31,873	32,795	34,309
Equity (TTM) in Millions	4,606	5,715	6,040	6,618