

# Competition and Valuation: A Case Study of Tesla Motors

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**Abstract.** Tesla's rapid rise to become one of the world's most influential automakers has marked the start of a new era in the global automobile industry, where many of the traditional auto companies were overshadowed by Tesla's dominance. Judging from Politics, Economy, Society and Technology perspectives, Tesla's market value can potentially be overvalued due to its leading role in the Electrical vehicle market. Economically, Tesla facilitates the growth of global economy by creating more employments and manufacturing factories. Socially and politically, Tesla's Electrical Vehicle reduces the level of negative externalities (e.g., pollution), which aligns with the developmental frameworks proposed by governmental policies and regulations. Meanwhile in technological aspect, Tesla pioneers the innovative design of battery pack to reduce the overall cost of battery and seeks to integrate better automatic driving system into electrical vehicle. Given those merits of Tesla, overoptimism on its stock price is expected. Therefore, it is important for stock traders who are willing to throw money at Tesla to ruminate over their choices before making the investment. In this study, the results of valuation methods indicate that true market value of Tesla has been overestimated due to its irregularly high operating cash flow, price-to-earnings ratio and enterprise value to earnings before interest, taxes, depreciation, and amortization ratio, suggesting its stock price is overvalued.

**Keywords:** Tesla, PEST, Core Sections of Tesla, Competition Analysis, Valuation, Electrical Vehicle.

## 1. Introduction

Tesla is an electric vehicle (EV) company founded by Elon Musk, JB Straubel, Martin Eberhard, Marc Tarpenning, and Ian Wright in 2003 [1]. The company specialized in producing electric vehicles using lithium-ion battery for energy storage and subsidizing the establishment of solar panels [2]. Compared to the traditional vehicles that rely heavily on the combustion of fossil fuel gas to supply energy to vehicles, Tesla pioneered the use of renewable energy to generate scalable clean energy to power vehicles, laying out a strong foundation for the development of electric vehicles industry. Ever since its establishment in 2003, Tesla underwent rapid market development worldwide due to its influential role in the electrical vehicle market and advanced technological innovations. In recent year, Tesla has turned out to be a \$2.3 trillion automotive industry in the world [3].

Tesla officially stepped into Chinese market in 2018, establishing factories and buildings in Shanghai that made up the total market share from 0.2% to 0.5% [4]. In one study, Tesla's technological advancement and influential market brand facilitated the development of EV market in China [1]. In 2020,



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Tesla's gross profit margin increased dramatically during the third quarter of Tesla's fiscal year compared profit made in 2019, which promoted its net income growth rate. Because of the positive net revenue income generated from mass productions and sales of electrical vehicles, Tesla exceeds in average liquidity ratio in terms of its financial performance to cover short term cash need. Therefore, Tesla will not be likely to encounter financial difficulties in the near future [5].

### *1.1. Objectives*

This paper will provide comprehensive evaluations on the true market value of Tesla in the EV industry. The evaluations are determined based on the results of different valuation methods, judgements from Politics, Economic, Society and Technology (PEST) perspectives, examination of Tesla's EV core sections and discussion of Tesla's stance in market competition. Hopefully, the result of the analysis can provide stock traders or investors with meaningful valuation reference to formulate their investment strategy on trading Tesla stock.

## **2. Pest analysis**

### *2.1. Politics*

Governmental policies and regulation facilitate the development of electrical vehicle market, expanding its global influence on the international market. The conventional gasoline powered vehicle relies on the internal combustion of gas to generate power, which creates greenhouse gases that cause environmental pollution. The electric vehicle, however, uses electric motor powered via a supply of electricity from current, decreasing the overall pollution. In countries such as the US, China and countries in Europe, governments have implemented laws and regulations to protect environment. Programs such as California Air Resources Board (CARB) or deliver zero-emission vehicles (ZEVs) substantially encourage the adoption of electric vehicles [6]. Internationally, 3 main pillars are employed to support the policy of expanding the sale level of Electrical vehicles: (1) The initial fleet purchase made by the government expanded the growth of EV market; (2) Because of the national and regional subsidies, buyers of EV pay less sticker price; (3) There is policy requiring automaker to sell set percentage of EVs beginning in 2019. Indeed, governmental intervention and regulation have pushed EV industries to achieve the goal of improving air quality, energy security and reducing carbon dioxide emission [7].

