REPORT TO VOLKSWAGEN GROUP BOARD OF DIRECTORS

THE GRIFFINS

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SECTION A: EXECUTIVE SUMMARY

1. Terms of Reference

Volkswagen Aktiengesellschaft (VW AG), referred to the Volkswagen Group internationally, are global leaders in automotive manufacturing. Volkswagen is an international public limited company headquartered in Wolfsburg, Germany. A comprehensive report has been produced for the VW AG board of directors in which key issues have been identified and practical, effective and efficient solutions and recommendations to these issues have been provided.

2. Prioritization of Key Issues

The table below carefully analyses each issue and effectively shows to what extent these issues affect the business. Using this analysis these issues will then be prioritized accordingly.

Each issue will receive a rating from 1-5 on how they rank in each category in comparison to the other key issues

KEY ISSUES	Urgency	Impact	Ethical Implications	PRIORITY
Strategy and Cost Optimization	3	1	2	*4*
Strategic Sourcing of Cobalt in Africa	5	3	4	*2*
E-Mobility Strategy	2	4	3	*3*
Product Portfolio Rationalisation	1	2	1	*5*
Paris Accord and Environmental Legislation	4	5	5	*1*

3. Key Recommendations

KEY ISSUE	KEY RECOMMENDATIONS
Paris Accord and Environmental Legislation	• We recommend that VW AG researches and develops new engines of their own. These would be made so that they can be modified to comply with further restrictions and regulations.
Strategic Sourcing of Cobalt in Africa	• VW should conform to local standards, regulations and laws which would allow them to negotiate better costs, quantity and quality of cobalt as well as supply and demand agreements. They should also consider acquiring most of their cobalt from artisanal miners as oppose to mining corporates.
E-Mobility Strategy	• We recommend that VW AG renegotiates the cancelled contract

Strategy and Cost Optimization	which they should extend to a 5 year contract and in the future look to manufacture their own batteries which help them save costs effectively. • VW AG should not centralize their business structure • VW AG should continue with their current strategy of manufacturing the larger variety of automotive vehicles instead of solely focusing on supercar production.
Product Portfolio Rationalisation	• We recommend that the board go with proposal 1, to reduce the price of the volume range in emerging market higher revenue. We also suggest that VW rationalize the volume segment, which is VW's main line of business

4. SWOT Analysis

SWOT ANALYSIS FOR VOLKSWAGEN GROUP	
Strengths	**Weaknesses**
• Has good reputation for reliability • International business • Established, recognizable brand in many countries • Have a diverse variety of Car segments/ categories that caters to most consumers in the market.	• VW AG does not manufacture their own engines and therefore has to outsource at an expense. • Gained bad publicity due to diesel issue.
Opportunities	**Threats**
• Entering the electronic vehicle market • Producing their own engines • Producing own batteries for electronic vehicles • Expansion into emerging markets	• Gaining more bad publicity for ethical issues the business is implicated in. • Competitors such as other German car brands such as BMW and Mercedes-Benz, who are known rather for good quality and being premium car brands.

SECTION B: DETAILED REPORT

4.1. Paris Accord and Environmental Legislation

Issue 1

The Paris Agreement on Climate Change Mitigation plans to start enforcing a set of regulatory standards on car emissions in January 2019. From this time, all road engines must emit less than 99g CO_2 per kilometer - if not, the manufacturer will be fined €600 million annually.

VW AG's engines currently emit an average of 125g CO_2 per kilometer. They therefore have three options with regards to their emissions; they can either develop new engines or they can redesign their current engines to emit less than 99g CO_2 per kilometer. Alternatively, they can ignore the regulations and perpetually pay the annual fines, which is ethically incorrect.

An analysis will be carried out to determine which option is favorable for VW AG.

Analysis

Modifying the current engines to comply with the standards mentioned above will require a capital cost of € 19,500 in the current financial year, and this will be used to build platforms that can accommodate future restrictions. However, this is unfavorable as many of the higher end vehicles will still be emitting more that 99g CO_2 per kilometer. This means VW will still have to pay the €600 million fine, and this strategy will not solve the problem.

