

The Impact of Strategic Alliance on Corporate Performance: Evidence from Tesla

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ABSTRACT

Nowadays, issues like sustainable development and clean energy have drawn the attention from all walks of life. As a result, the electric vehicle industry is developing ever rapidly, and one of the most successful manufacturers of electric vehicles, Tesla, has caught people's sight. Behind the success of Tesla as a technology giant, one corporation must be mentioned, Panasonic. Having established an equity strategic alliance with each other, Tesla and Panasonic have been engaging in unprecedented research and development cooperation in lithium-ion battery technology. This essay emphasizes the impact of such strategic alliance on corporate performance from Tesla's perspective through thorough business analysis and financial analysis. The results denote that the strategic alliance has exerted a positive impact on Tesla's technology innovation, profitability and overall competitiveness, although potential risks including overdependence and relationship crisis have occurred to Tesla as well.

Keywords: Tesla, Panasonic, Strategic alliance, Corporate performance.

1. INTRODUCTION

The electric vehicle (EV) industry is developing faster than ever as people start to pay close attention to global warming, sustainable development and subsequently the use of clean energy. The great prospect of the industry and its potential profits invite more and more companies in, including the traditional established giants like Ford, GM and BMW, as well as the young start-ups like Tesla. Founded in 2003, the 19-year-old corporation has made its way to the top, successfully becoming a pioneer in the EV industry. The emergence of Tesla as a technology giant has brought up a question that the investors and other corporations are curious about: what has made Tesla achieve such corporate performance?

To figure out the answer, a large amount of existing research has laid the emphasis on Tesla's overall business strategies including the order-production strategy (where Tesla only starts to manufacture a car after the to-be owner places the order), the direct-sales strategy (where all products are sold on the official website with only brick-and-mortar shops for experience), the zero-advertising fee strategy, the differentiation strategy, etc. [1][2]. This paper, on the other hand, would like to focus on the impact of Tesla's strategic alliance, especially,

with Panasonic, on its corporate performance, from an accounting perspective, filling the research gap to some extent.

This essay aims to analyse Tesla's strategic alliance with Panasonic and how it has greatly helped improve its corporate performance, typically technology innovation, profitability and overall competitiveness, through business analysis and financial analysis. In addition, some risks analysis will also be covered. I hope that this essay will bring about some theoretical and practical significance, providing implications to internal decisionmakers as well external investors in valuing the corporation and other businesses seeking similar technology and financial developments.

The detailed structure of this essay is as followed. First, this essay is focused on the "Business Analysis", which consists of the background information of Tesla, the strategic alliance it chose, the business operation and what technology innovation Tesla achieved through the alliance. Next, the emphasis is laid on the "Financial Analysis", which is composed of R&D analysis, DuPont analysis and turnover ratios analysis. Then, the positive consequences of strategic alliance as well as the potential risks coming along for Tesla is referred to in the "Discussion section". Finally, a summary of the whole essay is presented in the "Conclusion". The lists of references can be found in the end.

2. BUSINESS ANALYSIS

2.1 Background Information

Tesla Motors, as is widely known, is a US manufacturer as well a technology giant of high-level electric vehicles. Its main products include Model S, Model X, Model 3 and Model Y. What has made Tesla a dominator in the EV industry has something to do with its lithium-ion battery technology, which is considered the core of an EV. Panasonic Corporation is a Japan-based company known for various electronic technologies and products, who possesses world's leading lithium-ion battery technology that Tesla has long sought since its foundation in 2003.

In 2010, Tesla received an investment of \$30 million from Panasonic, officially forming an equity strategic alliance with Panasonic.

2.2 Equity Strategic Alliance

An equity strategic alliance is one of the three types of strategic alliance, other two being joint venture and non-equity strategic alliance. Equity strategic alliance occurs when one entity purchases the equity of another, as the case of Tesla and Panasonic where the latter owned 1.4 million shares of Tesla as of 2021, or when two entities purchase each other's equity which is not suitable to discuss in this case study. Different from non-equity strategic alliance which embodies more independence between the partners, an equity strategic alliance fosters both sides' ability to achieve a central business objective, to reduce the impact of the existing risks, to dominate the market or edge out other competitors, and to gain long-term competitiveness, through a closer combination of two companies' capital, technology, labor, market and finally profit-sharing [3].