Tesla receives support from government because its synchronous alignment with the governmental agenda to protect environment; in general, EV can improve air quality and energy security by reducing carbon dioxide emission. At beginning, Tesla started off with a loan funded by the advanced technology vehicle manufacturing program under President Bush administration and later was said to pay back with low interest. Along with federal loan, Tesla also received support from politicians through different state subsidies, in that various states have offered additional income – tax credits for each purchase of Tesla. Eventually, those subsidies became indispensable part of Tesla's business model to the advertisements of electrical car brand. Therefore, the financial success of Tesla is closely tied to government – granted privilege as its stock value increased to \$12 billion, implying greater emphasis on the political preference more than the creation of value to the customer [8].

### *2.2. Economy*

Tesla simulates the economic development of the US, China and Europe by encouraging EV market competition, which brings production projects and employment opportunities. In 2016, Tesla promotes competition domestically with other automotive industries by producing a wide range of electric cars for market sales and accelerates the growth of automotive industry trend by bringing more opportunities for economic developers in renewable energy market [9]. According to the report stated by Financial firm HIS Markit, Tesla has made direct impacts on the US economy by generating \$5.5 billion and 50,000 jobs to the state [10]. Meanwhile, Tesla has also accelerated the development of technology in the US market with the sales of electric vehicle.

### 2.3. Society

The advancement of new technology of electrical vehicle industry can help mitigate the environmental issues from the industrial nations where the greenhouse emissions reached at higher level every year. In general, electric vehicle is more efficient in energy conversion as it converts over 50% of the electrical energy to power at wheels, whereas the gas-powered vehicle only converts around 17% - 21% of energy stored in gasoline. Those factors give rise to the increase in demand for electrically powered vehicles [6]. Although there is still emission of greenhouse gas from the energy generation to charge electric vehicles, the adoption of fully electric batteries in Tesla vehicle production seem to claim to have nearly 0 tailpipe emissions. For instance, energy production in the US is more leaned toward non-renewable energy as the electric vehicles produced less than half of the amount of CO<sub>2</sub> emitted by the conventional gasoline cars [11].

### 2.4. Technology

Automobile companies shift their focus from producing traditional vehicle to electric vehicle, which encourages the development of EV in automobile market [6]. There are many advantages associated with electrical vehicle over the traditional vehicle in automobile industry. For example, electrical vehicle can be powered naturally by electricity, which is a renewable resource. Traditional vehicle, on the other hand, is powered by the combustion of gasoline that consumes oil, which is non-renewable natural resource. Moreover, electricity is also cheaper than gas. When traveling, electrical vehicle has regenerative braking to supplement the energy for car to run, making it cost much less than gas – powered vehicle; on average, electrical vehicle typically costs one third the cost of vehicles that rely on gasoline [12].

## 3. Core sections of ev

The electrical vehicle will be a major growth segment in China and the US because the battery capacity of electrical vehicles is going up and battery costs is going down. According to the new International Environment Agency (IEA) report, Tesla was the leading company to drive both of these trends. By 2030, IEA expects the average battery capacity to reach 1.5 TWh per year from 170 GWh per year, and battery costs will be expected to drop respectively. In addition, the average battery pack price will drop from \$1100 per kilowatt – hour in 2010 to \$156 per kWh in 2020. Eventually, the delivery of Tesla's new model will enhance the growth trend of EV market's development [13].

### 3.1. Battery

Lithium-ion battery is a type of rechargeable battery that are used to power portable electronics and electric vehicle. A prototype Li-ion battery was first developed by Akira Yoshino in 1985 and was then advanced by Sony and Asahi to create a commercial Li-ion battery. Later in 2019, Yoshino, Goodenough and Whittingham developed Lithium-ion battery [14]. The use of Lithium-ion battery is common in EV market in the past. Although scientists are working on other innovative technologies (including lithium-sulfur, lithium-metal and sodium-ion) that can be used as replacement of Lithium – ion battery, IEA still expects the Lithium – ion battery to remain as mainstream in EV market for next couple years [13].

