

TEACHING NOTE

Tesla Motors, Inc.

Structure of the Case

The case begins on January 1, 2015 with a vignette of CEO Elon Musk wondering about Tesla's future, including: (1) Will Tesla be the next great American car company? (2) Can it disrupt the industry with electric vehicles? (3) How should Tesla adjust to increased competition? (4) Can Tesla have a sustained competitive advantage without any infrastructure? (5) Is Tesla's business model sustainable? The vignette ends with Elon Musk wondering what can be done to ensure Tesla's success over the next few years.

Following the vignette is a biography of Elon Musk. Musk is a serial entrepreneur who previously founded Zip2 (an online software provider, sold to Compaq) and PayPal (an online payment processor, sold to eBay). He is now a portfolio entrepreneur with a stake in three Silicon Valley firms: SolarCity (solar panel manufacturer), SpaceX (satellite space exploration), and Tesla Motors (electric car maker). Musk has been lauded for his ability to bring good ideas to life but criticized for his lack of staying power, and the case suggests he sees Tesla as an opportunity to leave a legacy.

The next section provides a history of Tesla Motors (TSLA). Tesla was founded by Martin Eberhard and Mark Tarpenning in 2003, with Elon Musk as one of the first investors. Musk took over the lead engineering and managerial roles after discovering that Tesla was losing \$50,000 on each Roadster (its electric sports car model) it sold in December 2006. The redesigned Roadster then sold for \$109,000 before it was later discontinued in favor of the Roadster 2 and Roadster Sport, as well as designs targeted at larger markets. The Model S (family sedan) prototype was unveiled in 2009, and it received over 2,000 orders, with customers putting down a minimum \$5,000 down payment. The Model S received approximately 12,000 orders by 2012 when deliveries began. It is manufactured in a California factory purchased from Toyota. The Model X (family SUV) is planned for release in 2014. An IPO in 2010 that involved a strategic partnership with Toyota (3 percent stake) helped provide needed cash, but Tesla did not become profitable until 2013.

While it is beginning to expand internationally, Tesla largely competes in the United States where the automotive industry has historically been dominated by GM, Ford, and Chrysler. In 2009, the market share of the Big Three dropped below 50 percent for the first time as a result of increased competition from German, Japanese, Korean, and Chinese auto manufacturers. U.S. automakers profited during the "SUV craze" of the 1990s, but they were slow to adapt to shifting customer preferences for less

expensive, more fuel-efficient vehicles in the 2000s. Their financial troubles were further compounded by high fixed costs for unionized labor, with the result that both GM and Chrysler declared bankruptcy following the 2008 financial crisis. GM has largely recovered, but a failed merger with Daimler led to a restructuring, where 25 percent of the company is now owned by the Italian carmaker Fiat, and GM's pension fund has majority ownership. Ford avoided the need for a government bailout by mortgaging almost all of its assets, including its blue oval trademark that it regained control of in 2012.

Today, the U.S. automotive market has significant competition from foreign firms that began following the oil price shock in 1973–74. Competition largely resulted from German, Japanese, and Korean firms that offered higher quality and better fuel efficiency. From Japan, Toyota and Honda have a large part of the U.S. market and produce vehicles in the United States following voluntary export restraints (VERs) established in 1981. Producing cars in the United States helped decrease the liability of foreignness. The three largest German auto manufacturers are Daimler, BMW, and Volkswagen, and they are noted for superior engineering and design. Korean manufacturers, such as Kia and Hyundai, are gaining increased acceptance as lower-cost alternatives that provide fuel-efficiency.

