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Analysing on External Environment and Industrial Competition of High-Tech Companies—Using Tesla as an Example

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As the impact of the global energy crisis deepens, traditional oil resources are exhausted, and the harm caused by air pollution and rising global temperatures is increasingly severe; the government and automobile enterprises generally believe that energy saving and emission reduction is the future technology development direction of the automobile industry. The main direction of the attack is the general trend of new energy vehicles to replace traditional vehicles. As a leader in new energy pure electric vehicles, Tesla Motors has created a new concept of using the Internet for manufacturing cars and opened up a new brand segment of the automobile market. This paper mainly uses the PEST analysis model and Porter's Five Forces analysis model to understand the essence of Tesla is not a pure electric vehicle manufacturer, but a high-tech innovation driver at the forefront of the world. Based on the PEST model analysis, Tesla's development is still at the right time and place despite the impact of COVID-19. From Porter's Five Forces model, Tesla has higher bargaining power and a strong dominant position with upstream suppliers and service providers. Tesla has a first-mover advantage due to its customers' weak bargaining power, which lets Tesla's leading position in the industry cannot be surpassed in the short term.

Keywords: PEST model, Porter's Five Forces, high-tech company

Introduction

Tesla is an American electric vehicle and energy company that produces and sells electric vehicles, solar panels, and energy storage equipment. Headquartered in Palo Alto, it was co-founded by Martin Eberhard and Mark Tarpenning on July 1, 2003. The founders named the company "Tesla Motors" in honor of physicist Nikola Tesla. Elon Musk joined the company in 2004 and led its first round of funding. Tesla CEO Elon Musk said that Tesla strives to provide every ordinary consumer with a pure electric vehicle within its consumption capacity. Its vision is to accelerate the global transition to sustainable energy (Dolev, 2016).

In this paper, the PEST analysis model and Porter's Five Forces analysis model are used to analyse the internal and external competitive environment of Tesla in the past, present, and future, to further understand Tesla's financial and operating conditions, management, operation, and sales of the company's strategy and product planning, etc. It can also provide some reference opinions and suggestions for Tesla and the successful experience and advanced concepts for relevant industries to learn from. At the same time, it is also conducive to the competition of Chinese automobile companies in the future new energy vehicle market, and provides market analysis and summary.

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External Environment Analysis: PEST Analysis Model

Macroeconomic factors are events or conditions beyond the company's control (Thomas, 2014). This section discusses and identifies external factors that may affect Tesla's performance in terms of profitability and risk. Tesla's operating income is mainly dependent on expectations of economic growth. Automobile consumption is influenced by cyclical and chronic factors. It is not clear whether battery costs and infrastructure are the most important reasons why consumers switch from conventional gasoline and diesel vehicles to new energy vehicles. While Tesla is leading the plug-in electric vehicle market, it can also influence external factors that affect the market. The external drivers can be better understood through PEST external analysis.

Political and Legal Environment

One of the main reasons for the rapid development of new energy vehicles is the supportive policies successively issued by various countries in the world (KPMG, 2017). Since 2017, many countries worldwide have sequentially introduced a timetable to ban the sale of fuel vehicles, and the era of completely replacing fuel cars with electric cars is coming. The first countries to ban the sale of conventional petrol and diesel cars were the Netherlands and Norway, which are expected to ban the sale of traditional petrol and diesel cars in 2025. Germany will ban the sale of conventional petrol and diesel cars by 2030, the UK and France by 2040, and China by 2050. In the United States, 10 states have adopted the California Air Resources Board's zero-emission standards, which stipulates that any automaker that sells more than 60,000 vehicles a year must meet ZEV requirements at least 14 percent of the vehicles it builds and sells in California. Therefore, while countries are issuing more and more strict policies and regulations to restrict the development of traditional automobile manufacturers, they are also opening up broad new market space for clean energy automobile manufacturers represented by Tesla.

Besides the introduction of policies, there is also industry regulation. When automakers lack regulatory goals, they must make a trade-off decision: accept fines or bear the cost of reducing vehicle emissions levels. The United States, the European Union, and China have proposed carbon reduction targets. If countries adopt a method of "compliance" with the mandatory levels, then traditional automakers have a chance to breathe and avoid compensation. The agreement target could translate into significant investments by traditional automakers in emission-reduction technologies, such as promoting new energy vehicles and supporting infrastructure. Considering investments in carbon reduction technology and electric vehicle infrastructure, the penalty for exceeding emissions could be about 70 percent higher than the cost for traditional automakers to invest in developing new energy vehicles. According to this simple business logic, they will still invest more in new energy technologies and be determined to expand into new markets in accordance with regulations.

