

Analysis of the Operation Strategy of Tesla Inc. in China

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ABSTRACT. With Tesla establishing the Gigafactory in Shanghai driven by its triple predicament, “indigenized supply chain” enables Tesla to simultaneously increase production capacity and achieve cost efficiency through cheaper human resources and kinds of tax deductions and exemptions. Depending on the intensive high-tech differentiated products, Tesla enjoys its brand value effects and relatively independent supply chain. Whereas, some operating problems such as insufficient capacity and financial distress may deteriorate its operating sustainability, and corresponding suggestions are proposed in this report.

KEYWORDS: Operation management, Tesla gigafactory in china, Supply chain strategy

1. Introduction

On 10th May 2018, Tesla's wholly-owned subsidiary in Shanghai was officially established, implementing an integral part of this American car company's global strategic map. The business scope of the subsidiary is focused at R & D of electric vehicles instead of production. In succession on 7th January 2019, Tesla factory in Shanghai was officially opened, which is the first Gigafactory outside the United States, with the total investment of 50 billion RMB and the first phase investment of 16 billion RMB. In the initial stage, the assembly line will be built first, and then Tesla's “localization” process will be accelerated. At that time, how to manage the supply chain, localized R &D, and a series problems relating to domestic parts will develop into the key strategic issues. Investors expectation was not optimistic after the record-breaking loss for the send quarter in 2018 of 785 million dollars, together with supply falling short of Model 3 demand. Two mass layoffs can also prove its distress with the redundancy rate of 9% involving more than 4000 people as early as mid-2018, and another 7% layoff of exceeding 3100 employees in January 2019. Tesla consequently fell into triple predicament: lack of money, production and people. Surprisingly, the annual report of Tesla showed that the company's sales revenue in China increased from 7.8% in 2015 to 17.2% in 2017, jumping into the second largest consumer market of Tesla. Because of the China's policy and economic advantages, Chinese market plays an important role in injecting new impetus into Tesla and enabling it to smoothly escape from the loss situations.

In China, the biggest policy obstacle that Tesla faces in entering the Chinese market has been resolved. China's national Development and Reform Commission announced the abolishment of restrictions of foreign shares ratio on new energy vehicles in April 2018. Afterwards, as the “Special Administrative Measures for Foreign Investment Access (negative list, 2018 version)” implemented on 28th July 2018, officially signifying foreign-owned enterprises are allowed to build new energy automobile plants in China, Tesla ushers in a breaking-through point by the feasibility of policy to achieve its localization strategy in China.

As around half of Tesla's suppliers are from China, not only the successfully-established super factory can ease the tight production capacity, but also obtain substantial costs reduction and exemption of labor force, tariffs, manufacturing and mainland parts, as a result of which is a broaden market. Labor costs can be greatly lowered, in particular for the assembly workers on the production line. The hourly wage of an assembly worker in Shanghai is 35 RMB while that of an American worker is 100 RMB (≈ 16 USD). Besides, domestic production in China will relieve both of the costly importing tariffs and shipping fees from U.S., remaining only land transportation cost. Tesla can also get 10% purchase tax relief and rewarding subsidies for new energy. The advantage of economics of scope will be furthered utilized by diluting overall R & D and manufacturing costs. Overall, China's abundant economic resources enable Tesla to achieve cost efficiency among China's imported vehicles. Take the China's top selling - Model S as an example, the cost of which may enjoy probably one third reduction of the previous selling price.

