

Case study on Tesla Motors: analysis of the business model and growth strategy

Introduction

In the human history, physical mobility forms an inseparable part of life. In that, the inventions of the wheel and the automobile have been considered as most significant ones which contributed to human development. The first electric car, using storage battery and motors had come on the roads in 1830s, and being not a user friendly invention, disappeared from the scene once the Internal Combustion Engine (ICE) burning fossil fuels was created in the 1880s. For the next hundred years, the world did not look back and the automobile researchers virtually had banished the electric automobiles. The reason was the entrenched oil exploration, refining industry as well as the manufacturers of the ICE. Efforts if any, of exploring electric prime movers for cars were from existing fossil fuel car makers and hardly any exclusive effort was made in that direction. In 2003, Tesla Motors was founded by Eberhard, Tarpenning and Elon Musk, all three were technology geeks who had high level of mutual respect and Elon Musk was the business founder of two earlier start-ups including PayPal and he became the core investor for the venture. Elon Musk named the company on one of the greatest inventors of the late 19th and early 20th century- Nikola Tesla, who invented the alternating current and the induction motor. They licenced some technology inventions from AC Propulsion Laboratories, where JB Straubel, an inventor had a stake and decided to base their electric car on the Lotus Elise platform originating from the UK.[12]

Since the founding, Tesla Motors has become synonymous with high performance, economical electric cars and till now has released 3 successful car models in the market at the US. The company has expanded its operations, is sourcing its parts and components from several



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nations across the world. Tesla Motors as a business venture is a unique proposition in terms of its product, its leadership, its organizational structure and the business ethos. This case study endeavours to explore the nature of competitive advantage Tesla Motors has over other automakers and its growth strategy. The study will be incomplete if the Tesla leadership is not a part because it is the dreams and the enormous efforts in planning and execution of the leadership which has made Tesla what it is today.[12]

Objectives of the case study

- The objectives of this case study is to examine the following:
- Competitive advantage of Tesla Motors
- External and Internal analysis of the company
- Functional strategies which made the company unique
- Excellence through leadership which separates Tesla Motors from others

In this case study, the author wishes to highlight that the business model, business strategy and the analysis there of are incomplete without the study of technology and innovation backbone spawned by the founders. Specifically, the time, effort and money spent at Tesla on marketing, advertising and promotions are a miniscule part of that spent on innovation, achieving technology leadership. Hence, the case study focuses on the thrust area for future growth on which the competitive advantage of the firm is being constructed.

Literature survey

The author identifies Tesla Motors as a unique business model for several reasons which will be discussed in the case study. As part of the literature survey, several secondary sources were studied by the author in addition to watching interviews of Elon Musk in which the primary strategist of Tesla Motors has articulated his vision for the company founded on his vision for the future of transportation across the world. Few of the significant works are introduced below.

The first source of the survey was the biography of Elon Musk, one of the founders, financier and the fountain head of the electric car ideology by Ashlee Vance, published with the title

‘Elon Musk’, in 2015[12], the book chronicles the upbringing and professional life of Elon Musk. Though Tesla Motors is one of the three simultaneous ventures of Musk along with the SpaceX and SolarCity, the electric car has touched more lives across the world and is identified as the one which is shaping the future of technology. Musk, the man behind PayPal, SpaceX and SolarCity is sending shockwaves throughout business and industry. The book is an investigative account by a veteran technology journalist on the life and times of Elon Musk. The biography is an essential work for venturing into the study of Tesla Motors because Musk’s ideology, energy, audacious thinking and the futuristic planning have shaped the company into a unicorn of sorts in an untested field without any parallels till date.

Akash G Nandi (2013)[7], an undergraduate from the Leonard N Stern School of Business has published a project report titled ‘Tesla: Supercharging the Future’ as part of his thesis work. The project report delves into the world of Tesla, its origins and as to why electric cars may lead the way in future in the context of increasing awareness on global environmental issues, global warming and the cost of operation of electric vehicles as compared to vehicles run with fossil fuels.

Jennifer Todd, Liz Thorstensen(2013)[5] have authored a report titled ‘Creating the Clean Energy Economy- Analysis of the Electric Vehicle Industry’ for the International Economic Development Council. The work studies the job creation potential of electric vehicle industry, the state of the electric vehicle market in the USA and the running cost and savings of mass use of electric vehicles vis a vis fossil fuel vehicles. The study also examines the consumer perception of the electric vehicles and the lessons learnt in the last hundred years by the manufacturers of conventional vehicles which will be of use in shaping the electric vehicle industry.

Authors Paul Gao, Han-Werner Kaas, Detler Mohr and Dominc Wee (Jan 2016)[8] have published a Mc Insey and Co report on ‘Disruptive trends that will transform the auto industry’. The report examines the technological developments, the disruptive forces that are operating and their effect on the auto industry and the related domains for the future. The report, based on its extensive data analytic results, predicts the rise of autonomous vehicles in developed nations and across the world. Another study is by the investment firm Black Rock, which, in its report titled ‘Future of the Automotive Industry’ published in April 2017 predict the mass digitization of the auto industry as a major change which is already happening.

There are several video interviews of Elon Musk conducted over several years since 2005[14] in which he articulates his vision, the purpose of existence of Tesla and the overall plan for Tesla. The links for these videos are cited in the reference list. Tesla is not just a car company but a transportation solution. Musk's intention of drastically reducing the human carbon footprint takes the shape of Tesla as it is known that transportation is one of the major contributors to atmospheric pollution and contamination of the oceans and land. From there on, the grand plan of using renewable solar energy to power the entire world's transportation reducing dependency on fossil fuels is explained. The opposition from the petroleum producers, refiners, petroleum transporters, conventional car makers against this shift of power dependency is evident.