In the case of Tesla, the establishment of the equity strategic alliance with Panasonic is aimed at producing better lithium-ion battery. This also explains why Tesla chose the equity strategic alliance over non-equity. It required the capital and technology invested by Panasonic so that there would be sufficient resources to prepare for cooperative research and development, which is in line with Tesla's core business goal, mitigating the its risks in capital shortage, increasing its share in the market by introducing exclusive high-quality batteries, and therefore improving the corporate innovation and competitiveness.

2.3 Business Operation

In 2011, Tesla signed its first cooperative contract with Panasonic ordering 6400 million 18650 batteries to build over 80,000 Model S in the next four years. Two years later, the number increased to 1.8 billion, and Panasonic successfully became the sole supplier of Tesla's lithium-ion batteries.

Later in 2017, Tesla and its strategic partner Panasonic collectively constructed the first Gigafactory in Nevada, the US, at a cost of \$5 billion of which \$1.6 billion was invested by Panasonic. Together in Gigafactory Nevada, they accelerate battery technology innovation by producing lithium-ion battery packs with lower costs and better quality. Meanwhile, Tesla immediately applied the technology to more affordable vehicles (Model 3 and Model Y) and facilitate the production of them right in the Gigafactory Nevada [4].

Gigafactory Nevada is in charge of the production of Model 3 and Model Y. In Tesla's 10-K, the company put it, "We have integrated battery material, cell, module and battery pack production for Model 3, Model Y and our energy products in one location at Gigafactory Nevada...Gigafactory Nevada allows us to access high volumes of lithium-ion battery cells manufactured by our partner Panasonic there while achieving a significant reduction in the cost of our battery packs. We continue to invest in Gigafactory Nevada to achieve additional output there, including through our agreement with Panasonic."

It can be noted that in addition to cooperative R&D, the combination of the vehicle factory and the battery factory of Tesla and Panasonic has also saved Tesla the expenses to transport the batteries to the factories where cars are produced, thus enabling Tesla to lower the costs as well as listing prices to boost sales.

2.4 Technology Innovation

Technology innovation is one of the most valuable activities of Tesla. Each year, Tesla invests a huge amount of capital on R&D, specifically on high-performance batteries, energy generation and storage components, self-driving technology and new models. With Panasonic as a research partner, Tesla is making great efforts to enhance its battery performance as well as to reduce the unit cost for more affordable models.

Among all the research projects Tesla has been running, the fundamental importance of lithium-ion batteries is the reason why Tesla chose to start a strategic alliance with Panasonic; the latter has the battery technology that is considered one of the key technologies of EVs, the core that differentiates Tesla's cars from traditional gasoline automobiles and from other competitors' EVs.

A more detailed description of various attributes of lithium-ion batteries includes energy density, power density, operating temperature range, change retainment, cell voltage, cyclability, recyclability, safety, unit price, etc. [5], which directly affect the performance of the entire vehicle with regards to estimated range on a single charge, top speed, acceleration, driving safety, etc. These are the aspects that Tesla and Panasonic are working on in the laboratory of Gigafactory Nevada. And as expected, they did achieve some innovative

breakthroughs, referring to the 2170 battery and the 4680 battery introduced in 2017 and 2020 respectively, replacing the former 18650 lithium-ion battery used in most EVs.

2.4.1 The 2170 Battery

One of the most important innovative outputs is the 2170 battery, which was developed by Tesla and Panasonic together and officially launched in 2017. Compared with the old Panasonic 18650 lithium-ion battery, 2170 battery is much more efficient in both energy storage and cost control. To better illustrate through figures, the current delivered by 2170 battery almost doubled from 3,000 mA to 5,750-6,000 mA. However, its physical size only grew by 50% from 18 mm in diameter and 65 mm high to 21 mm by 70 mm [6]. What’s more, the producing costs of 2170 battery stayed pretty much unchanged, which indicates a higher cost-efficiency.