Based on its prominent technology configuration and brand effects in pure electric vehicles, Tesla decided to expand its global supply chain upon the policy, economy and market opportunity. China is by far the largest market for mid-sized premium sedans and believed to be the biggest market for Model 3. Model 3, a lower-priced sedan designed

for the mass market with ramped production, is priced on par with gasoline mid-sized sedans (even before gas savings and other benefits). Capex per unit of capacity is forecasted to be about 50% lower than the current Model 3 production system in the United States. Besides, Model Y equipment installation is underway in advance of the planned launch next year through efficiency gained from Shanghai factory. Through the domestic production of Model 3 and Model Y in China, Tesla is embarking on the deliveries of Model 3 in international markets, focusing on lowering manufacturing costs while continuing to increase its production rate. Gigafactory Shanghai has installed annual capacity for 150,000 Model 3 pre-production since 2020, contributing to the sustainable competitiveness advantage of Tesla throughout the Asia^[1]. Cost efficiency aims to exploit scale of production, well-defined scope and other economies, producing highly standardized products through advanced technology. From the perspective of entering China, the automobile industry has always been criticized for the disparity between home and abroad in the prices of imported cars, which turns to be a starting point for Tesla to open the door of Chinese consumers' heart armed with its fair and just price. Localization production makes Tesla effective at a form of price competing with its low cost structure and management to achieve double gain of high profits and access to the widest market shares. From the brand itself, under its E-commerce order mode of "Order-first, Produce-later", together with the method of distribution channel control that bypasses dealers saves a lot of agency fees, cash flows can hence be received in advance, preventing tight funding chains.

To sum up, if supportive policies provide Tesla the access to possibility for entering China, then broad market shares, preferential tax rates and financial subsidies (according to the "Notice on adjusting and improving the financial support policies for the promotion and application of new energy vehicles" in 2019) provide the inevitability of maximizing its global value chain. Localized production caters both China's power plan "Made in China 2025" and Tesla's cost efficiency strategy due to the cheaper manufacturing and labor costs.

2. Inspirations of Tesla's Current Operation Strategy

Established in Silicon Valley in 2003, Tesla has been working on the designing, manufacturing, marketing battery electric vehicles (BEVs), as well as lithium-ion battery packs and electric vehicles power-train components, pioneering new energy pure electric vehicles with Internet thinking and opening up new market segments. It has become the most satisfied car brand in the American magazine "Consumer Reports" for two consecutive years. Boston Consulting ranked third in the "World's Most Innovative Companies" list in 2015. Tesla is not only a vehicle, a smart terminal, but also a lifestyle and a culture for its consumers. After the two fundamental revolutions of automobile industry in the past 100 years: assembly line production introduced in 1914 by Henry Ford, and "Lean Production" led by Japan since 1980s, a third automobile revolution is undertaken against the scarcity of fuel energy, exhaust emissions and manual driving accidents, calling for the emergence of clearer and intelligent driving era.

Differing greatly from its industry peers: Chrysler, Ford, General Motors, which have been struggling to evolve their aging lines to meet the increasing demands for electric and hybrid vehicles, global branding recognition can therefore be obtained and first mover market is possessed by Tesla. Research found that brand globalization is positively related to both perceived brand quality and prestige, through which can lead to purchase likelihood, and among them the effect through perceived quality is the strongest^[5]. The brand featured with "high-end digital electric sports vehicle" is positioned at three target customers or market segments: The affluent stratum who likes collecting cars - High-end sports car: Roadster (priced at: 109,000 USD); Premium young groups who lay stress on styling, high-tech content, and environmental protection - Luxury vehicle sedan: Model S (around 57,000 USD) and Model X; Middle-class groups-Mainstream vehicle consumer segment: Model 3 (under 30,000 USD). With the precise market segmentation, experience stores are mainly located at the core business districts in first-tier cities such as Beijing, Shanghai, Guangzhou and Shenzhen or developed second-tier cities around the Yangtze river delta. Although the sales and service network has covered most of China's developed cities, its maintenance and service centers have chosen the outskirts of popular cities to save the cost. The progressive shifting of brand position from high-tech, high-price, low-volume towards relatively high-tech, low-price, mass-production can be apparently proven by 30 thousand pre-capacity of Model 3 annually in Tesla gigafactory Shanghai. All in all, the ultimate goal of Tesla's brand value effect is to achieve higher profits at affordable prices, whose market price regression is similar to what happened when Apple laptop computers hit the market that started as luxuries but eventually became mass consumer products^[3]. However, the premium branding has become the primary link in the value of Tesla's products, opening up China's new energy market from a segmenting niche market and growing upon the first-mover market shares. Consistent with its uniquely targeted market objectives, Tesla also makes its unique marketing and pricing strategy^[1].