Organizational structure and governance at Tesla Motors

The organization structure of Tesla can be termed as a functional one as its theme is centered around functionality as the defining element. Global hierarchy, global centralization and minimal regional divisions characterize Tesla Motors[4]. Tesla's emphasis on global hierarchy is significant, in that, there are global functional teams that oversee domestic and international operations, this is similar to some of the traditional organization structures where multinational companies maintain a strict control over their global arms. The global hierarchy is represented as under :

1. Chairman & Chief Executive Officer
2. Chief Financial Officer
3. Chief Technology Officer
4. Vice President – Vehicle Engineering
5. Vice President – Powertrain Operations
6. Vice President – North America Sales
7. Chief Designer
8. Vice President – Manufacturing

9. Vice President – Autopilot Hardware Engineering
10. Vice President – Worldwide Services & Deliveries
11. General Counsel

Global centralization is about the centralized decision making on operations[4], and a general lack of autonomy at the regional level. Currently, there are 3 divisions by financial reporting at the United States, China and Norway. Due to the adaptation of the latest technology in all its business operations and communication, the milieu of innovation being the outstanding characteristic at Tesla, the current organizational structure seems to be working with fast decision making and even faster dissemination of information. The number of divisions being less, financial reporting is less complicated and supports faster growth and management of change. However, it is observed that the rigidity imposed by the centralized decision making may progressively restrain the company as it grows in size and complexity. It is relevant to mention here that in the global hierarchy, there is an absence of representation for marketing function as the COO is responsible for the logistics and supply chain as well as business development.

