

Name:
Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

Online End Semester Examination, December 2020

Course: Introduction to Automotive Industry
Program: BBA (AM)
Course Code: MKTG2003

Semester: III
Time 03 hrs.
Marks: 100

SECTION A
(30 marks)

1. There are **SIX** questions in this section. All are compulsory.
2. Each question carries equal marks
3. Instruction: Answer the questions as “True” OR “False”

Q.No	Question	CO
1	Henry Ford started his first motor vehicle company in 1899. It was called the Detroit Automobile Company. Is this statement True or False?	1
2	The Nissan Leaf is the top-selling electric car in the world. Is this statement True or False?	2
3	Car and Petrol are substitutes. Is this statement True or False?	3
4	The commonly used automotive abbreviation ABS stands for Anti-lock Block System. Is this statement True or False?	4
5	The primary difference between a hybrid car and an electric car is that the hybrid car derives some of its power from a conventional gasoline engine. On the other hand, a true electric car gets all of its power from electrical sources and thereby is a completely non-polluting zero-emission vehicle (ZEV). Is this statement True or False?	1
6	Garbage trucks, concrete mixers, etc., including mobile machineries like forklift trucks, wheel loaders, and agricultural equipment are the Multipurpose passenger vehicles. Is this statement True or False?	2

SECTION B
(70 Marks)

1. There is only **ONE** Case Study in this section.
2. Instruction: Solve the case as per the Case Analysis Guidelines.

Q.No	Case Study	CO
7.	Analyze the following case:	4

VOLKSWAGEN GROUP: ADAPTING IN THE AGE OF AI¹

Duan Yang wrote this case under the supervision of Professors Ning Su and Yulin Fang solely to provide material for class discussion. The authors do not intend to illustrate either effective or ineffective handling of a managerial situation. The authors may have disguised certain names and other identifying information to protect confidentiality.

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Becoming a “world-leading provider of sustainable mobility:” that was the ambition. In mid-2016, the Volkswagen Group (VW Group) revealed its vision for the company’s future with the announcement of Together–Strategy 2025, “the biggest change process” the company had ever initiated.² While acknowledging the overall success of Strategy 2018, the strengths of which had included unique innovation capability, robust finance, and strong customer confidence,³ the established automaker set its eyes on a comprehensive transformation in response to rapid changes in the automotive industry. The VW Group made it clear that innovation and technology would be essential enablers for a successful new strategy, especially in the areas of business transformation and mobility solution development (see Exhibits 1 and 2).⁴

Note to the Participant: In this exercise, you are expected to take full advantage of the emerging information technologies, especially artificial intelligence (AI), to help the VW Group achieve its long-term ambition. Serving this purpose, your team has been tasked with planning a feasible priority initiative that could comprehensively facilitate the company’s evolution. The company executives will be open to hearing innovative yet practical initiatives from you and your competitors at an upcoming meeting.

COMPANY BACKGROUND

The VW Group was founded in Wolfsburg, Germany, in 1937. As a state-owned company, it had focused on the design and production of a small-engined, economical vehicle for the mass market. However, the outbreak of World War II meant that this mass production did not begin until 1946. As the company’s operations resumed in the 1950s and 1960s, backed by a surge in sales both at home and abroad, the company grew quickly through acquisitions. At the beginning of 1965, the VW Group acquired Auto Union GmbH from Daimler-Benz AG, an acquisition that marked the initiation of the VW Group’s multi-brand development strategy. In 1969, the company acquired another German automobile manufacturer, NSU

¹ This case has been written on the basis of published sources only. Consequently, the interpretation and perspectives presented in this case are not necessarily those of Volkswagen Group or any of its employees.

² Volkswagen AG, *Shaping the Transformation Together: Annual Report 2017*, 152, 51, 2018, accessed April 17, 2019, https://web.archive.org/web/20181212151544/www.volkswagenag.com/en/InvestorRelations/strategy/Strategy_2025.html.

³ “Strategy 2025,” Volkswagen AG, accessed April 17, 2019, www.volkswagenag.com/en/InvestorRelations/strategy/Strategy_2025.html.

⁴ Volkswagen AG, *Shaping the Transformation Together: Annual Report 2017*, op. cit., 51–53.