In addition, various countries' subsidies or support policies for new energy vehicles, such as free license plates, reduction and exemption of purchase tax, subsidies, free parking, dedicated roads, and so on, promote the development of the new energy vehicle market.

Economic Environment

Since 2020, due to the COVID-19, the global economy has been hit to varying degrees. Recently, the emergence of the new Delta virus has affected the global economic recovery. Supply-side restrictions are tightening, and rising inflation is emerging as a major constraint on policy support, which may keep the economy growing. Soaring energy prices are emblematic of the problems caused by supply disruptions that

could eventually hurt aggregate demand, especially if central banks are forced to act more aggressively to contain inflation. In many countries, especially emerging markets and low-income economies, the 2020 recession continues to have a traumatic impact on GDP and employment.

The most significant economic environmental factor affecting the new energy vehicle market is the trend of international oil prices. Against a backdrop of steady growth in global energy demand, limited growth in U.S. crude oil production, and continued declines in oil inventories due to supply and demand mismatches, fundamentals have undergone a shift from continuous rebalancing to supply and demand contraction, which has contributed to a steady recovery in oil prices.

Social and Cultural Environment

By 2030, population will continue to grow by leaps and bounds as the world's urbanization, with 1.1 billion new urban residents living and working in cities. This large population concentration will increase the demand for urban mobility solutions with shorter average driving distances per person per trip, smaller spaces required, and quicker response times. Recent McKinsey research on future travel emphasized three different mobility scenarios in big cities: urban mobility, privacy, and sharing (Hensley, 2012). All three situations require more sustainable mobility solutions. The most important is a clean, environmentally friendly solution that can be used as a travel tool for autonomous electric vehicles. At the same time, with the improvement of environmental protection awareness, consumers pay more attention to environmental protection and clean energy zero-emission clean energy vehicles. Battery factories are starting to install home solar power systems, and home energy storage systems (Powerwall) can store or upload surplus energy from the solar power systems to the grid.

Technical Environment

As the core battery technology for electric vehicles, Tesla is always at the forefront of the industry. Before Tesla launched the Model 3, as its strategic vehicle to capture the mass market, Musk realized that the key obstacle was the supply of lithium-ion batteries. At the time, the Battery capacity at the California plant was only 7% of demand, a far cry from the Tesla Model. To deal with this obstacle, Tesla has invested heavily in building GIGA, the world's largest lithium-ion battery factory. If the project is successful, the battery capacity will meet Tesla's annual production demand of 500,000 vehicles. McKinsey conducted a study on battery technology trends in 2012 (Koller, Goedhart, & Wessels, 2015). Automobile ownership cost is one of the most critical factors directly affecting consumers' purchasing decisions. According to McKinsey's research results, batteries account for one-third of the cost of manufacturing a vehicle. According to the battery price information released by Tesla in 2020, the cost of the latest LFP battery from Model Y has reduced to US$100 per kWh, a drop of 58%, mainly due to the scale effect brought by the first phase of the super battery factory. Therefore, consumers will be more inclined to buy new energy vehicles represented by pure electric vehicles due to the stability or continuous rise of oil prices and the cost advantages of constant breakthroughs in battery technology and economies of scale.

The second is the increase in mileage. The range of many electric cars has improved significantly since 2013. For example, in 2013, the basic model of Tesla Model S could travel approximately 208 miles on a full charge, which will increase to about 288 miles by 2020. According to McKinsey's research report, about 20% to 40% of the mileage increase makes the main contribution to the rise in battery pack energy, which means that the battery pack capacity of Tesla Model S has increased from 60 kWh to 75 kWh. Customers who used

the Tesla package before can use the full 75 kWh of available capacity even in the basic model after increasing mileage, which helps offset some consumers' concerns about buying consumer electric vehicles.

The third is a charging technology. The McKinsey Electric Vehicle Index (EVI) analysis of the global charging infrastructure shows that the ratio of electric vehicles to public charging stations in Europe has increased slightly, and the average service of 12.4 electric vehicles per charging station in the US market has risen to an average of 12.4 in a year. Thirteen charging stations serve 13.2 electric vehicles. At the same time, a new round of private equity investment will boot those ratios considerably. US automakers, for example, will invest billions of dollars in new charging infrastructure over the next decade. European carmakers from the mid- to high-end and full coverage markets will work together to set up a European charging facility network. Tesla has taken a different approach. The pioneering solution is to build self-funded superchargers with quick charging piles, and the scheme has been rolled out in major markets around the world. As an essential part of the purchase of supporting facilities for pure electric vehicles, charging convenience has always been a major obstacle to the marketization of electric vehicles. To improve the user experience, Tesla has built its quick-charging piles and charging stations.