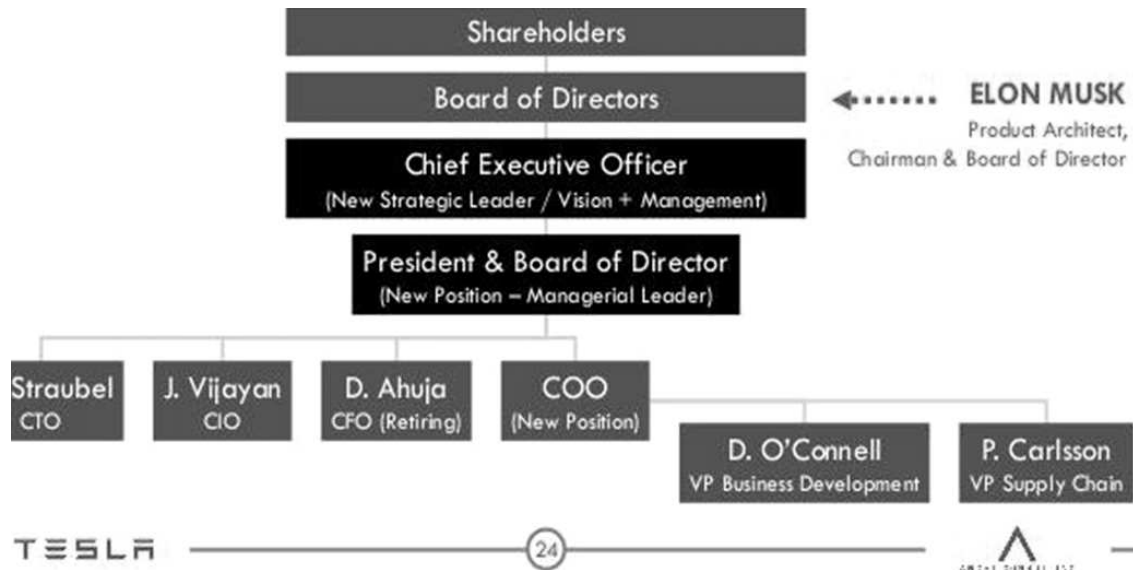


Figure : 1 Tesla - revised corporate structure

Source: Tesla releases on www.teslamotors.com

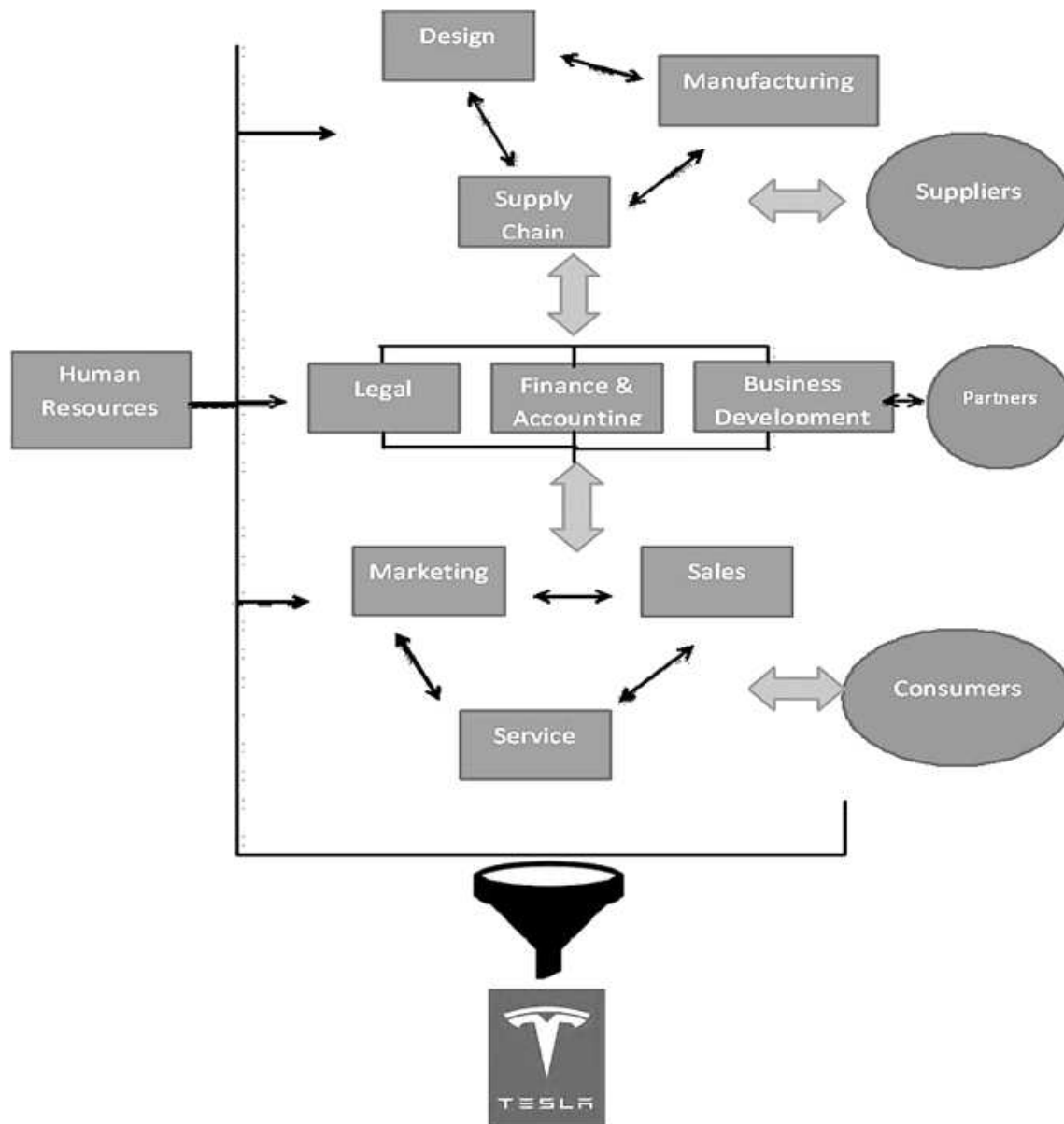


Figure 2 : Organizational flow at Tesla

Source: Tesla releases on www.teslamotors.com

It is evident from the existing organizational structure that,

- For a commercial organization of over \$30 billion plus market cap, Tesla Motors is having a simple chain of command
- Decision making powers are vested with very few including Elon Musk at the top
- Technology and innovation are the primary drivers for the company
- Most of the board of directors have technology/innovation background with experience in start-ups or as venture capitalists

The governance issues and board room discussions with conflicting views if any have been kept away from the public purview. The general impression among the public and the media about Tesla Motors is one of secrecy and a personality oriented decision making, centered around Chairman Elon Musk.

Tesla Motors, an energy company

No. Tesla Motors is not just a car company but an energy company which powers transportation needs.[10] It is surprising that for the founder entrepreneurs, establishing Tesla Motors was not about setting up a profit making business but to find a viable, sustainable solution of transportation. The investments by Tesla in the R&D for a long term viable battery pack and the battery charging facility named as the Supercharger are more than that for the prime mover, the Nikola Tesla (1856-1943) invented induction motor and the gearbox assembly which replaces the conventional IC Engine powertrain. In analogy, the time, efforts and expenditure for the fuel tank being more than that for the engine in conventional terms.

Typical 'Supercharger' which uses Solar-Induction Chargers without physical contact or wires to complete car charging in 30 minutes free of cost for users. The remaining power produced is fed into the US National Grid.



Figure 3 : Tesla super charger

Source: Tesla Motors website. www.teslamotors.com

As on Jun 2017, Tesla has presence in Tesla intends to have more than 10000 supercharging docks by the end of 2017 and one can see that the number of red dots are increasing globally day by day.[13]

Salient features of the Tesla Superchargers are as under:

- Entering the final destination and trip planner into the cabin console results in a map of the charging stations on the route
- All Superchargers are co-located with fast food centers, so while you grab your cup of coffee, your vehicle charges and the range increases by another 270km in about 30minutes.
- Your Tesla App notifies you when the car charging is complete
- Each year, the car owners receive 400Kwh free Supercharger credit enough to travel about 1600km. These credits cover the long distance travel needs of most owners, those who travel more pay a nominal charging fee of \$90 a year which is less than half of the gasoline cost.

- Tesla partners with hotels, restaurants, shopping centers and resorts to make charging an enjoyable experience. so while you grab your cup of coffee or do shopping, your vehicle charges and the range increases by another 270km in about 30minutes.
- The life of the battery is given a 'personal guarantee' by Elon Musk for 160,000 km life distance at the time of purchase. Even after completing the life distance, the battery will not be dead but only the range reduces. The company replaces the battery at the request of the customer and a replacement car is delivered to the customer for the duration of the repair/replacement and taken back from the customer's residence by the company on delivering the owner's car.

Jun 2017: 875 Superchargers spread across the US, having 5655 charging docks, each able give 270km range within 30 minutes. Elon Musk wants to increase range to 500+km



Figure 4 : Tesla super charger map, USA

Source: Tesla Motors website. www.teslamotors.com

Few features of the Tesla Lithium-Ion battery and the Vehicle Prime Mover and the Driver Console :

- Each Model S car has the entire flat floor made up of 16 panels of roughly 444 battery cells, each panel delivering 5.4Kwh at 24v. Each line of battery is insulated with liquid gel coolant network which circulates cooling down the battery pack to prevent fire and explosion hazard

- The batteries deliver DC to the inverter which converts it to AC and feeds the induction motor, which coupled with a gearbox and an open differential deliver power to the rear wheels. The motor, inverter and gearbox are mounted on the rear axle.
- Deceleration achieves braking on the move, stores the reserve power which is used later. Complete stop is achieved by a braking pedal. No power is wasted except during complete stoppage.
- The 'accelerator' pressure directly increases motor speed and hence the car speed, there are no graded gears.
- Calibration of the motor, inverter, battery pack and braking are computerized and simple, useful data is available on the screen to the driver.