With this background, the case then transitions to focus on the history of alternative propulsion systems. The U.S. Big Three have not been at the forefront of the search for more fuel-efficient and environmentally friendly engines. Rather, they respond when necessary due to changing consumer demands (for example, the oil embargoes of the 1970s) or the passage of new legislation (for instance, California's zero-emission vehicle [ZEV] mandate in the 1990s). The ZEV mandate is credited with stimulating early research into electric-car prototypes, but these models were quickly abandoned once automakers defeated the mandate in federal court. Environmental concerns and rising gas prices have increased interest in alternative energy, and a competition for establishing a new standard appears to be emerging among several technologies, including:

- Pure battery electric vehicles (e.g., Nissan Leaf, Mitsubishi i-MiEV, and Tesla's cars)
 - Advantages include low noise, no exhaust gases, lower maintenance, and high torque over a larger range of speeds
 - Disadvantages include battery weight and expense, long charging times, and limited range per charge
- Hybrid gas/electric vehicles (e.g., Toyota Prius, Honda Insight, and Chevy Volt)
 - Advantages include those of pure electric vehicles without range restriction
 - Disadvantages include weight, cost, and technological complexity
- Biofuels and natural gas (generally existing models are converted to use these fuels)
 - Derived from natural products and do not contribute to CO₂ emissions
 - Contribute to increased food prices, farming process uses carbon-based fuels, and governmental subsidies skew prices
- Hydrogen and fuel cells (largely limited to prototypes)
 - May work through combustion or fuel-cell conversion
 - Lack of infrastructure to support refueling

For electric vehicles, batteries are the “number one constraint.” Several corporations are investing in battery technology, and no clear standard exists. Initial efforts targeted nickel-metal hydride (NiMH) batteries, but their high weight has shifted attention to lithium-ion batteries that provide longer ranges. Still, lithium-ion batteries have safety concerns related to high heat that can lead to fires (e.g., Dell laptops, Boeing 787). Elon Musk is a strong opponent of hybrid vehicles and criticizes the added complexity and weight dedicated to both electric and gas. Further, Tesla has invested \$5 billion in a lithium-ion plant, despite rising competition from BYD with its lithium-ion phosphate batteries—which boasts Warren Buffet as an investor.

The lack of a clear standard has hindered the development of needed infrastructure to support alternative-energy vehicles. The U.S. government offers incentives for electric vehicles and recognizes the need to develop a smart grid in order to have an infrastructure to increase adoption. Better Place, a California startup, offered another approach whereby consumers buy battery-charged minutes at service stations. The stations provided too many restrictions on design, and the company went bankrupt in 2013. Another idea was to replace the electrolyte in batteries in a format similar to existing stations. In advancing its design as the standard, Tesla has begun a network of service stations that allow customers of its Model S vehicles to charge batteries or have fully charged batteries swapped into their vehicles. Additionally, Tesla has made its patents available to competitors, a move that likely is intended to increase adoption of Tesla’s technology as the industry standard.

Before the concluding vignette, the case provides a summary of Tesla’s current challenges and strategic choices. Electric vehicles face price and performance pressure from consumers that is compounded by lower gas prices, at the same time competition is increasing.

Suggested Questions

ANALYSIS: FOCUS ON EXTERNAL AND/OR INTERNAL ENVIRONMENTS

- 1. Conduct a PESTEL analysis to identify the forces affecting car manufacturing of alternate energy vehicles.*
- 2. Conduct a SWOT analysis to analyze internal and external conditions Tesla must consider going forward.*
- 3. Using VRIO analysis, evaluate whether Tesla has a sustained competitive advantage.*

FORMULATION: FOCUS ON BUSINESS, CORPORATE, AND/OR GLOBAL STRATEGY

- 4. How does Elon Musk constrain Tesla’s options?*
- 5. (Advanced) How has Tesla departed from existing auto industry practices?*

IMPLEMENTATION: FOCUS ON RECOMMENDATIONS AND HOW TO EXECUTE THEM

6. *What short-term objectives are required for Tesla to survive?*
7. *What are the primary elements of Tesla's internal and external environment that need to be addressed for it to achieve a sustained competitive advantage?*

