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**VOLKSWAGEN Strategy 2025: SHIFTING GEARS In DISRUPTIVE TIMES[[1]](#endnote-1)**

Professor Andreas Schotter, Tom Watson, and R. Chandrasekhar wrote this case 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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On April 13, 2018, Herbert Diess, the newly appointed chief executive officer (CEO) of Volkswagen Group (VW), renewed the company’s commitment to an ongoing plan meant to radically transform the German automaker by 2025.[[2]](#endnote-2) The plan, titled “TOGETHER—Strategy 2025,” (Strategy 2025) had been originally unveiled in June 2016 by Matthias Müller who had taken over as the CEO of VW in September 2015. In a dramatic turn of events on April 12, 2018, and following increasing external and internal pressures, Müller had stepped down from his post.[[3]](#endnote-3) Diess replaced him the very next day amid hopes that the “long-awaited and far-reaching reforms at VW may finally be around the corner.”[[4]](#endnote-4)

Strategy 2025 was designed to reshuffle existing formal and informal structures of VW so that it would turn into a nimble, agile, and innovative corporation, able to face up to the realities of mobility in the digital age. VW wanted to be ready to take on not only its traditional rivals among the “Big Six global automakers,”[[5]](#endnote-5) who were themselves in transformation mode, but also technology firms entering the auto sector, including the likes of Apple Inc. (Apple), Google Inc. (Google), and Uber Technologies Inc. (Uber).

VW had done well with Strategy 2018, which was launched a decade earlier and focused on multi-brand market segmentation, common cross-brand vehicle platforms, and so-called green-diesel technology. But its achievements had been overshadowed by a blockbuster crisis that hit the company in September 2015. The United States Environmental Protection Agency exposed VW for secretly deploying software meant to defeat emissions tests in millions of turbocharged diesel engines. As the full outcome of “Dieselgate” (as the scandal was known) was still unknown by 2018, the executive team of VW, led by Diess, had to devise a viable execution plan for Strategy 2025. Major questions remained regarding the potential for radically transforming the core business model and whether or not VW would become a more agile organization.

COMPANY BACKGROUND

VW was founded in 1937, in the city of Wolfsburg, in the northwest German state of Lower Saxony, by members of the German Labour Front (Deutsche Arbeitsfront), an organization of the Nazi government. In tune with its German name, which translated into “people’s car,” VW’s mandate was to design a car that could be mass-produced to feed the country’s then burgeoning road network, carry two adults and three children, move at a speed of 100 kilometres per hour, and cost no more than a motorbike at the time.[[6]](#endnote-6)

After the Second World War, VW embodied West Germany’s acclaimed “economic miracle,” with its cars acquiring a reputation for quality and reliability. VW’s first product went on to become an iconic brand. It was affectionately called the “Beetle” by the public because of its bug-like rounded body design. VW soon launched a new generation of successful front-wheel drive vehicles. Later, the company grew largely by acquisitions with, for example, German Auto Union in 1964, which subsequently became Audi; SEAT in 1986; Czech Skoda in 1994; Porsche in 2009; and Swedish truck company Scania, Bentley, Lamborghini, and Ducati Motorcycles in 2012. The company also resurrected the Bugatti brand in 2012.[[7]](#endnote-7) By 2018, there were 12 independently managed automotive brands in Volkswagen AG (the VW Group) with a total of 355 models. Volkswagen was the flagship brand and its largest business division. Europe was the largest market by revenue (see Exhibit 1).

Starting in the 1990s, the VW Group implemented an elaborate vehicle platform system enabling the sharing of common core components across brands. For example, the VW Touareg sport utility vehicle (SUV) provided the platform for the Audi Q7, the Porsche Cayenne, and even the super luxury Bentley Bentayga, which had a price tag starting at almost $250,000.[[8]](#endnote-8) The shared platforms allowed for shared components, including seat frames; heating, ventilation and air-conditioning modules; engine-transmission combinations; electronic modules; and electrical architectures. The group’s factories worldwide were equipped to make vehicles, regardless of the brand, based on predetermined platforms. The platforms were regularly upgraded, leading to substantial spikes in investments. Morgan Stanley estimated that the most recent platform generation implementation, completed in 2013, had cost VW $70 billon with an estimated savings potential of $19 billion per year by 2019. The expectation was that VW would reduce its component costs by 20 per cent and the time required to launch a new car by one fifth, when compared to the prior platform generation.[[9]](#endnote-9)

VW’s main value proposition was that its vehicles were not only well-engineered and fuel-efficient but also environmentally friendly. They were powered by diesel engines that had a lower per mile fuel consumption of up to 40 per cent compared with regular gasoline engines. This strategy worked well in Europe where diesel vehicles comprised 50 per cent of auto sales. These numbers were in stark contrast to North America where diesel vehicles comprised only 3 per cent of auto sales. Diesel was cheaper in Europe than regular gas and of a premium quality compared with the fuel available in North America. In the United States, VW was a relatively minor player, with imports inching slowly toward 100,000 units annually by 2009.[[10]](#endnote-10) In addition, a strong euro combined with a weak US dollar were eroding profitability from around 2005. Many industry watchers were beginning to predict VW’s retreat from North America.

However, VW’s leadership believed a volume strategy was the only solution to the company’s American woes.[[11]](#endnote-11) It called for increasing the annual sales in the United States, across all brands, to 1 million units no matter what. The goal was part of a much broader decade-long plan, unveiled on the eve of the Great Recession in 2007 by Martin Winterkorn, VW’s then CEO. Known as “Strategy 2018,” the plan was aimed at reaching the top of the global auto industry, surpassing both General Motors and Toyota, and transforming VW into “the world’s most profitable, fascinating and sustainable automobile manufacturer.”[[12]](#endnote-12) VW had sold 6.2 million passenger cars and commercial vehicles worldwide in 2007 with pre-tax profit of 6.2 per cent. Winterkorn sought annual sales of 10 million vehicles and a pre-tax profit of 8 per cent or higher by 2018. He also aimed for the top spot in two performance indices—employee productivity and customer satisfaction. “Only an automaker who can achieve all these goals,” he said, “can really call itself number one. . . .”[[13]](#endnote-13)

The plan was daring but, as it turned out, it was also a complete success. VW crossed the 10-million units mark in 2014 (see Exhibit 2), four years ahead of schedule, although the success had come at a cost. Under Winterkorn, VW had set out on its biggest ever spending spree, investing $80 billion in 10 new plants (including seven in China). The company also launched many new products, ranging from an American-style SUV designed and manufactured in a new plant at Chattanooga in the southeastern US state of Tennessee, to a $9,000 starter vehicle for emerging markets. It had invested in technologies such as plug-in diesel hybrids and advanced digital control and infotainment systems. Investment spending reached an all-time high of 15 per cent of sales in 2015. Consequently, VW’s profitability was nowhere close to that of Toyota, which had reached the 10-million-car production level with half the 624,000 people VW employed. VW’s headcount made it the world’s fifth-largest publicly traded employer. No other carmaker made the list of the 15 largest employers.[[14]](#endnote-14) The company’s “bloated”[[15]](#endnote-15) workforce was affecting profitability, reaching an amount equal to 17 per cent of total sales (see Exhibit 3).