Meanwhile, Tesla is the leading company to be able to reduce the cost of a cylindrical cell batteries for more USD 200 per kWh in 2019 and use cylindrical battery cells in as its battery packs. There are two major ways that enable Tesla to do so: the use of more advanced form of engineering and the establishment of more Giga factories to manufactures battery packs. Therefore, Tesla has revolutionized the batterie's industries by reducing the costs of using cylindrical battery as battery cells in battery packs [15].

Because of Tesla's dominating success in EV market worldwide, other automotive industries announce that they will spend billions of dollars to catch up to Tesla. Companies such as Toyota and the Japanese battery firm Panasonic started to horizontally integrate with other popular EV industries in order to develop and build more powerful batteries pack to power electrical vehicles. Moreover, General

Motors and South Korea's LG Chem spent billions of dollars to try to establish multiple battery plants in northeast Ohio in order to catch up with the productions of powerful batteries from Tesla [15].

### 3.2. Automatic Driving

Numerous investments have been made toward the development of technology in driverless vehicles. Autonomous vehicles (AV) are expected to be designed following the guideline of ACES (autonomous, connected, electrified and shared). In order for the AV to appear on the street, there is need for the substantial development for faster charging infrastructure, longer range, safer technology, battery durability and protection of personal or vehicle data. Meanwhile, electrical vehicles are the driving force for the growth of adopting automatous system in vehicle driving because of the special features of electric vehicles that matches the design of autonomous vehicle [16]. There are few reasons that automation integrated better in EV. Firstly, the drive-by-wire system built in EV is more compatible and flexible than traditional mechanical control system with electronic controls in gas – powered vehicle. Secondly, wireless charging in electrical vehicle will integrate seamlessly with autonomy. Lastly, autonomous technology integrate better with electric engine as electrical cars are easier for the computer to drive. Therefore, it is very likely that EV will be automated, or vice versa.

Despite various advantages of electrical vehicle over traditional vehicle in integrating automatic driving system, the technology is still limited for purely EV vehicle to achieve automation. During the current trend, EV has adopted partial automation in terms of driving, which means vehicle is able to perform autonomous brake and steer in some situation. In order to achieve purely automatic EV vehicle, a big discovery of battery technology will be needed. More specifically, if lithium-ion battery can be moved to solid state, there will be more generation of power and capacity. Therefore, \$50 billion investment has been expected to develop more sophisticated AV technology by 2035 before it is fully integrated into EV vehicle. For next couple decades, consumers will expect the partial automation assistance in EV such as automatic brake or computer vision. Those adoption of assistive AV technologies will be available for the consumer to use, and the cost will be expected to drop as volumes scale. More importantly, automakers will likely include more safety features to ensure the effectiveness of those AV technologies [16].

The development of automation technology is also correlated with more accidents associated with using semi-autonomous driving features to drive electrical vehicles. According to the report of National Safety Board's (NTSB), there have been fatal crashes in 2019 and 2020, where autopilot features in electrical vehicles fail to function properly at the time of emergencies. In one of those cases, an accident occurred when a Tesla driver used autopilot features as automatic tools to drive on the highway. In response to the accidents, Tesla did not start to address their shortcomings of driving technology, which includes the failure to effectively monitor driver's level of engagement with the driving tasks and the inability to give a well-timed warning to elicit the driver's response to a crash [17].

## 4. Competition analysis

The developments of electrical vehicles are facilitated by the traditional auto industry and EV industry such as Tesla, Daimler AG, Volkswagen, BYD, BMW, Mercedes – Benz, Nio and others [13]. Among those, the leading players include Tesla, Nio, Volkswagen and BYD, etc. Those leading players adopt different marketing strategies to compete for major market share in EV industries, which can potentially change investor's mind to invest into alternatives on the manufacturer of electrical vehicle. As more competitors flood into the EV market, Tesla has been pressured to turn to alternative profits, ramping up the production of its EV vehicles.