Focused on user experience, "Fan Praise" marketing strategy is adopted by Tesla to speak by products instead of television advertising, which is regarded as the most prevailing approach of traditional vehicles. As consumers are currently almost immune to ubiquitous marketing, "vital marketing", proposed by well-known entrepreneur Seth Godin, is promoting efficiency by mutual marketing among consumers, in other words, word-of-mouth communication is the best medium and has formed its marketing mechanism. It can not only save a large amount of advertising costs, but also engender the possibility of "Butterfly Effect" caused by large-scale "Fun Praise Effect"^[4]. Furthermore, the words,

pictures, audios or videos of the high-end customers is of great influence and those opinion-leaders may emerge enormous idol-driven effect, extending the products and services they use down straight to the potential consumers. Bill Gates, founder of Microsoft, had posted a “vital video” of a test drive of Model X with a friend on his blog. Many big names in the technology industry, like Google’s Sergei Brin, Cao Guowei - the CEO of China’s Sina blog, Lei Jun, the founder of Xiaomi, Leonardo who finally won the Oscars, Morgan Freeman, Steven Spielberg and many other influencers are Tesla’s star users.

Channel strategy is concerning with how products or services are delivered to buyers or end users. Profit margin varies according to related decisions regarding whether to sell products to customers indirectly through retailers or agents, or directly via the Internet or sales personnel. A service leader can obtain value advantage against competitors by provision of certain key service elements (eg: specially tailored service, or various distribution channels) to differentiate its products while a cost leader takes pains to optimize resources utility at the the lowest possible cost (maintaining low levels of inventory, Internet direct selling), aiming at gaining a productivity advantage. The perfect combination of sophisticated technology and disruptive operating models empowers Tesla to completely bypass traditional distribution model of automotive 4S stores. In the “place the order first, build the car later” e-commerce mode, risks regarding to overstock, inventory, storage, and the most important tied-up funds of goods in stock can be fundamentally eliminated. As Tesla (2019, Q3) states “Shifting all sales online, combined with other ongoing cost efficiency will enable us to lower all vehicle prices by about 6% on average, allowing us to achieve the \$35,000 Model 3 price point earlier than we expected”.

3. Operational Areas to Be Improved for Tesla

3.1 Insufficient Capacity

As a subversive innovation enterprise with intelligent manufacturing technology and complete charging service, however, Tesla who is stuck in successive losses for years has to depend on ceaseless indebtedness due to its inability of mass production. Elon Musk, CEO of Tesla, said that “Tesla first has to achieve target production rate and then smooth out flow to achieve target cost. Shipping minimum cost Model 3 right away would cause Tesla to lose money and die”. Since Tesla launched the entry-level Model 3 in March 2016, sold at the price of \$35000, the explosive model brought a record-breaking order volume of 450 thousand, while the production capacity was at 2k units/ week at that moment. Despite that the Model 3 capacity goal was set at 2.5k/week in Q1, 2018 and rise up to 5k/week in Q2, 2018, the total weekly production was 2020 vehicles of the first quarter in 2019. At present, the capacity of Model 3 goes up to 3.5k/week, which has not yet met the previous expectations. The latest data from Second Measure displays that 23% pre-orders of Model 3 in the U.S. have been called off as Tesla is incapable to fulfill those orders and customers can barely endure the over-three-years delivery. The capacity dilemma is rooted in both the lack of proficient skilled workers and the lagging battery cells supply. Initially Tesla’s strategy positioned at fully automated production with the convenience that basically there is not much requirement for man-made intervention once the entire assembly line had been perfected. The idealistic 24/7 production with little automakers, whereas, is subjecting to overly complicated system that many parts need manual assemble and adjustment, such as the tightness of nuts and installation of small components in tiny spaces, resulting the imbalance of skilled staff assignments. Besides, Panasonic grasped over-excessive bargaining power as the sole battery supplier of Tesla before 2019, hence the insufficient battery capacity was the biggest constraint on Tesla’s productivity. However, the ample experienced human resources, with the capacity release of power battery in China will support Tesla Gigafactory Shanghai to breakthrough these bottlenecks.