After introducing the 2170 battery to the market, Tesla and Panasonic immediately began the mass-production of it in Gigafactory Nevada and applied the battery cell in Model 3 with a lower listing price targeting the middle market, which then became a big hit.

2.4.2 The 4680 Battery

The other and also the latest outcome of Tesla and Panasonic is the 4680 battery, officially made to public in late 2020, and the cell production was confirmed by Panasonic in February 2022. The new one has evolved on the basis of the 2170 battery in terms of the battery performance, with continuously growing energy density and dropping producing costs. To take a deeper look, the 4680 battery is able to store 6 times the energy as the 2170 battery, but still its physical size grows slightly to 46 mm in diameter and 80 mm high [7]. Also, Tesla and Panasonic managed to cut the costs by nearly 14%, significantly improve the cost-efficiency. Other features include the tabless structure, dry electrode technology, safety and so on.

The launch of the 4680 battery has drawn a lot of attention from the public, which has laid a foundation for its future sales. Besides direct economic benefits, the project will also help Tesla to move closer to its blueprint in raising battery capacity by around 50% annually and by 30 times by 2030, reinforcing its lithium-ion revolution in the EV industry.

3. FINANCIAL ANALYSIS

Generally speaking, the equity strategic alliance with Panasonic has improved Tesla’s overall corporate performance, including innovation, profitability and core competitiveness. In this section, the emphasis will be laid on Tesla’s corporate performance under this equity

strategic alliance by looking into its financial statements and some ratios.

3.1 R&D Analysis

There exists a significant amount of R&D expense in Tesla’s financial statements each year, with an overall increasing trend since 2010. At this point of time, a series of signals was made by Tesla telling the world that it was going to highly focus on technology innovation by pouring huge funds into R&D, and one was the establishment of equity strategic alliance with Panasonic. *Source: Tesla 10-K*

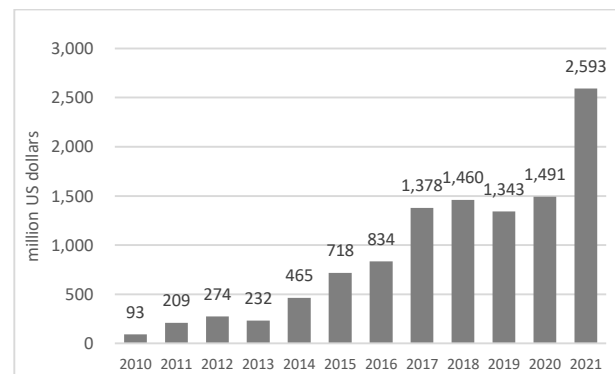


Fig 1. Tesla’s R&D expenses from 2010 to 2021

Notice that there were two major surges in R&D expense in 2017 and 2021 respectively. In 2017, Tesla’s annual R&D expense increased by 65%, from \$0.8 billion to \$1.4 billion, and in 2021, the figure increased by 74% from \$1.5 billion to \$2.6 billion, which accounted for 12 % and 5% of its total revenues respectively. To be more specific, as Tesla wrote, “R&D expenses increased \$342 million, or 106%, in the three months ended March 31, 2021, as compared to the three months ended March 31, 2020. The increase was primarily due to a \$147 million increase in employee and labor related expenses due to an increase in headcount and increased payroll taxes related to the appreciation of our stock price.” The explanation for 2017 was quite similar. Tesla attributed the significant increase in R&D expense to the growing employee benefits in the R&D department for relevant research projects without mentioning Panasonic, but there is still financial evidence indicating the essential role played by Panasonic.

In 2017, Tesla, together with Panasonic, opened the Gigafactory Nevada, started and successfully introduced 2170 battery project. In 2021, besides the redesigning and refreshing work of Model S and Model X, the project for 4680 battery was reinforced by the two corporations collectively. These two projects, as previously mentioned, were of great importance to Tesla overall technology innovation, which indeed required huge amount of capital for equipment, talents, etc. So, the surge in R&D expense and the battery cell projects in 2017 and 2021 weren’t a coincidence but strongly linked

together, and the role of Panasonic as a strategic ally in technology innovation cannot be ignored.

