TALLINN UNIVERSITY OF TECHNOLOGY
School of Business and Governance
Department of Economics and Finance

Oliver Arthur Kikkas

FINANCIAL PERFORMANCE ASSESSMENT OF TESLA, INC. AND NISSAN MOTOR COMPANY

Bachelor's thesis
International Business Administration, Finance & Accounting

Supervisor: Kalle Ahi, MA

Tallinn 2020

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Oliver Arthur Kikkas ……

(signature, date)

Student code: 164942TVTB

Student e-mail address: olkikk@taltech.ee

Supervisor: Kalle Ahi, MA:

The paper conforms to requirements in force

……

(signature, date)

Chairman of the Defence Committee:

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ABSTRACT

Tesla, Inc. is perhaps the most well-known electric car manufacturer at the time of writing, having developed a strong following in its relatively short existence due in part to its more advanced technology as well as its forward-looking vision. This has caused industry-leading automobile manufacturers to react in response to Tesla, Inc's technological advantage, introducing rapid development and competition within the electric car segment of the automobile industry.

This thesis compares the financial performance of Tesla, Inc. to Nissan Motor Company, whose top-selling electric car model and globally the most well-selling electric car to date, the LEAF, is a competitor to Tesla's recently-released Model 3, the least expensive model Tesla has to offer at the time of writing. Comparative financial statement analysis will be used by analysing and comparing five types of financial ratios and Altman's Z-score, as well as conducting vertical and horizontal analysis of the balance sheets and income statements of both companies during the years 2015 to 2018.

The findings suggest that despite significant, five-fold revenue growth during the four-year period, Tesla, Inc. remains in poor financial condition in comparison to Nissan Motor Company due to large production-related investments and R&D efforts as part of its rapid path of growth in an effort to maintain its technological lead in the electric car segment. Tesla was able to achieve its first profitable quarter during that period in Q4 of 2018, followed by a profitable Q3 in 2019.

Keywords: financial ratio analysis, financial ratio, electric car industry

INTRODUCTION

The automobile manufacturing industry is one with a high barrier to entry both in terms of competition and capital requirement - taking into consideration most household names in the car industry were founded in the late 19th and early 20th century, it is somewhat surprising for Tesla to have come as far as it has in its, speaking in relative terms, short existence as a car manufacturer. It has offered competition and, by association, driven developmental progress within the industry when it comes to both drivetrain and battery cell technology, the latter benefitting from its partnership with Panasonic Corporation, prompting market leaders like Nissan Motor Company, Daimler AG and Volkswagen Group to develop battery electric vehicles (BEVs) and their supporting charging infrastructure of their own.

The primary reason behind choosing Tesla, Inc. and Nissan Motor Company as the two companies to compare is the fact Nissan's most well-selling electric car, the Leaf, is the best-selling electric-powered car worldwide and as such, a direct competitor to the recently released Tesla Model 3, which is the least expensive and the most mass adoption-directed car model Tesla, Inc. has to offer at the time of writing. Furthermore, the car manufacturing industry is one with a known high barrier to entry (due in part to its capital intensity) and Tesla has, thus far, managed to outperform the expectation of becoming another failed venture in the industry while simultaneously developing mould-breaking technologies and supportive infrastructure as well as offering considerable competition to the already long-standing manufacturers through rapid development cycles.

Data from 2015 to 2018 will be compared so as to involve reasonable amounts of data in the comparison itself - additionally, the time period chosen was partly influenced by the Volkswagen emissions scandal that occurred in late 2015, a turbulent period passenger car manufacturing industry as it lead to consumer distrust towards fossil fuel-powered vehicles and helped bring further attention to alternative fuel-powered vehicles, including battery-electric vehicles (BEVs).

The goal of this thesis is to evaluate and compare the financial performance of Tesla, Inc. to Nissan Motor Company through the use of financial ratios along in addition to vertical and horizontal analysis of their annual financial data.

The thesis centers around the two main aspects: comparing a new car manufacturer in a new segment of its market to an established car manufacturer in the process of transitioning into that segment, and determining whether Tesla's strategy of growth is risky enough to cause it to go bankrupt. The analysis will be performed by means of comparative financial statement analysis, with five types of financial ratio analysis as well as vertical and horizontal analysis of both companies' balance sheets and income statements throughout the years 2015 to 2018 being used as the basis for analysis.

As financial ratios combine multiple sources of data into a single number, the context of the source information may be lost in translation, requiring further, more in-depth analysis - also, reliable and comprehensive industry-specific ratio norms on a global scale are not readily available with regards to automobile manufacturing. As such, use of industry average ratios will be explicitly mentioned in the subchapters of Chapter 3.

While Nissan Motor Company's LEAF model is a leader in electric car sales and is thus a competitor to Tesla, Inc. in this particular vehicle market segment, it also produces regular fossil fuel-powered cars - i.e. its revenue is not derived primarily from electric nor hybrid vehicle sales and their supportive infrastructure as is the case with Tesla. Furthermore, it must be considered that unlike Tesla's fiscal year, which ends in December, Nissan's fiscal year ends in March and as such, a nine-month shift exists between the two company's fiscal years – to further add, car sales are seasonal, peaking in spring months (Federal Reserve 2018). Being a long-standing manufacturer, Nissan benefits from having multiple manufacturing plants globally in addition to having supply chains already in place, amongst other factors.

The structure of the thesis consists of three main chapters - the overview of financial statement analysis, the overview of the market the two companies are in as well as of the two companies themselves and lastly, the financial analysis itself along with suggestions derived from the analysis. The first chapter describes the analysis methods that will be used in conducting further analysis, describing in detail the ratios, Altman's Z-score formula as well as vertical and horizontal analysis methods. The second chapter provides a brief overview of the electric car industry and a

description of the driving forces behind electric car adaptation, along with descriptions of both companies and lastly, the third chapter describes the results of the conducted analysis as well as possible explanations of the causes behind the results, outlining the conclusive results of the analysis and suggestions.

The author would like to thank his closest friend for providing the basis for the idea, the supervisor of this thesis for supportive ideas and improvements and additionally, friends from university for providing continuous motivation while writing this thesis.

1. FINANCIAL STATEMENT ANALYSIS OVERVIEW

This chapter will provide an overview of various methods applied in the analysis of the financial data used in this thesis.

The aim of conducting financial analysis is to determine the performance of a company relative to its goals and market strategy (Palepu and Healy 2013). Depending on the role of the party performing the analysis, the need for financial analysis is driven by the need for clarification before a decision is made - for example, a credit institution has interest in the extent to which additional debt obligations affect the operations of a company to determine a level of risk, while the management of a company may want to conduct analysis of their competitors to determine their strengths and weaknesses. The differences in accounting principles, causing differences regarding inventories, depreciation and write-offs, as well as other aspects such as unanticipated changes in balance sheet or income statement items, similarly constitute the need for analysis. Financial statements that have been audited are to be used in such analysis as they are reviewed and approved by an auditor who by definition is a trustworthy party independent of the management of a company, which consequently adds to the credibility and the validity of the published financial data as such statements for publicly traded companies are required by regulatory authorities on an annual basis. Audited financial data can be usually obtained from the companies' own websites, as well as stock exchange websites and public databases such as Nasdaq or Morningstar.

1.1. Financial Ratios

Financial ratios can be used to time-efficiently determine the performance of a company as they provide a meaningful way to study the relationships by combining two or more financial figures into one (Ross et al. 2013). In terms of financial ratios, they can be expressed as a percentage, a product of division or as a proportion of another figure. Ratio analysis enables the user to compare data throughout several years, compare the analysed company to another company operating in

the same industry or compare the data to an absolute benchmark (Palepu and Healy 2013) and is, by design, meant to "facilitate comparisons by eliminating size differences across firms and over time (White et al. 1997). A more in-depth table including the underlying formulas for the subsequent ratios used in this thesis can be found in Appendix 7.

The relevance and usage of a financial ratio highly depends on the role of the user in question - for example, to a creditor, it is of relevance that the enterprise in question has the capacity to meet their potential debt obligations, whereas an investor would utilize ratios so as to determine, with some degree of accuracy, the value of a given company presently or at some point in time in the future - the management board of a company, however, is interested in both of the aforementioned qualities as it serves in their own best interest that investors as well as creditors are both content in order for the company to obtain capital at the best possible terms available (Tugas 2012). Taking the aforementioned aspects into account, it is noteworthy to mention that there is no so-called "officially agreed-upon by a regulatory body" way to calculate financial ratios, which can, in some instances with no additional clarification, lead to confusion (Ross et al. 2013). As such, before comparisons can be drawn between companies and their ratios, it is of importance to know the source formulas of the ratios being compared. One of the primary advantages of ratio analysis is the ability to draw comparisons regarding risk and return between firms of different sizes operating within the same industry (White et al. 1997).