In 2017, VW pleaded guilty to charges of conspiracy to commit wire fraud, customs violations, and obstruction of justice, as well as violating the *Clean Air Act* of the United States in a decade-long diesel-emissions cheating scandal. The company admitted that it used “defeat software,” on 11 million cars worldwide, including half a million cars sold in the United States. The software could identify whether a car was being driven on the open road or tested during an emissions check.[[16]](#endnote-16) VW set aside €16.2 billion[[17]](#endnote-17) to cover restitution costs in its financials for the year 2015 and consequently posted a loss of €4.1 billion, its first negative annual result since 1993. A senior VW executive was sentenced to seven years in prison.

The public backlash was immediate. The *New York Times* commented that the auto sector had a “tradition of dishonesty,” but that “few schemes appear as premeditated as VW’s brazen scam.”[[18]](#endnote-18) Although heads rolled with the brand development chief’s resignation, the heads of research and development (R&D) at Audi and Porsche divisions suspended, and Winterkorn forced to resign as CEO, VW greatly mismanaged the crisis. The board and interim leadership blamed “rogue engineers” for installing the defeat software after the engineers had failed to deliver diesel products that could meet US emission standards. Insiders noted, however, that typically nothing of a technical nature happened at VW without senior executive awareness. They also wondered how two separate design teams working at different locations could come up with the same solution.[[19]](#endnote-19)

Remarkably, Dieselgate’s medium-term impact on VW’s sales was much less than generally expected. In 2015, for example, while total sales volume declined by only 2 per cent, unit sales in the US and European markets increased by 4.4 per cent and 2.6 per cent, respectively.[[20]](#endnote-20)

Investors pushed up VW stock 1.7 per cent following news of the US settlement, indicating that the market no longer feared the scandal’s costs or a VW collapse.[[21]](#endnote-21) While the long-term effects were unclear, Dieselgate had exposed two weaknesses of the company—governance structure and corporate culture.

**Governance Structure:** It was evident that internal processes lacked oversight. The workflows for approving the software for engine management, for example, did not have built-in accountability and clear lines of authority.

VW had a two-tier board structure. Its management board consisted of senior executives whose pay packages had a large variable component linked to short-term metrics such as sales growth and operating profits rather than to long-term shareholder value. For example, in 2014 Winterkorn was paid €16 million with only 12 per cent comprising fixed compensation. The supervisory board was staffed with members appointed by major shareholders and worker representatives with the objective of overseeing the management board. Employees and unions held the right to nominate 10 directors. The extended Porsche families (Porsche and Piëch), which controlled more than 50 per cent of VW’s voting shares, appointed five directors. The German state of Lower Saxony, which owned 20 per cent of VW, appointed two directors and held veto power over strategic decisions. Qatar’s sovereign wealth fund, with its 17 per cent stake, also appointed two directors. Director compensation also mostly comprised variable pay. In 2014, for example, Ferdinand Piëch, VW’s former CEO and then chairman of the supervisory board, was paid €1.5 million, of which 13 per cent was fixed.[[22]](#endnote-22) Charles M. Elson, director of the John L. Weinberg Center for Corporate Governance in Delaware, noted that VW governance was “a breeding ground for scandal.”[[23]](#endnote-23)

**Corporate Culture**: Much of VW management’s brazen behaviour that had led to Dieselgate could be attributed to the company’s ownership structure and the political power it provided, especially in Europe. The company’s ruthless work environment, however, was attributed by many experts to Ferdinand Piëch, the Porsche grandson, who led VW as both its CEO (1993–2002) and chairman (2002–2015). Piëch openly took pleasure in pointing out flaws in the work of his underlings while letting everyone know he thought failure and dismissal went hand in hand. As *Fortune* noted:

Under Piëch and his successors, the company was run like an empire, with overwhelming control vested in a few hands, marked by a high-octane mix of ambition and arrogance—and micromanagement—all set against a volatile backdrop of epic family power plays, liaisons, and blood feuds. It’s a culture that mandated success at all costs.[[24]](#endnote-24)

According to Ferdinand Dudenhöffer, an automotive expert, VW workers had been taught to avoid not only failure but even the appearance of failure, at all costs. “All you hear when you speak to people is that there is a special pressure at VW,” Dudenhöffer told Reuters*.*[[25]](#endnote-25)A staff letter by supervisory board member Bernd Osterloh—issued after the emissions scandal came to light—stated that the current VW culture meant problems were hidden and not communicated by workers, who understood that orders were to be followed without question regardless of ramifications. “We need a culture in which it’s possible and permissible to argue with your superior about the best way to go,” he bluntly noted.[[26]](#endnote-26)

A hallmark of VW’s corporate culture was the role of labour unions in influencing day-to-day management. Mandated by German law, the influence prevailed at two levels—at the shop floor through work councils and at the supervisory board through a 50 per cent stake in director positions.[[27]](#endnote-27) The unions had often stalled the company’s efforts at reform such as increasing automation and making structural layoffs. Overall, there was less room for manoeuvring a plant closure in Europe compared with in the United States.

In 2015, Müller replaced Winterkorn as the CEO within days of the latter’s departure. Müller was a VW “lifer,” having spent more than 30 years at the company. Starting as an apprentice toolmaker for Audi, by 2011 he had risen to the CEO position of the Porsche division. Considered to be more cordial than his predecessor, he was expected to stabilize the situation. Following a series of media missteps that forced his departure in 2018, Müller’s only contribution remained the launch of Strategy 2025 in June 2016.

TOGETHER—STRATEGY 2025

The development of Strategy 2025 was unique since it was not devised in VW’s C-Suite, and no external consultants were involved. More than 250 cross-functional managers from different departments had worked on developing it for months beginning in early 2016. It was in late May 2016 that Müller unveiled it at a company-wide global town hall meeting broadcast from Wolfsburg, Germany. The then CEO wanted to secure maximum buy-in by closing the ranks of VW’s officer corps and swearing them in on their loyalty and dedication to the new growth plan.[[28]](#endnote-28)

Strategy 2025 had four building blocks. First, VW’s core purpose of developing, building, and selling automotive vehicles would remain unchanged, but its portfolio would transition from almost 100 per cent internal combustion engine-powered diesel and petrol vehicles to battery-powered electric vehicles (BEVs). Analysts had been predicting for a while that by 2030, 50 per cent of passenger cars would be BEVs.[[29]](#endnote-29) VW planned to launch over 30 new BEVs by 2025, investing upward of $50 billion. BEV production was expected by then to reach between 2 million and 3 million units annually, or 25 per cent of total sales by volume. A related initiative was the development of battery technology as a new group-wide core competency. Battery technology accounted for 20–30 per cent of the value-added for an electric vehicle. VW had to build 150 gigawatt hours (GWh) of battery capacity by 2025 for its planned e-fleet alone.[[30]](#endnote-30) By contrast, in 2018, Tesla Inc. (Tesla), the US-based all-electric vehicle company, had a capacity of 105 GWh of battery cells and 150 GWh of battery packs.[[31]](#endnote-31) By late 2018, VW was in the late stages of scouting a location in North America for a new factory to build BEVs targeted directly at Tesla’s Model 3.