Motorenwerke AG, and merged it with Auto Union GmbH, creating a new subsidiary called Audi NSU Auto Union AG, today's Audi AG.⁵

Early in the 1970s, the VW Group expanded its lineup with some of its best-selling models, including the Passat, the Polo, the Jetta, and the Golf (see Exhibit 3).⁶ The 1980s and early 1990s witnessed the company's development through new brands and in new markets. The VW Group further enriched its brand portfolio with the acquisitions of Spanish car maker SEAT SA in 1986 and Czech car maker Škoda Auto in 1991. The company also established joint ventures in China and cooperation agreements with multiple automobile manufacturers, including Nissan Motor Co. Ltd., Ford Motor Company, and Toyota Motor Corporation,⁷ which gave the company access to promising markets in various developing countries. Specifically, the joint ventures in China laid solid foundations for the VW Group's substantial development in the region over the next 33 years. With the number of vehicles sold and produced in China both exceeding 4.1 million in 2018,⁸ the VW Group had already seized a considerable share in its biggest single-country market.

In the 1990s, the VW Group continued to enrich its selection of brands with the formation of Volkswagen Commercial Vehicles (VWCV) and the acquisitions of Bentley Motors Ltd., Lamborghini, and Bugatti Automobiles. These acquisitions also enabled the company to extend its business to the luxury vehicle segment. During this period, the VW Group also consolidated its financial services business—which included leasing, banking, and insurance—and created an independent subsidiary, Volkswagen Financial Services AG, to manage its financial service operations.⁹

In the new century, the VW Group continued its steady pace of globalization and expansion. The acquisitions of Scania AB in 2008 and MAN SE in 2011 enabled the company to create a commercial vehicles group consisting of these two leading commercial vehicle manufacturers as well as VWCV. In 2012, a merger with Porsche AG and the acquisition of Ducati Motor Holding SpA further enhanced the company's presence in the high-end vehicle market.¹⁰ As of 2018, the VW Group owned a portfolio of 12 brands that covered a wide spectrum of passenger and commercial vehicles. In 2018, with a sales revenue of €236 billion¹¹ generated by its operations in 153 countries and regions, the VW Group was an indisputable leader in the global automotive industry.¹²

CURRENT ORGANIZATION

In 2018, the VW Group had two business divisions, the automotive division and the financial services division (see Exhibit 4). The automotive division, consisting of three major business areas—passenger cars, commercial vehicles, and power engineering—was responsible for the development, production, and sales of vehicles, engines, and other vehicle components and machinery. The financial services division, on the

⁵ "1961–1972: Boom and Crisis in the One-Product Business," Volkswagen AG, accessed April 17, 2019, www.volkswagenag.com/en/group/history/chronicle/1961-1972.html.

⁶ "1973–1981: The Shift to Models with Water-Cooled Engines," Volkswagen AG, accessed April 17, 2019, www.volkswagenag.com/en/group/history/chronicle/1973-1981.html.

⁷ "1982–1991: New Brands, New Markets," Volkswagen AG, accessed April 17, 2019, www.volkswagenag.com/en/group/history/chronicle/1982-1991.html.

⁸ Volkswagen AG, *Full Speed Ahead to the Future: Annual Report 2018*, 51–53, 2019, accessed April 17, 2019, www.volkswagenag.com/presence/investorrelation/publications/annual-reports/2019/volkswagen/en/Y_2018_e.pdf.

⁹ "1992 until Today: Globalisation of the Mobility," Volkswagen AG, accessed April 17, 2019, www.volkswagenag.com/en/group/history/chronicle/1992-2014.html.

¹⁰ *Ibid.*

¹¹ € = euro; €1 = US\$1.1443 on December 31, 2018; all currency amounts are in € unless otherwise specified.