As for EV industries, Nio is a Chinese automobile company that specializes in the design and development of electric vehicles. The company is headquartered in Shanghai and was founded back in 2014. Nio's stock has been growing more significantly lately: at the end of October 2020 in fiscal quarter, Nio has sold 5000 electrical vehicles, which represents almost 35 % sales surges, making it a tough competitor for Tesla. Besides, another world's largest producer of electric vehicle is BYD company. The company is based out of the economic powerhouse in Shenzhen and is developing at a very rapid rate

due to its unique headquarters (a 670-acre campus that includes schools, hotels, and a monorail system) devoted to electrical vehicle production. In addition, the company's products also cover almost every high-tech sector, ranging from consumer electronic to energy storage. As for traditional auto industry, Volkswagen is one of the largest auto companies in the world. It has been 82 years ever since its initial establishment; the company has gone through countless hardships, which makes it one of the toughest competitors in EV industry today. In November, Volkswagen started to massively produce electric vehicle of its own brand dubbed the "ID.3.", aiming to dedicate tens of billions of euros and launching 70 new electrical models by the year 2028 [18].

Despite the impressive influence of those auto industries on EV market, Tesla is still the leading player because of its technological innovations and market control. First of all, Tesla is the founding company to strengthen the self-driving algorithm through machine learning for the EV vehicle as it gathered almost 2 billion miles of data through its autopilot drive-assist feature on EV vehicle. Secondly, Tesla is also the first company to first achieve the production of powerful batteries at lower costs. Lastly, Tesla's EV can travel farther than electrical vehicles built in other industries, for that its Model S can travel as long as 380 miles, which has much further travel range in miles than any of the EV cars [18]. Because of those achievements, Tesla claims its undisputable dominance in EV market, making up almost 60% of electric vehicles sold in the US nowadays. Besides, its stock share has risen by more than 500% in 2020 over the last 12 months. In response to Tesla's global influence, companies such as Nikola, Rivian, Fisker, Byton and Faraday Future will join the competition, hoping to become "the next Tesla" and gaining majority of market control in terms of stocks [19].

## 5. Valuation

### 5.1. P/E and EV/EBITDA Ratios

One of the common metrics to evaluate the relationship between a company's stock price and its earning per share is price-to-earnings (P/E) ratios. A stock's P/E ratio generally indicates the extent to which the investors are willing to pay for every dollar of earnings they have placed on investment. Generally, P/E ratio offers a great insight and understanding to the potential of a stock's growth [20]; the higher the P/E ratio, the higher the expected returns for an investor. However, a stock with high P/E ratio does not necessarily correlate with the expectation of the investment since the stock can be overvalued [21]. While a company's stock price can reflect the value that investors are currently placing on that investment, a stock's P/E ratio indicates how much investors are willing to pay for every dollar of earnings. The market price of a given stock is needed to calculate its P/E ratio, but in many ways, the P/E ratio offers better insight into the stock's growth potential. In this regard, it is important take into considerations of additional valuation metric such as enterprise value to earnings before interest, taxes, depreciation, and amortization ratio (EV/EBITDA) to have a broader understanding on the potential growth of a stock [21].

EV/EBITDA ratio is another valuation metric used to understand a company's financial health and prospect for its future growth. EV/EBITDA ratio compares enterprise value of the company to its earnings before taxes, interest, depreciation and amortization, offering different perspectives and approach to evaluate the value of a company's stock. Similar to that of P/E ratio, lower EV/EBITDA ratio generally implies the stock is undervalued. It is suggested that investors should also use other valuation metrics to analyze a company's potential as an investment because of the limitation of EV/EBITDA ratio [22].

