

Financial Analysis and Forecast of Volkswagen Group

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Abstract: With the development of the global economy and the improvement of the technology level, the integration of information technology and the manufacturing industry has accelerated. The global manufacturing sector is moving in major directions as a result of digitalization, networking, and intelligence. The auto industry is also innovating, and artificial intelligence and new energy have accelerated the innovation and change of the auto industry. How automotive companies can improve their profitability and gain advantages in the competition during the transition period has become a key issue. This paper takes Volkswagen (VW) Group as the research object and analyzes its relevant indicators in FY2022, and also selects enterprises in the same industry for comparison. The current financial situation of VW Group is analyzed in terms of solvency, operating capacity, and profitability. The financial indicators such as total debt ratio, profit margin, total asset turnover ratio, and return on equity are used to make a comprehensive assessment of VW Group's financial status. With the gradual diversification of corporate sales revenue, revenue measurement, and recognition have become more complex. This paper also accounts for elements such as revenue and intangible assets of VW Group to make sure accounting data is accurate. The analysis is conducted from the perspective of corporate strategy to understand the strategic objectives and future direction of the VW Group. The VW Group's risks and difficulties are evaluated and projected within the framework of the overall company plan.

Keywords: automobile manufacturing industry, financial analysis, strategic forecast

1. Introduction

The Volkswagen (VW) Group, an auto manufacturing business with its headquarters in Germany, is made up of the Automotive Division and the Financial Services Division. The business areas of Passenger Cars, Commercial Vehicles, and Power Engineering make up the Automotive Division. The Automotive Division's activities include, among others, the development of vehicles, engines, and vehicle software, as well as the manufacturing and marketing of passenger cars, light trucks, buses, and motorcycles. It also operates businesses for genuine parts, large-bore diesel engines, large-bore diesel engines, turbomachinery, and propulsion components. VW also offers ancillary financial services, including as leasing, leasing to customers and dealers, banking, insurance, fleet management, and mobility services [1].

VW is one of the largest automakers in the world based on sales volume thanks to its high-quality goods and services that cater to the specific demands of each client as well as a positive customer experience. VW Group has always maintained its market leadership in China and Europe while

expanding its business in other countries and regions. Production of the VW ID.4 has already begun at the Chattanooga plant in the United States, and a new project, the Scout, is planning to enter the attractive U.S. market for pickups and rugged SUVs [2]. VW has also selected sites for six battery plants planned for Europe. In China, VW continues to invest in electric vehicles and software, with a strong push into driver assistance systems and highly automated driving development.

Thanks to the company's improved price positioning and positive mix effects, VW's profitability further improves in 2022, with sales revenue increasing by 11.6% from €205.2 billion in 2021 to €279.2 billion in 2022. Gross profit increased by €5.0 billion to €52.2 billion, with a gross margin of 18.7%. In North America, unit sales increased by 7.8% to 868,000 units. Despite the fact that unit sales declined by 6.2% and 3.2%, respectively, in Europe and South America, respectively. The impact of lower volumes was offset by positive currency effects. Sales revenue in Europe and South America improved to €154.5 billion and €155 billion [1].

On the one hand, the VW Group is developing mobility solutions and working on a comprehensive mobile platform that offers customers a fast digital experience and flexible mobile access. From traditional financing and leasing services to car ordering, the mobile services of all its brands are integrated into a single mobile platform. VW is able to stay in touch with consumers throughout the life of the car using the mobile platform, enabling it to offer them services and features that are tailored to their specific needs. VW is also combining autonomous driving with new mobility solutions and continuing to advance software development with strategic partner Microsoft, transforming the VW Group into a leading provider of sustainable mobility. Meanwhile, Porsche AG is conducting an initial public offering in the third quarter of 2022. VW also sold 25% of its ordinary and preferred shares to Porsche AG, increasing the VW Group's share capital by €191 billion, which also generated a cash inflow of €161 billion for the VW Group [3].