Furthermore, ratios on their own may not paint a clear picture of a company's financial state as, for example, they can be affected by the seasonality of the industry (requiring a closer look at quarterly data as opposed to annual) as well as by the company conducting business activities in different industries simultaneously (rendering comparisons to industry average figures somewhat illogical). As a consequence, it is worthy to keep in mind that extreme accuracy is not to be chased after in calculations of financial ratios and additionally, that only appropriate and reasonable ratios that are suitable relative to the company's activities are to be applied in such analysis (Brookson 2001). Furthermore, as noted by White et al. (1997), due to the aforementioned factors in this paragraph, the integrated use of ratios is required, for example, alongside the discounted cash flow valuation method. This is especially true in relation to ratios relying on the price of the company's stock as from a behavioural standpoint, investors do not always act in a rational way, i.e. act based on and derive decisions from logical conclusions. An example of this is seen in Figure 7 on page 25 of this thesis, in the EV/EBITDA ratio values for Tesla, Inc – between FY2016 and 2017, its value swung, in absolute terms, over 6.5-fold into the negative due to a 46% increase in its stock

price despite a near 11% reduction in equity year-over-year and EBITDA falling by $502 million to $-102 million.

As for the classification of financial ratios, there are several categories by which they can be categorised. As stated by Ross et al. (2013), they can be largely categorised into five categories - leverage, liquidity, profitability, market value and turnover ratios. These categories shall be used moving forward.

1.1.1. Leverage ratios

Leverage ratios are an indication of the amount of borrowed capital used relative to equity. Excessive use of leverage puts the company at risk of being unable to service their debt - using leverage, profitability can be increased during economic upswings, but such debt obligations might a burden during an economic downturn and is thus a "double-edged sword, increasing profits during good times but compounding losses during bad times" (Horngren and Harrison 2007).

To compare leverage between the two companies, three ratios will be used - the cash coverage ratio, the total debt ratio and the debt-to-equity ratio. The former represents a company's ability to cover its annual interest expense, while the second ratio represents how much debt the company has per one currency unit of invested equity - the last ratio depicts the proportion of debt that comprises its assets.

The cash coverage ratio indicates the amount of times the company has cash to cover its interest expenses, should it need to do so immediately. Though depreciation and amortisation are, on occasion, excluded in some sources, Ross et al (2013) notes that excluding those two aspects would be incorrect as they are both non-cash expenses and would consequently present an incorrect view.

The total debt ratio depicts the proportion of a company's assets that is debt - the higher the ratio, the more leveraged the company is.

The debt-to-equity ratio is indicative of the multiple of times that a company has debt in comparison to its own funds - consequently, it is also a measure of risk as the higher value it is, the more debt-related risk is involved.

1.1.2. Liquidity ratios

Liquidity refers to the company's ability to service its short-term financial debt. To provide an overview of liquidity, the current ratio, the quick ratio and the cash ratio will be used.

As current assets and current liabilities are comparable in terms of their duration, the current ratio can be considered as a significant factor in determining short-term liquidity (Palepu and Healy 2013) - though in some regards, the quick ratio could be considered a more accurate measure in comparison as inventory, which is part of current assets, may not always be liquidated at once. Neither are not without their flaws, though - in the instance that cash is borrowed for longer than one year, current assets would increase while current liabilities would not, which would result in an effectively inflated figure and as such, it would be worthwhile to take a closer look at leverage ratios to obtain a more complete picture. The cash ratio is indicative of the amount of cash per every currency unit of current liabilities the company owns.

1.1.3. Profitability ratios

Profitability ratios indicate "the ability of a firm to generate revenues in excess of expenses relative to the capital used" (Lehtinen 1996), or, in broader terms, are interpreted as earnings relative to the company's resources which have been invested in their activities - as the primary interest of shareholders is the return on their invested capital, these ratios are a highly important part of financial statement analysis (Salmi et al. 1990). As mentioned by Cornell and Damodaran (2014), the riskier the business or the environment itself is, the higher the cost of equity and capital and thus the lower the profitability of a company should be. Likewise, return on capital can alternatively be seen as an indicator of productivity from a managerial success standpoint (Salmi et al. 1990).

For profitability comparison, two profitability ratios will be used for comparative analysis - return on equity (ROE) and net profit margin (NPM).

ROE is a representation of overall profitability of the company - in simpler terms, it can be thought of as the amount that is earned per one currency unit of equity. Due to different industry-to-industry norms, returns consequently vary, too - furthermore, the usage of leverage affects ROE where, the more leverage is utilised, the less equity company has and so the higher ROE appears to be, which in reality may point to additional risk regarding debt and lead to false conclusions.

NPM is a representation of the company's ability to generate profit relative to sales, less expenses - to draw similarities between the example mentioned in the previous subchapter, net profit margin can be thought of as the amount of money the company is left with after expenses have been deducted, relative to one currency unit of sales. As is the case with all profitability ratios, the higher the figure, the better.

1.1.4. Turnover ratios

Turnover ratios are indicative of a firm's usage of its assets as they are descriptive of the extent to which a company uses its assets in terms of efficiency and usage intensity (Ross et al. 2013) - a low sales-to-assets figure would be symptomatic of room to improve the utilisation of assets to generate sales, for instance. As turnover ratios provide an overview of past managerial efficiency, future efficiency can be predicted on a reasonable basis (Glauntier and Underdown 1995). Such ratios also vary greatly based on the nature of the industry - a good case in point is the very industry under examination - automobile manufacturing, a capital-intensive industry where such ratios would be considerably lower to those of service-based industries. An asset-turnover and a receivables-turnover ratio will be included in the analysis.

The total asset turnover ratio used in the thesis represents the value of sales made per one currency unit worth of the company's total assets, i.e. how many currency units worth of sales a company can generate per one CU of its assets. The receivables turnover ratio is representative of the multiple of times that the sum of accounts receivable is loaned out to a company's clients or customers, or alternatively, how many times per year the company collects its amount of receivables. When dividing 365 by the latter ratio value, the answer indicates the average amount of days the company is owed money to for the sales it has made but not received money for.

1.1.5. Market value ratios

Market value ratios are useful in determining the valuation level of a given firm, i.e. whether it is fairly, over- or undervalued. Because the value of any company is of importance, it is a point of interest to parties like shareholders and the firm's own management for ROI as well as public perception reasons. Such ratios may not be applicable in all instances as private companies lack a market value due to not being traded on the stock market. The choice of ratios may further be

limited assuming the inclusion a company's annual earnings in the formula as the use of negative earnings would result in a nonsensical ratio value.

The market-to-book ratio is also known as the "P/B ratio", "P/B" standing for "price-to-book". It is indicative of the multiple of times of the market's willingness to pay for a share of a company in comparison to the company's share price as per its own book value.

In this instance, the book value is represented by result of dividing the total equity of the company by the average number of outstanding common stock. In the case of both Tesla, Inc. and Nissan Motor Company, neither has outstanding preferred stock and thus will not be included in the calculations. Historical price data from Nasdaq and Yahoo Finance will be used as a basis for calculating the market value of both companies, respectively.

The Enterprise Value EV/EBITDA ratio is well-known valuation ratio. As defined by Damodaran (2018), it is a measure of a company's market value of assets against the cash flow generated by those assets before tax obligations and other expenses. As is the case with the other mentioned ratios, there is not a clearly defined range in which a company is over-,under- or fairly valued as it varies from industry to industry, meaning for comparative value analysis purposes, the author will rely on the global Auto & Truck industry average ratio values for FY2017 previously calculated by Damodaran (2018), encompassing 133 manufacturers.

1.2. Failure prediction

In an empirical analysis performed by Glautier and Underdown (1995), it was found that, by utilising financial ratio analysis, companies with a higher likelihood of failure could be differentiated from financially healthy companies with an accuracy rate above that of a random prediction, no less than five years before the actual bankruptcy - though it is notable that "the ability of ratios alone to predict corporate collapse has not been conclusively proved" and thus should not form a single basis for analysis, but rather be used in combination with additional and/or supplemental financial analysis data so as to reach a conclusive verdict. The principle of permanent factors being the cause of business failure was also suggested in the same analysis - furthermore, an inverse relationship existed between the accuracy of the bankruptcy prediction and the age of the source data used where, the older the data was, the less accurate the prediction became - in this

particular instance, the initial 95% accuracy rate based on financial data from the prior year dropped to 72% when data from two years before had been used.

Altman's Z-score is a comprehensive way of gauging the bankruptcy risk of a company, or more broadly, determining a company's financial state of health. It is named after Edward Altman by whom it was developed in the late 1960s (Altman et al. 2016). The Z-score is based on the principle of combining multiple variables, financial ratios in this instance, into one on a weighted basis. As found by Eidleman (1995) and Altman et al. (2016), the Z-score is accurate in approximately 75% of instances and thus makes for a reasonable basis for evaluation. There are three primary formula versions of Altman's Z-score - for public, private and non-manufacturing companies. As both of the companies to be analysed are publicly listed companies, the Z-score formula for public companies shall be used. The other two versions take into consideration X_4 listed below, where the market value of equity is substituted with the book value of equity, and X_5, which for non-manufacturing companies is eliminated entirely due to lesser capital intensity, respectively - moreover, different weights are applied accordingly for all three versions (Eidleman 1995).