The second building block was a new cross-brand mobility solutions business, which was expected to generate revenue in the multibillion-dollar range. This new business would be independent from the manufacturing divisions of the VW Group. It would provide last-mile solutions for mass movements of people and cargo in major cities by developing a competitive self-driving system for private transport. VW had already taken the first step in this regard by investing in Gett Inc. (Gett), a Tel Aviv-based taxi-app provider.[[32]](#endnote-32) The investment was part of gaining a foothold in the fast-growing ride-hailing market. Gett had more than 50 million users in 100 global cities, including New York, London, and Moscow. A related initiative was to develop autonomous driving as a new core competence.

Third, VW planned to strengthen its innovation agenda by mobilizing in-house resources and harnessing external inputs, which would be done in two ways. First, VW would realign and bundle the company’s auto-components business, across the group worldwide, to provide greater entrepreneurial freedom to employees and encourage internal competition. Second, driving forward the company’s digitization, which was already under way, was to be achieved by focusing on operations through initiatives such as Industry 4.0 (aimed at digitizing all elements of the company’s value chain, at both the vendor and customer end, with a focus on making them transparent and seamless). VW would be harnessing outside skills, through acquisitions and venture capital investments. The company already had set up three “Future Centers”—in Potsdam, Germany; Belmont, California; and Beijing, China—which were tasked with enabling VW to “leap-frog” into providing mobility solutions in Europe, the United States, and Asia.

The fourth and final building block was to secure the financial resources for the massive investments that lay ahead by harnessing efficiency improvements in existing businesses. The company would ensure better utilization of assets to generate earnings for reinvestment in the new mobility businesses.

Strategy 2025 had clearly defined metrics (see Exhibit 4). The operating return on sales, which in 2015 stood at 6 per cent before special items, needed to reach 8 per cent or more by the end of the strategic cycle. The selling, general, and administrative expenses as a percentage of sales revenue needed to be reduced to less than 12 per cent. The ratio of R&D costs to sales revenue was to be reduced to 6 per cent.

VW was pulling four levers simultaneously as part of Strategy 2025—transforming the core business, developing new battery technology competencies, promoting entrepreneurial spirit, and generating operational efficiencies in the legacy business lines. VW in 2016 also launched a new growth driver in mobility solutions (i.e., MOIA) for the purpose of redefining mobility for people living in urban areas. The independent company based in Berlin, Hamburg, and Helsinki was not a pure-play car-sharing provider, but rather aimed at becoming one of the world’s leading mobility service providers by 2025. Key were in-house development of IT-based on-demand offerings, strategic investing in digital start-ups, and collaborating with cities and established transport providers. While two of the levers involved scaling up ongoing initiatives, three were new initiatives that required mega investments and involved hard choices.

Core business transformation included a fundamental realignment of VW as an organization to make it ready for the new age. The realignment meant, at one level, a rationalization of its current portfolio of diesel-driven products numbering about 340 model variants. The objective here was to identify the products that could be targeted at the most attractive and fastest-growing markets. It also meant, at another level, developing a new product portfolio as part of a plan to introduce 30 BEVs over the next decade.

In order to build its marque of BEVs, VW decided on a dedicated platform. The company was in the middle of awarding €20 billion worth of contracts to vendors to firm up supplies. The investment was meant to measure up fully to the Tesla vehicles on range, acceleration, and other performance measures. It was also meant to signal the company’s determination to become a mass-market maker of BEVs. Johann Jungwirth, the former head of future-product innovation at Apple, led VW’s digital strategy development. Jungwirth was building a new team of about 100 members tasked with redesigning the car all-around—diesel-driven, electric, and self-driven.

In carrying forward Strategy 2025, Diess made two immediate changes. First, the 12 VW brands would be regrouped along three broad dimensions: volume, premium, and super-premium. The move was meant to speed up decisions on pricing, marketing, and sales. It would be supplemented by a new management structure wherein key executives would manage multiple brands at the same time (see Exhibit 5). Second, VW would have a separate China division not only because managing the company’s largest and distant market from Germany was challenging but also because China was the most evolving global automotive market poised to lead the global market for BEVs.

VW was also seeking partnerships with competitors. Together with BMW, Daimler, and Ford, it formed the pan-European high-power charging network IONITY, which other automotive manufacturers were invited to join. Further, VW collaborated with Korean company Hyundai on fuel-cell development. It explored a non-equity strategic alliance with Ford to extend capabilities, strengthen competitiveness, and better serve customers. Microsoft Corporation (Microsoft) was the anchor-partner for building a multi-company digital ecosystem under the name Automotive Cloud, which encompassed two subdomains. The first was a vehicle-centric device platform enabling complete connectivity, continuous updates, and upgrades. The second was a service platform that allowed customers to get actively connected via “Volkswagen We,” its new retrofittable mobility interface. Besides Microsoft, Diconium GmbH, a digital transformation agency was a key partner for the latter.[[33]](#endnote-33)

The core issues, however, went beyond managing the imminent disruptions to the industry. Transforming the core business and building a new mobility solutions business required building a company culture conducive to transparency, having a structure conducive to decentralized decision-making, and creating an environment conducive to innovation. For an engineering-driven company such as VW, these changes comprised a paradigm shift which was far more challenging than the technological issues.

By 2018, the VW Group comprised three automotive manufacturing divisions: passenger cars (covering economy, mid-tier, and luxury segments), commercial vehicles (such as pick-ups, buses, and heavy trucks), and power-engineering products (engines). It also had a service division providing financing, leasing, insurance, and fleet management services to both dealers and customers. The auto-conglomerate had 340 subsidiary companies in 152 countries, including 119 manufacturing plants across 27 countries. It had two joint ventures in China, the world’s largest automotive market by volume. VW had revenues of €230.7 billion in 2017 (see Exhibit 6).

DISRUPTIVE FORCES IN THE GLOBAL AUTO INDUSTRY

Industries around the world were disrupted by several megatrends, such as a shift in the balance of economic power toward emerging markets, the arrival of new—often digital—technologies, growing concerns over climate change, shifting demographics and consumer preferences, and a rise of political populism leading to heightened trade tensions between countries. All of these trends were altering the established order of the global auto industry.

New car buyers were spending more time examining the technologies installed in the car rather than the engine under the hood. Owning a car was no longer seen as a status symbol, and the rise of digital ride-sharing platforms such as Uber, Lyft, Grab, and Didi further reduced the need of individually owning a car. Consumers were moving away from car ownership, which was leading to changes in automotive business models. Further, growing concerns over carbon footprint were forcing automakers to adopt sustainability practices. There were also signs that global trade tensions would have a profound impact on the prevailing geographical footprints in the automotive industry. General Motors was reducing its overall manufacturing capacity after selling, or closing, many non-North American and non-Chinese manufacturing ventures. BMW had to start producing its popular SUV lines in China instead of at its global US facility, following increased Chinese tariffs on US manufactured vehicles—a countermeasure to the trade tensions fuelled by the Trump administration. By 2010, China had become the world’s largest automotive market, overtaking the United States.[[34]](#endnote-34) By 2015, it had become the largest market for BEVs and also the largest BEV developer and manufacturer.[[35]](#endnote-35)

Having not had a basic change for decades, the global auto industry was in the middle of a tectonic shift, and was expected to generate substantially lower margins than in the past. The shift was driven by several different factors (see Exhibit 7).