3.2 DuPont Analysis

The decomposition of ROCE (return on common equity) is usually a useful tool to analyse a corporation’s profitability. In this essay, statistics of Tesla from 2017 to 2021 were chosen for DuPont analysis (Table 1). Computations of ROCE are based on the assumption that ROCE equals profit margin times assets turnover times capital structure leverage. Also, the timing has its significance, which starts from the year when Tesla and Panasonic began R&D cooperation and battery manufacture in Gigafactory Nevada. This point of time is the turning point in Tesla’s overall development.

- Profit Margin for ROCE

Profit margin is one component of ROCE, which answers how well the company generates profit from sales. We can see that this ratio of Tesla is growing rapidly from 2017 to 2021 and became positive in 2020 for the first time, thanks to the positive net income appeared in 2020. The growth also suggests that net income is increasing faster than sales, implying that cost of revenues is increasing but at a much lower rate than sales, or cost of revenues per delivery is decreasing.

Source: Tesla Investor Relations

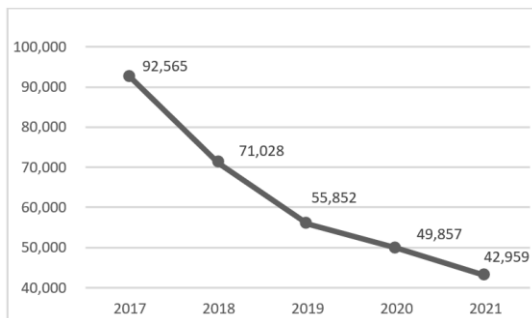


Fig 2. Tesla’s vehicle deliveries from 2017 to 2021

Source: Tesla 10-K

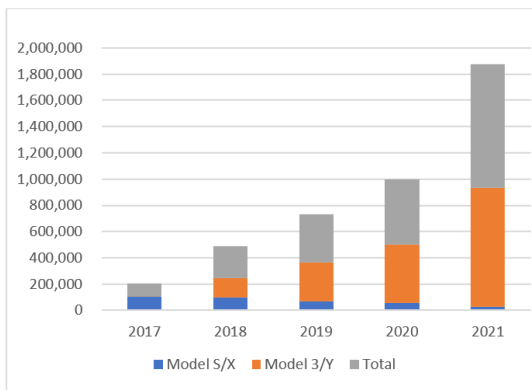


Fig 3. Tesla’s average cost of revenues per delivery from 2017 to 2021

As the graphs depict, total deliveries from 2017 to 2021 grew over 9 times, with the sales of two older models, Model S and Model Y, slightly going down, giving way to the emerge of Model 3 and Model Y. The surge in the sales of Model 3 and Model Y can be partly attributable to their lower prices targeting the middle market, which is made possible with the unit cost dropping by nearly 54% over the five years thanks to the cost control in the 2170 battery and the 4680 battery developed by Tesla and Panasonic together. In other words, through financial ratios, it’s observable that Tesla’s strategic alliance with Panasonic and the cooperation in battery technology innovation has indeed lowered the cost and boosted the total sales.

- Assets Turnover

Another component is assets turnover, which measures how well the company generates sales from its assets. The assets turnover of Tesla is pretty stable over these years. Tesla’s ability to generate sales from its assets remains at a relatively efficient level.

- Capital Structure Leverage

The final component is capital structure leverage, showing how much leverage Tesla has, that is how much liabilities it has in terms of assets. The capital structure leverage of Tesla is decreasing from 2017 to 2021, indicating a decreasing liabilities to assets ratio as well, which means the percentage of Tesla’s liabilities to assets is dropping. In other words, with liabilities and assets both growing, assets grow faster than liabilities.

Typically, since Tesla established the strategic alliance with Panasonic, it has incurred huge amount of capital to improve operations including research and development in lower cost lithium-ion batteries, building Gigafactory, introducing new vehicle models, acquiring high-tech companies, etc. All of these have led to more plants, better performance, greater public confidence, and accordingly more assets.