The formula for Altman's Z-score is:

$$\boldsymbol{Z = 1.2 \times X_1 + 1.4 \times X_2 + 3.3 \times X_3 + 0.6 \times X_4 + 0.999 \times X_5} \quad (1)$$

where

Z – index result,
X_1 – working capital/total assets,
X_2 – retained earnings/total assets,
X_3 – EBIT/total assets,
X_4 – market value of equity/book value of total liabilities,
X_5 – sales/total assets.

Source: Altman (2000)

Altman defined three ranges for the Z-score - for the version of the formula adjusted for publicly traded manufacturing companies, the ranges are:

High risk of bankruptcy: <1.81

Zone-of-ignorance: 1.81 to 2.99

Non-bankrupt: >2.99

Source: Eidleman (1995)

A considerable aspect of the Z-score is X_4 as indicated above - more specifically, the market value of equity in the numerator of this ratio. Assuming irrational behaviour in the stock market, the Z-score would be artificially inflated by a market cap value that does not correspond to reality.

1.3. Vertical and horizontal analysis

Vertical analysis is a method of analysing the financial data of a company where each of the balance sheet or income statement items is calculated as a proportion of assets as well as total liabilities and owner's equity, or as a proportion of net sales, respectively. As opposed to horizontal analysis in which data from one year is compared to the year prior, vertical analysis is constrained to a given year and enables companies of different sizes to be compared as figures are compared to a respective common base figure, resulting in a percentage value.

In terms of the income statement, vertical analysis depicts what percentage of net sales goes towards costs, expenses, depreciation and more, while vertical analysis of a balance sheet indicates, for example, the proportion of cash to total assets or short-term liabilities to total liabilities and owner's equity. This, for example, enables the end user to see what percentage of a company's assets is comprised of its inventory or what percentage of sales goes towards servicing debt.

Vertical analysis be effectively used when comparing two companies of different sizes operating in the same industry as it useful in "comparing companies with each other for a particular time period or comparing a company with industry or sector data" (Robinson et al. 2015).

Horizontal analysis is method of analysing the financial data of a company where the difference between the current and previous year figures of a balance sheet or income statement item is found and, in addition, divided by the previous year's figure to determine the percentage by which the item in question has grown or declined compared to the year prior (Robinson et al. 2015). Horizontal analysis is advantageous in the context of potential year-to-year correlations and changes between, for example, sales and cost of goods sold or interest-bearing liabilities and interest expense.

An additional method of conducting horizontal analysis is by way of trend analysis where a base year is chosen, commonly the first year of a given period, and subsequent years are compared by dividing the following year with the base year chosen to get a percentage figure. As opposed to the previously described method of horizontal analysis which presents a percentage of growth compared to the previous year, trend analysis essentially shows the multiple of times a balance sheet or income statement item has grown in comparison to the base year.

2. OVERVIEW OF THE ELECTRIC CAR PRODUCTION INDUSTRY

This chapter will provide an overview of the electric car production industry as well as of the two subject companies of the thesis.

2.1 Industry overview

According to the 2018 Global Electric Vehicle Outlook report compiled by the International Energy Agency (IEA), global electric car sales totalled 1.1 million, a 54% increase compared to the previous year, with China being the largest customer market by sales volume with 580,000 electric cars sold. In terms of the market share of electric cars, Norway is the leader with 39% of all new registered vehicles being electric in 2017, with countries like The Netherlands and Denmark similarly having an above-average market share of electric vehicles (IEA 2018).

When compared to annual automobile production figures made available by OICA, it becomes evident that relative to total annual production figures, electric-powered vehicle sales make up a relatively small proportion. This can be put down to most electric vehicles (EVs) typically commanding a premium over vehicles powered by internal combustion engines due to increased research and development expenses and higher overall production costs. That said, the recent fundamental shifts in the car business have, too, been recognised by the Chair of the Board of Directors of Nissan as detailed in the annual report for FY2018. Factors such as the lack of charging infrastructure, range anxiety, long charging times and lifestyle incompatibilities are also to be taken into consideration, which are mostly, if not all, a limitation of the currently available, production-ready technology.

With the global electric vehicle stock surpassing the five million mark in 2018, up 63% from 2017 (IEA 2019), it is reasonable to assume the mentioned obstacles will be resolved in the near future

as adaptation of electric vehicles grows and the cost of the most expensive component in any electric vehicle at the time of writing, the battery, lowers as more and more such vehicles are produced and as solid state battery technology makes its way into production vehicles in the coming decade. According to a report compiled by Deloitte (2019), the estimated "tipping point" of an electric vehicle's ownership cost equalising with its present counterpart will arrive in 2022 – on average, every 22th car sold in China in 2018 was electric, while in Europe and in the US, that figure stood at around one in 41 (IEA 2019).

To help speed up the adaptation of electric cars, it likely comes as no surprise that in countries with the highest volume or market share of electric car sales, government-supported incentives and tax breaks related to car ownership are coincidentally offered - in the United States, for example, a federal tax credit is available for every electric car sold, while in Norway, numerous incentives have been made available for the 230,000 registered BEVs in an effort to pivot away from non-zero emission vehicles – they are exempt from import taxes and annual road taxes, 25% VAT upon purchase is waived and the use of bus lanes has been made available for EVs, too, amongst other incentives. The Norwegian Parliament has furthermore set the goal of having every vehicle sold in the country be a zero-emission (i.e. powered by electricity or hydrogen) vehicle by the year 2025 (Norwegian Electric Vehicle Association 2019). Incentives such as tax breaks or free land are often offered to manufacturers, too, in hopes of boosting the local economy through newly-created jobs and trade – Tesla, for example, received free land for its first Gigafactory location in Nevada while Rivian, a smaller American electric vehicle manufacturer, received tax breaks from the state of Illinois, contingent on meeting employment and investment quotas (Bushey 2019).

2.2. Overview of Tesla, Inc. and Nissan Motor Company

Tesla, Inc., named Tesla Motors at the time of founding, was founded in 2003, making it a new car manufacturer in relative terms when considering the market leaders were founded in the late 19th of early 20th century. As at the end of 2018, it had a market cap of 44 billion USD and employed 48,817 full-time employees (Yahoo Finance 2019). As a result of their partnership with Panasonic in co-developing and manufacturing battery cells, Tesla has a key advantage when it comes to vehicle range compared to other manufacturers – the ability to offer its few models with

vastly varying degrees of performance at different price levels, enabling to cater to a much wider customer base than its competition despite a small product portfolio. To demonstrate an example of this – at the time of writing, the least expensive trim level of the Model 3, the Standard Range Plus, with a maximum range of 409 kilometres, starts from a price of 39,500 euros - the least expensive Nissan Leaf in comparison starts from 35,800 euros, but also has only 66% of the Model 3's range and inferior performance. The closest equivalent trim level of the Leaf in terms of range, however, starts from 43,600 euros – some 10% more expensive (Nissan 2019). The company also benefits from selling directly to the consumer as opposed to sales flowing through manufacturer-approved dealerships – a unique approach in this industry and from another perspective, a necessary measure from Tesla's perspective to help retain a higher margin on sales and build brand loyalty. In relation to the latter, the company has been able to cultivate a following through its technological achievements and marketing strategies that is unlike that of other car brands, ranging from out-of-the-box car model designs to media events that are more akin to game console reveal events than showing off a design concept mock-up at an international car show - all of which has helped Tesla build the brand image and loyalty that it has today.