First, the internal combustion engine, the predominant powertrain for the automobile for over a century, was challenged by hybrid and fully electric powertrains. It was foreseen that, in only a dozen years, by 2030, the internal combustion engine would hold less than 50 per cent of the market share.[[36]](#endnote-36) Stricter emissions regulations, lower battery costs, widely available charging stations, and increasing consumer acceptance were creating new and strong momentum for market penetration of electric vehicles in the coming years.

Further, software competence was becoming a differentiating factor for the industry. Software had a role to play in delivering advanced safety features, in-vehicle content, and remote analytics. The program code for the “connected” car had as many object instructions as an aerospace flight-control system. Subsequently, technology companies were beginning to experiment with car development, invading the long-held domain of automotive incumbents such as VW.

Apple, for example, was broadening its mandate of providing a digital lifestyle for its customers by pursuing new applications for its operating systems. The company was looking at cars and homes as opportunities to embed its operating system and build new networked economies.[[37]](#endnote-37) A dedicated team was reportedly working on a program, code-named Project Titan, aimed at taking Apple right into the heart of automotive business of the future.[[38]](#endnote-38) Having already been providing services such as Google Maps that matched driver needs, Google viewed itself as “an independent self-driving technology company with a mission to make it safe and easy for everyone to get around without the need for anyone in the driver’s seat.”[[39]](#endnote-39) Uber, another technology pioneer, was leveraging universal smartphone penetration to launch its ride-sharing platform that radically affected not only the profitability of new vehicle manufacturing but also the viability of the used-car industry.[[40]](#endnote-40) While automotive incumbents were likely to start competing directly with these technology companies soon, they were under compulsion to co-operate with them.

Consumer expectations were also rising exponentially and across all segments. With the emergence of new features such as self-braking, self-parking, intelligent adaptive cruise control, automatic accident-avoidance, and computer-operated power steering available across all categories and price levels, individual drivers were coming to terms with at least partially relinquishing control over a vehicle. Advanced driver assistance systems were playing a crucial role in preparing regulators, consumers, and corporations for the reality of autonomous driving. Regardless, consumers demanded greater comfort and a much better “experience” from a car. In addition, up to one out of 10 new cars sold in 2030 were expected to be shared vehicles, which would affect private-use vehicle sales.

In global cities, such as London or Shanghai, car ownership was a hassle for many owners because of traffic congestion and lack of parking. The shared mobility service presented a very appealing value proposition. In addition, by 2030, the car market of New York City would likely have more in common with the market in Shanghai than with that of Kansas. In rural areas, where low density creates a barrier to scale, private-car usage was expected to remain the dominant means of transport.

GEARING UP FOR DISRUPTION

Each of the Big Six companies was gearing up for disruption in its own way. GM had launched a ride-sharing service called Maven. It had also bought a stake in Lyft in a bid to enter the on-demand market, and acquired a developer of autonomous vehicle technology called Cruise Automation.[[41]](#endnote-41) Ford was repositioning itself from a car company into a transportation company and, in a series of new mobility initiatives, was leading the way to develop the concept of Smart Cities.[[42]](#endnote-42) Toyota had set up a research institute with a mandate to develop the software for operating self-driving cars. It had also established a joint venture with Mazda to develop technologies for electric vehicles in addition to building next-generation solid-state batteries to jump-start BEV adoption.[[43]](#endnote-43) Honda was focused on innovation in basic technologies. It had become the first company to develop a motor for a hybrid vehicle without using any heavy rare-earth metals.[[44]](#endnote-44) Nissan was also focused on innovation; it collaborated with NASA (the National Aeronautics and Space Administration) to launch Seamless Autonomous Mobility, wherein it was working on matching up an artificial intelligence platform with humans who could actively assist drone-like self-drives from call centres.[[45]](#endnote-45) Chrysler was actively negotiating purchasing the off-the-shelf vehicle technologies from Google and others, reducing its own development time, costs, and risks.[[46]](#endnote-46)

Changes in technology were expected to happen so fast that the incumbents would “have to make acquisitions and integrate them,” noted industry analyst Michael Robinet.[[47]](#endnote-47) While talk of the future was filled with discussions on electrification, manufacturers regarded BEVs as still being a work-in-progress for about another decade. Battery prices were expected to drop from more than €300 per kilowatt hour (kWh) to less than €100 per kWh by 2020. “Electric is coming, but how to make money out of it is the difficult equation,” said Joseph Hinrichs, executive vice-president and president, global operations for Ford, but “the vast majority of vehicles built in the next five years will [still] have [internal combustion engines].”[[48]](#endnote-48)

Despite the tectonic shifts (see Exhibit 8), there were two redeeming expectations. First, annual global unit sales were expected to continue to grow until 2030, although at the lower rate of 2 per cent per year (down from 3.6 per cent).[[49]](#endnote-49) The decline would be largely due to the substitution effects caused by the rise of services such as car sharing and e-hailing. Dense geographies with a large, established vehicle base were expected to be fertile grounds for such services. Many cities and suburbs of Europe and North America fit that profile. Second, the aggregate revenue pool of the automotive industry would increase from $3.5 trillion in 2015 to $5.2 trillion by 2030. The additional revenue would be derived from diversification into on-demand mobility services and data-driven services, replacing the long-standing twin revenue streams of vehicle sales and aftermarket sales.[[50]](#endnote-50) Vehicle sales in general were expected to produce substantially lower margins.

In light of all these turbulences, big questions remained for Diess concerning the effectiveness and sustainability of “TOGETHER—Strategy 2025.” Was VW doing enough to transform into a mobility company while remaining one of the original vehicle automotive incumbents?

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Exhibit 1: VolksWagen group—REVENUE SEGMENTATION, 2013–2017

(in thousands of €)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **2017** | **2016** | **2015** | **2014** | **2013** |
| **By Brand**  Volkswagen passenger cars  Audi  SKODA  SEAT  Bentley  Porsche Automotive  Volkswagen commercial vehicles  Scania  MAN commercial vehicles  MAN power engineering  Other  Financial services | 79,979  60,128  16,559  9,892  1,843  21,674  11,909  12,789  11,087  3,283  (30,286)  31,826 | 105,651  59,317  13,705  8,894  2,031  20,710  13,120  11,303  10,005  3,593  (56,617)  27,554 | 106,240  58,420  12,486  8,572  1,936  21,533  10,341  10,479  13,702  –  (56,318)  25,901 | 99,764  53,787  11,758  7,699  1,746  17,205  9,577  10,381  14,286  –  (45,885)  22,139 | 99,397  49,880  10,324  6,874  1,679  14,326  9,370  10,360  15,861  –  (40,047)  18,983 |
| Total | **230,682** | **217,267** | **213,292** | **202,458** | **197,007** |
| **By Division**  Automotive division   * Passenger cars * Commercial vehicles * Power engineering   Financial services division | 196,949  158,466  35,200  3,283  33,733 | 186,016  150,343  32,080  3,593  31,251 | 183,936  149,716  34,220  –  29,357 | 177,538  143,601  33,937  –  33,937 | 175,003  140,077  34,927  –  34,927 |
| **By Geography**  Asia Pacific  North America  South America  Europe | 39,123  38,818  9,988  142,753 | 35,761  35,454  7,973  138,079 | 35,225  35,384  10,148  132,535 | 38,113  27,619  13,868  122,858 | 35,016  27,434  17,495  117,072 |

Note: € = euro; in 2017, US$1 = €1.13. Statista, accessed March 11, 2019, www.statista.com/statistics/412794/euro-to-u-s-dollar-annual-average-exchange-rate/.