It is relevant to mention here that the battery platform, integrated with a strong metal frame forms the flat floor of the car and gives the structural integrity to the vehicle. The two side panels holding the doors and fenders are fitted on to the floor panel and then the hood, the roof are attached. The two wheel axles, the rear one being the driving axle with motor-gearbox-inverter complete the assembly.

The picture below is that of a typical Model S cabin console and the driver seat. Each car made by Tesla may be customized for the Left Hand Drive US market or the Right Hand Drive (UK) model as applicable. The driver console



Figure 5 : Cabin console of Tesla model S

Source: Tesla Motors website. www.teslamotors.com

Till now, three models have already been released to the market. Starting with the Tesla Roadster, a luxury sports car, priced at over \$90,000, then came the Model S, the 5 seater with 2 optional jump seats for children at the back, priced at \$68000-\$140000 and then Model X, priced at \$79500-\$145000. Model 3, the low priced passenger car deliveries have started in the USA since Jun 2017 and may pick up pace. Model 3 is priced at \$35000-\$44000. Tesla Roadsters are now made only on order.

Strategy and competitive advantage of Tesla Motors

All Elon Musk companies including Tesla Motors follow these business principles:-

- Patents will not be obtained to ward of potential competitors, the company continuously innovates. Its designs, plans and technology are open to scrutiny of the general public. Tesla Motors uses open source software.
- There are no franchised dealerships or distributorships to sell the car, the company maintains direct contact with the end user, its customer relationship continuously evolves, aided by technology such that the service is instant, qualitative and value driven
- There are no advertisements or proactive marketing to sell the car, the value proposition of the car and customer service pull the discerning customers to buy and use.

By any standard, the above self-imposed boundaries are a tall order, but Elon Musk is a difficult businessman to understand and his company is unique.

Martin Eberhard and Marc Tarpenning, together wrote a seminal Whitepaper [10]describing the win-win logic of the Electric car being superior to gasoline /diesel and hybrid electric cars in terms of economic factors measured through 'well to wheel' efficiency, performance and its long term benefits to mankind. Well to Wheel efficiency considers the cost of operation per kilometer from the point of generating the electricity to charge the car from fossil fuel sources/renewable sources, refurbishing the battery after the specified time/kilometers of use and the overall emission standards. The results are hard to ignore.

A common argument against electric vehicles as solution to carbon emissions is about the transfer of CO₂ emissions to the power plant. The electricity production may use a variety of means like hydro, wind, geothermal, nuclear, solar which involve no emissions and if the electricity is generated using natural gas, which is prevalent in the US or diesel generators then the transfer of emissions takes place. For example, the H-System Combined Cycle

Generator of General Electric sports 60% efficiency in converting natural gas to electricity, burning natural gas and using waste heat is used to create steam running a second generator. The natural gas recovery is 97.5% efficient and with a loss of 2.5% in processing, 8% loss in transmission giving us a well-to-wheel efficiency of $97.5\% \times 97.5\% \times 60\% \times 92\% = 52.5\%$.

Tesla Roadster needs 0.4 Mega Joules (MJ) per Kilometer or travels 2.53 km per MJ of electricity. The charge and discharge cycle efficiency of Tesla Roadster is 86%, that is, for every 100 MJ of electricity charging the battery, about 86 MJ reaches the motor, we get the final figure of $2.53 \text{ km/MJ} \times 86\% \times 52.5\% = 1.14 \text{ km/MJ}$. The table below compares the energy efficiency of different cars running with different sources of energy and their equivalent usage of energy. Note that a 'Hybrid' car, which does not need an external source of battery charging has a gasoline/diesel engine mounted on it, thus negating the positive effects of lesser emissions achieved, as in Toyota Prius.

Table 1 : Comparing the electric car with petroleum fuel and hybrid cars [10]

Vehicle	Energy Source	CO ₂ Content	Consumption	CO ₂ Emissions
Honda CNG	Natural Gas	14.4 g/MJ	0.32 km/MJ	45.0 g/km
Honda FCX	Nat Gas-Fuel Cell	14.4 g/MJ	0.35 km/MJ	41.1 g/km
Toyota Prius	Oil charging battery- Hybrid	19.9 g/MJ	0.56 km/MJ	35.8 g/km
Tesla Roadster	Nat Gas-Electric	14.4 g/MJ	1.14 km/MJ	12.6 g/km

Source: Eberhard and Tarpenning(2016)

Tesla Motors will be marketing sustainable energy products from other companies along with the car, offering solar panels from SolarCity, a sister company and the technologically superior gadgets which are by-products from the top of the line research conducted at another sister company the SpaceX.

The intended master plan for strategy beginning with the first product is as under:-

- Build an electric sports car, having a high price tag (the Roadster) and create a buzz selling it the rich who can afford it
- Use the money to build an affordable car, (Model S)
- Again use the money to build an even more affordable car (Model 3)

- All the while from the beginning, continuously build zero emission charging stations to service the customers charging almost nothing (Superchargers)

The competitive advantage of Tesla Motors is clearly visible in their ability to create value creation, product quality and superior customer service.