¹² "Portrait & Production Plants: The Volkswagen Group," Volkswagen AG, accessed April 17, 2019, www.volkswagenag.com/en/group/portrait-and-production-plants.html.

other hand, provided a wide range of financial services, including dealer and customer financing, vehicle leasing, direct banking, insurance, fleet management, and mobility offerings.¹³

In 2018, the VW Group became the world's top-selling vehicle manufacturer for five consecutive years in terms of sales volume, selling 10.9 million¹⁴ vehicles around the world.¹⁵ In 2018, the Volkswagen Passenger Car remained the most popular brand within the VW Group, accounting for 34.08 per cent (3.715 million units) of total sales. Audi, Škoda, and SEAT ranked second, third, and fourth, contributing 1.467 million, 957 thousand, and 608 thousand units, respectively, to the company's total sales in 2018 (see Exhibit 5). Over 84 per cent of the VW Group's sales were from Europe (about 4.739 million units) and Asia-Pacific (about 4.64 million units, including sales of VW China), while the North American and South American markets (about 925,000 units and about 596,000 units, respectively) accounted for the rest.¹⁶ In 2018, the company was also the best-selling automaker in terms of sales revenue,¹⁷ ahead of Toyota Motor Corporation's €226 billion.¹⁸ The VW Group had an impressive after-tax profit of €12.153 billion for the year, a 6 per cent increase compared to the 2017 figure (see Exhibit 6).¹⁹

While it had enjoyed strong financial and sales performance, the VW Group also experienced major troubles in recent years. In September 2015, the United States Environmental Protection Agency (EPA) issued a notice of violation revealing that the VW Group had intentionally installed undisclosed management software on various Volkswagen and Audi vehicle models since 2009 to control the vehicles' performance in regulatory tests of nitrogen oxide (NO_x) emissions, which meant that test results differed substantially from results generated under real driving conditions (up to 40 times more).²⁰ The company later admitted to the existence of the issue and announced that it would be "working intensively" to clarify the irregularities.²¹ External investigations commenced shortly after the emissions scandal, as did extensive internal inquiries to review the relevant processes, reporting and control systems, and management infrastructure. The scandal led to a US\$2.8 billion fine in April 2017²² and a series of criminal indictments in May 2018 that involved managers and executives.²³ With around 11 million vehicles affected,²⁴ the VW Group consequently announced a worldwide recall plan to provide hardware and software fixes to the affected vehicles; the massive recall was still in progress at the end of 2018. The scandal resulted in a total loss of €29 billion for the VW Group from 2015 to 2018.²⁵

¹³ Ibid.

¹⁴ Volkswagen AG, *Full Speed Ahead to the Future: Annual Report 2018*, op. cit., 22.

¹⁵ "Renault-Nissan Group Sold Most Cars Last Year, but VW's No.1 Including Trucks," Reuters, January 30, 2019, www.reuters.com/article/us-automakers-sales-japan/renault-nissan-group-sold-most-cars-last-year-but-vws-no-1-including-trucks-idUSKCN1P00R1.

¹⁶ Volkswagen AG, *Full Speed Ahead to the Future: Annual Report 2018*, op. cit., 23.

¹⁷ Statista, "Revenue of the Leading Car Manufacturers Worldwide 2018," Statista, 2019, accessed April 17, 2019, www.statista.com/statistics/232958/revenue-of-the-leading-car-manufacturers-worldwide.

¹⁸ Volkswagen AG, *Full Speed Ahead to the Future: Annual Report 2018*, op. cit., 22; Toyota Motor Corporation, *Annual Report 2018*, 48, 2019, accessed April 17, 2019, <https://global.toyota/en/ir/library/annual>; This figure was equivalent to 29,379.5 billion Japanese yen (¥), based on a conversion rate of ¥130 = €1, according to the company's annual report.

¹⁹ Volkswagen AG, *Full Speed Ahead to the Future: Annual Report 2018*, op. cit.

²⁰ "Learn about Volkswagen Violations," United States Environmental Protection Agency, February 4, 2019, accessed April 17, 2019, www.epa.gov/vw/learn-about-volkswagen-violations.

²¹ Volkswagen AG, *Moving People: Annual Report 2015*, 49–54, 2016, accessed April 17, 2019, www.volkswagenag.com/presence/investorrelation/publications/annual-reports/2016/volkswagen/englisch/Y_2015_e.pdf.

²² Christina Rogers and Mike Spector, "Judge Slaps VW with \$2.8 Billion Criminal Fine in Emissions Fraud," *Wall Street Journal*, April 21, 2017, accessed April 17, 2019, www.wsj.com/articles/judge-slaps-vw-with-2-8-billion-criminal-fine-in-emissions-fraud-1492789096.

