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Capitalizing Development Costs at Fiat Chrysler Automobiles and Volkswagen

In 2019, automobile companies throughout the world spent $103 billion on research[1] and development (R&D), making the industry the third largest spender behind only the pharmaceuticals/biotech, and technology hardware/equipment industries.[2] For U.S. auto companies, U.S. Generally Accepted Accounting Standards (GAAP) required that all R&D spending be reported as an expense when incurred. However, standards set by the International Accounting Standards Board (IASB), which governed financial reporting for many non-U.S. auto makers, considered certain development costs as intangible assets to be amortized over their useful lives.[a] The application of these standards led to variation in reporting assumptions used by auto makers to capitalize and amortize development costs.

To examine the impact of this reporting standard, we consider R&D in the auto industry, and the financial reporting practices of Fiat Chrysler Automobile and Volkswagen, both headquartered in Europe, and which used international financial reporting standards (IFRS).

Research and Development in the Auto Industry

Several factors drove the high R&D spending of auto makers. The technological sophistication of the automobile had increased since the late 1990s as on-board electronics, computer systems, sensors, and software facilitated on-board entertainment systems, and improved energy efficiency and safety. A 2018 report on the industry in the U.S.[3] observed that:

> A new smart phone contains one microprocessor, while a new car or truck contains about 60. These microprocessors manage 100 or more sensors located throughout the vehicle, connected by as much as a mile of wiring. Just as important, a microprocessor in a smart phone is expected to last about three years, while autos are expected to last 12 years or more.

[a] In practice, the terms R&D spending, R&D outlays, R&D expenditures, and R&D costs are used interchangeably to refer to the amount a company spends during a period on research and development activities. R&D expense is the amount it reports in its income statement as the expense for the period.

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R&D in the industry had improved efficiency and reduced fuel consumption and emissions. Innovations had included lighter vehicles, with better aerodynamics, less drag and resistance, engine stop-start (which turned off the engine and fuel flow automatically when the vehicle stopped and re-started it when the driver disengaged the brake), as well as high-efficiency alternators and smart charging technology to reduce fuel consumption. R&D on powertrain technologies had improved fuel economy and emission levels of small and medium gasoline engines, and led to inventions of hybrid and battery propulsion cars, and natural gas engines.

Many of these changes were reinforced by increasingly stringent government regulations on fuel economy, emissions, and safety. These regulations had stimulated innovations within the auto industry and led to collaborations with other industries, such as electronics, materials, and aerospace.

In addition, traditional automakers were facing competition from new entrants, such as Telsa Motors and Google's Waymo, that were designing and building new electric and driverless vehicles. And in emerging economies, such as China and India, local companies, such as Geely, Changan Automobile Group, Dongfeng Motor,[4] Mahindra & Mahindra, and Tata Motors,[5] were becoming increasingly competitive.

Industry observers concluded that the costs of funding these innovations had increased economies of scale in the industry:

> In earlier times economies of scale were linked to individual models, and production of some 250,000 units per year could be enough for that model to break even for a producer. Today, however, economies of scale in the industry are rather linked to the underlying platforms and shared modules and components. This creates opportunities for firms to find ways to spread costs across models.[6]

Funding R&D spending in 2019 was further exacerbated by stagnant global auto sales and excess capacity. In 2019, unit sales of autos declined by 10% in China, 13% in India, and by 2% in the U.S. and Japan. See **Exhibit 1** for global auto sales and sales by region from 2015 to 2019.

Fiat Chrysler Automobiles

Fiat Chrysler Automobiles N.V. was created in October 2014 through the combination of Fiat, the largest Italian car maker, and Chrysler, the third largest U.S. auto manufacturer. By acquiring the troubled Chrysler, which went through Chapter 11 bankruptcy reorganization in 2009 and was rescued by the U.S. government,[7] Fiat sought to compete more effectively with rivals like Toyota and Volkswagen. It anticipated that by "developing common vehicle platforms and powertrains," the merger would "accelerate the time-to-market for many of our new vehicle launches and result in cost savings."[8]

The new merged company, Fiat Chrysler Automobiles NV (FCA), became the world's seventh largest automaker.[9] FCA was incorporated in the Netherlands, tax domiciled in the UK, and listed on the New York Stock Exchange and the Milan Borsa Italiana.[10] Its corporate headquarters were in Amsterdam, its financial headquarters in London, and its mass-market auto brands operated through two subsidiaries, FCA Italy (previously Fiat Group Automobiles SpA) in Turin, and FCA U.S. (previously Chrysler Group LLC) in Auburn Hills, Michigan.