Ignoring the regulations altogether could potentially earn VW a lot of money. Most engine manufacturers will invest in redesigning or modifying their engines to conform to the restrictions and avoid the €600 million fine, so if VW ignores the regulations and continues to manufacture engines with high emissions, it could be very profitable. There is a huge target market for this kind of car; many people want fast cars and VW will be one of few manufacturers who will still be producing powerful, high emission cars, therefore they would see a huge increase in sales. Their reputation may be tarnished more than it already has been following the diesel emissions scandal; however this may not stop the target market from wanting to purchase a powerful car. The sole purpose of a business is to make money and this strategy seems profitable; however, ethics do need to be taken into account. The Paris Accord was made to help mitigate the effects of Climate Change, and VW should definitely get involved in this effort. Most of VW's sales come from their lower end cars, and to follow the aforementioned strategy, VW would be leaving the low end car market. This would be eliminating their main source of income and will therefore be unfavorable.

The third option is to research and develop new engines. These would be made so that they can be modified in the future to comply with further restrictions and will aid in VW AG's 'Strategy 2025' in that the engines can eventually be replaced by or integrated with electric motors. The two strategies mentioned above both had positive net present values (€ 2,200million and € 1,000 million respectively); however the strategy to research and develop our own engines has a net present value of - € 2,000 million. Although this is financially unfavorable, this strategy is the most ethical. This strategy will be the most effective to ensure the longevity of the business as they will be able conform to further restrictions and will be exempt from fines in the future. It may also earn VW a better reputation and not to mention, should VW AG manufacture and produce their own engines, they inevitably could become the forefront of innovation of vehicle engines and may become a key player in engines of the future. The reasons above show that although the net present value of this strategy is negative (- € 2,000 million), the strategy still potentially holds a long term positive impact, both financially and in terms of VW AG's reputation .

KEY RECOMMENDATIONS

- We recommend that VW AG researches and develops new engines of their own. These would be made so that they can be modified to comply with further restrictions and regulations.

4.2. Strategic Sourcing of Cobalt

Issue 1

The board is currently contemplating the strategic sourcing of cobalt from key international suppliers, including mining giants such as Glencore, in the Democratic Republic of Congo (DRC), which holds 60% of the world's reserves. Against a background of failed talks with the major mining companies to secure supplies, the group, according to local reports, has resorted to using its local Rwanda offices, to access cobalt. Reports claim that the VW group is doing so by buying from artisanal mining operators who 'siphon' this out of the DRC.

Analysis

With regards to the economics surrounding the sourcing of cobalt from artisanal suppliers, VW will simply not be able to obtain the necessary amount of cobalt from the artisanal mining companies at a fast-enough rate and large enough volume to satisfy the demands of their new integrated mobility concept and electric vehicle assembly plant in Kigali, nor their other plants and factories that would require the cobalt.

The demand for cobalt would increase exponentially due to the need of mass production and supply of fixed units, but the actual supply itself will not be able to rise to meet the demand set for it. Although acquiring the supply of cobalt from the artisanal siphoning operators who acquire it themselves from mining giants such as Glencore (who hold 60% of the world's reserves) is a solid strategy they will not be able to cope with the dramatically increased demand set forth. There is very limited choice of suppliers, so to maximise requisition, compromises will have to be made in order to acquire what is needed for manufacturing to begin efficiently.

VW always needs to keep professionalism and business ethics in mind when considering any venture on this sort of strategic international scale. They need to comply with all rules and regulations set out within International Business Law in order to ensure a legal and efficient process during their venture within Rwanda and the Democratic Republic of the Congo. Taking ethics and professionalism into account, VW would need to analyse all available opportunities for sourcing cobalt into account, and critically research how they would make use of the wide variety of options available outside of just artisanal operators. The standards and laws most operators in the cobalt sector are bound to need to be respected and cannot be disregarded simply for small conflicting interests.

Below are the positives and negatives of agreeing to the regulations and laws set out by the local mining corporate in order to source a larger supply of cobalt.

Negatives

- The sourcing of cobalt within Rwanda and the DRC would not meet operational standards and requirements if only artisanal siphon operators were utilized to source the main supply of cobalt
- VW could stand to lose reputation within the mining and similar operators within the DRC and Rwanda if they refuse to make use of large suppliers available simply because of a different cost and regulatory difference that can be ratified
- No guarantee can be made for the availability, quantity according to scarcity and supply, quality and demand of cobalt sources and supplies
- Artisanal operators could charge more for their services and operations if they were primarily used as opposed to a more spread out and accessible solution utilizing DRC and Rwandan native suppliers

Positives

- Sourcing from large suppliers with ample stocks of cobalt within DRC and Rwanda would provide increased opportunity for production, marketing, company and industry expansion as well as possibly lowering costs across the board
- Conforming to local standards, regulations and laws will allow better access to the cobalt supply environment, increasing communication and acquisition efficiency
- VW would be able to begin their operations and movements for electric vehicles and similar products in a shorter amount of time
- Costs for suppliers, transport, management and movement could be planned in advance, leaving more time available for other matters concerning the operation and its intricacies

Conclusion

VW would benefit far more by acquiring most cobalt from artisanal miners, who may be able to give us the price that we are looking for, but obtaining the remainder of the cobalt from mining corporates, who’s cobalt will be more expensive but will at least give us the exact quantity required.