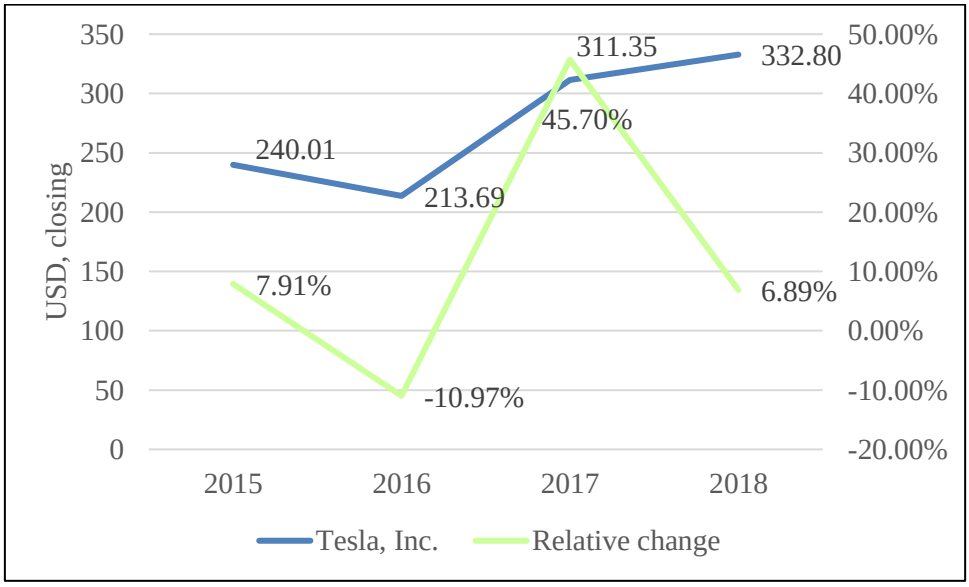

Figure 1. Closing stock price of Tesla, Inc. at the last trading day of each respective fiscal year and its relative change from the previous years' respective trading days
Source: Nasdaq (2019)

Nissan Motor Company was founded in 1933, some 80 years earlier, making it an experienced automobile manufacturer in the industry. As at the end of FY2018, it had a market cap of 40.6 billion USD and employed 138,910 full-time employees (Yahoo Finance 2019) with a production volume nearing 6 million vehicles in 2017, which is the equivalent of 6 percent of the global annual

vehicle production for the year as shown in Table 1. Nissan made investments into electric car development early as a response to Tesla, being one of the first to do so (Wesoff 2011), paving the way for the LEAF. The company furthermore benefits from multiple manufacturing facilities in Asia, Europe and America, as well as from the joint alliance venture with Renault and Mitsubishi, allowing for lower total production costs (through shared parts and architecture platforms) and quicker production development and rollout as opposed to Tesla.

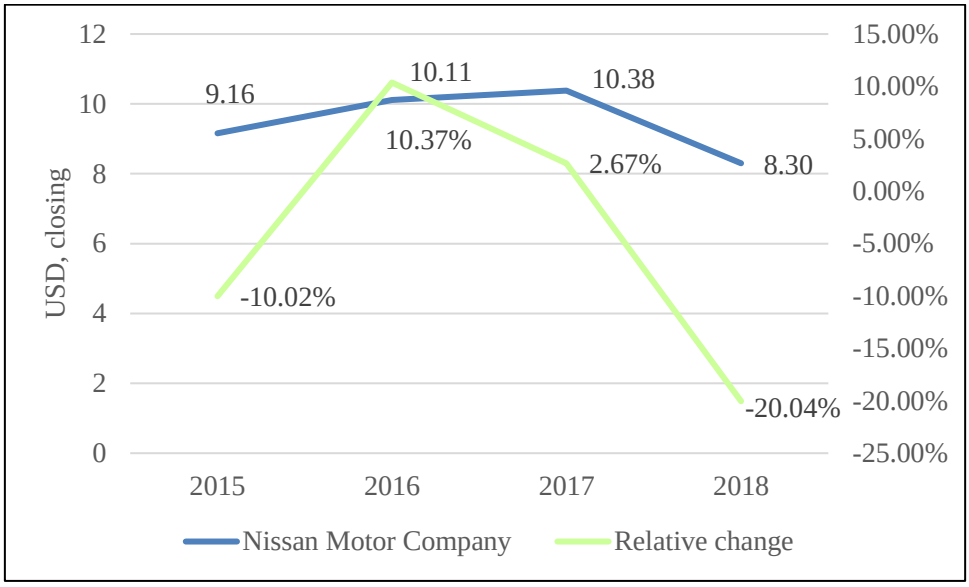

Figure 2. Closing stock price of Nissan Motor Company at the last trading day of each respective fiscal year and its relative change from the previous years' respective trading days
Source: Nasdaq (2019)

Table 1. Annual production output of Nissan and Tesla compared to worldwide output, 2015-2017 (units)

	2015	2016	2017
Nissan	5,170,174	5,556,241	5,769,277
Tesla	50,580	83,922	101,027
Total production (units)	90,086,346	94,020,883	96,922,080
Respective share of total production	5.74%; 0.06%	5.91%; 0,09%	5.95%; 0.10%

Source: Tesla (2016), OICA (2019), author's calculations

3. FINANCIAL ANALYSIS OF TESLA, INC. AND NISSAN MOTOR COMPANY

In this chapter, the results of the financial data analysis are presented. The exact results can be seen in Appendices 5 and 6.

3.1. Comparative ratio analysis

Leverage ratios

As can be seen from Nissan's balance sheet in Appendix 3, due to having very small interest expenses in comparison to Tesla, Nissan is in a far better position to cover its interest-related expenses. The large jump between 2016 and 2017 for Nissan is primarily caused due to a sharply-increased cash balance.

Nissan's liabilities compared to assets has remained stable throughout the studied period, depicted in Figure 3 below, and are more favourable overall. The drop in this ratio with regard to Tesla in 2015 was due to a sharper increase in assets than liabilities as seen in Appendix 1, notably in contributions to PP&E in an effort to prepare for the production of the Model 3.

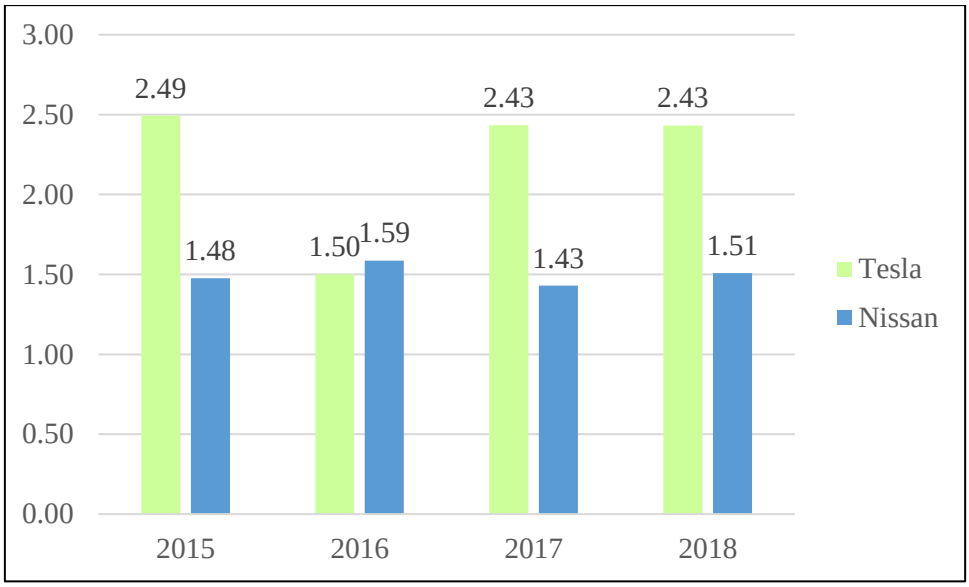

Figure 3. Debt-to-equity ratio values of Tesla, Inc. and Nissan Motor Company
Source: Author's calculations

Similarly to the previous ratio, Nissan is in a more favourable position as it utilises far less debt relative to its own equity, meaning lesser risk and reliance on external funding.

Liquidity ratios

When it comes to the current and quick ratio, Nissan is, similarly, in a significantly more favourable position in comparison to Tesla. It also becomes evident that, as the difference between the two ratios is the subtraction of inventory in the latter ratio, Nissan is anywhere from two to three times as liquid in the short-term, seen in Figure 4, with Tesla having just around half a dollar of current assets per current liabilities.

The exclusion of Tesla's inventory from its ratio calculations also has a more significant impact compared to Nissan, the difference being between 0.30 to 0.40 as opposed to 0.20 in Nissan's instance, meaning Tesla is operating on a lean basis and in a constant need for working capital. With the exception of 2016 in Tesla's case, the liquidity of both companies has generally remained at a similar level throughout the four years.