FCA positioned the Chrysler brand as its main North American line to compete with Ford, Chevrolet, Toyota and Volkswagen, and used the Dodge brand to focus on performance-based vehicles. Jeep was positioned globally, with models introduced in new markets, such as Asia. Finally,

Fiat was the company's main brand outside North America, Alfa Romeo was positioned as its premium brand to compete with Mercedes-Benz, BMW, and Audi, and the Maserati brand competed in the luxury market.

FCA's strongest markets were North America, Italy, and Brazil (where the Fiat Strada, Mobi, and Toro models were among the top ten selling cars).[11] But its sales throughout the remainder of Western Europe and China lagged the market leaders. See **Exhibit 2** for auto sales for FCA by geographic segment. In 2019, the company was the world's eighth largest auto maker with a market share of 5.1%. See **Exhibit 3** for a list of the world's 15 largest auto makers and their market shares.

Since the 2014 merger, FCA's gross and EBIT margins had improved, and the company had been able to reduce its debt. However, sales had remained relatively flat. See **Exhibit 4** for a summary of FCA's financial performance from 2015 to 2019.

In 2019, FCA had 46 R&D centers located throughout the world, with around 18,000 employees. Its R&D was focused on two areas: reducing vehicle energy demand, and lowering fuel consumption and emissions. Research to reduce energy demand included work to cut vehicle weight, aerodynamic drag, tire rolling resistance, brake drag torque, driveline parasitic losses, heating and air conditioning, and electrical loads. Fuel consumption and emissions reduction activities covered powertrain technologies, such as engines, transmissions and drivelines, hybrid and electric propulsion and alternative fuels. FCA had also intended to devote additional R&D resources for developing automated driving and connectivity technologies.

In October 2019, FCA announced its intention to merge with PSA, the French auto maker. If completed, the new company would become the world's fourth largest auto company.

Volkswagen

Founded in 1937 and headquartered in Wolfsburg, Germany, Volkswagen (VW) designed, manufactured, and distributed vehicles under its own name as well as the SEAT, Audi, Skoda, Porsche, Bentley, Lamborghini and Bugatti brands. In 2019, VW was the largest automaker in the world (see **Exhibit 3**), with leading market shares in Europe, North America and China (see **Exhibit 2**).

In 2015, VW faced a major scandal over its strategy of promoting and selling fuel-efficient, low-emissions diesel-powered vehicles. The U.S. Environmental Protection Agency found that software had intentionally been included in many VW and Audi cars sold in the U.S. to detect emissions testing and modify performance to meet regulatory standards. However, VW's cars fell well-short of these standards in regular driving conditions. VW acknowledged the cheating, which affected 482,000 cars sold in the U.S. and around 11 million cars globally,[12] and set up recall and buyback programs to correct the problem or buy back affected vehicles. In January 2017, the company pleaded guilty to criminal charges in the U.S. and was fined $2.8 billion.[13] By mid-2020, the scandal had reportedly cost VW $34.7 billion in fines, penalties, financial settlements and buyback costs,[14] and additional government and civil actions were ongoing in the U.S. and Europe.

Yet Volkswagen remained profitable for most of the period 2015 to 2019. Its sales grew steadily, and EBIT margins improved. See **Exhibit 5** for VW's financial information during this period.

In 2019, VW's research departments employed 54,947 people, an increase of 5.8% over the prior year, and 8.2% of the company's total workforce.[15] It announced plans to spend €33 billion through 2024 to develop new electric vehicles,[16] anticipating that, by 2025, 25% of its new vehicles would be electric – as many as three million electric vehicles per year. By 2029, VW projected that its lineup would

include 75 battery-powered electric vehicles and roughly 60 hybrid models. To accomplish this and other research goals, the company had entered into a series of alliances. A partnership with Ford Motor Company was created to develop vans and mid-sized pickups and an autonomous driving system. A strategic partnership with Northvolt AB had been created to build a lithium battery factory in Salzgitter, and an alliance with Microsoft had been formed to work on connectivity.