KEY RECOMMENDATIONS

- VW should conform to local standards, regulations and laws which would allow them to negotiate better costs, quantity and quality of cobalt as well as supply and demand agreements, therefore jump-starting their electric vehicle and related industries internationally. They should also consider acquiring most of their cobalt from artisanal miners as oppose to mining corporates

4.3. E-Mobility Strategy

Issue 1

VW AG, as part of 'Strategy 2025', needs to source batteries to power the electric vehicles they plan to manufacture. The battery is an important component as its range and lifespan determines the practicality of the car as a whole; if the battery has a low range, the car will be considered impractical. An analysis will be carried out to determine which supplier VW should obtain their batteries from.

Analysis

VW AG has a 5 year contract with Panasonic that will end in July 2021, after which the cost of batteries may increase, considering the increased demand of batteries in recent years. The 6 month contract from Supplier 2 will be unfavourable as new contracts will have to be renegotiated every 6 months; this may result in the costs increasing faster than the rate of inflation. The Just-In-Time inventory management system from Panasonic and Supplier 4 is favourable compared to conventional inventory management as VW will not be put in a

YEAR	2018	2019	2020	2021	2022
Estimated Units Produced (millions)	0.1	0.3	3.5	4.0	4.5
Estimated Avg. Cost to purchase in €	390.0	390.0	390.0	390.0	390.0
Estimated Avg. Shipping Cost in €	5.0	5.0	5.0	5.0	5.0
Estimated Total Purchase Price (million €)	39.0	117.0	1365.0	1560.0	1755.0
Estimated Total Shipping and Transport (million €)	0.5	1.5	17.5	20.0	22.5
Estimated Total Cost (million €)	39.5	118.5	1382.5	1580.0	1777.5

Cost of Capital (i.e. Interest Rate %)	14%					
Present Value of the Cost	34.65	91.18	933.15	935.49	923.18	
TOTAL COST (MILLION €)						**2917.64**

position where they have excessive amounts of batteries lying in storage, where it could be

Panasonic batteries have the longest range and lifespan, and, as seen above, they are the most cost effective supplier for VW AG. However, since Panasonic has been supplying Tesla, they may not be able to supply VW to their demand. But because VW had negotiated a 5 year contract with Panasonic, only ending in 2021, which was cancelled. This should be renegotiated even though this long-term contact may take a large period of time and may incur VW large costs to renegotiate. We therefore recommend that VW AG renegotiates the cancelled contract which they should extend to a 5 year contract

KEY RECOMMENDATION

- We recommend that VW AG renegotiates the cancelled contract which they should extend to a 5 year contract and in the future look to manufacture their own batteries which help them save costs effectively.

4.4. Strategy and cost optimisation

Issue 1

The scenario brought forward brings about an issue regarding the centralization of certain functional units under the authority of the new CEO at Head Quarters to reduce cost of sales, administrative costs and selling costs. The issue being that the centralization of the VW AG has both positive and negative aspects within the company's perspective.

Analysis

Positive Aspects of Centralization

Key Areas	Explanation
BETTER QUALITY DECISION MAKING	Centralized business structures implement a strategy of only granting the CEO, the board of directors and some of the company's most talented leaders. This will ensure that all decisions regarding the company are made by experienced, talented and proficient individuals ensuring that

	the best outcome based on decision making is achieved
REDUCED ADMIN AND OFFICE COSTS	Because the business is centralized and all decisions regarding the business is made by the leadership body of the company and the board of directors which take place primarily at the head office, meaning the need to employ a large administration staff and other office staff is unnecessary and as these are eliminated, costs are saved in the process.
CLEAR LINE OF COMMUNICATIION	Because the workforce required for business decision making is primarily at the head office, it allows for clear communication between the individuals involved and eliminates confusion as all decision making is confined to one branch of VW AG.
FOCUSED VISION AND QUICKER IMPLEMENTATION OF STRATEGIES	The decision making is confined to the executive leaders who make them and to the lower level managers who meet with these executives and elaborate on ways to implement these strategies, because this process is confined to a small group it allows for this process to be free of confusion because of the direct communication. Because of this it means that the process takes a shorter time and increases the efficiency of the business in implementing strategies.