Suggested Answers

ANALYSIS: FOCUS ON EXTERNAL AND/OR INTERNAL ENVIRONMENTS

1. *Conduct a PESTEL analysis to identify the forces affecting car manufacturing of alternate energy vehicles.*
 - *Political* – Governments play a strong role in the automotive industry. The case primarily contains information on the impact of the U.S. government. For example, it has provided funding for research with a 2003 investment of \$1.3 billion into hydrogen-powered vehicles, as well as tax incentives (such as the 2003 commercial truck rebate and the 2009 “Cash for Clunkers” program). It also provided financial bailout funds to GM and Chrysler to help them emerge from bankruptcy. Additionally, the “Cash for Clunkers” program will have an effect on future car sales, as the models purchased in 2009 age and need to be replaced. Local efforts to implement mass transit systems could also depress future demand for automobiles as a mode of transportation.
 - *Economic* – Economic conditions have a large impact on the demand for vehicles, with large declines in demand during the 2008 financial crisis that are just now returning to prior levels. Another economic concern involves the price of oil, with consumer demand for alternative energy growing as the price of oil continues to be volatile.
 - *Sociocultural* – Demographic factors may also have an important impact on the automotive industry. As baby boomers age, the types of cars they buy will change (wider mirrors, bigger knobs, simpler dashes, etc.), as will their driving patterns. Generation Y may also depend less on owning vehicles, with a greater acceptance of car sharing or use of mass transit. It is also worth noting that attitudes toward driving differ cross-culturally. While American cities are planned with the car in mind, many European governments (e.g., London) are taking actions to make driving less attractive and encourage pedestrian traffic.
 - *Technological* – This is a primary focus of the case, with the discussion of alternative energy sources such as electric batteries, hybrid engines, hydrogen fuel cells, and biofuels. Automakers must monitor multiple competing technologies to see what emerges as the new standard for automotive propulsion systems.
 - *Ecological* – This segment has significant overlap with both sociocultural attitudes toward alternative energy sources and their technological state of development. However, biofuel has additional concerns of diverting food sources to transportation as well as concerns over how electricity is generated to supply electric vehicles or hydrogen.

- *Legal* – Historically, the California ZEV mandate of the 1990s is credited with stimulating the development of early electric-car prototypes, even though they were abandoned when the mandate was defeated in federal court in 2002. Consumer liability, auto-safety regulation, and state regulation of dealerships are also relevant concerns. Specifically, auto franchise laws are impacting Tesla's ability to establish a network of its own sales centers.

During discussion, it is worthwhile to ask students which two or three driving forces are most likely to have a significant impact on the industry in the near future. Likely technological uncertainty surrounding the alternative energy that will become the standard represents the primary force affecting alternative energy vehicles. Consumers are hesitant to purchase alternative vehicles due to the lack of infrastructure and the fear that any new technology will become quickly outdated. The company that successfully identifies and implements a new standard could gain a significant first-mover advantage. Even if a better technology emerges later, it is possible that available infrastructure may maintain the advantage of widely adopted technology. For example, the QWERTY typewriter keyboard is not necessarily a superior arrangement, but it was the first to gain widespread adoption. Other forces that remain important are economic and sociocultural forces that will impact demand for Tesla's products.

2. Conduct a SWOT analysis to analyze internal and external conditions Tesla must consider going forward.

Strengths

- Experienced management with good track record (Elon Musk)
- Recognized brand with Tesla and recognition for quality design
- Technology expertise in battery electric vehicles
- Production in California near primary market with celebrity owners
- Gaining economies of scale with internal production of cars and now batteries

Weaknesses

- Higher prices than competitors
- Struggles to maintain consistent profitability
- High identification of company with Elon Musk, who is also managing SpaceX and SolarCity
- Focus only on electric vehicles
- Rely on improved lithium-ion battery performance for future success
- Problems expanding production models

Opportunities

- Growing concerns of environmental sustainability and acceptance of electric cars
- Alliance with other auto manufacturers by making technology available

- Expanding beyond sports cars to broader market categories
- Expanding internationally
- Additional alliances to access financing

