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Tesla Energy Division Strategic Audit

Kaleb Strawhecker

University of Nebraska-Lincoln

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Tesla Energy Division Strategic Audit

An Undergraduate Thesis Submitted in
Partial Fulfillment of
University Honors Program Requirements
University of Nebraska – Lincoln

By Kaleb Strawhecker
Bachelor of Science in Business Administration
Economics
College of Business

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Faculty Mentor:
Marijane Look England, Ph.D., Management

Abstract

Tesla's electric vehicle manufacturing operation is the major revenue source for the company. Tesla has established itself as a significant player amongst other automotive manufacturers, specifically in the electric vehicle sector. Many trends are favoring Tesla's expansion. This audit takes a look at trends and changes through a PESTEL analysis along with Porter's Five Forces. Both provide an in-depth look into what the environment around Tesla is like. Then, these are used to evaluate Tesla's major strategies, competitive advantages, and resources it has at its disposal. Finally, the audit will address how the factors allow Tesla to take advantage of the ever-changing environment while also dealing with future challenges.

Key words: Porter's 5 Forces, PESTEL, strategic audit, Tesla, electric vehicles, electric cars, cars, vehicles, car manufacturing, gigafactories, automotive

History of Tesla

Tesla was created in 2003 by two engineers, Martin Eberhard, and Marc Tarpenning, to produce a fully electric car. The name was fitting, referring to the great inventor Nikola Tesla, known for his discoveries on properties relating to rotating electromagnetic fields. Eberhard, CEO, and Tarpenning, CFO, cited a three-year study conducted by General Motors, which revealed positive reactions relating to market tests. While widely associated with Tesla, Elon Musk became involved in 2004 when he invested \$30 million. This enabled him to operate as the chair of Tesla's Board of Directors (Reed, 2020).

In 2008, Tesla made the Roadster, its first electric vehicle. The Roadster could travel around 250 miles on one battery cycle with the ability to compete with gas-powered sports cars in terms of speed and acceleration. Still, the vehicle had its issues, including price and a charging time of between one to two days. In 2007, Eberhard stepped down as CEO and remained at the company while Ze'ev Drori assumed the role of CEO. The following year there was controversy, and Eberhard and Tarpenning completely exited Tesla. This allowed Elon Musk to operate as the company's Chief Operating Officer. Both Eberhard and Tarpenning insist that they were forced to leave their company, with Eberhard even attempting to sue Tesla and Musk over libel and slander. However, the suit was eventually dropped by Eberhard (Reed, 2020).

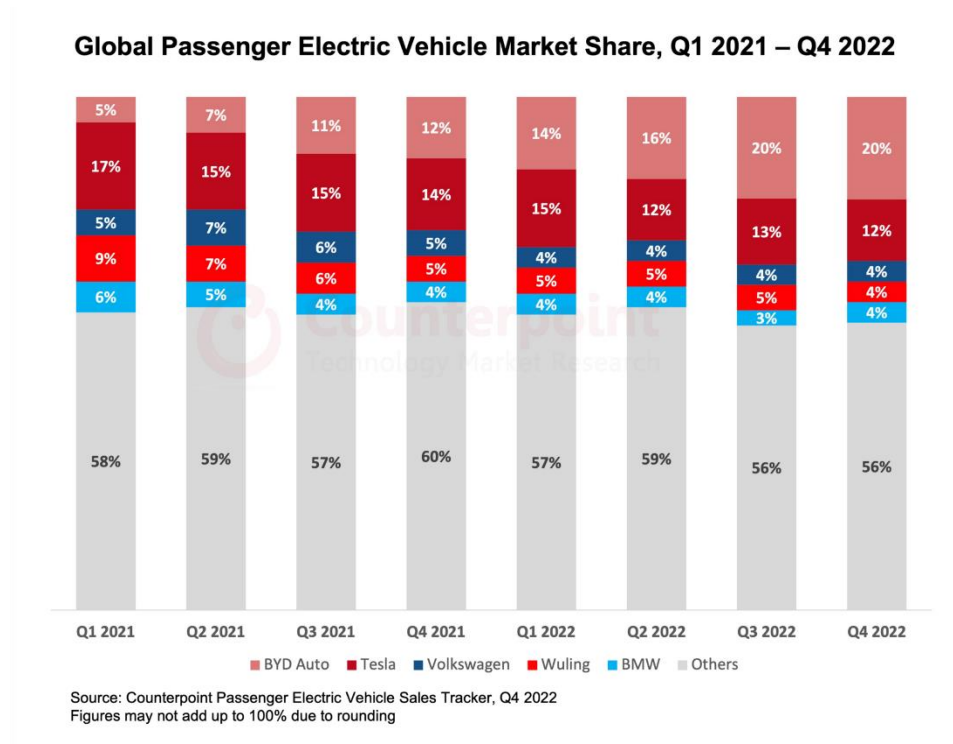
The company ran into difficult financial times in 2009, with less than \$10 million cash on hand. However, an investment from one company and a loan from the Department of Energy ensured that Tesla had the capital needed to keep going. Following that, in order to raise capital, Tesla made the decision to go public in 2010 at \$17 a share. In 2012 Tesla introduced the Model S to the market. The vehicle was incredibly successful, receiving awards and hitting unseen performance milestones. More vehicles like the Model S have been released since then that