Additionally, VW programmed the engine software of its diesel car models to activate emission control mechanisms only during testing to bring emissions up to standard levels. Due to the diesel emissions problem, VW Group had to conduct a bulk recall of cars sold, including a variety of models such as Jetta, Beetle and Audi [4]. This also had a negative impact on VW's share price.

2. Accounting Analysis

2.1. Revenue Recognition

In 2022, the VW Group generates €279.2 billion in revenue with an operating return on sales of 8.1%, higher than the other competitors. By identifying the different business revenues, VW clearly distinguishes the way revenue is recognized and explains how it is accounted for in certain specific cases. Sales of new and used cars as well as genuine OEM parts are examples of transactions where the company's revenues depend on delivery, i.e., they are realized once the buyer has possession of the items. Sales income is calculated before any customer bonuses, sales discounts, or refunds. When the goods or services associated to financial services have been delivered or when the corresponding services have been rendered, revenue is recorded. The effective interest rate approach would be used to calculate the sales revenue from loans and finance lease contracts. Straight-line revenue recognition for the course of the lease is used to account for sales of operating leases. Trade receivables are recognized in the period between delivery of the vehicle and receipt of payment. The VW Group provides a more detailed breakdown of revenues generated by the company according to its business type and accounting standards, which also ensures the accuracy of revenues.

Compared to its peers, Ford's revenues are not classified as precisely as VW's, nor is there any explanation for special cases. Mercedes-Benz and BMW Motor Company are comparable to VW in terms of the accuracy of revenue recognition. The way VW Group recognizes revenue through the transfer of control, cost recognition changes as revenue recognition changes, which in turn brings

profitability closer to the actual business situation at a point in time. The VW Group's accounting policy regarding revenue recognition appears to be reasonable and comparable to its peers. However, due to the complexity of VW Group's operations, careful judgment and evaluation are required.

2.2. Intangible Assets

The VW Group follows international accounting standards to account for intangible assets. Intangible assets acquired are recorded at cost, and the VW Group typically uses the straight-line technique to amortize intangible assets with finite useful lives throughout their useful lives. For example, three years are typically used to amortize software costs. expenditures associated with the internal production of intangible assets, including development expenditures for future product lines, are capitalized. Most of the time, capitalized development expenses will comprise both direct and indirect expenditures incurred throughout the development phase. In most cases, they will be depreciated during the anticipated life cycle of the models and powertrains created, beginning with the product's creation. The VW Group also examines goodwill, intangibles with indefinite useful lifetimes, and intangibles that are not yet usable for impairment. When selling off the relevant cash-generating unit, VW typically considers the greater value in use and fair value minus the cost to calculate the recoverable amount. In 2022, the intangible assets of the VW Group amounted to €83.2 billion and the increase in intangible assets has a greater impact on the total non-current assets in the balance sheet.

BMW identifies intangible assets as one of its key accounting policies, and its accounting policy regarding intangible assets and their impairment is similar to that of the VW Group. Mercedes-Benz Automotive only employs the cost of manufacturing less accumulated amortization and accumulated impairment losses for the computation, albeit it does not specify how intangible assets are to be measured for impairment [5]. The VW Group's financial sheet and income statement are significantly impacted by intangible assets. Therefore, the impairment of intangible assets requires more accurate estimates and judgments.

2.3. Property, Plant, and Equipment (PPE)

International accounting standards are followed by the VW Group when it comes to the recognition of impairment losses on PPE. When the relevant asset's recoverable value is lower than its carrying value, an impairment loss is recorded. The higher value in use less the fair market value less selling expenses is the recoverable amount. The VW Group also creates the company's medium-term strategy based on predictions of future global economic patterns, as well as suppositions regarding market trends for passenger and commercial vehicles, market share, prices, and cost structures. Based on management's medium-term plan, the VW Group determines the value of using PPE, which leads to the recognition of impairments. Impairment losses on PPE, intangible assets, and other assets reach € 5.72 billion in 2022 (compared to € 3.44 billion in the previous year). The main causes of this adjustment are market and currency rate risks, specifically the anticipated fall in sales volumes, which lowers the value of using various goods in the Passenger Cars and Commercial Vehicles divisions.