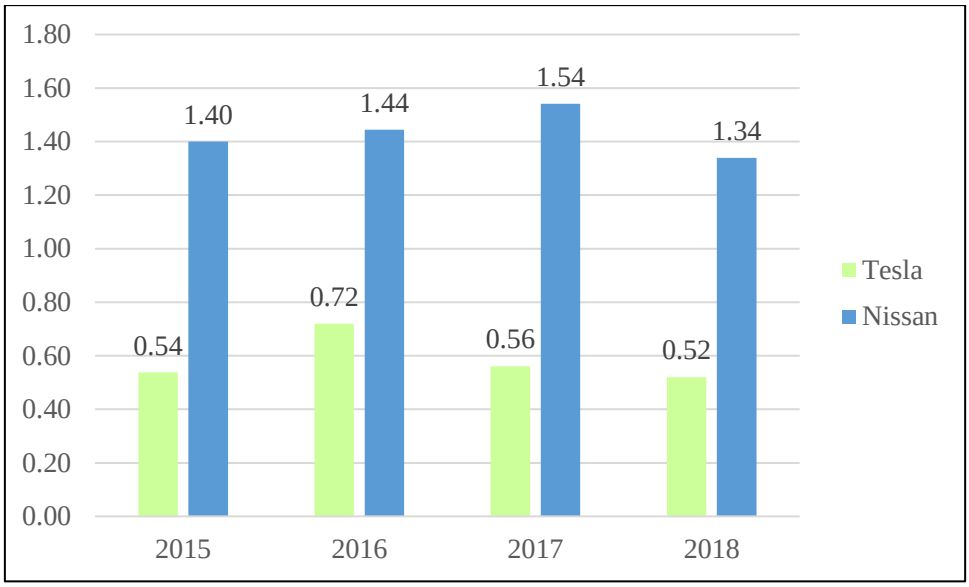

Figure 4. Quick ratio values of Tesla, Inc. and Nissan Motor Company
Source: Author's calculations

Throughout the four-year period, Tesla has had anywhere from two to over four times the cash at hand to cover its current liabilities. While this fluctuation could be seen as a positive aspect, it could also be indicative of having to constantly service debt, which, in reality, is the case with Tesla.

Profitability ratios

As shown in Appendices 5 and 6, Tesla uses significant leverage and at the same time, has significant expenses, it's understandable that its return on equity is negative - while showing a trend of improvement from 2015 to 2018, such a deeply negative return is not a hopeful indication. Its counterpart, however, has maintained a steady ROE growth of approximately 2% per year. Considering the average 2017 ROE of 10.38% in the Auto & Truck industry, Nissan had been above the average three times, except in 2018 when its return on equity was 6.02%.

Both companies display a trend of improvement in this case, with Tesla's margin improvements being the more substantial ones in this comparison. Compared to the 2017 global Auto & Truck industry average net profit margin of 4.76% (Damodaran 2018), Nissan managed to beat the average twice, with its net profit margin growing by over two percent over three years, impacted in 2018 by loss of sales in the US as well as Europe due to an aging product portfolio and ever-stricter emission policies (Nissan 2018).

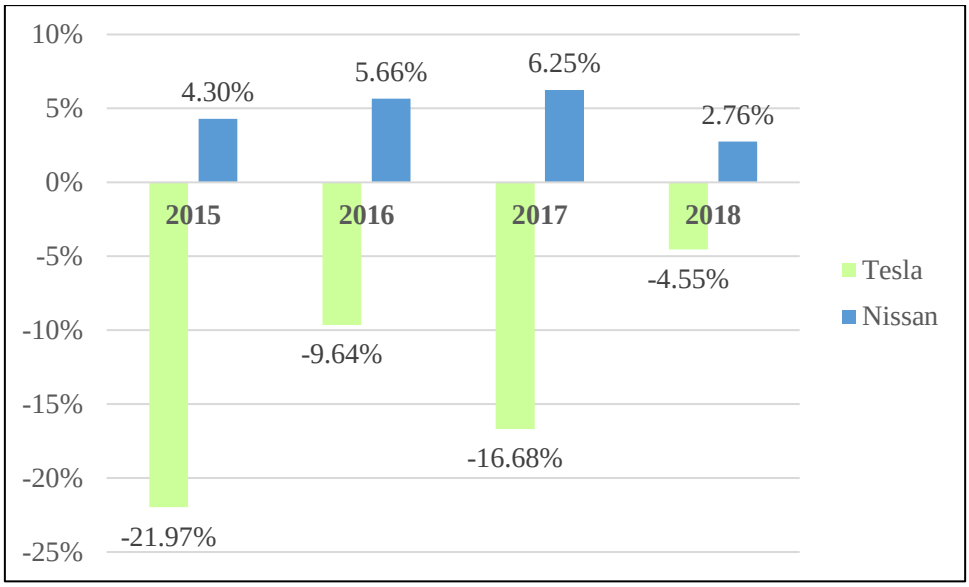

Figure 5. Annual net profit margin values of Tesla, Inc. and Nissan Motor Company
Source: Author's calculations

Turnover ratios

As far as turnover ratios are concerned, in 2018, Tesla was able to utilise its assets, in relative terms, eight percentage points more than Nissan, with significant improvements made from the beginning of 2015. Nissan has, meanwhile, maintained its efficiency over the past two years with <10% fluctuations.

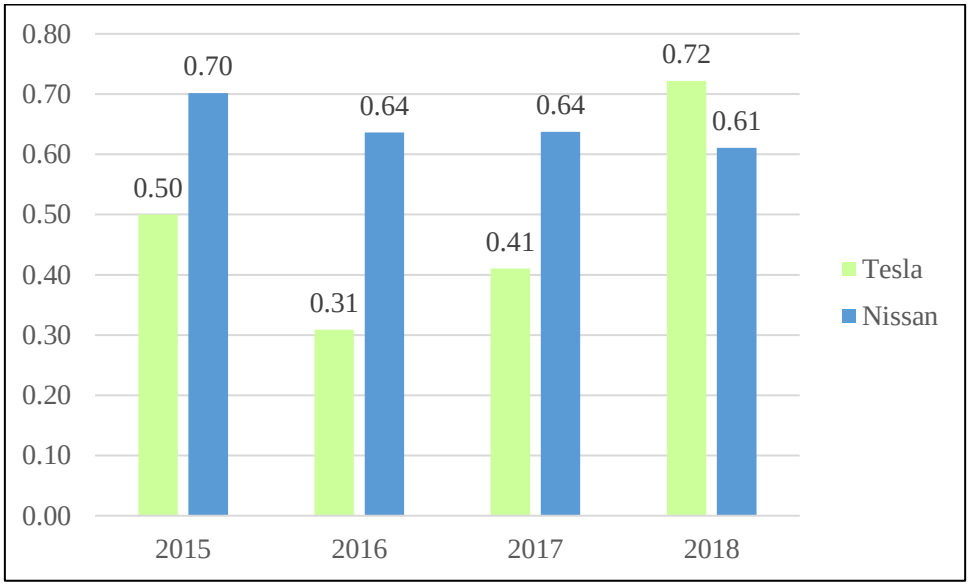

Figure 6. Total asset turnover ratio values of Tesla, Inc. and Nissan Motor Company
Source: Author's calculations

In terms of receivables, Tesla is far more efficient in collecting sales from its customers, collecting on its receivables in an average of just 16 days in 2018, compared to Nissan's 23 days - a 40%

difference relative to Tesla - though it can be argued that it is vital for Tesla to collect on its sales that much quicker so as to maintain its lean operations.

Market value ratios

Regarding Tesla's market value, it is difficult to argue against the company being overvalued to an extent when its constant losses and negative returns are taken into account, especially considering its market cap doubling between 2016 and 2017 - an indication of severe volatility, likely a result of speculative and irrational trading behaviour. On the contrary, by the same metric, Nissan is what would be considered as rather undervalued, seemingly in part due to investor inconfidence stemming from the company's position within the alliance with Renault and the continued public uncertainty, which is a result of the prosecution of its previous CEO over financial misconduct related to misuse of the company's assets and underreporting of income (Tacken 2019).

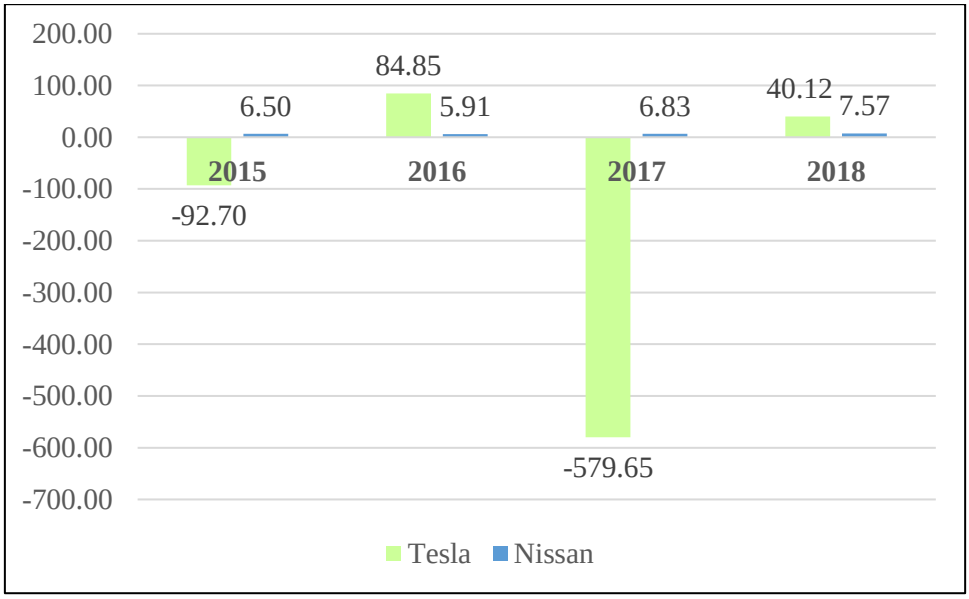

Figure 7. EV/EBITDA ratio values of Tesla, Inc. and Nissan Motor Company
Source: Author's calculations

The figure of EV/EBITDA ratios above confirms the previously mentioned aspects. As mentioned in Chapter 1, compared to Nissan, the ratio values for Tesla fluctuate severely and paints an almost nonsensical picture when considering the volatility of its stock price, seen in Figure 1. The severe variance between the years 2016 and 2017 was caused by EBITDA dropping to $-102 million USD while the price of the stock increased by over 45% - that said, Nissan appears to be slightly overvalued, too, taking into account the industry average of 9.37 for FY2017 (Damodaran 2018).