Currently, Tesla Inc. (NASDAQ: TSLA) valuation ratios (PE ratio and EV/EBITDA ratio) is much higher than the aggregate valuation ratios in other automobile industries in EV market. Because of that, shareholders may be inclined to capitalize on the higher share price for higher investment return with the expected investment strategy. As shown in Figure 1, Tesla's valuation metrics (P/E ratio and EBITDA ratios) are between 9 to 23.6 times higher than that of the competitors for each metrics despite those carmakers are selling much more vehicles than Tesla does. For instance, BMW AG, the smallest by market cap, has 6,75680 cars sales in 2020, which is nearly 5 times as many as Tesla's 1,39300.

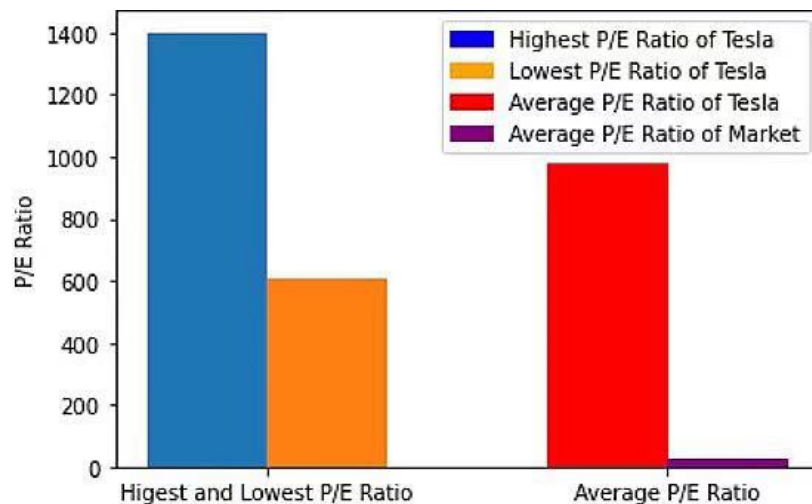


Furthermore, Tesla's stock value is still growing. So, it is clear that Tesla's stock has been overvalued [20]. Table 1 Below presents a valuation statistic of Tesla from July 2020 to November 2020.

**Table 1.** Valuation Statistics from July 2020 to November 2020

Tesla Inc. Valuation Ratios		Toyota Motors Corp. Valuation Ratios		General Motors CO. Valuation Ratios		BMW AG. Valuation Ratios	
P/E Ratio	EV to EBITDA	P/E Ratio	EV to EBITDA	P/E Ratio	EV to EBITDA	P/E Ratio	EV to EBITDA
781.06	99.44	12.90	10.35	33.05	8.961	12.51	11.96

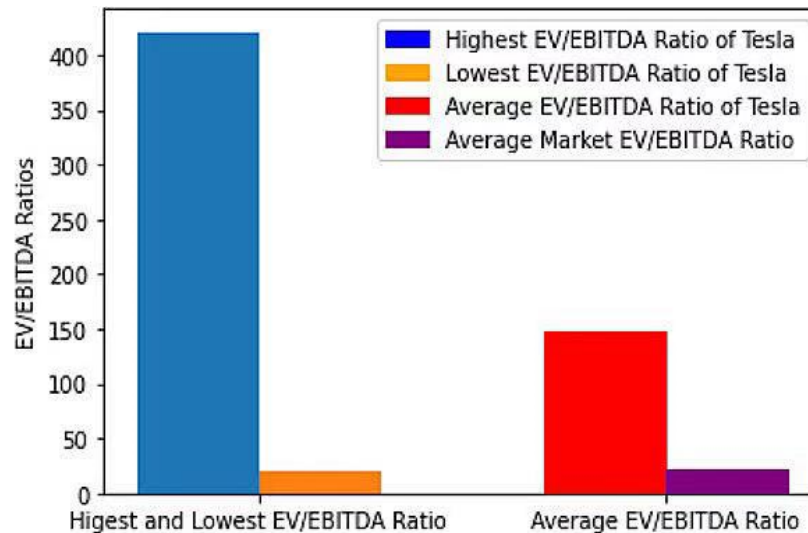
In terms of P/E ratio, Tesla has shown consistent dominance among its peers in auto industries. Tesla has achieved both the highest P/E ratio of 1401.53 and the lowest P/E ratio of 607.39 in 2020. Ever since June 2020, Tesla P/E ratio has increased from 607.39 to 1050.84 at November 2020, making it a leading company in auto industries. Furthermore, Tesla's average P/E ratio of 981.31 is much higher than an industry average of 24.49, which again, asserts Tesla's dominance in market control [23]. However, it is also possible that the stock has been overvalued because of the limitation of P/E ratios in determining the nature of earnings that made up of a company. According to the report from Bromels in 2020, Tesla's valuation P/E ratio is a dozen times higher than that of other competitors in EV industry despite it has much lower sales of electrical vehicles, indicating Tesla's stock is overvalued. Figure 1 below shows descriptive statistic of market and Tesla's P/E ratios from 2013 to 2020:



**Figure 1.** Statistics of market and Tesla's P/E ratios from 2013 to 2020

In terms of EV/EBITDA, Tesla has highest value from 2013 to 2020 in the EV market. The lowest EBITDA value that Tesla has ever reached is 20.84, and the average EBITDA value for Tesla is 148.34 from 2013 to 2020. Since December 2013, Tesla's EBITDA value has decreased from 231.53 to 135.98 on November 2020. Despite such decrease, Tesla's EBITDA value, on average, is still higher than its peers in the auto manufacturers. From December 2013 to November 2020, Tesla has average EBITDA value of 148.34 compared to the industry average of 20.99, suggesting its dominance in auto industry [23]. Again, it is possible that EV/EBITDA ratio inflates the true market value of Tesla stocks price because of the limitation of EV/EBITDA ratio; EV/EBITDA ratio does not take into account of capital

expenditures, which is very important components when calculating EV/EBITDA ratio as well as the non – cash expenses such as depreciation or amortization, which is considered to be less significance than the value of cash flow or available working capitals. Therefore, the use of EV/EBITDA metric can result in inaccurate evaluation of stock's value [22]. Figure 2 below shows descriptive statistics of market and Tesla's EV/EBITDA ratios from 2013 to 2020:



**Figure 2.** Statistics of market and Tesla's EV/EBITDA ratios from 2013 to 2020

### 5.2. DCF Model

The operating cash flow (OCF) will be used as the main cash flow parameter to calculate the discounted cash flow of Tesla since operating cash flow is a sustainable measurement of a firm's financial performance in the long term. The average difference in Tesla's operating cash flow over the past 10 years will be used to approximate its average annual growth rate, which is 74% per year [24]. According to the results from Tesla annual report, the latest Tesla OCF value was 775 million in 2019, making it an optimal option to be used as the starting OCF value for the DCF model. As for the discount rate of DCF model, the current value of Tesla's weight average cost of capital (WACC) will be used, which is 13.85%. Meanwhile, the long-term growth rate of Tesla will be set to 4% by taking the current average of its respective minimum and maximum [25]. Due to the irregularity of Tesla's OCF annual growth rate over the past 10 years, it is hard to determine the projection growth rate of Tesla's OCF in the future. Conservatively, Tesla's OCF will be estimated on a 10-year timeframe ( $n = 10$ ), where its growth rate will be set at 50% in the first 4 years, 40% in the following 3 years and 30% in last 3 years based on the calculation of its annual average growth rate from 2011 – 2019 from Tesla annual report. Lastly, the terminal value of DCF model will be calculated from Tesla's long-term growth rate, projected cash flow at 10<sup>th</sup> year and discount rate of 13.85%, which turns out to be roughly 249.7 billion.