Compared to the VW Group, the BMW Automotive Group uses a more explicit approach to determining the fair value of PPE. Taking into account the influence of relevant factors on the useful life, the BMW Automotive Group provides for a regular review of plant and equipment and extends or shortens their useful life when necessary. This allows for a more precise accounting of the fair value of PPE [6]. Ford and Mercedes-Benz Automotive do not provide a detailed description of impairment losses on PPE. The VW Group's fair value accounting regarding PPE is more reasonable compared to its peers and still needs to adjust its accounting methods to improve its accuracy.

2.4. Lease

The VW Group follows IFRS for accounting for leases. In a lease, the lessor transfers to the lessee, in exchange for consideration over the course of an agreed-upon period, the right to utilize an asset. The right-of-use asset and lease obligation for each lease would be recorded in the balance sheet if the VW Group were the lessee. The present value of the outstanding lease payments is used by the VW Group to calculate the lease liability, and the right-of-use asset is typically valued using the lease liability plus any direct expenditures. The balance sheet displays right-of-use assets under non-current assets if the VW Group is the lessor. The continual updating of internal and external data by the Financial Services division, which is reflected in the estimated residual value of the vehicles, is mostly to blame for the € 2.7 billion impairment of the VW Group's lease assets in 2022.

Compared to its peers, the VW Group has a simpler accounting for leasing-related accounting. Both Ford and BMW Motor Company provide detailed instructions on the calculation of lease payments, making it clear that leases will be discounted using incremental borrowing rates [7]. Therefore, the VW Group's accounting for leases requires more reasonable estimates and judgments.

3. Performance Evaluation

3.1. Liquidity

Table 1 shows that VW Group's current ratio is 1.226, higher than Mercedes' current ratio of 1.164 and BMW's current ratio of 1.092, and lower than Ford's current ratio of 1.602. VW Group's quick ratio is 0.94, higher than Mercedes' quick ratio of 0.874 and BMW's quick ratio of 0.855, and lower than Ford's quick ratio of 1.457. VW Group's cash ratio of 0.159 is lower than that of its competitors in the same industry. Volkswagen Group's net working capital ratio of 0.073 is higher than that of its competitors in the same industry. VW Group's current and quick ratios were higher than those of its peers except for Ford Motor Company, and its net working capital ratio was higher than those of its competitors, while it under-performed in terms of cash ratio. Compared to last year, the small increase in leased assets and the significant increase in liabilities was not offset by an increase in inventories and receivables, which also resulted in more funds being tied up in working capital. This explains VW's poor performance in terms of cash ratios. Additionally, this may prevent the company from making timely interest payments on loans, paying off obligations when they become due, or having enough cash on hand for emergencies. Cash flow from operating activities fell from €28.5 billion to €10.01 billion as a result of the increased cash outflow due to the diesel issue. the issuance and redemption of bonds and other financial liabilities involved in financing activities generated a cash inflow of €42 billion, and a cash inflow of €16.1 billion from the initial public offering of Porsche AG made VW Group's liquidity higher than that of its competitors. The VW Group is in a strong financial position in the short term.

Table 1: Liquidity ratios of VW and its competitors.