Source: Created by the case authors using data from company annual reports.

Exhibit 2: VolksWageN group—VEHICLE SALES, 2013–2017

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| (Number of vehicles in `000s) | **2017** | **2016** | **2015** | **2014** | **2013** |
| Volkswagen passenger cars  Audi  SKODA  SEAT  Bentley  Porsche Automotive  Volkswagen light commercial Vehicles  Scania  MAN  VW China  Other | 3,573  1,530  937  595  11  248  498  92  114  4,020  (840) | 4,347  1,534  814  548  11  239  478  83  102  3,873  (1,638) | 4,424  1,529  800  544  11  219  456  78  102  3,456  (1,608) | 4,583  1,444  796  501  11  187  442  80  120  3,506  (1,454) | 4,704  1,349  719  459  11  155  436  80  140  3,038  (1,634) |
| Volkswagen Group | 10,777 | 10,391 | 10,010 | 10,217 | 9,728 |
| Automotive division  Passenger cars  Commercial vehicles | 10,077  700 | 9,729  662 | 9,374  636 | 9,575  652 | 9,071  657 |

Source: Created by the case authors using data from company annual reports.

EXHIBIT 3: VOLKSWAGEN AG COMPARABLE FIRM ANALYSIS (JANUARY 1, 2018)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **COMPANY PEERS** | **Debt/Market Value Equity** | **Debt/ EBIT** | **Capex/ Revenue** | **EBIT/ Revenue** | **Gross Margin** | **Revenue Growth** | **Enterprise Value/EBITDA** | **Price/ Earnings** |
| **Daimler AG** | 1.68 | 10.23 | 4.1% | 7.6% |  | 7.1% | 9.4x | 8.0x |
| **Toyota Motor Corporation** | 0.92 | 8.79 | 12.2% | 7.6% | 18.0% | 7.8% | 8.8x | 11.1x |
| **General Motors Company** | 1.62 | 8.84 | 19.0% | 7.3% | 12.9% | (2.4)% | 5.9x | 8.7x |
| **Fiat Chrysler Automobiles** | 0.78 | 3.05 | 5.4% | 5.6% | 15.3% | (0.01)% | 2.5x | 7.3x |
| **Ford Motor Company** | 3.11 | 22.42 | 4.5% | 4.4% | 10.6% | 3.3% | 10.2x | 11.4x |
| **Honda Motor Co., Ltd.** | 1.02 | 8.54 | 2.8% | 5.4% | 21.8% | 9.6% | 7.5x | 10.8x |
|  |  |  |  |  |  |  |  |  |
| **Volkswagen AG** | 1.94 | 10.84 | 5.7% | 6.6% | 18.2% | 5.7% | 8.6x | 12.0x |
|  |  |  |  |  |  |  |  |  |
| **Peer average** | 1.52 | 10.31 | 8.0% | 6.3% | 15.7% | 4.2% | 7.4x | 9.6x |
| **Peer median** | 1.32 | 8.81 | 4.9% | 6.4% | 15.3% | 5.2% | 8.2x | 9.8x |

Note: EBIT = earnings before interest and taxes; Capex = capital expenditures; EBITDA = earnings before interest, taxes, depreciation, and amortization

Source: Created by the case authors using data from annual reports.

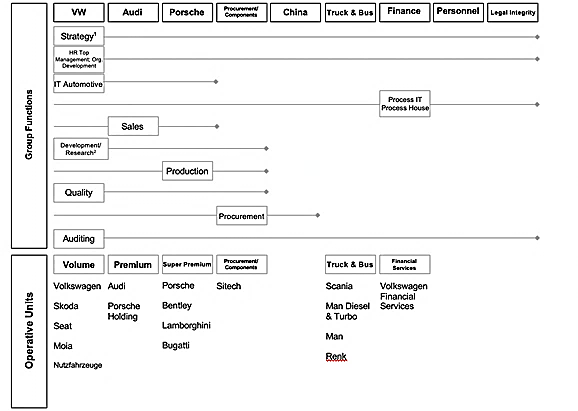
Exhibit 4: FINANCIAL TARGETS AND MILESTONES (in Euros)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Key Financial Targets** | **2016 Actual** | **2017**  **Actual** | **2018 Outlook** | **2020**  **Targets** | **2025**  **Targets** |
| **Operating return on sales**  Before Special Items | 6.7% | 7.4% | 6.5 –7.5% | 6.5 –7.5% | 7 –8% |
| **Return on investment** Automotive division before Special Items | 13.9% | 14.4% | 12 –14% | 13 –15% | >15% |
| **Capex ratio** Automotive division | 6.9% | 6.4% | 6.5 –7% | 6% | 6% |
| **R&D cost ratio** Automotive division | 7.3% | 6.7% | 6.5 –7% | 6% | 6% |
| **Cash a) Net cash flow**Automotive division  **b) Net liquidity** | €7.2 bn  €27.2 bn | €10.1 bn  €22.4 bn | ≥ €9 bn  > €20 bn | ≥ €10 bn  > €20 bn | > €10 bn  ~10% of Group sales |

Note: Capex = capital expenditure; R&D = research and development; bn = billion; € = euro; in 2017, US$1 = €1.13, Statista, accessed March 11, 2019, www.statista.com/statistics/412794/euro-to-u-s-dollar-annual-average-exchange-rate/.

Source: Created by the case authors using data from company annual reports.

Exhibit 5: VolksWagen group’s DISTRIBUTED MANAGERIAL ROLES



Source: Adapted from *Shaping the Transformation Together*, accessed March 19, 2019, www.volkswagenag.com/presence/investorrelation/publications/shareholder-meetings/2018/rede-und-p%C3%A4sentation-dr-diess/Charts%20Dr.%20Diess%20HV%20englisch\_final.pdf.