Threats

- Increased competition in U.S. market and internationally
- Lack of a clear standard, and the potential it will be set by a competitor
- Lack of infrastructure supporting Tesla vehicles outside coastal U.S. markets
- Young people are less interested in cars
- Risk of economic slowdown

NOTE: It is recommended that a SWOT analysis be linked with Question 7: *What are the primary elements of Tesla's internal and external environment that need to be addressed for it to achieve a sustained competitive advantage?*

3. Using VRIO analysis, evaluate whether Tesla has a sustained competitive advantage.

Tesla's IPO and profitability signal that it is likely a viable company. However, its ability to achieve a sustained competitive advantage likely depends on organizing its resources and capabilities to capture value. Elon Musk's high identification with Tesla and involvement with other ventures leads to concern about the focus of Tesla and the depth of its managerial talent. Making Tesla's technology available to other companies likely facilitates it capturing value from its investments in a network of recharging stations and battery manufacturing. Sufficient revenue needs to be generated to enable making needed investments in R&D and manufacturing, and to avoid unfavorable rates to refinance convertible debt. Additionally, its location in California places it near supporting high-technology industries and an important market, but it also represents a high-cost location and with limited entry barriers, as Apple's potential entry signifies. If Tesla is unable to organize itself to generate value from its technology, it will likely become an acquisition target by another firm that will attempt to organize its resources to generate value. (See Exhibit TN-1 for a VRIO analysis of Tesla.)

FORMULATION: FOCUS ON BUSINESS, CORPORATE, AND/OR GLOBAL STRATEGY

4. How does Elon Musk constrain Tesla's options?

Tesla's value is highly dependent on the continuing presence of Elon Musk, both for his engineering and entrepreneurial abilities, and he continues to be actively involved in his two other companies (SolarCity and SpaceX). However, an executive who is highly identified with a firm, such as Elon Musk, can inadvertently limit the alternatives a firm pursues. For example, when Elon Musk is focused on one of his other ventures, will important decisions at Tesla be delayed? Additionally, Elon Musk's opposition to hybrid gas/electric vehicles constrains Tesla's involvement in this area. To the extent

that Elon Musk wants Tesla to represent his legacy, he may be overcommitted to electric vehicles and lithium-ion batteries that may contribute to poor decisions. One possibility in this area is his high commitment to quality that keeps the cost of Tesla vehicles higher than competitors.

5. (Advanced) How has Tesla departed from existing auto industry practices?

Tesla is a very innovative company. In addition to challenging the 100-year-old design of combustible engines in automobiles, Tesla displayed several other innovative strategies. For example, while Tesla has moved into designing and producing its own cars, it originally worked with Lotus for the design and production of the Roadster. Traditionally, auto manufacturers have used their own design and production. Further, by requiring orders to have a minimum \$5,000 down payment, Tesla essentially used consumers to help finance the company with interest-free loans.

Tesla has also diverged from traditional practices by selling its cars online or in company owned dealerships, as well as making its patents publicly available. Avoiding dealerships limits costs and sharing revenues with dealerships, but it has limited the ability to leverage the investment by dealers in needed infrastructure to charge and maintain its vehicles.

One of the auto industry practices that Tesla has embraced are partnerships and alliances.

*IMPLEMENTATION: FOCUS ON RECOMMENDATIONS
AND HOW TO EXECUTE THEM*

6. What short-term objectives are required for Tesla to survive?

In the short term, Tesla needs to lower costs and grow sales. The primary concern for Tesla is achieving consistent profitability and/or securing continued financing. This problem relates to Tesla's focusing on the premium market (Roadster sports car) that limits demand and hinders its ability to lower costs with economies of scale. The move into the Model S (family sedan) and Model X (SUV) broadens the market segments that Tesla serves, and it has internalized production to enable increased efficiency to lower production costs. However, it has located production in California, a high-cost location. Meanwhile, competitors are already serving the family sedan market with lower-cost electric vehicles.

7. What are the primary elements of Tesla's internal and external environment that need to be addressed for it to achieve a sustained competitive advantage?