Negative Aspects of Centralization

Key Areas	Explanation
DELAYS IN WORK COMPLETION	If business executives are constantly busy making the decisions of the business and constantly under strain then they are unavailable to help and guide employees of the business with the task at hand. Because reports of the business are sent to this group of individuals, it means that these reports could be held by the executives for longer, holding up the whole work process and thus delaying work completion and the productivity of the employees.
BUREAUCRATIC LEADERSHIP	Only the leadership of the company are entitled to make decisions and put forth their ideas and opinions and the opinions and ideas of other employees are thus disregarded and overlooked. This leads to a dictatorial leadership body within a company where the executives are the only ones making decisions and employees are merely implementing them. Because these executives never implement the strategies as they are constantly under strain of making decisions, employees facing challenges with implementing a particular strategy cannot ask executives for help or guidance as they do not have the experience or know how to do so
EXECUTIVES BECOMING OVERBURDENED	Because the executives of the business are so invested into the decision making of a centralised business. They receive large volumes of work regarding these decisions and thus may become overburdened with authority and management of the company's activities that they no longer can effectively complete other aspects of their job as they no longer have sufficient time to invest into other major business issues. This could lead to a decrease in working efficiency of the company.
UNSUITABLE FOR LARGER	Centralisation may become impractical in large companies with many branches in different locations. It is difficult to communicate managerial

ORGANISATIONS	decisions to different operating levels in the management hierarchy. Top level managers cannot effectively supervise and control all the activities of the organization; it therefore may become impractical for a company on the scale of VW AG.

Solution

The solution that needs to be implemented in order to increase the efficiency of the business is for the business to have a more centralised structure. The proposal of the CEO to centralise the business for an increased profitability is smart as the centralisation of the business is expected to save the business significantly in terms of administration and office costs as well as cost of sales. Centralisation also has many other advantages set forth in the table above, it is therefore recommended that the CEO centralise the business structure

Issue 2

The second issue brought about by the following scenario is the predicament which VW AG faces, as discussed by executives, on whether VW AG should focus primarily on the premium car category production or whether to continue with their current strategy in producing a larger variety of vehicles and catering for a wider market.

Analysis

VW AG is broken up into two divisions and then into different areas, one of these areas being the passenger cars business area in which the vehicles they produce are grouped into many different divisions/brands, these brands are then further classified. VW AG owns a premium car category which is primarily made up of 4 sectors namely: Porsche, Audi, Bentley and Bugatti. The 3 premium car brands which make up a large portion of Volkswagen Group’s car sales is Audi, Bentley and Porsche.

The table below shows how the 3 premium car brands affect VW AG car sales in relation to VW AG as a whole

Name of Category	VW AG as a whole	AUDI	BENTLEY	PORSCHE
No. of Vehicles Sold	10,777,000	1,530,000	11,000	248,000
Sales Revenue generated (€)	€ 230,682,000,000	€ 60,128,000,000	€ 1,843,000,000	€ 21,674,000,000
Operating Profit of vehicles (€)	€ 13,818,000,000	€ 5,058,000,000	€ 55,000,000	€ 4,003,000,000

All figures are taken from VW AG annual report 2017

SALES REVENUE CALCULATION

ALL MONETARY VALUES ARE EXPRESSED IN MILLION €

Premium Car Brand Total Sales Revenue

Total = Audi + Bentley + Porsche = € 60,128+ € 1,843 + € 21,674 = € 83,645 million

% Premium Car Brand Sales of Total Sales Revenue

= (Total Premium Car Sales Revenue ÷ VW AG total Sales Revenue) x 100

= (€ 83,645 ÷ € 230,682) x 100

= 36.3 %

Premium Car Brand Total Operating Profit of Vehicles

Total = Audi + Bentley + Porsche = € 5,058 + € 55 + € 4,003 = € 9,116 million

% Premium Car Brand Operation Profit on Vehicles on Total Operating Profit of VW AG

= (Total Premium Car Operating Profit ÷ VW AG Total Operating Profit on Vehicles) x 100

= (€ 9,116 ÷ € 13,818) x 100

= 66 %

The calculation above reflects that the premium car category makes up roughly 37.3% of the total sales revenue generated by VW AG as a whole in 2017 and as much as 66% of the total Operating Profit earned by VW AG on vehicle sales. This shows that VW does rely heavily on these premium car brands. However, the remaining 63.7% made up of other divisions in the passenger cars business area and the commercial vehicles business area does complete the VW AG company as a whole as this wider variety of automotive vehicles allows VW AG to cater to a larger portion of the market being the domestic vehicles as well as commercial vehicles.