3.2 Financial Distress

According to Tesla’s 10-K report, as of December 31, 2018, Tesla had total assets of \$29.74 billion, total liabilities of \$23.43 billion, current assets of \$8.31 billion, current liabilities of \$9.99 billion, net loss of \$1.06 billion (\$2.24 billion in 2017) and operating revenue of \$21.5 billion (\$11.8 billion in 2017). The following analysis on Tesla’s financial situation may explain that why JP Morgan has given “reduction” recommendations on Tesla’s stock.

Table 1 Solvency Capability Index (Source: Sec Fillings - 10k Reports over the Years, Same Below)

Items	2014	2015	2016	2017	2018
Current Ratio	1.507	0.989	1.074	0.857	0.832
Quick Ratio	1.019	0.491	0.686	0.527	0.483
Property Ratio	5.341	6.426	3.526	5.433	4.758
Asset Liability Ratio	0.834	0.860	0.739	0.803	0.788

In terms of short-term liquidity, the current ratio (CR) and quick ratio (QR) showed an overall downward trend

during the past five years (Figure 1). The CR of 0.832 and QR of 0.483 in 2018, which was far below the average value of 1.1 and 1.26 in China's automobile industry, had revealed the potential short-term liquidity crisis of Tesla. In terms of long-term solvency, the property ratio (PR) fluctuated significantly in recent years. Although PR fell by 55% in 2016 compared to 2015, it rebounded in 2017 due to capacity bottlenecks and considerable R & D investment, and slightly dropped back in 2018. Anyhow, excessive liabilities are making the firm's capital structure vulnerable and amplifying the endogenous fragility of its business operation. The overall asset-liability ratio was relatively stable but always exceeding the 70% warning line, indicating the "high-risk, high-return financial structure" of Tesla and also its insufficient debt-paying capability.

Table 2 Operation Capability Index

Items	2014	2015	2016	2017	2018
Inventory Turnover (times)	3.6	2.8	3.2	4.4	6.5
Receivable Turnover (times)	17.1	27.0	17.0	25.8	29.3
Current Asset Turnover (times)	1.44	1.36	1.55	1.83	2.89
Total Asset Turnover (times)	0.78	0.58	0.46	0.46	1.50

Net income had remained negative since funded and operating cash flow started turning into positive since 2019. All the way before 2018, the Tesla's inventory turnover (ITO) remained at a far low level than the average of 6.7 in China's auto industry in consideration that Tesla had not yet achieved mass production, but basically reached up to 6.5 with a 47% increase in 2018 with its continuous improvement of production efficiency (Figure 2). However, the receivable turnovers were drastically surpassing the industry average of 8.5, indicating an efficient utilization of funds. The turnover rate of current assets (CAs) were steadily rising while that of total assets (TAs) were descending for years and returned to 0.74 in 2018, for the reason that the CA/TA ratio was gliding with each passing year from 54.5% in 2014 down to 27.9% in 2018. In brief, Tesla's operating indicators are currently unsatisfying owing to its constantly optimizing production lines, constructing factories, and introducing new equipment in order to break through the bottleneck of production capacity and improve product quality.