²³ Jack Ewing, "Ex-Volkswagen C.E.O. Charged with Fraud over Diesel Emissions," *New York Times*, May 3, 2018, accessed April 17, 2019, www.nytimes.com/2018/05/03/business/volkswagen-ceo-diesel-fraud.html.

²⁴ Volkswagen AG, *We Are Redefining Mobility: Annual Report 2016*, 91–97, 2017, accessed April 17, 2019, www.volkswagenag.com/presence/investorrelation/publications/annual-reports/2017/volkswagen/en/Y_2016_e.pdf.

²⁵ Volkswagen AG, *Full Speed Ahead to the Future: Annual Report 2018*, op. cit., 92–94.

TOGETHER–STRATEGY 2025

With the announcement of Together–Strategy 2025, the VW Group initiated a grand transformation to secure its position in tomorrow’s world of mobility. For its new corporate strategy, the VW Group set its eyes on four key components: transforming its core business, building the mobility solution business, strengthening innovation power, and securing funding (see Exhibit 1).²⁶

Aiming at developing several new competencies that would be vital for the future, the company had set over a dozen major initiatives in motion. Specifically, the company had set up an ambitious goal in electric vehicles: offering more than 30 new pure battery-powered electric vehicles and achieving annual unit sales of 2–3 million electric cars by 2025. This goal was equivalent to 20 to 25 per cent of its total sales, and would thereby make the e-car a new hallmark for the company, which was positioning itself as a driving force behind the expansion of electro-mobility. The VW Group was also working on autonomous vehicles and was determined to cover all relevant market segments and develop self-driving systems in-house.²⁷ It had laid grand plans for its development in mobility solutions through the establishment of a new, independent subsidiary named MOIA, which would provide customized transport solutions worldwide.²⁸ The VW Group expected MOIA to be a leader in mobility solutions and to generate billion-dollar sales revenue by 2025.

The VW Group made it clear that innovations would be of paramount importance to the success of its forward-looking strategy. The company had been investing significantly on research and development (R&D) activities to enhance its competitiveness and prepare itself for the future. Since 2014, the company had been spending over €12 billion annually on R&D activities, making itself a top R&D spender in the world.²⁹

In order to finance the future-proofing investments in Together–Strategy 2025, the company emphasized improvements in operational efficiency. In particular, the VW Group envisioned significant reductions to the costs of capital expenditures; R&D; and selling, general and administrative expenses relative to its sales revenue. Additionally, the company set a list of key performance indicators, including net cash flow, net liquidity, and return on investment, which would be used to monitor and to evaluate the growth in its profitability. Specifically, the company was aiming for a 7–8 per cent operating return-to-sales revenue ratio by 2025 (the ratio for 2015 was 6 per cent).³⁰

THE PROMISE OF ARTIFICIAL INTELLIGENCE

One technology that led to heated discussions was AI, which a PwC report defined as a “a collective term for computer systems that can sense their environment, think, learn, and take action in response to what they’re sensing and their objectives.”³¹ According to PwC, the application of AI could be further classified into four categories: automated intelligence, which focused on the automation of tasks; assisted intelligence, which could help with work efficiency; augmented intelligence, which could support the decision-making

²⁶ Volkswagen AG, Full Speed Ahead to the Future: Annual Report 2018, op. cit., 51–53.

²⁷ Volkswagen AG, New Group Strategy Adopted: Volkswagen Group to Become a World-Leading Provider of Sustainable Mobility, 3–4, press release, June 16, 2016, accessed April 17, 2019, <https://web.archive.org/web/20181212151544/http://www.volkswagenag.com/presence/investorrelation/events/2016/strategie-2025/Press+Release.pdf>.

²⁸ “MOIA—the Volkswagen Group’s New Mobility Services Company,” Volkswagen AG, December 5, 2016, accessed April 17, 2019, www.volkswagenag.com/en/news/stories/2016/moia_the_volkswagen_groups_new_mobility_services_company.html.