Key competencies and assets of Tesla Motors

Major competencies developed at Tesla Motors and the tangible and intangible assets are listed as under:

Assets

- Innovative manpower, experiential knowledge of the workforce
- 40+ patents and 211 pending patents
- Gigafactory at Nevada and the other facilities for manufacturing
- Supercharger stations across the USA and other nations
- Partnership with Panasonic, Toyota and Daimler AG
- Supportive supply partnerships
- Customer responsiveness and goodwill
- Surplus funding and good will of the venture capitalists **Competencies**
- Expertise in battery technology, AC induction motor design, unique manufacturing process
- Leadership in support software which is winning customer base, as it enables superior customers service
- Highly efficient inventory management and order driven process
- Highly adaptive and fast product development process of 30 months from the drawing board to customer use

Analyzing Tesla Motors for external and internal factors affecting business

Tesla's current product portfolio includes the following :

- Cars – Roadster, Model S, Model X and Model 3
- Electric vehicle power components- includes components other than battery and solar modules
- Battery Products – 7 and 10 KW wall mounted Solar charging units which are multi utility including vehicle charging, residential electrification and industrial use.

Table 2 : Subjecting Tesla Motors to a PESTEL analysis results in the following table

Analysis Component	Criteria	Cost Effect	Revenue Effect	Volume Effect	Profitability
Political	Environmental laws			+ ve	+ve
	US Energy Department loans to electric car companies at low interest	+ ve			+ve
Economical	Raising of interest rates by FED	-ve		-ve	-ve
	Record low gasoline prices			-ve	-ve
	Instability in the currency markets				-ve
Social	Declining preference for fossil fuel driven vehicles			+ve	+ve
	Scarcity of charging stations			-ve	-ve
	Increasing environmental consciousness among the prospective customers			+ve	+ve
Technological	Continuous cost of innovation R&D	-ve	-ve		-ve
	Establishing charging infrastructure with renewable energy sources	-ve	-ve		-ve
Environmental	As per E&Y (2016) and BCG (2015), connectivity, safety, fuel efficiency are primary drivers of buying decisions	-ve	+ve	+ve	+ve
	Support by government policies	-ve	+ve	+ve	+ve
Legal	Cost of compensation due to accidents/ incidents caused by new technology use	-ve			-ve
	Tax incentives	+ve		+ve	+ve

It is evident from the above PESTEL analysis that the current environmental awareness among the informed public and the supportive government policies are aiding the company to further their objective of working towards the greater good of the society by causing less pollution of the environment.

Table 3 : Subjecting Tesla Motors to the Porter's 5 Forces Model, results in the following table

Component	Criteria	High Impact	Low Impact
Bargaining Power of Buyers	Individual customer preference		Yes - due to unique product offering, competitive advantage and technological superiority
Bargaining Power of Suppliers	Effect of defaults, delays, defects- Image in the eyes of the customer	Yes- due to dependence on few available suppliers	
	Dependence on big firms as suppliers		Low- due to their dependence on riding the next wave with Tesla
Threat of substitute products	Fossil fuel cars and Hybrid cars		Low- due to inherent and evident advantages of electric cars in terms of performance, cost of operation and ease of maintenance
	Other electric cars with better features, performance	Yes- Tesla Needs to continuously innovate to keep ahead in the pack	
Threat from new entrants	New entry by technologically superior competitors		Low- need of high initial investments
	Government support to all new entrants	Yes- may lead to too many new competitors with similar products	
Rivalry among competitors	With existing electric car producers,	Yes- competitors like GM, BMW with higher financial strength may overtake Tesla	
	With existing fossil fuel vehicle manufacturers like Toyota, Volkswagen		Low

It is evident from the above that for the next few years, Tesla Motors can continue to pursue its strategy of focusing on development of high performance and high fuel efficiency, low cost of operation vehicles

Subjecting Tesla Motors to the 7S Framework developed by McKinsey as illustrated below for assessing the readiness for change.

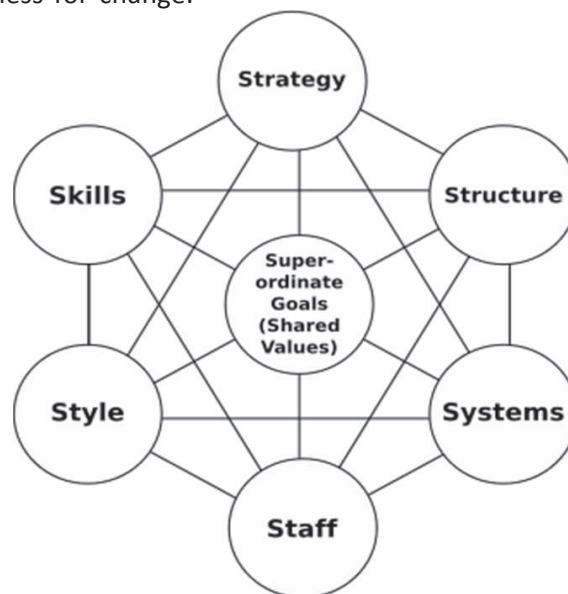


Figure 6 : 7S framework

Source : https://www.mindtools.com/.../newSTR_91.htm

Super ordinate goals or shared values – In terms of the overarching goals, Tesla Motors is leading the way for all the car companies including the other electric car manufacturers. The stated mission of providing transport solution with least possible environmental damage and ensuring sustainability of the transport solution is a strong binding force in keeping the organization relevant in the realm of the transport solutions industry.

Strategy - The stated strategy of selling high performance, expensive vehicles to the buyers and then using the money to design and manufacture progressively lower cost models is a winner. Again, throwing the challenges of open patents, use of open source software and not outsourcing the sales through dealerships is a unique change. Maintaining direct contact with the end user by leveraging technology enabled connectivity, providing superior level of customer service is also a winner. The most impressive strategy of using solar power for the

fast increasing Supercharger stations across the USA and ensuring a lower carbon footprint for the entire business is winning the hearts and minds of the prospective buyers as well as the government policy makers.