With the Discounted Cash Flow analysis that takes the sum of future earnings at particular terminal value and growth stage, the value of the company turns out to be 102.6 billion USD based on the result of DCF model. As stated before, the overwhelming high OCF value of future earnings of Tesla is not consistent with its low market sales of EV, indicating the market's overoptimistic expectation on Tesla's future growth. Furthermore, the unusual annual average growth rate of 74% over the last 10 years implies that the market value of Tesla is highly overvalued, which results in extreme high stock price. While the discounted cash flow (DCF) model has the most rigorous and financially fruitful implications for business valuation, it does have several limitations: extreme sensitivity of assumptions and the uncertainty when calculating the business' terminal values [26]. In this analysis, the future growth projection of Tesla under the DCF model's assumptions can be affect by factors such as market competition, drawbacks of automatic driving, governmental regulations and policies etc. Those factors can influence the output of

DCF model, embodying the uncertainty and over-sensitive nature of DCF models.

## 6. Conclusion

In conclusion, Tesla continues to develop internationally to accelerate the advent of clean transport and clean energy production around the world. Judging from PEST perspectives, Tesla has received ample supports to expand its global influence. In terms of its stance on market competition and core technologies, Tesla has the edges over its competitors because of its dominant market control and technological innovations. Because of those factors, it is likely that investors will have high expectation on Tesla's future growth, which will inflate Tesla's true market value. Indeed, the results of different valuation methods employed in this paper have indicated the overestimation of Tesla's true market value, suggesting that Tesla's stock price is overvalued. However, because of the limitations presented by different valuation methods, further studies are suggested in order to provide a more accurate evaluation on Tesla's true market value.

## References

- [1] Vynakov, O. F., Savolova, E. V., & Skrynnyk, A. I. (2016). Modern Electric Cars of Tesla Motors Company. Automation of Technological and Business Processes, 8 (2). doi: 10.15673/atbp.v8i2.162.
- [2] Tiwari, Jai Deo. (2017). Marketing Research on Tesla Inc. - Strategic analysis.
- [3] Campbell, Peter. "Tesla Hits Bumps in Pursuit of Mass Market." Financial Times, Financial Times, 3 Nov. 2017, <https://www.ft.com/content/b305aa0a-c011-11e7-9836-b25f8adaa111>.
- [4] Yu Guojun, Shen Yunjia. Enlightenment from "Tesla to China" and "Amazon Retreat" [J]. Zhejiang Economy, 2019 (17): 60.
- [5] "About Tesla: Tesla." Tesla, Inc, [www.tesla.com/about](http://www.tesla.com/about).
- [6] Singh, Abhay. "Electric Vehicle Market Size, Share, Analysis, Growth by 2027." Allied Market Research, April. 2020, [www.alliedmarketresearch.com/electric-vehicle-market](http://www.alliedmarketresearch.com/electric-vehicle-market).
- [7] McKerracher, Colin. "Electric Vehicles and Industrial Policy." The Interpreter, The Interpreter, 20 Aug. 2018, [www.lowyinstitute.org/the-interpreter/electric-vehicles-and-industrial-policy](http://www.lowyinstitute.org/the-interpreter/electric-vehicles-and-industrial-policy).
- [8] Koopman, C. (2013, June 3). Tesla Is No Success Story. Retrieved November 08, 2020, from <https://www.usnews.com/opinion/blogs/economic-intelligence/2013/06/03/teslas-success-is-the-result-of-political-favoritism>
- [9] Gibson, J., & \*, N. (n.d.). The Rise of Tesla Motors and What it means for Economic Development. Retrieved November 09, 2020, from <https://whittakerassociates.com/the-rise-of-tesla-motors-and-what-it-means-for-economic-development/>
- [10] Elias, J. (2018, May 16). Tesla says it helped create more than 50,000 jobs in California in 2017. Retrieved November 08, 2020, from <https://www.bizjournals.com/sanjose/news/2018/05/16/tesla-economic-impact-california-bay-area-jobs.html>
- [11] Schmid, Ashley. 2017. "An Analysis of the Environmental Impact of Electric Vehicles." Missouri S&T's Peer to Peer 1, (2). <https://scholarsmine.mst.edu/peer2peer/vol1/iss2/2>
- [12] Research, Hearst Autos. "Electric Cars: Pros and Cons." Car and Driver, Car and Driver, 10 Nov. 2020, [www.caranddriver.com/research/a32758614/electric-cars-pros-and-cons/](http://www.caranddriver.com/research/a32758614/electric-cars-pros-and-cons/).
- [13] Morris About the Author Guest Contributor is many, Charles. "International Energy Agency: Electric Vehicle Battery Tech Rapidly Improving." CleanTechnica, 10 July 2020, [cleantechnica.com/2020/07/09/international-energy-agency-electric-vehicle-battery-tech-rapidly-improving/](http://cleantechnica.com/2020/07/09/international-energy-agency-electric-vehicle-battery-tech-rapidly-improving/).
- [14] "Lithium-Ion Battery." Wikipedia, Wikimedia Foundation, 12 Nov. 2020, [en.wikipedia.org/wiki/Lithium-ion\\_battery](https://en.wikipedia.org/wiki/Lithium-ion_battery).
- [15] Lebeau, P. (2020, February 10). Tesla's competitors play catch-up on electric batteries. Retrieved November 09, 2020, from <https://www.cnbc.com/2020/02/10/teslas-competitors-play-catch-up-on-electric-batteries.html>