²⁹ “The 2018 Global Innovation 1000 Study,” Strategy&, accessed April 17, 2019, www.strategyand.pwc.com/innovation1000.

³⁰ Volkswagen AG, Full Speed Ahead to the Future: Annual Report 2018, op. cit.

³¹ Chris Curran and Anand Rao, “Briefing: Artificial Intelligence,” PwC: Next in Tech (blog), January 22, 2018, accessed April 17, 2019, <http://usblogs.pwc.com/emerging-technology/briefing-ai/>.

process; and autonomous intelligence, which was capable of making decisions automatically.³² AI had been widely applied across various industries in forms including robotic process automation, machine learning, and natural language processing. Enterprises had been actively exploring the application of AI as an enabler for innovation and productivity in different dimensions of business operations.

The VW Group held a strongly positive attitude towards the application of AI. In late 2013, the company set up a research centre called Data:Lab Munich, which was tasked with undertaking dedicated research and application development on AI, automotive data science, and machine learning. The company planned to apply AI technologies in areas such as data analytics, production automation, as well as customer service. On the company's involvement in AI research, Martin Hofmann, chief information officer of the Volkswagen Group, commented, "We assess every single AI-based application to see how helpful it can be. . . . Our aim is to use AI to provide even better support for our teams at factories and offices. Because that will generate lasting benefits for the entire company."³³

PREPARING FOR THE UPCOMING EXECUTIVE MEETING

Note to the Participant: Your team is expected to devise and present an initiative that could considerably boost the company's development to achieve the goals in Together-Strategy 2025. Artificial intelligence should hold a major significance in the initiative. The presentation should comprise an initiative outline, a demonstration of expected advantages, a proposed budget summary, and a brief plan for implementation. It should also list potential risks along with plans for mitigating these risks. The executives will assess each initiative they receive and will single out the most promising one before revealing the selection rationale at the end of the meeting.

³² Ibid.

³³ "Learning to Learn," Volkswagen AG, accessed April 17, 2019, www.volkswagenag.com/en/news/stories/2018/11/learning-to-learn.html.

EXHIBIT 1: VOLKSWAGEN GROUP STRATEGY 2025

With the future program TOGETHER–STRATEGY 2025 announced in 2016, we aim to make the Volkswagen Group more focused, efficient, innovative, customer-oriented and sustainable, and systematically geared towards generating profitable growth. The program creates the framework and lays the cornerstones for us to achieve our vision of being one of the world's leading providers of sustainable mobility. . . .

Our Group strategy comprises a raft of far-reaching strategic decisions and specific initiatives aimed at safeguarding the long-term future and generating profitable growth. It is composed of four building blocks which cover strategic Group initiatives. We regularly review the progress of these initiatives so as to analyze the significance, suitability and target achievement of the measures defined. We are thus able to adjust the Group initiatives specifically according to the dynamic changes occurring within our Company.

The first of these is the transformation of the core automotive business. Developing, building and selling vehicles will remain essential for the Volkswagen Group going forward. However, there will be far-reaching and lasting changes to this business in the future. That is the reason why we are comprehensively restructuring our core business to face this new era of mobility.

The second key building block in our Group strategy is establishing a new mobility solutions business. In this business, we are developing innovative and efficient, attractive yet profitable mobility services that are tailored to customer requirements with the goal of being one of the leading providers in this growth market in the future.

With the third key building block, we are intensifying our traditionally excellent innovative strength and placing it on an even broader footing. This is necessary both for the transformation of our core business and for the establishment of the new mobility solutions business. To this end, we are pushing ahead with the digital transformation in all parts of the Company.

Becoming one of the world's leading providers of sustainable mobility calls for substantial capital expenditure. This will be financed in particular through efficiency gains along the entire value chain—from product development and procurement through to production and distribution as well as in the central supporting areas. Additional funds for future investment can also be generated by optimizing the existing portfolio of brands and equity investments. Through the fourth key building block of the Group strategy we will safeguard the financing of the Volkswagen Group and place it on a solid basis. . . .