Structure - Organizational structure of Tesla Motors indicates highly centralized decision making. Therefore, is an element of concern.

Systems - The processes and procedures at the Tesla Motors are in a continuous motion. The business model itself being new, the systems are continuously evolving and every round of fund infusion spins out new manufacturing processes, procedures and adaptations of existing technology to suit the requirements. System maturity may take a long time to figure for Tesla.

Staff - Elon Musk, the founder, financier personally takes interest in selecting the best talent available among the applicants. Even with the growing number of several thousands of employees, working at Tesla Motors is a sought after experience for bright engineers and innovators. The aura of innovation leadership, challenging atmosphere with pressure by time, money and smart effort has made Tesla Motors the market leader in attracting the best brains. However, the attrition levels and burnouts are also high due to the high pressure and high stakes business innovation requirements.

Style - The culture of technological superiority, maintenance of innovation edge continuously and the centralized decision making have made Tesla Motors a unique and at times difficult place to work. The feeling of 'survival of the fittest' pervades among the bright aspirants who seek to work at Tesla Motors. Elon Musk's leadership characterized by a no-nonsense approach to efficiency, competency and innovation have constructed a style which few other companies can emulate. However, the style of working at Tesla Motors also has invited sharp criticism for its ruthless efficiency which does not give a second chance to those employees who do not measure up to the organizational requirements of competence. Tesla Motors is changing in terms of style continuously.

Skills - Tesla Motors successfully secured over 40 patents and more than 211 patents are pending award. Being a pioneer in the electric prime movers using alternative current in a commercial scale, Tesla Motors has spawned several new skill sets, has created regulations, processes, measures to assess quality, benchmarks to maintain. For example, the life of the battery pack, is stated as 100,000 miles or 160,000km though the company adds rejoinder which says that 'even at 100,000 miles, the battery will not be dead, but only the range will be

less than the new one. We will buy it back from you and rebuild the pack into a new battery'. The emphasis is on recycling, less and less damage to the environment, with the latest technology. Thus, the skill sets are being created on a day to day basis at Tesla, training is imparted continuously to new and experienced employees. Tesla Motors is a change leader in the field of developing new skillsets.

SWOT analysis of Tesla Motors

Strengths

- Pioneer in manufacturing luxury electric cars on a commercial scale
- Strategic partnership with Panasonic, Toyota and Daimler AG
- Direct marketing, superior customer service
- Technology and innovation leader
- Open source

Weaknesses

- Large fund requirements, increase in debt and lack of record yet in achieving net profits
- Inability to meet deadlines, lack of economies of scale
- Huge requirement of charging stations may eat into future profits
- Fear of losing customers due to delays in delivering vehicles as promised

Opportunities

- Public awareness about environmental pollution and global warming
- Battery technology opening new areas in energy business
- Supportive government policy, tax breaks

Threats

- Current strategy may not be able to cater for future demand
- Increase in cost of raw materials
- Low oil prices slowing down the electric mobility market
- Competition from Hybrid, conventional vehicle manufacturers

Core challenges for Tesla Motors

One of the major challenges of Tesla Motors has been the on-time delivery as promised to the customers. Each of the products have been delivered with the delay of 1-3 years and the quantity of manufacturing is unable to meet the demand due to absence of the necessary scale of manufacturing. Inability to forecast demand has resulted in delay of allocation of funds though funds could be arranged within time after planning. That is, mass market focus without the right infrastructure has been the major challenge.

Till date, 25 rounds of funding have taken place to finance the Tesla Motors operations mainly because of the confidence of the investors in the potential of the company to deliver in the future. However, the same level of confidence may not continue with the successive delays in delivery in launch of the promised car models.

Tesla Motors funding and finances

Till date, Tesla Motors had 25 funding rounds which roped in investors. Other than the IPO equity, major investors are Tencent Holdings, Al Wahada Capital Investment, Abudhabi and the US Department of Energy debt financing. Tesla, by its larger objective of creating a renewable energy eco system for charging the vehicles was given a soft loan by the US Government through the US Department of Energy.

Table 4 : Funding Rounds (25) at Tesla Motors Inc, USA

Date	Amount / Round	Valuation	Lead Investor	Investors
Mar, 2017	\$1.7B / Post Ipo Equity	—	Tencent Holdings	1
Mar, 2017	\$850M / Post Ipo Debt	—	—	0
Mar, 2017	\$750M / Post Ipo Debt	—	—	0
Mar, 2017	\$594.1M / Post Ipo Equity	—	—	0
Nov, 2016	\$383.5M / Post Ipo Equity	—	—	0
May, 2016	\$1.46B / Post Ipo Equity	—	—	5
Aug, 2015	\$1.1B / Post Ipo Equity	—	—	0
Feb, 2014	\$2.7B / Post Ipo Debt	—	—	0
May, 2013	\$600M / Post Ipo Debt	—	—	0
May, 2013	\$309M / Post Ipo Equity	—	—	0
May, 2013	\$450M / Post Ipo Debt	—	—	0
Oct, 2012	\$10M / Grant	—	California Energy Commission	1
Sep, 2012	\$192.7M / Post Ipo Equity	—	—	0
Nov, 2010	\$30M / Post Ipo Equity	—	Panasonic	1
May, 2010	\$50M / Post Ipo Equity	—	Toyota Motor Corporation	1
Sep, 2009	\$82.5M / Series F	—	AI Wahada Capital Investment	4
Jun, 2009	\$465M / Debt Financing	—	US Department of Energy	1

Source: www.crunchbase.com, downloaded at 10:16, 03 Oct 2017 <https://www.crunchbase.com/organization/tesla-motors/funding-rounds>

**Figure 7 : Movement of Tesla Motors stock at NASDAQ 2012-16**

Source: www.businessferret.com

Shown above is the movement of the Tesla Motor stock at the NYSE since listing in 2012. The real revenue growth for the period 2012-16 has been top of the line at 103%. The operating expenses has skyrocketed at 199% per year as average in the same period.