- ROCE

ROCE is the combination of the three ratios above, measuring the overall profitability of Tesla. It can be observed that ROCE is rising rapidly from -43% in 2017 to 21% in 2021 and appeared positive and exceeded the average industry level in 2020 for the first time. Tesla’s overall profitability is growing over time thanks to its improvement in the ability to generate profit from sales and capital structure leverage as well as its effort in keeping the ability to generate sales from its assets efficiently, which can be further attributed to the strategic alliance with Panasonic to some extent.

Table 1. Computations of ROCE decomposition

	2021	2020	2019	2018	2017
Profit Margin for ROCE	10.25%	2.29%	-3.51%	-4.55%	-16.68%
× Assets Turnover	0.94	0.73	0.77	0.74	0.46
× Capital Structure Leverage	2.18	3.00	5.55	6.38	5.71
= ROCE	21.06%	5.00%	-14.94%	-21.31%	-43.63%

3.3 Turnover Ratios

Another index to evaluate corporate performance is turnover ratios. Still, statistics of Tesla from 2017 to 2021 regarding turnover were chosen for the analysis (Table 2).

- Accounts Receivable Turnover

Days accounts receivable outstanding are averagely 15.4 days from 2017 to 2021, without too many deviations. Days accounts receivable outstanding are not high, which means it doesn't take long for Tesla to collect its accounts receivable, signifying efficiency.

- Inventory Turnover

Days inventory held is around average industry level. The figures demonstrate a downward trend, indicating a better selling condition or a greater market demand.

- Accounts Payable Turnover

It's quite obvious that days accounts payable outstanding are pretty long and are getting even longer over time, so are accounts payable in amount. Notice that Tesla is a manufacturer, and its purchases made during the production which adds value to inventory are not clearly pointed out in amount, so I use cost of revenues

instead. However, I believe that major purchases are expected to take place in procuring direct materials including the lithium-ion batteries from Panasonic.

It's worth noticing that this exceptionally low accounts payable turnover can be partly justified by Tesla's strategic alliance with Panasonic. Panasonic is the sole supplier of lithium-ion batteries of Tesla. Such privilege didn't come without a price, which might include offering Tesla a longer period of time to pay its accounts payable. With accounts receivable turnover and inventory turnover stable at normal industry level, a relatively low accounts payable turnover gives Tesla an edge in terms of its cash operation cycle.

- Days other financing required

As calculated, it only takes as few as 3 days and -15 days in 2020 and 2021 respectively for Tesla to get its cash back, which is very fast for cash conversion in automobile industry. The negative figure in 2021 implies that the cash flows into the corporation through its daily operations before it flows out. This is a good signal as it indicates that it's relatively more efficient for Tesla to use cash in its operating, investing and financing activities, especially in innovating and improving overall competitiveness, which in return generates more fortune, entering a positive cycle.

Table 2. Computations of turnover ratios for Tesla from 2017 to 2021 (in million US dollars)

	2021	2020	2019	2018	2017	2016
Sales	\$53,823	\$31,536	\$24,578	\$21,461	\$11,759	\$7,000
Cost of revenues	40,217	24,906	20,509	17,419	9,536	5,401
Accounts receivable	1,913	1,886	1,324	949	515	499
Inventory	5,757	4,101	3,552	3,113	2,264	2,067
Accounts payable	10,025	6,051	3,771	3,405	2,390	1,860
	2021	2020	2019	2018	2017	Average
Days receivables outstanding	13	19	17	12	16	15.4
Days inventory held	45	56	59	56	83	59.8
Days accounts payable outstanding	-73	-72	-64	-61	-81	-70.2
Days other financing required	-15	3	12	8	17	5

Source: Tesla 10-K

4. DISCUSSION

4.1 Positive Consequences of Strategic Alliance

Tesla’s strategic alliance with Panasonic has led to positive consequences on Tesla’s corporate performance.

In terms of technology innovation, the cooperative research and development with Panasonic has accelerated both companies’ battery technologies, with better battery packs at lower costs being introduced after the Gigafactory Nevada was put into use as a collateral research center for them. Evidence can be found through R&D analysis and of course the technology breakthroughs (2170 battery & 4680 battery) of their continuous innovation.