Table 3 Profitability Index

Items	2014	2015	2016	2017	2018
Gross Profit Margin (%)	27.5	23.0	22.8	18.9	18.8
Operating Margin (%)	-5.8	-17.7	-9.5	-13.9	-1.8
Net Profit Margin (%)	-9.2	-22.0	-9.6	-16.7	-5.0
Return on Assets (ROA, %)	-4.4	-10.9	-3.6	-6.4	-2.7
EPS (dollar)	-2.36	-6.93	-4.68	-11.83	-5.72

Gross profit were gradually decreasing but rebounded since 2019 Q2 according to the latest report (Figure 3). The EPS achieved an extraordinary \$1.86/share in 2019 Q3, much more beyond the expectations of Wall Street analysts. Whereas, the other three indicators during the past five consecutive years sustained negative, especially the most terrible 2015 and 2017, reflecting the fact that Tesla was suffering from loss quagmire for years which had been expanding continuously.

4. Conclusions

Capacity is a basic condition to guarantee price reduction and the purpose of establishing Gigafactory Shanghai. According to "Barrel Theory", this report projects the three following suggestions pointing at Tesla's short boards. Firstly, personnel structure should be optimized by retaining employees who create most value and recruiting skilled technicians in batches through strict selecting standard and training. Sufficient manual resources and assembly time can effectively manage the delaying risks during vehicles manufacturing, completing and delivery process. Secondly, multi-supplier structure and back-up reserves are essential to set aside redundancy capacity in case of any unforeseen event. Involving tens of thousands of internal and external components and processes, the operating risk will be magnified by the complex global supply chain. The whole manufacturing efficiency of Tesla is actually depending on the least well run part in supply chain system. Thirdly, an actionable business continuity plan encompassing all suppliers, together with a comprehensive risk management system are imperative in operating sustainability for Tesla^[4]. The integration of external value chain can promote information sharing among upstream and downstream enterprises, reduce transaction costs and grasp market dynamics in time. Then Internet-interactive but circumscribed marketing strategy place restrictions on exploiting vast Chinese market against the extremely fierce local competition in China. It is necessary to develop various paid-advertising-throw-in strategies which are more in line with Chinese consumers' usual practice and preferences, such as TV advertising, collaborating with E-commerce platforms (Taobao, Jingdong, etc.) and automobile vertical information websites (Bitauto.com, PCauto.com, Automobile.com, etc.), each of which

possesses hundreds of millions of subscriptions. Statistics of research consulting prove that those websites are the dominant channels with the highest proportion of intended purchasers. Taobao, as China's largest online retailer, a daily transaction volume on double 11, 2019 (Annual Global Carnival) reached up to 268.4 billion RMB, which Musk once rejected the proposal of cooperation and should reconsider the project with thoroughness. It is noteworthy that profits and users volume are the two critical indicators for brand-name enterprises, especially for emerging ones, in order to accumulate continuous cash flows to enter to the next stage of entrepreneurship. Considering the aggressive input in administrative and R & D capabilities, abundant cash flows assure more choices and safety in case of sudden rupture of the capital chain, as well as operational resiliency and sustainability. With the increasing number of users and rapid growth momentum, at least, Tesla can obtain potential growth value in eyes of stakeholders and investors, hence further financing has the feasibility by Tesla's marketing and profitability strengths instead of Musk's personal credit. The core competitiveness and differentiation leadership can be stimulated and amplified by marketing initiatives on supply chain to maintain its holding position with increasing demands when meeting challenges of competition vehemence ^[2]. Domestic brands such as: BYD, NIO, GEELY, BAIC Group and foreign brands: TOYOTA, HONDA, BMW, AUDI, Cadillac, MERCEDES-BENZ etc. have already realized mass production of BEVs or hybrid vehicles in China and been on various of propagate. Data provided by The Passenger Federation showed that China's total sales of new energy vehicles in 2018 was 1.01million, of which 9100 were sold by Tesla, accounting for less than 1% of the market.

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