While the nominal revenue growth has fallen from 387% in 2013 to 19% in 2016, the price adjusted revenue growth stands at 17%. Price changes refer to the product selling price. It has become increasingly evident that Tesla Motors without periodic infusion of funds has become un-viable to pursue its objectives and that explains the 25 rounds of funds raised since inception. In 2012, Tesla raised its average sale price to 1.57 times from 1.17 times the cost. This has brought the element of pricing competition and the danger of losing advantage when more funds are needed to launch new products. There seems to be a lack of control over operating expenses.

Tesla Motors is currently having zero EBITDA or in the negative region. Cash Flow Before Financing (CFBF) is unable to hold and tends to fall steeply and every time is propped up by timely financing. Actually, CFBF is less than 50% of annual revenues. Evidently, there is no Debt Free Cash Flow (DFCF), forcing the company to continuously strive for increasing volume sales which needs fresh financing. Surprisingly, Tesla Motors has bought additional debt and equity of over \$20 billion, most of which is debt, where as in the same period, the total revenues have been only \$16.3billion.

Another financial aspect which bothers the watchers is the excess fund being pumped into Tesla whereas the money required at any given time seems to be far less.

Refer to figure below. One may see that at any given point of time, the required cash for running the show is a minor fraction of the money being borrowed frequently.

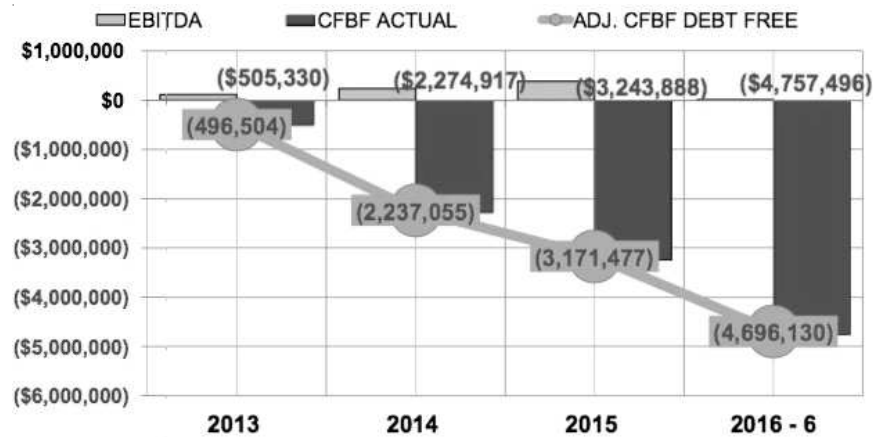


Figure 8 : EBITDA and cash flow before funding and after

Source: www.businessferret.com

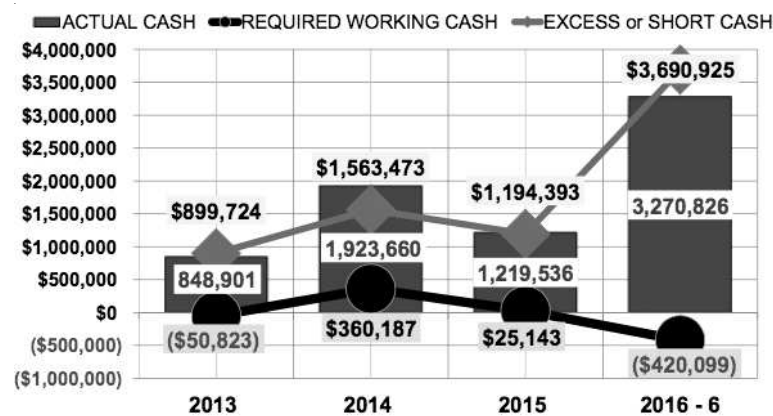


Figure 9 : Required cash and available cash

Source: www.businessferret.com

All forms of rates of returns on assets are totally and notably negative for each of the last five years. The Giga Factory built between 2013-16 at Nevada has been done during the very same period of falling RoA all the time. Another important factor is that the money being borrowed is being continuously used for various initiatives which seem to spring from the managing board or Elon Musk one after the other. The net trade cycle for the company is a weighted average of 111 days. This means that the company needs around \$20 million

per day – or \$2.2 billion – tied up in working capital all the time. This amount increases with increases in annual revenues if the company makes no significant changes.