Company name	Current Ratio	Quick Ratio	Cash Ratio	NWC to total assets
Volkswagen	1.226	0.940	0.159	0.073
Ford	1.602	1.457	0.259	0.228
Mercedes-Benz	1.164	0.874	0.200	0.056
BMW	1.092	0.855	0.200	0.031

3.2. Solvency

Table 2 shows that VW Group's long-term debt ratio was 0.533, higher than Mercedes-Benz and BMW's 0.418 and 0.438 and lower than Ford's 0.729. The total debt ratio was 0.684, higher than Mercedes-Benz and BMW's 0.667 and 0.630 and lower than Ford's 0.831. The interest coverage multiple was -50.054, higher than Mercedes-Benz's -132.844 and lower than Ford's 4.985 and BMW's 93.661. The interest coverage ratio was -80.290, higher than Mercedes-Benz's -175.188 and lower than Ford's 11.055 and BMW's 2.666. Despite the decline in non-current liabilities compared to last year, VW Group's long-term debt ratio was still higher than that of Mercedes-Benz and BMW. The company relies on long-term debt for financing and has weak long-term solvency. Compared to other competitors, the total debt ratio is at an average level. The interest coverage ratio shows that the indicator is negative, which also indicates the company's difficulty in using operating income to pay interest on debts as they fall due and the higher risk borne by creditors. The interest coverage ratio is lower than that of BMW and Ford Motor Company, and the company's ability to pay interest due on outstanding debt is weaker. Especially in periods of fragile free cash flow, the company faces a higher risk of being unable to pay interest and making debt service payments.

Table 2: Solvency ratios of VW and its competitors.

Company name	Long-term debt Ratio	Total debt ratio	Times-interest-earned	Interest coverage ratio
Volkswagen	0.533	0.684	-50.054	-80.290
Ford	0.729	0.831	4.985	11.055
Mercedes-Benz	0.418	0.667	-132.844	-175.188
BMW	0.438	0.630	93.661	2.666

3.3. Efficiency

Table 3 shows that VW Group's asset turnover ratio is 0.528, lower than other competitors in the same industry. Inventory turnover was -5.192, higher than Mercedes-Benz's -5.404 and BMW's -7.411, and lower than Ford's 11.139. Days in turnover were -70.305, lower than other competitors. The receivable turnover was 3.877, higher than other competitors in the same industry. The average collection period was 104.742, higher than BMW's 101.013 and lower than Ford's 125.739 and Mercedes-Benz's 227.853. VW Group's receivable turnover is higher than other competitors in the same industry, indicating that the company collects accounts quickly and with shorter aging, reducing collection costs and bad debt losses. With a shorter average collection period, companies can recover funds faster and increase the liquidity of their assets. The asset turnover ratio is at an average level, indicating that the company manages and utilizes its assets more efficiently. However, VW Group has a slower inventory turnover, which is adversely affected by disruptions in the logistics supply chain, in addition to production-related reasons. A slower inventory turnover indicates a high level of inventory utilization and a slower conversion of inventory into cash or accounts receivable. This also reduces the firm's liquidity.

Table 3: Efficiency ratios of VW and its competitors.

Company name	Asset Turnover	Inventory Turnover	Days in Turnover	Receivables Turnover	Average Collection Period
Volkswagen	0.528	-5.192	-70.305	3.877	104.742
Ford	0.615	11.139	32.767	3.393	125.739
Mercedes-Benz	0.577	-5.404	-67.546	1.699	227.853
BMW	0.621	-7.411	-49.251	3.756	101.013

3.4. Profitability

Table 4 shows that VW Group's profit margin of 0.057 is higher than Ford's -0.014 and lower than Mercedes' 0.111 and BMW's 0.130. The operating profit margin of 0.079 is higher than the other competitors. Return on equity was 0.096, lower than the rest of the competition. Return on assets was 0.029, lower than the other competitors. Compared to BMW and Mercedes-Benz, Volkswagen Group has a lower profit margin. In addition to the creation of new models, the VW Group is concentrating on electrifying its whole fleet of vehicles, digitizing, implementing cutting-edge technology, and making advancements in electric and modular toolkits and platforms in 2022. This also results in higher R&D costs recognized in profit or loss. Significantly higher R&D costs led to higher cost of sales and lower margins. Volkswagen's operating profit margin was higher than that of its competitors, reflecting good overall corporate earnings and strong corporate profitability. A much higher equity share was achieved because to profits from Porsche's IPO, decreased actuarial losses from the pension plan remeasurement, and the hybrid notes issued in March 2022. Despite the increased equity share, the VW Group's return on equity is still lower than that of other competitors in the same industry.