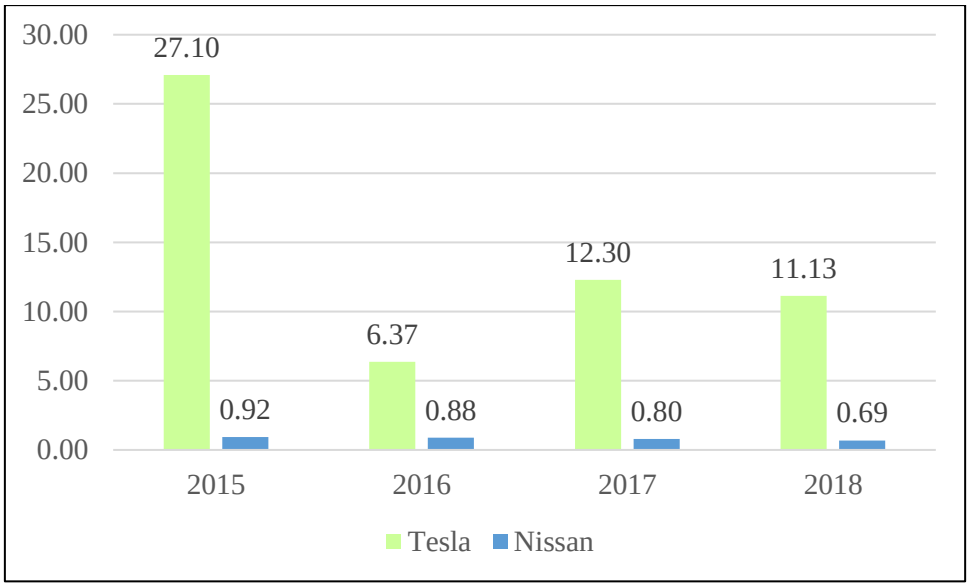

Figure 8. Price-to-book ratio values of Tesla, Inc. and Nissan Motor Company
Source: Author's calculations

The P/B ratio values for both companies confirm the above-mentioned details. The average US Auto & Truck industry P/B ratio value for FY2018 was 1.63 (Damodaran 2019), meaning Tesla's stock was valued just over 6.8 times above the industry average, while P/B ratio was 58% below the US average.

3.2. Comparative failure prediction analysis

Though Tesla had a more financially healthy year in 2015 compared to Nissan going strictly by this formula, it remains the only "healthier" year, with significant fluctuations yearly fluctuations, especially between the years 2015 and 2016. The aforementioned fluctuation can be explained by a decrease in the value of X_4 - as per their 2016 Form 10-K filing, sizable investments were made in relation to the development and production efforts of the Model 3. That is in stark comparison to Nissan, which, though at risk as per Altman's defined range of classification, has remained relatively stable, with its Z-score fluctuating by 0.051 between 2016 and 2017 at the most.

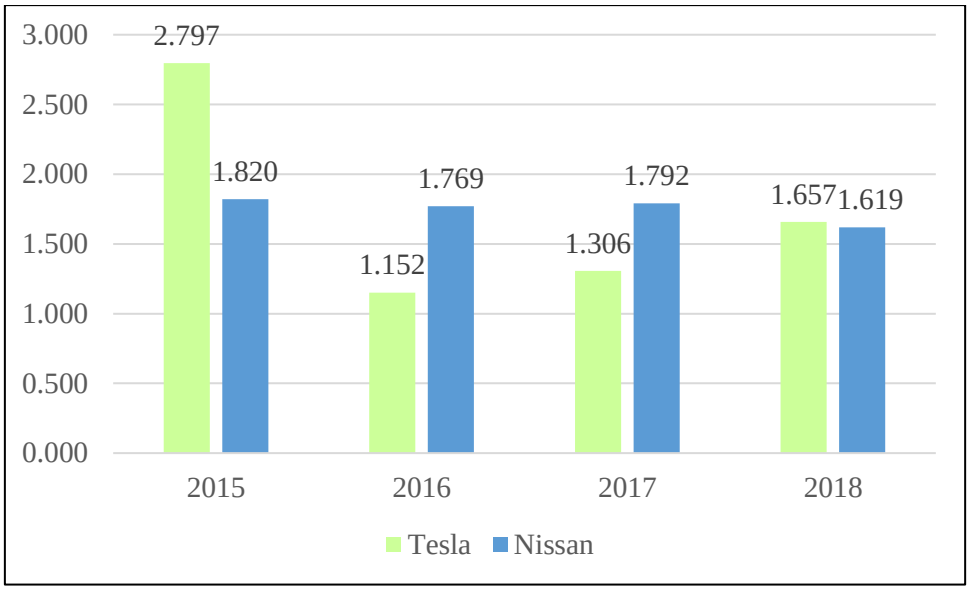

Figure 9. Altman's Z-score values of Tesla, Inc. and Nissan Motor Company
Source: Author's calculations

3.3. Vertical analysis

Vertical analysis of Tesla's balance sheet reveals several aspects – firstly, the company is very heavily invested in non-current assets, with an average of 71.75% of all assets comprising of property, plant and equipment on the balance sheet across the studied four-year period – this is in contrast to Nissan, whose gross property, plant and equipment makes up an average of just 29% of total assets. Relative to total assets, Tesla's current assets make up an average of 28% across four years –in comparison to Nissan, it is almost perfectly reversed - its current assets consist of 62% of total assets on average, which is also reflected in the liquidity ratio comparison and is as such indicative of Nissan's more liquid position. Relative to each company's respective proportional amount of assets, Tesla keeps more cash, anywhere from two to four times, on hand compared to Nissan as well.

On the liabilities side, the proportion of accounts payable is very similar between the two companies, which is where the similarities come to an end. At FY2018 year-end for Tesla, over 83% of the company was financed by debt, with approximately a third of the company being funded by long-term debt. Looking at Note 13 of Tesla's Form 10-K for FY2018 which summarises the company's debt, the company has $11 billion worth of debt, $1.67 billion of which is due in 2019. As per Appendix 2, in terms of the 2018 year-end cash and cash equivalents balance, the total debt due in 2019 equates to 45% of it. Comparatively, Nissan operates on a 72/28

split of liabilities-to-equity, with 91% of stockholders' equity consisting of retained earnings. Considering Tesla's negative retained earnings, this leaves little room to argue against Nissan's more favourable financial performance for 2018.

Similarly to Tesla, Nissan's cost of revenue and gross profit are both around the same figures, at 81% and 18% for 2018, respectively. Where they notably differ aside from income and profit-related items, though, is operating and interest expenses. Concerning operating expenses, the relative difference between the two companies was a surprising 27% in 2015, 19% in the two following years and 7% in 2018 in Nissan's favour, while interest expenses, percentagewise, were over 27 times higher in Tesla's case.

Though Tesla's net income remained negative in 2018, EBITDA was positive at 7.3% of net sales, fluctuating from -8% to the aforementioned figure throughout the years – in contrast, Nissan's EBITDA proportion of revenue has remained at a stable four-year average of 13.75%.

3.4. Horizontal analysis

As detailed in their latest Form 10-K, the depreciation incurred on PP&E has increased on an annual basis due to the continuous investments into its production with the aim to automate as much of the process and additionally, facilitate the production of the upcoming models, given their rapid development cycle. Trend analysis suggests that there is not a single balance sheet item that had not doubled at the very least by 2018 in comparison to 2015, with total assets having grown by 3.68 times. Troublesome is the amount of debt that Tesla is continuing to pile upon itself with short-term and long-term debt having increased by 406% and 452% during the studied period, respectively, to a cumulative figure of nearly 12 billion USD by 2018 year-end, even though net income shrunk even further by 87 million USD. That said, the expansion of the balance sheet in general is in line with their aggressive expansion strategy and quick developmental cycle.

Nissan's balance sheet in contrast has stayed fairly stable, with yearly growth being, in overall terms, between 10 and 15%, with the outliers being its cash balance, which is exactly 1.5 times the amount it was in 2015 having grown ~20-25% per year, and accumulated other comprehensive income, which is a result of currency translations due to the financial data being compiled in Japanese yen, having more than tripled over the course of four years.