primarily target the core consumer market. In 2012, public charging stations were established and have expanded worldwide. A little while later, Tesla opened Tesla Giga Nevada to produce the batteries needed to power its systems. These factories remain a key cog in its business. It then ventured into the solar space to provide power for homes and businesses made possible with rechargeable batteries (Reed, 2020).

Tesla has been successful in both the energy and automotive sectors, with numbers from 2021 showing that the energy sector brought in \$2.8 billion in revenue and the automotive sector brought in \$51 billion. (Farley, 2023). The company is currently headquartered in Texas and has over 100,000 employees. It also has six gigafactories, with several in the United States, one in China, and one in Germany (Tesla, 2023). This reach has allowed it to sell its products in various markets, including Europe, Asia, and North America. In addition to its reach, Tesla's innovative supply chain and vertical integration have positioned the company as one of the dominant electric vehicle manufacturers by market capitalization despite some current struggles (Edwards, 2023).

The automotive field itself is vast, with Tesla having a focus in the electric vehicle portion. Figure 1 displays the Global Market Share for companies that make electric vehicles (Counterpoint, 2023). Tesla is one of the major players. However, it is notable that BYD Auto has moved past Tesla over the past year or two. The two brands have had an intense battle in the market, especially in China. What is clear is that Tesla and BYD Auto are in command when compared to the rest of the companies in the industry. Both are growing quicker than the market is, overall. (Root, 2023).

Figure 1. Global Passenger Electric Vehicle Market Share (Counterpoint, 2023)



The industry is still growing rapidly. For example, in the United States, electric car sales went from a 0.2 percent of total automotive sales in 2011, to 4.6 percent in 2021. Forecasts may not be entirely accurate, but almost all predict that there will be continued aggressive growth. Consumer demand has made it more viable as a business opportunity. There are now more than two million electric cars on the road. Automakers are committed to electric vehicles. Gas powered cars and public transportation are a clear substitute for electric vehicles (Colato and Ice, 2023). This strategic audit will focus on electric vehicles specifically as a subsector of the automotive industry.

PESTEL Analysis

The PESTEL Analysis is used to take an external snapshot of the environment of an industry or firm. Further defined, it is a tool that takes an in-depth view of six factors to help

build a deep understanding of the external environment. The factors include political, economic, social, technological, environmental, and legal (BatonGlobal, 2019).

Political/Legal

The political and legal aspect of the PESTEL analysis differ at the global, domestic, and local level, especially in the United States. Both areas deal with the different state governments, policies in place, and laws. With so many national and local governments involved, the compliance for electric vehicle manufacturers is complex (ScienceDirect, 2021). Under the current US government administration, there is a push toward battery-powered transportation. While there is a larger and larger move toward electric vehicles, some in government would prefer to stick with gas powered vehicles. One reason is that the electric cars cost around \$65,000 on average, which could make Americans struggle to afford them. Despite this, the automotive industry has increasingly accepted electric vehicles, with many in the United States government pleased that EV battery plants will create more jobs (Fortune, 2022).