Because of the wide variety of vehicles being produced it creates supply diversity for VW meaning that they do not rely on one business are of vehicles and because of this cannot be defined by only 1 supply and demand curve. This means that if one division is not performing, the business will still be receiving income from other vehicle business area irrespective of the underperforming sector. Because of the variety especially in the pricing of these various vehicle divisions it also gives VW AG market control.

KEY RECOMMENDATIONS

- VW AG should not centralize their business structure as centralization of the business could cause confusion within the business with the sudden change and centralization brings about other disadvantages
- VW AG should continue with their current strategy of manufacturing the larger variety of automotive vehicles instead of solely focusing on supercar production

4.5. Product Portfolio Rationalization

Issue 1

VW AG's supervisory board wants to further re-organise the way passenger car brands, trucks and buses are grouped, in a bid to further increase its development and engineering synergies and improve its competitiveness. The deliberations come as rival carmakers and suppliers, including Fiat and Daimler work on ways to slim down and divest non-core assets. This has been triggered in part by the prospect of a 'no deal' Brexit and global trading concerns arising from tariff wars between the US, China and other trading partners.

Analysis

Calculation (all figures are expressed in € million

GROSS PROFIT MARGIN CALCULATIONS

% GP on sales (gross profit margin) for Volume

= (GP ÷ Sales) x 100

= (- 59.50 ÷ 23,237) x 100

= - 0.26 %

% GP on sales (gross profit margin) for Premium

= (GP ÷ Sales) x 100

= (631.37 ÷ 16,871) x 100

= 3.74 %

% GP on sales (gross profit margin) for Super-premium

= (GP ÷ Sales) x 100

= (7,733.29 ÷ 20,533) x 100

= 37.74 %

The calculation above shows that the Volume segment does have the lowest GP margin. However, it is recommended that the volume segment is rationalised as this is the segment where VW's core brands, such as Polo, Jetta, Amarok, Golf etc., are found. By eliminating such a large segment, the company will lose its main line of business.

There is an urgent need, under the helm of the new CEO of VW AG, to slim down, so to speak, as the company is becoming too complicated with an excessive number of branches, product categories and portfolios. There would be a need to identify which brands and products of the 3 categories are causing losses for the company and therefore cease production of these to make room for new, more profitable product categories. There is also a need to reduce the price of volume range in key emerging markets in order to maximise marketing efficiency and product returns.

Goldman Sachs has identified billions worth of hidden value that could be unlocked through product portfolio rationalization. This is imperative to VW AG to remain competitive in the market and always be steps ahead of its competitors through new, interesting and marketable products as well as a better range of products. A full breakdown of current costs and the different portfolios currently in use would be necessary to conduct this procedure appropriately and efficiently.

- The first proposal by VW AG is to reduce the price of the Volume range in emerging markets. This means that more units will have to be produced in order for VW to be profitable or at least to break even, because by reducing the price, the break even point increases.

  BEP (break even point) for volume segment
  = ((3550.45 ÷ (3490.95 ÷ 2015))
  = 2049.34 million cars

  The current BEP is 2049.34 million cars. Thus, by decreasing the price, you will increase the BEP, but will increase the sales volume, this will offset each other, and there is a strong likelihood that volume segment will start making a gross profit instead of loss
- The second proposal is for VW AG to investigate which car models are making a loss and then cease production of these vehicles. This seems unpractical as if a vehicle model is underperforming in the year it will not be produced anymore. The market is constantly changing along with the demand from consumers. If consumers eventually change the demand to a model that has stopped production, this demand cannot be met and as a result, consumers will be forced to go to competitors to supple their demand.

KEY RECOMMENDATIONS

- We recommend that the board go with proposal 1, reducing the price of the volume range in an emerging market, it could attract more consumers because of the lower price, and this could encourage consumers to buy these vehicles leading to an influx of sales and higher revenue for the business. We also suggest that VW rationalize the volume segment.