When it comes to revenue, Tesla grown its revenue over five-fold in comparison to 2015, from 4.046 billion dollars to 21.461 billion dollars – an undoubtedly impressive achievement. Though R&D expenses have doubled within the same period as well, as a percentage of revenue, it has been declining yearly. Operating income had increased significantly in 2018 by $1.379 billion to negative $253 million from 2017 – partially contributed to by the pre-order reservations for the two upcoming models and the significantly increased production efficiency of the Model 3, as well as by cost-saving measures through doing away with numerous physical store locations and shifting more towards online sales in 2018 - all in addition to lowering employee headcount in the beginning of the year as part of a restructuring plan. As expected, interest expense had grown by 457% in comparison to the base year. When it comes to net income, though it improved by nearly $1 billion from 2017, losses still amounted to $976 million (Tesla 2017-2019).

In contrast, just as its balance sheet, Nissan's income statement figures remains stable on the whole, with approximately 10 to 15% changes year-on-year. Although 2018 revenue had grown by just over 5% compared to 2015, net income had grown by over 63% to a record-setting 746.9 billion yen, which is due to the improvements Nissan had achieved in the Chinese market and due to changes related to the American tax policy (Nissan 2017-2018).

3.4. Findings and suggestions

The overall results of the analysis present the view of mixed results in Tesla's case and general stability on the part of Nissan.

2017 was a particularly poor year for Tesla in financial terms as it aimed to finally get the Model 3 into the hands of their customers and the company did achieve that, but at a remarkable total expense, ending the year with a near two billion dollar loss an in a highly illiquid financial state. Ratio analysis revealed that while Tesla is in a better position from the standpoint of turnover-related ratios and has significantly higher market value, Nissan is superior when it comes to liquidity, profitability and usage of leverage.

With respect to Altman's Z-score, both companies were somewhat close with the difference in the 2018 figures being apart by only 0.135. The overall lower score is typical of manufacturing industries as higher capital requirements and lower margins contribute to a poor score as per the standards outlined by Altman.

Vertical analysis of the balance sheet showed that, as similarly indicated by total debt ratio, Tesla utilises proportionally more debt than Nissan with significantly less equity, indicative of potential for instability and higher overall risks, with Nissan being invested in non-current assets and Tesla having focused in investment in current assets, indicative of its aggressive growth profile. Applying the same method of analysis to the income statement showed a considerable proportion of sales going towards operating expenses in comparison to Nissan - similar was the case with interest expenses, which is to be expected when looking at Tesla's interest-bearing liabilities. The rate of earnings compared to sales fluctuated a lot between the years, too, while it remained stable in Nissan's instance.

Horizontal analysis of the balance sheet depicted additional signs of Tesla's aggressive growth as there was not a single balance sheet item that had not doubled over the course of four years, with investments made into PP&E as part of its efforts to increase the production rate of the Model 3 - by association, short- and long-term debt also increased five-fold in both instances. Nissan's balance sheet by comparison grew in a stable fashion, with yearly increases being between 10 to 15% in most instances. Looking at the income statements of both companies, Tesla as grown its revenue five times compared to 2015 from four billion to over 21 billion dollars, though net income

still declined by 87 million. Much like Nissan's balance sheet, its income statement had improved year-on-year, with revenue remaining at 2015 levels, but net income improving by over 60% in 2018 thanks to positive developments in the Chinese market and changes in the U.S. tax policy as outlined in its latest annual report.

Considering the extent to which Tesla's assets consist of PP&E and that significant investments have already been made into long-term assets overall, combining production equipment usage should be explored so as to avoid significant production-related expenses each time a new model is put into production, as has happened with all of the previous models that Tesla currently sells. This could be achieved through changes made in the design philosophy of the company's car models, more particularly through sharing a higher percentage of parts between models. That said, Tesla is in a unique situation of its own and such large investments into manufacturing, research and development are necessary at this stage.

CONCLUSION

Considering the stock market valuation of Tesla, Inc. and taking into consideration the fact that its annual earnings per share have remained negative as indicated in its income statement, it is apparent that the value of the company is in some aspects based upon its future potential and in others, speculative views, especially considering when considering the financial performance as well as annual manufacturing output and capabilities of Nissan - though it can be argued that with high barriers to entry in the automobile manufacturing industry, it would take unusually long for a new company to mature in terms of refining its operations and becoming profitable, which seemingly could be the case in this instance. Although Tesla's financials have improved recently in many areas, notably regarding the amount of revenue and profitability margins, its costs remained too high by any objective measure by the end of 2018 and as such, the length of the process to become an economically viable operation will remain to be seen as such aggressive growth cannot be endlessly fuelled and ultimately sustained by ever-increasing amounts of debt. That said, so far it would appear that Tesla, though in a poor financial position compared to an established manufacturer, is currently in a good overall market position given its superior technology regarding drivetrain and battery cell technology, having got an early start ahead of market leaders in this industry and thus far, been able to maintain that lead, too.

As the largest manufacturers in the industry are investing considerable resources in an effort to close the technological gap that Tesla has created, it is the author's view that the following four- to five-year period will prove to be of utmost importance in determining if or when that lead will start to close. Considering the volatility of Tesla's stock price and the objectively irrational investor behaviour surrounding the company, it would be difficult to recommend it as a sound, stable investment, however bottomless the pockets of capital markets in combination with negative interest rates may seem. This is not to say that Tesla will go bankrupt in the near-term, however, as it very much is a functioning car manufacturer, operating in a very capital-intensive industry that is projected to reach a profitable fiscal year within a similar timeframe as the one chosen for this thesis.

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APPENDICES

Appendix 1. Balance sheet of Tesla, Inc., FY2015-2018 (mUSD)

Fiscal year, ending	2015-12	2016-12	2017-12	2018-12
Assets				
Current assets				
Cash				
Cash and cash equivalents	1,197	3,393	3,368	3,686
Total cash	1,197	3,393	3,368	3,686
Receivables	169	499	515	949
Inventories	1,278	2,067	2,264	3,113
Prepaid expenses	125	194	268	366
Other current assets	23	106	155	193
Total current assets	**2,792**	**6,260**	**6,571**	**8,306**
Non-current assets				
Property, plant and equipment				
Gross property, plant and equipment	5,766	16,055	22,436	22,886
Accumulated Depreciation	-571	-1,018	-1,944	-3,195
Net property, plant and equipment	5,195	15,037	20,492	19,691
Goodwill			60	68
Intangible assets		376	362	282
Other long-term assets	106	991	1,171	1,391
Total non-current assets	**5,301**	**16,404**	**22,085**	**21,433**
Total assets	**8,092**	**22,664**	**28,655**	**29,740**
Liabilities and stockholders' equity				
Liabilities				
Current liabilities				
Short-term debt	633	1,150	897	2,568
Capital leases				
Accounts payable	916	1,860	2,390	3,404
Taxes payable	101	153	186	349
Accrued liabilities	322	1,005	1,257	1,122
Deferred revenues	707	1,427	1,869	1,423
Other current liabilities	137	232	1,076	1,127
Total current liabilities	**2,816**	**5,827**	**7,675**	**9,992**
Non-current liabilities				
Long-term debt	2,082	5,978	9,418	9,404
Capital leases				
Deferred taxes liabilities				
Accrued liabilities				
Deferred revenues	446	852	1,178	991
Minority interest		785	997	834
Other long-term liabilities	1,659	4,469	5,150	3,595

Appendix 1 continuation

Total non-current liabilities	**4,187**	**12,084**	**16,743**	**14,824**
Total liabilities	**7,004**	**17,911**	**24,418**	**24,816**
Stockholders' equity				
Common stock	0	0	0	0
Additional paid-in capital	3,415	7,774	9,178	10,249
Retained earnings	-2,322	-2,997	-4,974	-5,318
Accumulated other comprehensive income	-4	-24	33	-8
Total stockholders' equity	**1,089**	**4,753**	**4,237**	**4,923**
Total liabilities and stockholders' equity	**8,092**	**22,664**	**28,655**	**29,739**

Source: Morningstar (2019)

Appendix 2. Income statement of Tesla, Inc., FY2015-2018 (mUSD)