Additionally, there are government agencies, such as the US Environmental Protection Agency (EPA), which are ruling in favor of electric vehicles. This again affirms the trend towards electric cars that has occurred over the recent past. Reports state that there will be a proposal that tightens up automobile pollution limits. This could require, at a minimum, that fifty-four percent of new cars sold in the United States must be classified as electric by the year 2030. Even more aggressively, it may require two-thirds of vehicles sold to be electric by the year 2032. Though, it is vital to note that this is based on information provided by officials in the industry that have received some information on the proposed plan. There will be a period for public comment once the proposal is made available to the public. This ruling will become final next year. Further goals for the current administration include requiring automakers to increase

gas mileage and reduce pollution from tailpipes between now and the year 2026. Both moves align with the White House's pledge to reduce US greenhouse gas emissions in half by 2030 (Associated Press, 2023).

It is interesting to note that consumers often act with their political alignment in mind. For example, a poll found that Democrats are two times as likely to state they plan to purchase an electric vehicle when compared to Republicans. On a state-by-state basis, there are different solutions to push consumers to purchase electric vehicles. California has created a goal for all new cars to be electric or plug-in hybrid by 2035. Other states have fewer extreme measures in place. Still, California's plan raises a variety of questions, including how to pay for charging stations and maintaining roads when faced with a decline in gasoline tax income. Biden's administration has allocated over seven billion dollars to states to create a highway network with around 500,000 electric vehicle charging stations (Fortune, 2022).

Specifically, the Bipartisan Infrastructure Law puts \$7.5 billion into electric vehicle charging. There is an additional \$10 billion added toward environmentally friendly transportation, and around \$7 billion allocated for electric vehicle battery materials (wh.gov, 2023). In addition, many in the government are pushing to create tax credits of \$7,500 beginning next year. While incentives will help the EV industry, there are still concerns about the high cost of such vehicles. In the eyes of many, the incentives themselves are not enough (Fortune, 2022).

Legally, the Inflation Reduction Act of 2022 also indirectly assists the entire electric vehicle industry. According to one article, the proposal aimed to increase the pace of electric car sales and invite domestic battery production, with a cost to China. With the focus on battling climate change with tax breaks and promotions, it naturally follows that electric cars will fare better. Eligible facilities reporting over 25,000 metric tons of CO₂ may face additional costs for

methane emissions if certain thresholds are exceeded (EPA, 2023). This further assists the growing electric vehicle industry. The cost to China is included with the incentives for battery production in the United States. This can be a major boost to players in the electric automotive industry, especially if batteries are obtained from the United States (Ewing and Penn, 2022).

The US is only one of many geographic areas in which politics are relevant for the automotive industry. Europe and China are making use of regulations and subsidies for automakers to boost electric vehicles. Europe has put forward the idea of banning the sale of gas-powered vehicles by 2035. The European Union has made the decision to ban all sales of new cars with internal combustion engines. Some in the international automotive industry argue that refining internal combustion engines makes more sense than using unproven technology (Winton, 2022). Not only that, Europe and China have their own financial incentives to support the purchase of electric vehicles (New York Times, 2021).

Green lobbying organizations are also present, an example is the Transport & Environment group in Europe which wants plug-in hybrids banned by 2035. Despite this, there is not much of a government push, if at all, to ban hybrids internationally. Though, many European countries have made efforts to ensure compliance with the 2035 European Union proposal by 2030. There has been no political opposition to this, which shows the growing acceptance around the world (Winton, 2022).

Economic

Because the price of electric cars is higher than most gas-powered vehicles, the state of economy could affect consumers' decisions to invest in electric cars. The good news for the industry is that real gross domestic product continues to rise. It went from a 3.2 percent increase

in the third quarter of 2022 to a 2.7 percent increase in the fourth quarter. These indicate that companies are increasing investment in inventory at the same time that consumer spending is rising. An increase in consumer spending could have a positive impact on the electric vehicle industry. Furthermore, these metrics indicate a financial recovery from COVID's harm to the US economy. (bea, 2023).

Still, predictions for the future along with some current events indicate that there are some bumps ahead for the economy. While the US GDP growth has beaten expectations and consumers have successfully fought off high levels of inflation and interest rates, some forecasts still suggest that the US economy is headed towards a recession with shrinking GDP growth for three quarters. High-interest rates can certainly harm expansion for any electric vehicle manufacturer since it indicates an increased cost of borrowing money. Still, as mentioned previously, investment has risen, mitigating some concerns. Inflation is expected to continue to drop over the rest of the year, but hitting the Federal Reserve's two percent benchmark will likely not be attainable.