Finally, the driverless technology that Tesla is most proud of has made a splash in the market. None of the global Internet technology giants is not developing technologies related to autonomous driving. From the perspective of companies such as Baidu, Google, and Uber, one important use of driverless cars in the future is to become shared private cars or driverless taxis. The global market for driverless cars could be as high as $2 trillion in the future. Even if Tesla only gets a 10% stake, it will greatly boost its business, stock price, and market value. Especially in the Chinese market, it is more advantageous. First-tier cities such as Beijing, Shanghai, Guangzhou, and Shenzhen have temporary driving restrictions on air pollution, while new energy vehicles can be driven freely without administrative limits. This will gradually eliminate consumers' hesitation to buy. With the advent of artificial intelligence, sensor fusion algorithms, and other technologies, the new energy self-driving car industry equipped with autonomous driving technology has created another trillion-dollar market.

Summary of External Environment Analysis

The above conclusions from the macro environment analysis by the PEST method are very beneficial to the future development of Tesla, taking advantage of time and place.

Firstly, local governments worldwide have spared no effort to promote a destructive regulatory system. In Europe, for example, the German government has added about 4,000 euros in incentives and tax credits for electric car buyers, the equivalent of 10 years' worth of car taxes in places like Berlin. In the United States, 10 states have adopted the zero-emission standards issued by the California Air Resources Board (2021). The California Air Resources Board also plays a leading role in setting strict fuel economy standards, separate from federal requirements issued by the Environmental Protection Agency. As more stringent policies and regulations are introduced to restrict the development of traditional car manufacturers, it also opens up new broad market space for clean energy car manufacturers represented by Tesla after the ban on fuel cars.

Secondly, facilities have begun to take shape in a way that new energy practitioners could not have imagined 10 years ago. At the same time, a new round of private equity investment will greatly increase that ratio. US carmakers, for example, will invest billions of dollars in new charging infrastructure over the next

decade. A number of European carmakers in the mid- to high-end and full coverage markets will work together to set up a network of charging facilities in Europe.

Thirdly, consumers' acceptance of new energy vehicles continues to improve. By 2030, population will continue to proliferate as the world's urbanization, with 1.1 billion more people living or working in cities. This large population concentration will increase the demand for urban travel solutions with shorter average driving distances per person per trip, smaller distances required, and faster response times. The global economy improves, and technological leadership has formed industrial barriers. Although there are still local uncertainties at the local level, for example, as the electric vehicle market continues to grow, there is a risk that subsidies or policy from local governments for electric vehicles will be withdrawn or reduced.

Industrial Environment Analysis: Porter's Five Forces Model

Tesla's competitive advantage can be obtained through macroeconomic analysis and through Professor Porter's Five Forces analysis model combined with Tesla's external environment, especially the industrial environment.

The Bargaining Power of Suppliers

Generally speaking, the purchased components of pure electric vehicles mainly include battery module blocks, high-performance magnetic motor drive systems, advanced driving assistance systems, lightweight high-tech material bodies, etc. Tesla produces its own battery body and electric drive system, which account for 70 percent of the cost of the car. In 2016, a US $1.8 billion vehicle plant and battery factory were upgraded and put into operation, significantly improving production efficiency. In the next few years, Tesla will continue to enjoy high returns from economies of scale. With 500,000 pre-orders for Model 3 are recognized, Tesla has relatively high bargaining power and strong dominance among upstream suppliers and service providers.

The Bargaining Power of Buyers

There are two reasons for the weak bargaining power of Tesla customers. First, Tesla adopts a particular online direct sales model. Compared with the agent model adopted by most competitors, the benefits of direct online sales are evident since the transaction link is shortened and the transaction is greatly reduced. Second, Tesla has unique and precise positioning products, which are technologically advanced, safe, and easy to use. Competitors represented by traditional automakers did not invest enough in new energy vehicle platforms represented by electric vehicles, resulting in a mismatch between supply and demand, a problematic cycle of supply and demand, and the lack of electric vehicles with rapidly growing demand and personalized pursuit of electric vehicles designed by car buyers. Therefore, combining Tesla's unique sales methods and product capabilities makes Tesla customers' bargaining power weak.