Table 4: Profitability ratios of Volkswagen and its competitors.

Company name	Profit Margin	Operating Profit Margin	Return on Equity	Return on Asset
Volkswagen	0.057	0.079	0.096	0.029
Ford	-0.014	0.040	0.172	0.031
Mercedes-Benz	0.111	-0.037	0.239	0.0735
BMW	0.130	0.165	0.187	0.065

4. Strategic Forecast

With the implementation of the VW Group's "New AUTO - Mobility for Future Generations" strategy, the corporation is quickly becoming an electric and digital company, driving Volkswagen's progressive transformation into a software-oriented organization [8]. The VW Group is dedicated to strengthening its software development capacities to engage customers with constantly advancing digital features. The combination of the Internet, artificial intelligence and automobiles will transform the customer's mobility experience and lay the foundation for new business models. Revenue streams will gradually shift and expand beyond core automotive products. The VW Group is continuously improving its supply chain management and is committed to a fully digital supply chain system. Supply chain management activities can secure supply during the start-up phase and volume production to ensure that suppliers can deliver products on time. It can help the VW Group to better overcome complex challenges in the supply chain [9]. The Volkswagen Group uses modular components in the production of its products [10]. Due to functional non-conformity, either internally or externally obtained parts and components might be time-consuming and expensive. This can result in recalls that can harm the VW Group's reputation. Quality issues are identified and corrected at an

early stage of product development to avoid delays in production. As part of its mobile platform strategy, VW is increasingly modular components in the production process. Thus when failures occur, the cause can be quickly determined and troubleshoot.

The implementation of the VW Group strategy may lead the company to invest significant amounts of money in R&D for software and new platform development as well as for new technologies. R&D is time-consuming and requires significant capital investment, which has a negative impact on cash flow. In addition, the continuous improvement of supply chain management by the public can better help companies to solve the problem of shortage of product supply, thus speeding up the collection of accounts receivable, avoiding companies from tying up funds due to accounts receivable, and improving the efficiency of cash flow management. It also reduces the huge capital pressure faced by enterprises due to ordering and avoids the risk of production interruption due to supply shortage.

Higher energy and commodity market prices due to war conflicts have led to increased uncertainty about global economic developments, higher energy prices and increased supply shortages of semiconductors and intermediate products. In 2022, restrictive measures to protect populations from the COVID-19 in many countries lead to economic constraints and international supply chain disruptions. Continued high inflation in many regions, causing central banks to adopt restrictive monetary policy measures to curb consumer spending, negatively impacting auto sales. Rising inventories are projected to result from excess manufacturing capacity in the automotive industry worldwide. As demand for cars and original parts declines, automakers may adjust capacity or step up promotional measures. This will result in increased expenses and price pressure. The quality risk control and supply chain management adopted by the VW Group will enable the Group to better cope with the risks and challenges it faces. In the future, the VW Group will create long-term competitiveness and sustained profitability, which lead to more investors being attracted in.

5. Conclusion

VW Group's poor 2022 performance make for a challenging year for VW investors. The war led to disruptions in global supply chain shortages and shortages of semiconductors and intermediate products. In response to global inflation, many countries have shifted to tighter monetary policies, leading central banks to raise interest rates and reduce bond purchases. Although the VW Group faces difficult global market conditions, limited parts availability and disruptions in the logistics chain in 2022. However, VW is taking action by building an all-electric, all-digital, highly scalable mechatronics platform and developing mobility solutions. By putting the mobility strategy into practice, the company will be able to work closely with the brands to develop new goods and foster cross-product line and model synergies. In the future, VW will be a cost effective and long-term competitive company. My forecasts indicate that the VW Group will perform better in the future, although its sales situation will remain under uncertain and challenging markets.

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