Social

Electric cars have become a more realistic option for people around the country, especially when looking at factors such as concern for the environment and affordability. There are still areas that consumers would still like to see addressed, including more charging options, a better mile range, and lower prices. One major problem that may need to be addressed is that many people are not aware of federal and state incentives to make the process of buying an electric vehicle much easier. In a national survey that covers a variety of racial/ethnic and income groups, nearly half of people indicated that they did not know about these incentives.

Almost six in ten Americans who indicated cost was an issue said the purchase price was the largest barrier (Bartlett, 2022).

Thirty-six percent of respondents replied to the survey that they plan to buy, lease, or are seriously considering the option of an electric car. Further broken down, fourteen percent of the entire survey stated that they would definitely buy an electric car, a four percent increase from a 2020 nationally representative CR survey. Most interest in electric vehicles was related to cost savings. Some reasons included in the survey were: lower charging costs, lower lifetime costs, and lower maintenance costs. CR's associate director of sustainability noted that there is an obvious interest from Americans to lower their transportation costs along with their environmental impact. Furthermore, the director noted that education would be key to breaking barriers in owning an electric vehicle. Demographically, males, younger adults, individuals with higher income, and those with higher levels of education have an increased likelihood of purchasing an electric vehicle (Bartlett, 2022).

Technological

Technological innovation continues to impact the electric vehicle industry. Major improvements are being made to batteries and battery capacity, a key component for electric cars to function. Currently, EV batteries have liquid electrolytes which provide a more limited mileage range. Semi-solid state or solid-state batteries would allow for much better energy density per unit area and are currently being developed. The Qilin battery, which is being developed by CATL, would allow for a vehicle to travel nearly 630 miles on a single charge (Liu, 2022).

Packaging technology for batteries is vital to utilizing space effectively while keeping vehicles safe. CATL has developed cell-to-pack technology, which puts battery cells into a battery pack to optimize space and energy density. Improvements created by BYD place the battery into the back body floor panel to best use space. Another improvement, made specifically by Tesla, includes integrating battery cells into the chassis of the car. Tesla's improvement would likely lead to a fifty-five percent cost reduction and a space reduction of thirty-five percent. Cost reduction with improved technology could help to lower EV prices. Finally, there have been improvements to the charging process of batteries. The main issue for quick charging is a lack of high-power charging infrastructure which needs an upgraded power grid and government support. China is one such country that has spent plenty of money on infrastructure to support the fast charging of electric vehicles (Liu, 2022).

Environmental

Electric vehicles are very friendly to the environment. However, the companies in the industry must still consider the impact on the Earth when producing such vehicles. Electric vehicles draw power from the power grid, which is powered via a mix of fossil fuels and renewable energy. Depending on where the vehicle is charged, it could be worse for the environment than a hybrid vehicle. On the positive side, governments are attempting to produce cleaner energy, making electric vehicles even greener.

Raw material mining to produce EVs and their component parts may present other environmental issues. Lithium-ion cells need cobalt, lithium, and other rare earth elements. All have been linked to serious environmental concerns, especially cobalt. The mining and smelting of cobalt for EVs leads to hazardous air pollution, including sulfur oxide. Plus, other products left over can leach into the surrounding environment (Tabuchi and Plumer, 2021).

In general, the manufacturing process for electric vehicles requires around fifty percent more water than the traditional vehicle manufacturing process. Lithium mining alone uses large amounts of water. To ease concerns, automakers have committed to removing artisanal cobalt from processes and will work to develop batteries that use less cobalt. Still, this technology is not currently available and is not realistic at the moment. Mr. Daudin of Pact, a nonprofit working with African mining communities, stated that manufacturers working with mines to lower the environmental impact would create great opportunities for African nations. However, if they do not, the environment may be at significant risk (Tabuchi and Plumer, 2021).