Building Blocks and Strategic Group Initiatives

Transform Core Business

- Sharpen positioning of brands
- Develop successful vehicle and drivetrain portfolio
- Partner with regional players to win in economy segment
- Streamline modular toolkits
- Implement model line organization
- Realign "Components" business
- Develop battery technology as new core competency
- Develop self-driving system for autonomous vehicles and artificial intelligence
- Develop best-in-class user experience across brands and customer touchpoints

Build Mobility Solutions Business

- Establish mobility solutions business
- Develop and expand attractive and profitable smart mobility offering

Strengthen Innovation Power

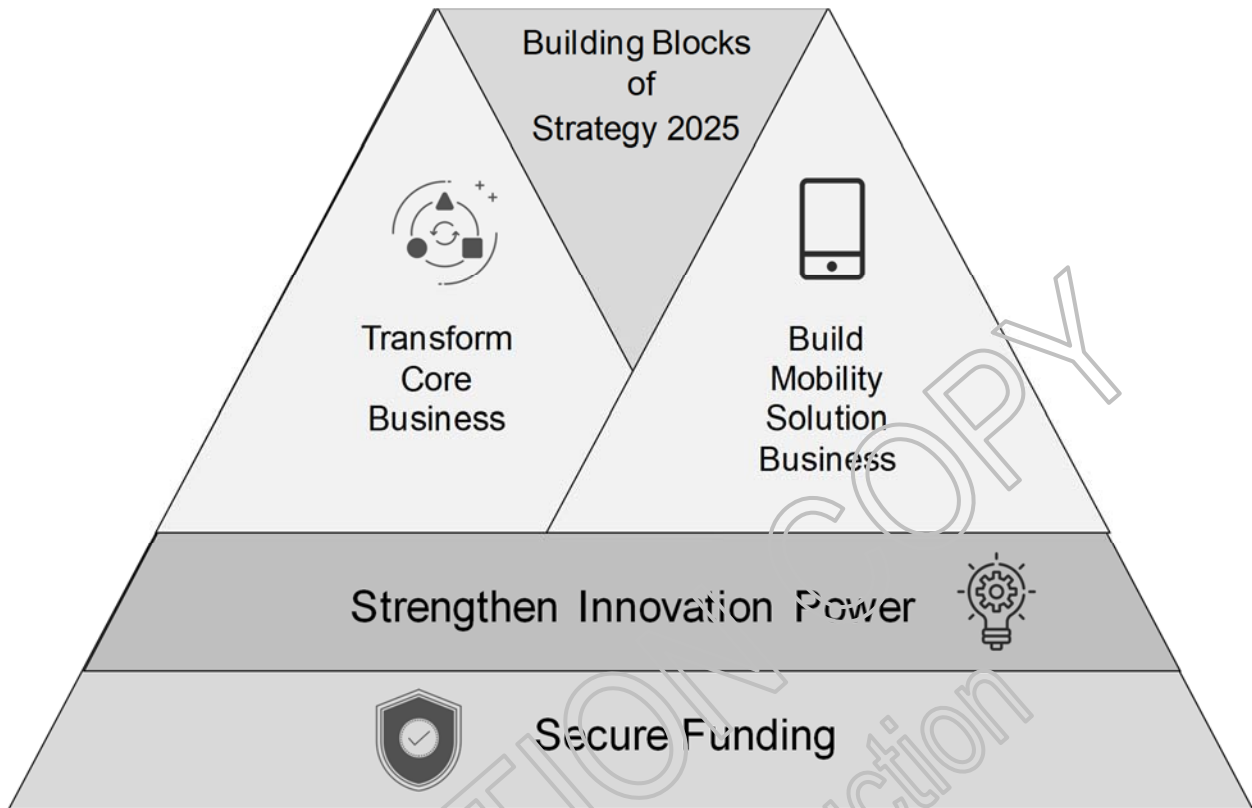
- Drive digital transformation
- Create organization 4.0

Secure Funding

- Improve operational excellence
- Optimize business portfolio
- Integrate strategy and planning process

Source: Excerpted from Volkswagen AG, *Full Speed Ahead to the Future: Annual Report 2018*, 51–52, 2019, accessed April 17, 2019, www.volkswagenag.com/presence/investorrelation/publications/annual-reports/2019/volkswagen/en/Y_2018_e.pdf.