Fiscal year, ending	2015-12	2016-12	2017-12	2018-12
Revenue	**4,046**	**7,000**	**11,759**	**21,461**
Cost of revenue	3,123	5,401	9,536	17,419
Gross profit	924	1,599	2,222	4,042
Operating expenses				
Research and development	718	834	1,378	1,460
Sales, General and administrative	922	1,432	2,476	2,834
Restructuring, merger and acquisition				135
Other operating expenses				-135
Total operating expenses	1,640	2,267	3,855	4,295
Operating income	-717	-667	-1,632	-253
Interest Expense	119	199	471	663
Other income (expense)	-40	120	-106	-89
Income before taxes	-876	-746	-2,209	-1,005
Provision for income taxes	13	27	32	58
Net income from continuing operations	-889	-773	-2,241	-1,063
Other		98	279	86
Net income	**-889**	**-675**	**-1,961**	**-976**
Net income available to common shareholders	-889	-675	-1,961	-976
Outstanding shares in Millions	128	144	166	173
Earnings per share (in USD)				
Basic	-6.93	-4.68	-11.83	-5.72
Diluted	-6.93	-4.68	-11.83	-5.72
Weighted average shares outstanding				
Basic	128	144	166	171
Diluted	128	144	166	171
EBITDA	**-334**	**400**	**-102**	**1,559**
EBIT	**-717**	**-667**	**-1,632**	**-253**

Source: Morningstar (2019)

Appendix 3. Balance sheet of Nissan Motor Company, FY2015-2018 (mJPY)

Fiscal year, ending	2016-03	2017-03	2018-03	2019-03
Assets				
Current assets				
Cash				
Cash and cash equivalents	918,771	1,122,484	1,134,838	1,219,588
Short-term investments	73,384	121,524	71,200	139,470
Total cash	992,155	1,244,008	1,206,038	1,359,058
Receivables	837,704	808,981	739,851	512,164
Inventories	1,274,566	1,273,161	1,290,549	1,257,923
Deferred income taxes	251,689	156,457	152,452	0
Other current assets	7,391,459	7,979,942	8,293,955	8,463,960
Total current assets	**10,747,573**	**11,462,549**	**11,682,845**	**11,613,105**
Non-current assets				
Property, plant and equipment				
Gross property, plant and equipment	5,216,902	5,275,221	5,265,634	5,305,698
Net property, plant and equipment	5,216,902	5,275,221	5,265,634	5,305,698
Intangible assets	130,877	127,807	128,782	134,471
Deferred income taxes	187,106	176,354	175,940	326,759
Prepaid pension benefit	4,691	8,456	10,552	8,499
Other long-term assets	1,086,494	1,370,621	1,483,148	1,563,813
Total non-current assets	**6,626,070**	**6,958,459**	**7,064,056**	**7,339,240**
Total assets	**17,373,643**	**18,421,008**	**18,746,901**	**18,952,345**
Liabilities and stockholders' equity				
Liabilities				
Current liabilities				
Short-term debt	3,246,038	3,118,756	2,755,226	3,762,772
Capital leases	14,916	31,565	25,766	19,846
Accounts payable	1,479,689	1,578,594	1,646,638	1,580,452
Deferred income taxes	51	2	2	0
Other current liabilities	2,023,493	2,325,303	2,316,754	2,367,461
Total current liabilities	**6,764,187**	**7,054,220**	**6,744,386**	**7,730,531**
Non-current liabilities				
Long-term debt	**3,725,883**	**4,596,962**	**4,941,116**	**4,231,030**
Capital leases	14,460	20,398	16,248	16,038
Deferred taxes liabilities	691,809	601,398	395,026	339,991
Pensions and other benefits	424,123	369,346	352,861	378,967
Minority interest	418,978	304,898	303,914	320,835
Other long-term liabilities	**612,436**	**611,548**	**608,529**	**632,278**
Total non-current liabilities	**5,887,689**	**6,504,550**	**6,617,694**	**5,919,139**
Total liabilities	**12,651,876**	**13,558,770**	**13,362,080**	**13,649,670**

Appendix 3 continuation

Stockholders' equity				
Additional paid-in capital	1,411,460	1,423,278	1,421,727	1,420,496
Retained earnings	4,150,740	4,349,136	4,908,747	4,961,980
Treasury stock	-148,684	-140,697	-139,970	-139,457
Accumulated other comprehensive income	-691,749	-769,479	-805,683	-940,344
Total stockholders' equity	**4,721,767**	**4,862,238**	**5,384,821**	**5,302,675**
Total liabilities and stockholders' equity	**17,373,643**	**18,421,008**	**18,746,901**	**18,952,345**

Source: Morningstar (2019)

Appendix 4. Income statement of Nissan Motor Company, FY2015-2018 (mJPY)

Fiscal year, ending	2016-03	2017-03	2018-03	2019-03
Revenue	**12,189,519**	**11,720,041**	**11,951,169**	**11,574,247**
Cost of revenue	9,796,998	9,422,551	9,814,001	9,670,402
Gross profit	2,392,521	2,297,490	2,137,168	1,903,845
Operating expenses				
Sales, General and administrative	711,100	647,992	634,903	673,639
Other operating expenses	888,143	907,270	927,505	911,982
Total operating expenses	1,599,243	1,555,262	1,562,408	1,585,621
Operating income	793,278	742,228	574,760	318,224
Interest Expense	-24,806	-14,128	-12,670	-13,478
Other income (expense)	-35,538	237,057	148,653	172,962
Income before taxes	732,934	965,157	710,743	477,708
Provision for income taxes	-180,141	-264,639	52,914	-135,793
Net income from continuing operations	552,793	700,518	763,657	341,915
Other	-28,952	-37,019	-16,765	-22,777
Net income	**523,841**	**663,499**	**746,892**	**319,138**
Net income available to common shareholders	523,841	663,499	746,892	319,138
Earnings per share (in JPY)				
Basic	125	166	191	82
Diluted	125	166	191	82
Weighted average shares outstanding				
Basic	4,191	3,998	3,911	3,911
Diluted	4,191	3,998	3,911	3,911
EBITDA	**1,590,626**	**1,820,342**	**1,581,380**	**1,356,770**

Source: Morningstar (2019)

Appendix 5. Financial ratios of Tesla, Inc.

Liquidity ratios	2015	2016	2017	2018
Current ratio	0.99	1.07	0.86	0.83
Quick ratio	0.54	0.72	0.56	0.52
Cash ratio	0.43	0.58	0.44	0.37

Leverage ratios	2015	2016	2017	2018
Total debt ratio	0.87	0.79	0.85	0.83
Cash coverage ratio	-2.81	2.01	-0.22	2.35
Debt to equity	2.49	1.50	2.43	2.43

Turnover ratios	2015	2016	2017	2018
Total asset turnover	0.50	0.31	0.41	0.72
Receivables turnover	23.94	14.03	22.83	22.61
Receivables in days	15.25	26.02	15.99	16.14

Profitability ratios	2015	2016	2017	2018
Return on equity	-81.63%	-14.20%	-46.28%	-19.83%
Net profit margin	-21.97%	-9.64%	-16.68%	-4.55%

Market value ratios	2015	2016	2017	2018
Market-to-book	27.10	6.37	12.30	11.13
EV/EBITDA				

Altman's Z-score	2015	2016	2017	2018
Value of Z-score	2.797	1.152	1.306	1.657

Source: Author's calculations

Appendix 6. Financial ratios of Nissan Motor Company

Liquidity Ratios	2015	2016	2017	2018
Current ratio	1.59	1.62	1.73	1.50
Quick ratio	1.40	1.44	1.54	1.34
Cash ratio	0.14	0.16	0.17	0.16

Leverage Ratios	2015	2016	2017	2018
Total debt ratio	0.73	0.74	0.71	0.72
Cash coverage ratio	-64.12	-128.85	-124.81	-100.67
Debt to equity	1.48	1.59	1.43	1.51

Turnover Ratios	2015	2016	2017	2018
Total asset turnover	0.70	0.64	0.64	0.61
Receivables turnover	14.55	14.49	16.15	22.60
Receivables in days	25.1	25.2	22.6	16.2

Profitability Ratios	2015	2016	2017	2018
Return on equity	11.09%	13.65%	13.87%	6.02%
Net profit margin	4.30%	5.66%	6.25%	2.76%

Market Value Ratios	2015	2016	2017	2018
Market-to-book	0.92	0.88	0.80	0.69
EV/EBITDA	10.08	9.12	10.42	11.74

Altman's Z-score	2015	2016	2017	2018
Value of Z-score	1.820	1.769	1.792	1.619

Source: Author's calculations

Appendix 7. Formulas of financial ratios used

Name	Formula
Current ratio	Current assets / current liabilities
Quick ratio	(Current assets – inventory) / current liabilities
Cash ratio	Cash / current liabilities
Total debt ratio	(Total assets – total equity) / total assets
Cash coverage ratio	EBIT + (depreciation + amortisation) / interest expenses
Debt to equity	(Short-term debt + long-term debt) / total equity
Total asset turnover	Sales / total assets
Receivables turnover	Sales / accounts receivable
Receivables in days	365 / receivables turnover
Return on equity	Net income / shareholders' equity
Net profit margin	Net income / sales
Market-to-book ratio	Market value per share / book value per share
EV/EBITDA	(Market capitalisation + total debt – total cash) / EBITDA

Source: Ross et al (2013), Glauntier and Underdown (1995), Damodaran (2018)

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