Recycling rates for lithium-ion batteries are currently at a low rate of five percent. This number should go up as time moves on, especially when considering the recycling opportunities available. For example, the batteries contain precious materials that can be recovered, along with the fact that these batteries could be used for other applications such as storage. Nissan and BMW are two companies leading the way in terms of using old EV batteries for grid storage. Still, there are major challenges as the reuse of such batteries necessitates extensive testing to ensure reliability (Tabuchi and Plumer, 2021).

Porter's Five Forces Analysis

Porter's Five Forces Analysis is a method that businesses can use to evaluate the competitive environment and potential profitability of an industry. The model was published in 1979 by Michael Porter of Harvard Business School. It identifies five different factors that decide whether a business can be profitable in relation to other competitors in the industry. These factors are competitive rivalry, the bargaining power of suppliers, the bargaining power of customers, the threat of new entrants, and the threat of substitute products or services (Martin, 2023).

Competitive Rivalry

There is a high level of competition in the electric vehicle industry. There are over forty-five different models of electric vehicles for sale in the United States alone (Krisher, 2022). Major traditional automakers have evolved and included operations for electric vehicles to capture the increasing move towards electric vehicles. These companies are willing to make significant investments, with Volkswagen paying over thirty-four billion dollars over the next five years to enhance its offerings. Renault, Nissan, and Mitsubishi have increased their share of EV sales as well. Overall, the top electric car manufacturers in 2025 based on sales predictions include Volkswagen, Renault-Nissan-Mitsubishi, Geely, Tesla, Toyota, Daimler, Hyundai, General Motors, and Ford. By 2025, it is expected that Volkswagen will lead all automakers in EV sales (Riley).

Bargaining Power of Suppliers

The bargaining power of the different suppliers for electric vehicle production is incredibly high. Prices continue to increase for a variety of bulk materials, such as steel, aluminum, and copper. Manufacturers have a high requirement for microchips, which are in short supply. The current supply chain has struggled to meet the increasing demand (Paoli and Gül, 2022). All signs point to the fact that there are not enough suppliers for EV makers to work with, thus increasing the current suppliers' bargaining power. Rivian's CEO stated that around ninety percent of the battery supply chain "does not exist." In the United States, there is only one lithium mine and one nickel mine that could supply auto manufacturers. Manufacturers are very dependent on importing the materials needed to produce batteries (Mayoral, 2022).

Bargaining Power of Customers

The bargaining power of consumers has increased over time in the industry and has reached a moderate level. Increasingly electric car options are available for consumers to choose from. While still not incredibly high, there is a projected growth for models available to increase from around sixty to over one hundred. Most major brands being involved in the industry enables consumers to feel like they have quite a few options. (Jenkins, 2021).

Threat of New Entrants

The threat of new entrants in the electric vehicle industry is at a low level. Electric cars are much more expensive to manufacture than traditional cars (Edelstein, 2020). The high cost of production makes it difficult for new manufacturers to join the race. Also, with so many major brands operating in the field, new companies would have difficulties matching established companies' processes. It is nearly impossible for a brand-new firm to enter the market, especially considering that current companies in the industry operate on such a large scale and can inject large sums of money. It is also important to note that most major automobile manufacturers are now involved in the EV space, so there is little threat remaining from established traditional car manufacturers jumping into the EV industry.

Threat of Substitute Products or Services

The threat of substitute products or services is high for EV manufacturers. Cities are eyeing opportunities to increase public transport to lessen emissions and increase convenience. Electric vehicles can increase income disparity if viewed as the primary solution, whereas public transport is a low-cost option (Charles and Kellman, 2021). Hybrid and gas-powered cars are an additional option for consumers, with a lower up-front cost than electric vehicles. On average, a

hybrid vehicle costs around \$39,040 before incentives and rebates. Meanwhile, the mainstream gasoline-powered vehicle comes in with an average initial cost of around \$33,797. This compares to an average initial cost of around \$66,997 before incentives and rebates for electric vehicles (Meyer, 2023).

Company Strategy and Major Strategic Objectives

Overall, Tesla has one overarching strategy to accelerate the rate at which the world transitions to sustainable energy. If the world does this, it is simple, more people will use electric vehicles, especially Tesla's electric vehicles. Batteries in Tesla vehicles are made by Tesla, demonstrating a commitment to vertical integration. They will continue to face lesser supplier costs and can further leverage this advantage as electric cars become more popular. This is another objective that the company is actively pursuing. As Tesla states, "We design sustainable systems that are massively scalable [...] Our energy generation and storage products work together with our electric vehicles to amplify their impact." (Tesla, 2023).