The Threat of Entry of New Competitor

The automobile is a typical high-end manufacturing industry, a technology-intensive and capital-intensive high-threshold industry. The $1 billion investment by auto giants like BMW and Mercedes-Benz in developing electric vehicles is just a drop in the ocean. In addition to exceptionally strong financial support, technologically advanced products are also indispensable. However, the accumulation of technology is a long-term process, even though it is an overnight method, such as "understanding, digesting and copying" after purchasing technology from outside. Minor innovations and malleable technologies are not major innovations. Five years is the basic time threshold from entry to implementation and application. In other words, high-tech

innovation-driven industries represented by new energy vehicles have very high entry barriers. In terms of capital, investing in a company that may not be profitable for eight or 10 years rarely tolerates such a long investment cycle. Therefore, the threat of new entrants to Tesla is relatively weak.

The Threat of Substitute Products

With the rapid development of shared bicycles, urban rails, and high-speed railways, personal travel options have become increasingly diversified. However, the car will not be replaced as the main means of personal mobility. Instead, it will continue to grow as a complement to other modes of mobility.

From the perspective of industry competition pattern, high-end electric vehicle models are mainly concentrated in the high-end consumer market that is not sensitive to price (Jackson, 2016). However, for mass consumers, there are few Tesla alternatives. Meanwhile, Tesla has achieved double-digit growth globally, with a five-year compound growth rate of 12% in the United States, 15% in Europe, and 63% in China. Tesla's alternatives pose a relatively weak threat.

The Rivalry Among Existing Firms in the Industry

Tesla pushes technological superiority to compete in the marketplace. The 100 km acceleration time is one of the important indicators of luxury cars. The acceleration time of Model S from 100 kilometers is about 3.3 to 5.8 seconds, far exceeding the 5.3 to 7.8 seconds of the Mercedes-Benz CLS series and the BMW 6-series, 4.9 to 5.7 seconds for the Audi A7 and 6.4 to 8.4 seconds for the Audi A7.

In addition, Model 3 is a strategic step for Tesla to extend its product line downward from the mid-to-high-end market. Its strategic positioning is to popularize pure electric vehicles, rapidly expand market share, and contribute to profit models. Model 3 is a perfect model for both performance and price. In the current market segment, Tesla Model 3 has almost no competitors. In addition to preferential policies such as tax reductions and exemptions, localized production will lower the price. Competitive electric vehicles or brands or products are far from Model 3, making it difficult for competitors to catch up in the short term.

Tesla also sets it apart from traditional automakers: its role as a disrupter. Disruptive technologies often come from niches that industry leaders ignore. New entrants develop technology and successfully sell to niche markets, eventually developing more cost-effective technology than existing technology through continuous improvement. As with disruptive technologies in the past, electric vehicles from traditional automakers have never won mass market success. That may explain why entrenched automakers are reluctant to bring electric cars to market. Tesla has found the opportunity to make a profit, though tiny compared with the tens of millions of conventional gasoline and diesel cars sold each year. If Tesla's strategy proves to be correct and feasible, it could pose a severe threat to the existing auto industry, and on the contrary, Tesla is less competitive.

Conclusion

Nothing can better demonstrate its innovative strength and development prospects than a "zero to one" and completion of the world's first innovative project. Tesla is one of the few companies in the world that can successfully do this, with higher bargaining power and a strong dominant position, both as an upstream supplier and as a service provider. In addition, Tesla adopts a unique online direct sales model, which has the benefits of significantly shortening the transaction process and greatly reducing transaction costs. Moreover, Tesla has opened showrooms in major cities around the world, allowing consumers to experience special offline Sla's unique product strength, precise positioning, leading technology and safe and easy-to-use. Matching has led to

a problematic supply and demand cycle, with a lack of electric vehicles designed to personalize electric car buyers with rapidly growing demand. Therefore, combining Tesla's unique sales methods and product capabilities makes Tesla customers' bargaining power weak.

By 2030, the world's urbanized population will continue to grow rapidly, with 1.1 billion more people living or working in cities. This large population concentration will increase the demand for urban mobility solutions with shorter average driving distances per person per trip, smaller distances required, and shorter response times. The relationship between the difference of enterprise operation and strategic location in the new energy industry has created an advantage for Tesla, but the benefit is very strong. In addition to financial support, technologically advanced products are also indispensable, but the accumulation of technology is a long-term process (Kappler, 2017). For some innovative and malleable technologies, five years is the primary time threshold from entry to implementation to application. Therefore, winning time is more important than winning technology in some cases. Tesla's first-mover advantage makes its leading position in the industry impossible to surpass in the short term. From the perspective of industry competition pattern, high-end electric vehicle models are mainly concentrated in the high-end consumer market that is not sensitive to price. However, there are few alternatives to Tesla for mass consumers, but Tesla is not without concerns. Unexpected opponents from all walks of life from all over the world will emerge. More and more low, medium, and high-end new energy vehicles begin to pose challenges to Tesla, such as cannibalization through diversified products. Market share or differentiated products to seize market blind spots.

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