EXHIBIT 2: VOLKSWAGEN GROUP, TOGETHER-STRATEGY 2025 BUILDING BLOCKS



Source: Created by the case authors based on information from Volkswagen AG, *Full Speed Ahead to the Future: Annual Report 2018*, 52, 2019, accessed April 17, 2019, www.volkswagenag.com/presence/investorrelation/publications/annual-reports/2019/volkswagen/en/Y_2018_e.pdf.

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**EXHIBIT 3: VOLKSWAGEN PASSENGER CARS—WORLDWIDE PRODUCTION BY VEHICLE TYPE,
2018 VERSUS 2017**

Model	Units Produced in 2018	Units Produced in 2017
Tiguan	861,331	769,870
Polo/Virtus	855,179	755,506
Golf	805,752	968,284
Jetta/Sagitar	770,447	883,346
Passat/Magotan	656,249	660,996
Lavida	513,556	507,574
Santana	272,080	293,313
Bora	272,080	293,313
T-Roc	236,977	22,724
Atlas/Teramont	166,034	129,724
Gol	156,410	203,148
Lamando	141,076	138,943
up!	136,512	158,795
Touran	130,417	144,676
Saverio	59,233	66,431
Arteon/CC	49,735	37,972
Fox	40,596	50,739
Touareg	40,387	42,407
Beetle	37,846	59,483
Sharan	30,459	45,695
Tharu	26,986	—
Phideon	24,102	13,014
Suran	16,356	21,093
Scirocco	—	8,199
Total	6,297,110	6,316,832

Source: Created by the case authors using data from Volkswagen AG, *Full Speed Ahead to the Future: Annual Report 2018*, 25, 2019, accessed April 17, 2019, www.volkswagenag.com/presence/investorrelation/publications/annual-reports/2019/volkswagen/en/Y_2018_e.pdf.

**EXHIBIT 5: VOLKSWAGEN GROUP—SALES BY BRAND, 2018 VERSUS 2017
(THOUSANDS OF VEHICLES)**

Brand/Business Field	Units Sold in 2018	Units Sold in 2017
Volkswagen Passenger Cars	3,715	3,573
Audi	1,467	1,530
Škoda	957	937
SEAT SA	608	595
Bentley Motors Ltd.	10	11
Porsche AG	253	248
Volkswagen Commercial Vehicles	469	498
Scania AB	97	92
MAN SE Commercial Vehicles	137	114
Volkswagen Group China	4,101	4,020
Other	(912)	(840)
Volkswagen Group	10,900	10,777

Source: Created by case authors using data from Volkswagen AG, *Full Speed Ahead to the Future: Annual Report 2018*, 23, 2019, accessed April 17, 2019, www.volkswagenag.com/presence/investorrelation/publications/annual-reports/2019/volkswagen/en/Y_2018_e.pdf.

**EXHIBIT 6: VOLKSWAGEN GROUP INCOME STATEMENT, JANUARY 1 TO DECEMBER 31, 2018
(€ MILLIONS)**

	2018	2017
Sales Revenue	235,849	229,550
Cost of Sales	(189,500)	(186,001)
Gross Result	46,350	43,549
Distribution Expenses	(20,510)	(20,859)
Administration Expenses	(8,819)	(8,126)
Other Operating Income	11,631	11,514
Other Operating Expenses	(14,731)	(12,259)
Operating Result	13,920	13,818
Share of the Result of Equity-Accounted Investments	3,369	3,482
Interest Income	967	951
Interest Expenses	(1,547)	(2,317)
Other Financial Result	(1,066)	(2,262)
Financial Result	1,723	(146)
Earnings Before Tax	15,643	13,673
Income Tax Income/Expense	(3,489)	(2,210)
Earnings After Tax	12,153	11,463
Of Which Attributable to		
Noncontrolling Interests	17	10
Volkswagen AG Hybrid Capital Investors	309	274
Volkswagen AG Shareholders	11,827	11,179

Source: Created by case authors using data from Volkswagen AG, *Full Speed Ahead to the Future: Annual Report 2018*, 115, 2019, accessed April 17, 2019, www.volkswagenag.com/presence/investorrelation/publications/annual-reports/2019/volkswagen/en/Y_2018_e.pdf.