Company Competitive Advantages

As mentioned previously, a major competitive advantage of Tesla is how business units of Tesla achieve synergy in their work together. Tesla's energy creation and storage items are utilized in tandem with its electric vehicles to achieve the best product with the best performance possible. Tesla also has economies of scale that its major competitors have not yet achieved. The vertical integration of Tesla's factories spans three continents. Its factories create the batteries that go in the cars. Furthermore, Tesla's early acquisition of battery manufacturing companies ensures that the organization has advanced battery expertise. Meanwhile, other competitors must play catchup to achieve the electric battery expertise of Tesla. Not only that, but its cars contain

features that other electric vehicles simply cannot match. Live software updates can be issued by Tesla over-the-air rather than having to be sent in. The software updates do not only contain fixes for bugs, but they also add new features in an instant (Tesla, 2023).

Tesla has been recognized as a legitimate competitor by large corporations such as Volkswagen, because its software allows extreme adaptability to consumer changing wants and needs. Other large automakers do not have the expertise to battle Tesla's software superiority. Tesla also includes fewer parts than many other companies, thus avoiding expensive repairs. This is a major draw to consumers around the world who want to save money in the long run. Tesla avoids a difficult car buying process by making it easy for consumers to go online, pick a model, add features, put down a deposit, and decide when they want to pick up their new vehicle. This is much faster than dealing with a sales representative or the complex process other companies employ. Overall, the buyer is in control and can enjoy avoiding hassles (Shipley, 2020).

Tesla's final competitive advantage is its superior marketing efforts. There is a trend towards being environmentally friendly, from companies to consumers. What other company embodies being environmentally friendly when on the road like Tesla? Tesla's name recognition evokes the idea of "clean" cars. Tesla's numerous advantages should a sustainable competition advantage as competition increases in the EV space (Shipley, 2020).

Resources

Tesla may have many competitive advantages, but it needs to have the necessary resources to sustain its competitive advantage over competitors. The company's early investment in resources for battery production facilities will continue to pay off. To counteract the

increasing demand for lithium to produce lithium-ion Tesla had secured a deal with a Vancouver company, Pure Energy Minerals, to acquire its lithium. This deal was negotiated in 2015 and will provide Tesla with a reliable supply of resources so as to not halt its production of batteries for its vehicles. Furthermore, Tesla also had plans to acquire lithium from New Mexico to increase supply. By investing in lithium mining, Tesla has ensured a steady supply. (DeBord, 2015). It is likely that Tesla has set up other deals with mining operations close to the company's wide range of gigafactories. Not only are these resources vital, but Tesla's battery factories themselves will remain a vital resource to ensure that Tesla continues to have superior vertical integration over its opposition.

Challenges and Future Positioning

There are numerous challenges that Tesla will encounter as time goes forward. First, it still faces the difficulty of being able to become more price competitive with gas-powered vehicles. The higher cost can keep a decent portion of the middle class away from purchasing a Tesla. Tesla could see effects from the ebbs and flows of the economy which may limit disposable income for potential customers if the high cost remains. In addition, there continue to be critics in the automotive industry, who will slow down a push towards electric vehicles. These critics can continue to lobby against the cleaner options of Tesla, and they will remain there as long as there is competition between internal combustion engines and battery-powered cars.

However, Tesla can continue to sustain its competitive advantage by lobbying for further tax cuts for those purchasing electric vehicles to make them more affordable. That, along with education on current incentives for purchasing electric vehicles could inform and persuade customers that may think they are unable to afford the vehicles. Leveraging this, in combination with Tesla's superior vertical integration, will allow them to drive costs down. Still, there is

another major challenge in the fact that there are so many substitute forms of transportation available around the world. Many cities are pushing public transportation as opposed to driving, as it is better for the environment and much cheaper. Then, there remains gas-powered cars along with hybrid ones. Still, public transportation is not possible everywhere, which Tesla can take advantage of. To solve so much competition, Tesla can also continue to use its name recognition to its advantage.

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