As technology innovation is one of the most valuable activities for a company like Tesla, such achievements in innovation will greatly improve the companies’ profitability as a result. With better batteries performance and lower prices, vehicle sales in unit grows steadily every year. With lower battery producing costs, gross profit continues to demonstrate an upward trend. Profitability improvement has manifested through the decomposition of ROCE.

Other benefits provided by a strategic alliance include a relatively small accounts payable turnover and therefore an efficient cash operation cycle for the company. This is also important because cash generated can immediately come into use for other critical corporate activities like technology innovation. A positive cycle will occur.

Collectively, these positive impacts, namely the improvements in innovation and profitability, brought by the strategic alliance with Panasonic has enhanced Tesla’s overall competitiveness, championing its leadership in the EV industry in a foreseeable future.

4.2 Potential Risks

The strategic alliance, on the other hand, leads to a number of potential risks for Tesla.

4.2.1 Strong dependence on one single supplier

As per the agreement between the two companies, Panasonic remains the sole supplier of lithium-ion batteries of Tesla (except in China), which is highly risky for Tesla’s operations, especially since the lithium-ion battery is the core of producing an EV. If anything goes wrong with the supply of the batteries, Tesla’s capacity will be subsequently affected. This severe problem has already been noticed by the management in Tesla. As they pointed out in 10-K, although famous for mass production of high-quality cells in Japan, Panasonic still lacks experience in manufacturing in Gigafactory Nevada due to the fact that the factory has only been in use since

2017. What’s more, as a strategic ally instead of a subsidiary, Panasonic is an independent entity with freedom to make its own decisions about whether to postpone production schedule in response to the COVID-19. All these uncertainties add to the risks facing Tesla.

4.2.2 Cracks in the strategic alliance

The relationship between Tesla and Panasonic start to fall apart when Tesla showed its ambition in globalization and localization, started in China. Clearly, Tesla would like to localize the battery supply for Gigafactory Shanghai to cut costs by working with local cell suppliers referring to CARL (CHN). This move, with no doubts, displeases its old partner Panasonic, who has invested too much in Tesla to hardly profit itself.

The localization of the production is not only limited to choosing local battery suppliers, but also includes using other local materials and selling products in local markets, with goals to mitigate the risk of overdependence on Panasonic discussed above, strive for local government’s support, speed up the production and distribution process, avoid extra tariffs and lower the manufacturing costs as well.

Table 3. Tesla’s worldwide production

Production Location	Production Activities
Fremont Factory	Model S and Model X Model 3 and Model Y
Gigafactory Nevada	Model 3 and Model Y Energy storage products
Gigafactory New York	Energy storage components
Gigafactory Shanghai	Model 3 and Model Y
Gigafactory Berlin	Model Y
Gigafactory Texas	Model Y Cybertruck
TBD	Tesla Semi Tesla Roadster

Now, Tesla owns factories all over the world and divides the work clearly among each factory (Table 3). in order to respond, Panasonic made a stock clearance of Tesla’s equity in 2021, though it keeps on deepening cooperation with Tesla. Tesla will continue to expand its strategic alliance team in the future. However, as it starts a new relationship, there will be cracks in its old one. Tesla must take the trade-off into account.

5. CONCLUSION

In conclusion, strategic alliance has a positive impact on corporate performance in terms of both business operations and financial positions. To be more specific,

in the case of Tesla, its equity strategic alliance with Panasonic has significantly enhanced its technology innovation, profitability and overall competitiveness, which can be observed through the business analysis and financial analysis, including the growing inputs and outputs of technology innovation, increasing ROCE and better turnover ratios. However, there also exist certain risks with regards to overdependence on Panasonic as the sole supplier of lithium-ion battery as well as the recent relationship crisis between them. What's more, this essay has shed a light on Tesla's move to the multipolarization in aspect of strategic alliance and its subsequent impact. Last but not least, although with limited access to complete, original financial data from Tesla and Panasonic, this essay is expected to contribute a certain level of theoretical and practical significance, providing implications to internal decisionmakers as well as external investors valuing the corporation and other businesses that might be undergoing similar technology and financial developments.

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