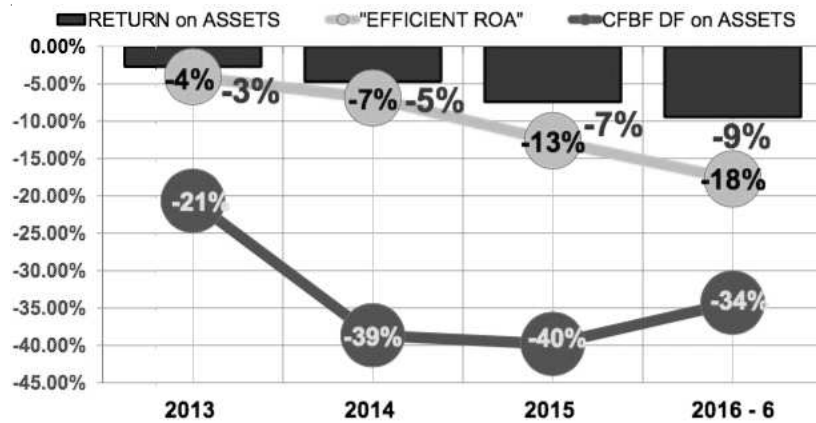


Figure 10 : Return on Assets (RoA) and cash flow

Source: www.businessferret.com

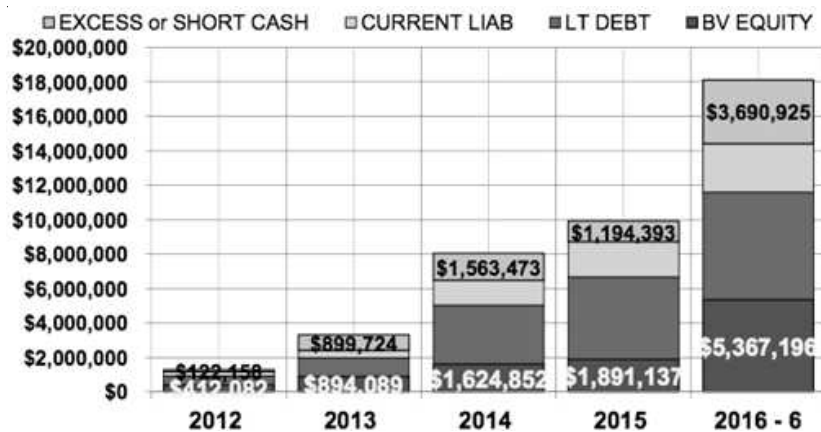


Figure 11 : Liabilities and book value equity

Source: <http://thebusinessferret.com/tesla-motors-financials> downloaded at 10:36 h 03 Oct 2017

Finally, debt financing is being addressed in a uniquely Tesla manner. It may be observed that the current liabilities of the company have stabilized in the last two years. On the positive side, there is almost a 283% rise in the book value equity which adds to the potential of the company to perform.

Tesla's adjusted weighted cost of capital is around 12% annually. It underperforms this cost by a weighted average of negative 4.2%. The cash flow return on assets is a weighted average of

negative 42%. **And it gets worse than even that.** Total assets are three times the amount of annual sales. The company has already dropped off the cliff and is accelerating towards the canyon floor!

Conclusion

Great achievements start with small steps and Elon Musk and associates started with big steps as an exception. The dream which took shape in 2003 now has grown into a futuristic giant with over \$31 billion market valuation.

In the medium term Tesla may enter into joint venture manufacturing to shore up its continuously in demand manufacturing capacity. As Elon Musk prides in keeping patented knowledge open, sharing technological knowhow with partners may be the logical next step to maintain public image of the company as one which keeps its promises in terms of timely delivery and launch dates. Tesla may also establish complete assembly lines overseas in high demand centres such as Europe and China.

In the long term, Tesla may change the governance model by decentralized decision making and letting go of the key controls from the hands of the few, which now is the case.

Thanks to the overwhelming confidence among the investors and customers, the funding scenario has never been more promising in spite of the successive instances of delay in delivery and launches. More giga factories may come due to the easily available finances and Elon Musk hopes to overcome the loss of image by 2019.

References

- Liao, C., Chuang, S. H., & To, P. L. (2011). How knowledge management mediates the relationship between environment and organizational structure. *Journal of Business Research*, 64(7), 728-736.
- Menguc, B., & Auh, S. (2010). Development and return on execution of product innovation capabilities: The role of organizational structure. *Industrial marketing management*, 39(5), 820-831.
- Tesla Motors, Inc. Form 10-K, www.teslamotors.com
- David F Larcker and Brian Tayan (May16, 2011), 'Tesla Motors: The Evolution of Governance from Inception to IPO', *Stanford Closer Look Series*

Jennifer Todd, Liz Thorstensen (2013), Analysis of the Electric Vehicle Industry,
International Energy Development Council

Akash G Nandi (2013), 'Tesla: Supercharging the Future', project report published at Stern
School of Business, USA

Paul Gao, Han-Werner Kaas, Detler Mohr and Dominc Wee (Jan 2016) McKinsey and Co report
on 'Disruptive trends that will transform the auto industry'.

Black Rock Investments, report titled 'Future of the Automotive Industry' published in April
2017

Martin Eberhard and Marc Tarpenning, (2016) 21st Century Electric Vehicle Energy Efficiency' a
Whitepaper published in-house by Tesla Motors Inc on 16 July, 2016

Ashlee Vance (2013), 'Elon Musk', biographical non-fiction published as a book.

Resource websites for data

www.teslamotors.com

www.businessferret.com

www.glassdoor.com

Youtube videos as listed under

<https://www.youtube.com/watch?v=Q7ZnXo-kfNQ>

https://www.youtube.com/watch?v=ut3_YYIQcwg

<https://www.youtube.com/watch?v=UMht2eFYpIY>

<https://www.youtube.com/watch?v=HIVGLrA-L2I>

<https://www.youtube.com/watch?v=nkrZsuTKCd0>

https://www.youtube.com/watch?v=PJJuM_rmlas

<https://www.youtube.com/watch?v=UMht2eFYpIY>

https://www.youtube.com/watch?v=65CW2z5YX_o

<https://www.youtube.com/watch?v=WmH3rUzwLCY>

https://www.youtube.com/watch?v=ut3_YYIQcwg&t=116s

http://www.evworld.com/library/Tesla_21centuryEV.