Exhibit 6: VolksWagen group’s INCOME and CASH FLOW STATEMENTs, 2014–2017

Income Statement

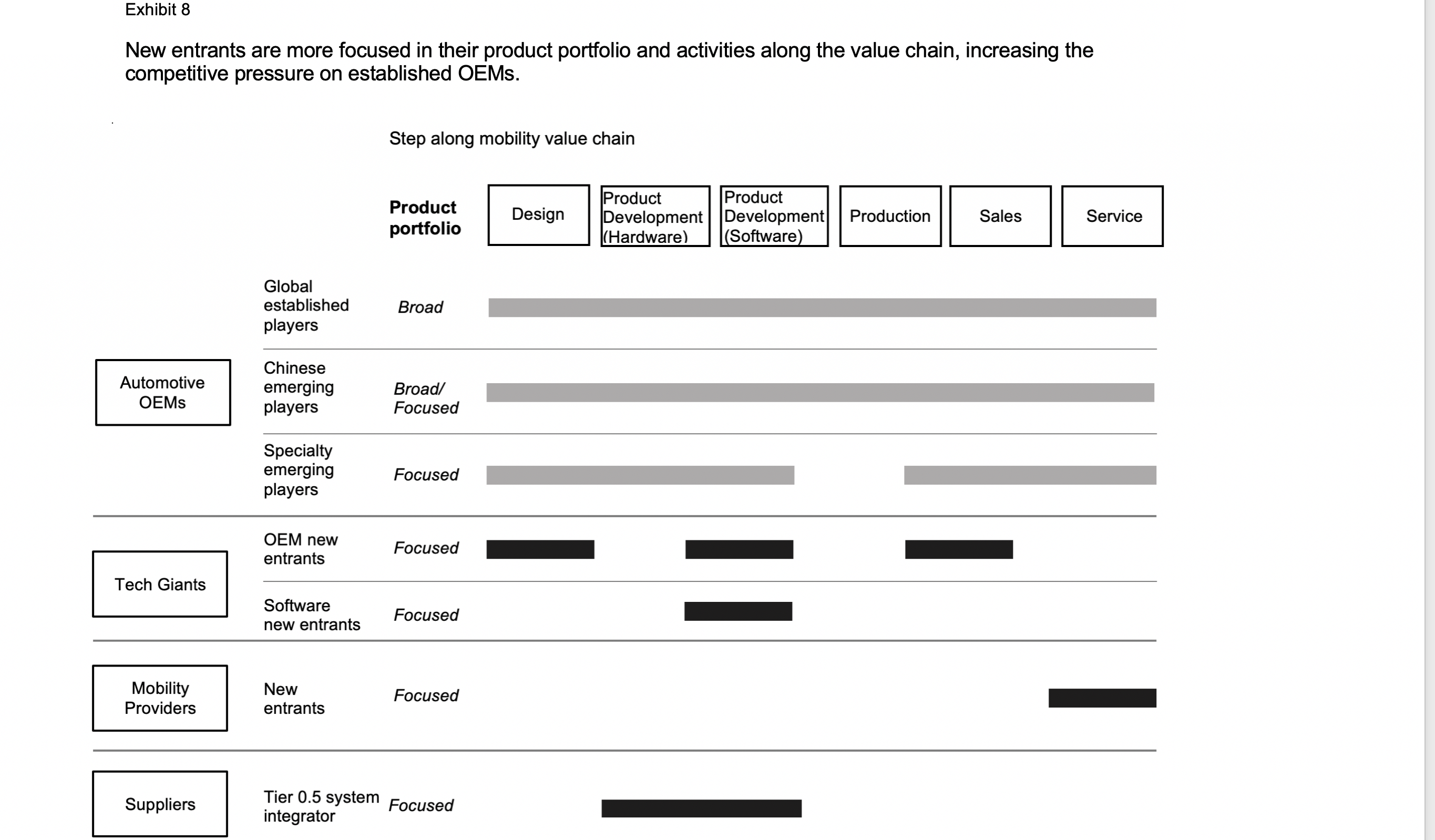
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Year ending December (in € millions) | 2017 | 2016 | 2015 | 2014 |
| Sales revenue  Other income  Cost of sales  Distribution expenses  Administrative expenses  Other operating expenses  Operating profit  Interest  Earnings before tax  Earnings after tax | 230,682  18,960  188,140  22,710  8,254  12,259  13,818  1,366  13,913  11,638 | 217,267  11,411  176,270  22,700  7,336  16,907  7,103  1,670  7,292  5,379 | 213,292  4,387  179,382  23,515  7,197  7,266  (4,069)  1,620  (1,301)  (1,361) | 202,458  7,294  165,934  20,292  6,841  6,992  12,697  1,891  14,794  11,068 |

Cash Flow Statement

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Year ending December (in € millions) | 2017 | 2016 | 2015 | 2014 |
| Cash and cash equivalents at year beginning  Gross cash flow  Changes in working capital  Cash flow from operations  Cash flow from investments  Cash flows from financing  Cash and cash equivalents at year end | 18,833  32,651  (33,836)  (1,643)  (16,508)  17,625  18,038 | 20,462  26,007  (14,576)  (2,093)  (20,679)  9,712  18,833 | 18,634  16,280  (2,601)  232  (21,151)  9,068  20,462 | 22,009  26,549  (15,764)  294  (19,099)  4,645  18,634 |

Source: Company annual reports.

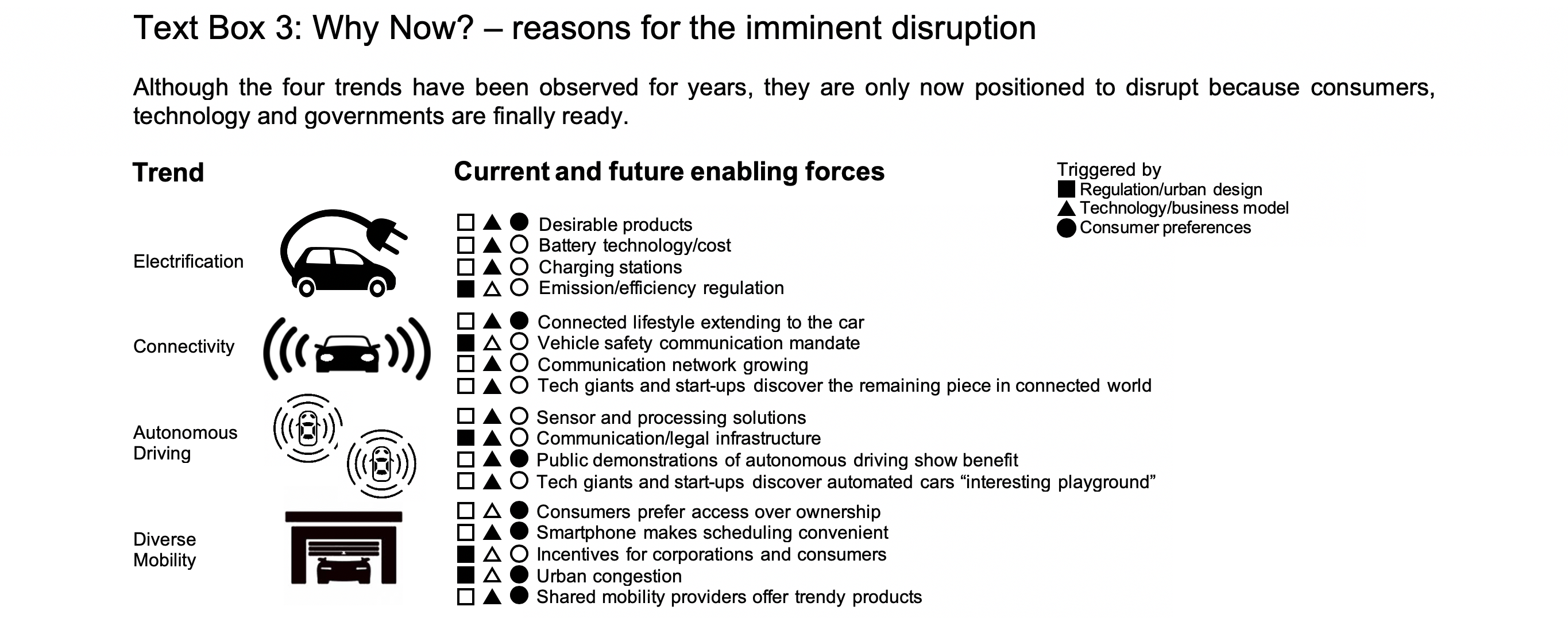
**Exhibit 7: COMPETITIVE PRESSURES in the global auto industry**



Note: OEMs = original equipment manufacturers

Source: Adapted from *Automotive Revolution—Perspective Towards 2030: How the Convergence of Disruptive Technology-Driven Trends Could Transform the Auto Industry*, 14, McKinsey and Company, January 2016, accessed September 30, 2018, www.mckinsey.com/~/media/mckinsey/industries/high%20tech/our%20insights/disruptive%20trends%20that%20will%  
20transform%20the%20auto%20industry/auto%202030%20report%20jan%202016.ashx. Used with permission.