- [16] Srinivasan, Prasanna. "How Electric Vehicles Are Driving Growth of Autonomous Vehicles." LORD Corp, 28 Jan. 2020, [www.lord.com/blog/electronics/how-electric-vehicles-are-driving-growth-of-autonomous-vehicles](http://www.lord.com/blog/electronics/how-electric-vehicles-are-driving-growth-of-autonomous-vehicles).
- [17] Heilweil, R. (2020, February 26). Tesla needs to fix its deadly Autopilot problem. Retrieved November 22, 2020, from <https://www.vox.com/recode/2020/2/26/21154502/tesla-autopilot-fatal-crashes>
- [18] O'Donoghue, Jamie. "Tesla's Competitors: The Other Players in the Electric Vehicle Industry." MyWallSt Blog, MyWallSt Blog, 15 Oct. 2020, [blog.mywallst.com/teslas-competitors/](http://blog.mywallst.com/teslas-competitors/).
- [19] McFarland, Matt, and Peter Valdes-Dapena. "These Electric Car Startups Are Looking to Take on Tesla." CNN, Cable News Network, 16 July 2020, [www.cnn.com/2020/07/16/cars/ev-startups-roundup-tesla-rivian-nikola/index.html](http://www.cnn.com/2020/07/16/cars/ev-startups-roundup-tesla-rivian-nikola/index.html).
- [20] Bromels, J. (2020, November 05). Is Tesla Stock Overvalued? Retrieved November 22, 2020, from <https://www.fool.com/investing/2020/11/05/is-tesla-stock-overvalued/>
- [21] Staff, M. (2016, March 18). What Is the Relationship Between P/E Ratio and Stock Price? Retrieved November 22, 2020, from <https://www.fool.com/knowledge-center/the-relationship-between-pe-ratio-and-stock-price.aspx>
- [22] Maverick, J. (2020, August 29). How Can EV/EBITDA Be Used in Conjunction With the Price to Earnings (P/E) Ratio? Retrieved November 22, 2020, from <https://www.investopedia.com/ask/answers/072915/how-can-evebitda-be-used-conjunction-pe-ratio.asp>
- [23] Tesla Inc Financial Ratios. (n.d.). Retrieved November 22, 2020, from <https://www.discoverci.com/companies/TSLA/financial-ratios>
- [24] Tesla, Inc. (TSLA) Cash Flow. (2020, December 20). Retrieved December 20, 2020, from <https://finance.yahoo.com/quote/TSLA/cash-flow/>
- [25] Tesla, Inc. (n.d.). Retrieved December 20, 2020, from <https://finbox.com/NASDAQGS:TSLA/models/dcf-growth-exit-10yr>
- [26] Jones, A. (2018, January 02). Limitations of Discounted Cash Flow Valuation Models. Retrieved November 29, 2020, from <https://blog.privateequityinfo.com/index.php/2018/01/02/limitations-of-discounted-cash-flow-valuation-models/>

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