While a case can be made for multiple concerns, the elements of a SWOT analysis suggest relevant questions to organize responses:

- How can managers use strengths to take advantage of opportunities?

Tesla has recognized strengths in electric-car technology and design that it can use to help set an industry standard (opportunity). Providing its technology to auto manufacturers that are lagging in electric vehicle development represents one approach to setting an industry standard. Other options are an involvement with government projects or starting an industry standards-setting organization.

- How can managers overcome weaknesses to take advantage of opportunities?

Tesla needs continued financing in the short-term (weakness), and there is growing acceptance of electric cars (opportunity). Additional financing largely depends on continued profitability and growth when Tesla is having problems in China and releasing new production models. Another concern is building an executive team to support Elon Musk to lower Tesla's dependence on him.

- How can managers use strengths to reduce the impact of threats?

The threat of increased competition and lack of a clear standard in alternate energy can be addressed with strengths in Tesla's technology and brand. By making its technology open source, Tesla can leverage its acceptance by auto manufacturers that are not developing their own technology. Creating partnerships can also help address the lack of infrastructure to support non-Tesla vehicles.

- How can managers overcome weaknesses and reduce the impact of threats?

Tesla needs to ensure compatible infrastructure is developed to support its cars. Involvement in government projects, company investments, and possibly using traditional dealerships to share the cost of investment may be needed.

The risk of another economic slowdown and the weakness of higher prices than competitors can be mitigated by lowering the costs of production with automation and bringing aspects of Tesla cars that demand high quality (e.g., design, final assembly, batteries) in house.

In summary, the different combinations from a SWOT analysis can help to triangulate primary areas on which to focus. The items that repeat for the different combinations of SWOT elements begin to demonstrate what is more important or what makes more sense for a firm to pursue. For Tesla, securing additional companies to use its technology and continued growth/profitability to enable continued financing represent consistent themes.

Recent Updates

1. Planned locations of Tesla's stations, see: <http://my.teslamotors.com/supercharger>
2. Apple car: *The Economist*, February 21, 2015: <http://www.economist.com/news/business/21644149-established-carmakers-not-tech-firms-will-win-race-build-vehicles>
3. Rumors Apple might acquire Tesla: <http://www.forbes.com/sites/robinlewis/2014/05/15/buying-beats-bah-why-apple-should-think-big-and-buy-tesla/>
4. Insightful article in *The Wall Street Journal* (March 4, 2015) about how the existing car companies plan to respond to a potential entry of Google and Apple into the car industry: <http://on.wsj.com/1GOyppK>

Additional Resources

5. Tesla's website (<http://www.teslamotors.com/models>) has worthwhile information on its different models, including cost comparisons. The website changes fairly often, so it is best to start at the homepage and review it before class.
6. <https://www.youtube.com/watch?v=5XdiGMIUxeY> (7:24). A video of a Tesla media event comparing the speed of refilling a car with gas or swapping a battery out of a Model S at a Tesla station.
7. For additional reading, a July 2013 Bloomberg *Businessweek* article entitled: "Why everyone loves Tesla," see: <http://www.businessweek.com/articles/2013-07-18/the-tesla-electric-cars-creators-chase-their-iphone-moment>. It also includes a video of Tesla's highly automated manufacturing facility.

Contact your local representative from McGraw-Hill Education (<http://shop.mheducation.com/store/paris/user/findltr.html>) for information about access to financial analysis spreadsheets.

EXHIBIT TN-1 A VRIO Analysis of Tesla

Tesla's Resources and Capabilities ... are they?	Valuable V	Rare R	Costly to Imitate I	Organized to capture value O
Elon Musk	✓	✓	✓	?
Technology	✓	✓	✓	✓
Brand recognition	✓	✓	✓	?
CA location	✓	✓	?	?
Partnerships Daimler Toyota	✓			
Manufacturing	✓			✓
Supercharger network	✓	✓	✓	✓