Exhibit 8: TECHNOLOGY-DRIVEN TRENDS in the global auto industry



Source: Adapted from Paul Gao, Hans-Werner Kaas, Detlev Mohr, and Domink Wee, *Disruptive Trends That Will Transform the Auto Industry*, January 2016, McKinsey & Company, www.mckinsey.com. Copyright (c) 2019 McKinsey & Company. All rights reserved. Used with permission.

ENDNOTES

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. [↑](#endnote-ref-1)
2. “VW’s New CEO Herbert Diess Outlines Automaker’s Plans,” Bloomberg, April 13, 2018, accessed July 5, 2018, www.bloomberg.com/news/videos/2018-04-13/vw-s-new-ceo-herbert-diess-outlines-automaker-s-plans-video. [↑](#endnote-ref-2)
3. Volkswagen Group, “Extensive Revision of Volkswagen Group Management Structure Decided,” April 12, 2018, accessed July 5, 2018. www.volkswagenag.com/en/news/2018/04/VW\_Group\_Umfassende\_Weiterentwicklung.html. [↑](#endnote-ref-3)
4. Patrick McGee, “Herbert Diess, the ‘Kostenkiller’ Installed behind the Wheel at VW,” *Financial Times*, April 13, 2018, accessed July 5, 2018, www.ft.com/content/2dea51b0-3ef4-11e8-b7e0-52972418fec4. [↑](#endnote-ref-4)
5. General Motors Company, Ford Motor Company, Toyota Motors, American Honda, Chrysler Group LLC, and Nissan Motors were together referred to as the Big Six. “The Big Six Automakers Defined,” *Autotrends Magazine*, September 7, 2010, accessed July 16, 2018, http://autotrends.org/2010/09/07/the-big-six-automakers-defined/. [↑](#endnote-ref-5)
6. Tim Bowler, “Volkswagen: From the Third Reich to Emissions Scandal,” BBC, October 2, 2015, accessed August 3, 2018, www.bbc.com/news/business-34358783. [↑](#endnote-ref-6)
7. Ibid. [↑](#endnote-ref-7)
8. All dollar-denominated currency amounts are in US$. [↑](#endnote-ref-8)
9. Bowler, op. cit. [↑](#endnote-ref-9)
10. Jens Meiners, “Volkswagen’s Big Game of Risk: The Ambitious Plan for World Domination,” *Car and Driver*, December 28, 2011, accessed August 2, 2018, www.caranddriver.com/features/volkswagens-big-game-of-risk-the-ambitious-plan-for-world-domination-feature. [↑](#endnote-ref-10)
11. Thorsten Schröder and Sophie Schimansky, “The End of VW in the US?” DW, March 18, 2016, accessed July 20, 2016, http://m.dw.com/en/the-end-of-vw-in-the-us/a-19126597. [↑](#endnote-ref-11)
12. Volkswagen Group, “Strategy 2018,” *Volkswagen Annual Report 2012*, accessed March 11, 2019, https://annualreport2012.volkswagenag.com/managementreport/reportonexpecteddevelopments/strategy/strategy2018.html. [↑](#endnote-ref-12)
13. Joann Muller, “How Volkswagen Will Rule the World,” *Forbes*, April 17, 2013, accessed August 3, 2018, www.forbes.com/sites/joannmuller/2013/04/17/volkswagens-mission-to-dominate-global-auto-industry-gets-noticeably-harder/. [↑](#endnote-ref-13)
14. Chris Bryant, “VW’s Growing Bloat,” Bloomberg, October 27, 2016, accessed September 11, 2018, www.bloomberg.com/gadfly/articles/2016-10-27/vw-has-to-stop-competing-to-be-world-s-largest-employer. [↑](#endnote-ref-14)
15. Ibid. [↑](#endnote-ref-15)
16. Gilbert Kreijger, “How VW Rose So High and Fell So Low,” Handelsblatt, June 23, 2017, accessed September 11, 2018, https://global.handelsblatt.com/companies/how-vw-rose-so-high-and-fell-so-low-volkswagen-history-dieselgate-emissions-fraud-porsche-hitler-784792. [↑](#endnote-ref-16)
17. € = euro; in 2017, US$1 = €1.13; All currency amounts are in € unless otherwise specified. Statista, accessed March 11, 2019, www.statista.com/statistics/412794/euro-to-u-s-dollar-annual-average-exchange-rate/. [↑](#endnote-ref-17)
18. James B. Stewart, “Problems at Volkswagen Start in the Boardroom,” *New York Times*, September 25, 2015, accessed June 20, 2016, www.nytimes.com/2015/09/25/business/international/problems-at-volkswagen-start-in-the-boardroom.html?\_r=0. [↑](#endnote-ref-18)
19. John Armour, “Volkswagen’s Emissions Scandal: Lessons for Corporate Governance? (Part 1),” University of Oxford Law School, May 17, 2016, accessed July 20, 2016, www.law.ox.ac.uk/business-law-blog/blog/2016/05/volkswagen%E2%80%99s-emissions-scandal-lessons-corporate-governance-part-1. [↑](#endnote-ref-19)
20. Tom Osegowitsch and Hari Bapuji, “How Volkswagen Is Using Tried-and-True Tactics to Avoid Paying Compensation,” The Conversation, July 14, 2016, accessed July 20, 2016, https://theconversation.com/how-volkswagen-is-using-tried-and-tested-tactics-to-avoid-paying-compensation-62386. [↑](#endnote-ref-20)
21. David Shepardson and Joel Schectman, “VW Agrees to Buy Back Diesel Vehicles, Fund Clean Air Efforts,” Reuters, June 27, 2016, accessed July 20, 2016, www.reuters.com/article/us-volkswagen-emissions-settlement-idUSKCN0ZD2S5. [↑](#endnote-ref-21)
22. John Armour, “Volkswagen’s Emissions Scandal: Lessons for Corporate Governance? (Part 2),” University of Oxford Law School, May 18, 2016, accessed July 20, 2016, www.law.ox.ac.uk/business-law-blog/blog/2016/05/volkswagen%E2%80%99s-emissions-scandal-lessons-corporate-governance-part-2. [↑](#endnote-ref-22)
23. Stewart, op. cit. [↑](#endnote-ref-23)
24. Smith and Parloff, op. cit. [↑](#endnote-ref-24)
25. Andreas Cremer and Tom Bergin, “Fear and Respect: VW’s Culture under Winterkorn,” Reuters, October 10, 2015, accessed November 23, 2018, www.reuters.com/article/us-volkswagen-emissions-culture-idUSKCN0S40MT20151010. [↑](#endnote-ref-25)
26. Ibid. [↑](#endnote-ref-26)
27. Germany Federal Ministry of Labour and Social Affairs, *CO-DETERMINATION 2018*, accessed September 11, 2018, www.bmas.de/SharedDocs/Downloads/EN/PDF-Publikationen/a741e-co-determination.pdf. [↑](#endnote-ref-27)
28. Bertel Schmitt, “Volkswagen Strategy 2025: Connectivity, Electrification and Strange Dreams of an Apple Takeover,” *Forbes*, May 24, 2016, accessed July 14, 2018, www.forbes.com/sites/bertelschmitt/2016/05/24/volkswagen-strategy-2025-and-the-secret-master-plan-for-an-apple-takeover/. [↑](#endnote-ref-28)
29. Xavier Mosquet, Hadi Zablit, Andreas Dinger, Gang Xu, Michelle Anderson, and Kazutoshi Tominaga, “The Electric Car Tipping Point,” The Boston Consulting Group, January 11, 2018, accessed September 30, 2018, www.bcg.com/en-ca/publications/2018/electric-car-tipping-point.aspx. [↑](#endnote-ref-29)
30. Michael Dean, Gillian Davis, Tobias Nystedt, James Evans, J. J. Houldin, and Christopher Perrella, “Electric Vehicles Race to the Bottom or New Valuation Paradigm,” Bloomberg Intelligence, January 11, 2018, accessed May 5, 2019, www.bloomberg.com/professional/blog/electric-vehicles-race-bottom-new-valuation-paradigm/. [↑](#endnote-ref-30)
31. Fred Lambert, “Tesla Confirms Gigafactory Battery1 Production at ‘~20GWh’—More Than All Other Carmakers Combined,” Elektrek, August 2, 2018, accessed September 10, 2018, https://electrek.co/2018/08/02/tesla-gigafactory-1-battery-production-20-gwh/. [↑](#endnote-ref-31)
32. Volkswagen, “New Group Strategy Adopted: Volkswagen Group to Become a World-Leading Provider of Sustainable Mobility,” press release, June 16, 2016, accessed November 23, 2018, www.volkswagen-newsroom.com/en/press-releases/new-group-strategy-adopted-volkswagen-group-to-become-a-world-leading-provider-of-sustainable-mobility-1852. [↑](#endnote-ref-32)
33. Frank Witter, “Shaping the Transformation Together,” Volkswagen, 2018, accessed January 31, 2019, www.volkswagenag.com/presence/investorrelation/publications/presentations/2018/12\_december/Volkswagen\_ Group\_

    Presentation\_US\_Roadshow\_Dec\_18.pdf. [↑](#endnote-ref-33)
34. “China Overtakes US as World’s Biggest Car Market,” *Guardian*, January 8, 2010, accessed November 24, 2018, www.theguardian.com/business/2010/jan/08/china-us-car-sales-overtakes. [↑](#endnote-ref-34)
35. “China to Overtake US as World’s Biggest Electric Car Market,” *Telegraph*, December 6, 2015, accessed November 24, 2018, www.telegraph.co.uk/finance/newsbysector/industry/engineering/12036116/China-to-overtake-US-as-biggest-electric-car-market.html. [↑](#endnote-ref-35)
36. Mosquet, Zablit, Dinger, Xu, Anderson, and Tominaga, op. cit. [↑](#endnote-ref-36)
37. Ray Wang, “Analysis: Rumors on Apple’s Foray into Cars ‘Project Titan,’” ZDNet, February 18, 2015, accessed September 23, 2018, www.zdnet.com/article/analysis-rumors-on-apples-foray-into-cars-project-titan/. [↑](#endnote-ref-37)
38. Malcom Owen, “Apple’s ‘Project Titan’ Car Could Warn You What It Is about to Do Well before It Does It,” AppleInsider, August 21, 2018, accessed September 23, 2018, https://appleinsider.com/articles/18/08/21/apples-project-titan-car-could-warn-you-what-it-is-about-to-do-well-before-it-does-it. [↑](#endnote-ref-38)
39. Waymo, 2018, accessed September 23, 2018, https://waymo.com/. [↑](#endnote-ref-39)
40. Dr. Tony Hughes, “The Effect of Ride-Sharing on the Auto Industry,” Moody’s Analytics, July 2017, accessed September 23, 2018, www.moodysanalytics.com/risk-perspectives-magazine/managing-disruption/op-ed/the-effect-of-ride-sharing-on-the-auto-industry. [↑](#endnote-ref-40)
41. Mathew DeBord, “General Motors CEO Mary Barra: ‘We Are Disrupting Ourselves, We’re Not Trying to Preserve a Model of Yesterday,’” *Business Insider*, November 16, 2015, accessed September 23, 2018, www.businessinsider.com/general-motors-ceo-mary-barra-were-going-to-disrupt-ourselves-we-are-disrupting-ourselves-were-not-trying-to-preserve-a-model-of-yesterday-2015-10. [↑](#endnote-ref-41)
42. Lubna Hamdan, “Revealed: How Ford Is Gearing Up for Tomorrow Land,” Arabian Business, November 13, 2017, accessed September 23, 2018, www.arabianbusiness.com/lifestyle/cars-boats/383212-revealed-how-ford-is-gearing-up-for-tomorrow-land. [↑](#endnote-ref-42)
43. Hans Greimel, “For Toyota, It’s Always Time to Panic,” *Automotive News*, March 19, 2018, accessed September 23, 2018, www.autonews.com/article/20180319/OEM02/180319750/toyota-akio-time-to-panic. [↑](#endnote-ref-43)
44. “How Honda’s New Innovation Gives It a Huge Edge,” *Forbes*, July 13, 2016, accessed September 23, 2018, www.forbes.com/sites/greatspeculations/2016/07/13/how-hondas-new-innovation-gives-it-a-huge-edge/#47eef22d7a00. [↑](#endnote-ref-44)
45. Hope Reese, “The Future of the Auto Industry ‘Depends on Partners,’ Says Nissan CEO,” TechRepublic, January 10, 2017, accessed September 23, 2018, www.techrepublic.com/article/the-future-of-the-auto-industry-depends-on-partners-says-nissan-ceo/. [↑](#endnote-ref-45)
46. Greg Keenan, “How Sergio Marchionne Drove Fiat Chrysler to Success,” *Globe and Mail*, May 25, 2018, accessed September 23, 2018, www.theglobeandmail.com/business/article-how-sergio-marchionne-drove-fca-to-success/. [↑](#endnote-ref-46)
47. Dave Waddell, “Technology Is Redefining Traditional Business Models in the Auto Industry, *Windsor Star*, June 11, 2018, accessed September 23, 2018, https://windsorstar.com/business/technology-is-redefining-traditional-business-models-in-the-auto-industry. [↑](#endnote-ref-47)
48. Ibid. [↑](#endnote-ref-48)
49. “Automotive Revolution—Perspective Towards 2030: How the Convergence of Disruptive Technology-Driven Trends Could Transform the Auto Industry,” McKinsey and Company, January 2016, accessed September 30, 2018, www.mckinsey.com/~/media/mckinsey/industries/high%20tech/our%20insights/disruptive%20trends%20that%20will%20transform%20the%20auto%20industry/auto%202030%20report%20jan%202016.ashx. [↑](#endnote-ref-49)
50. Ibid. [↑](#endnote-ref-50)