Accounting for R&D at FCA and VW

Regulators in the Netherlands and Germany, where FCA and VW were headquartered, required public companies to prepare their financial statements using International Financial Reporting Standards (IFRS) set by the International Accounting Standards Board (IASB). See **Exhibit 6** for an overview of accounting standard setting and standard setters.

Under IFRS (IAS 38), research spending was always expensed when incurred. These included spending to create new knowledge, and to search for, design, formulate or review alternatives. But, the IASB concluded, spending for the development phase of a project created an intangible asset if the developer could demonstrate all of the following:

(a) Technical feasibility of completing the intangible assets so it will be available for sale or use.

(b) Its intention to complete the intangible asset and use or sell it.

(c) Its ability to use or sell the intangible asset.

(d) How the intangible asset will generate probable future economic benefits. Among other things, the entity can demonstrate the existence of a market for the output of the intangible asset or the intangible asset itself or, if it is to be used internally, the usefulness of the intangible asset.

(e) The availability of adequate technical, financial and other resources to complete the development and to use or sell the intangible asset.

(f) Its ability to reliably measure the expenditure attributable to the intangible asset during its development.

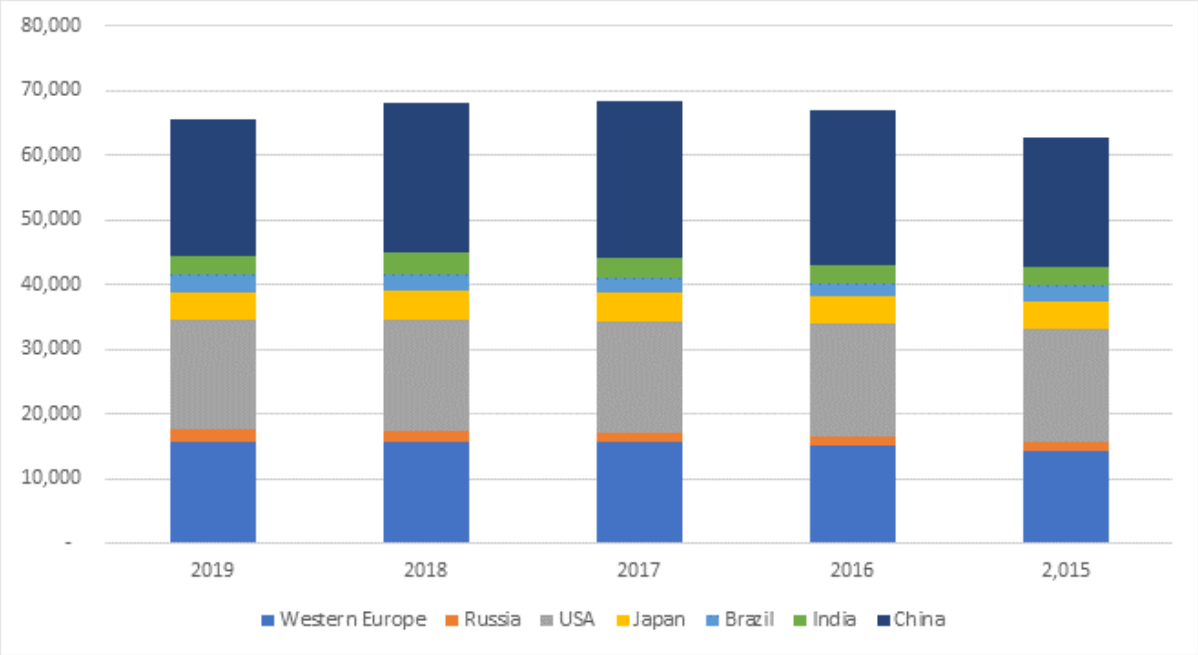
Instead of being expensed when incurred, development spending that satisfied these conditions was capitalized, that is reported as an intangible asset, and amortized over the asset's useful life once it became available for use. Activities in the development phase included the design, construction and testing of proto-types; tools, moulds and dies involving new technology; the design and construction of a pilot plant that was not at a scale that made it economically feasible for commercial production; and the design, construction, and testing of a specific new improved material, product, process or service.

In contrast, under U.S. accounting standards, known as generally accepted accounting principles (US GAAP) and formulated by the Financial Accounting Standards Board (FASB), all research and development spending was required to be expensed as incurred (Financial Accounting Standard No. 2). [b]

[b] One exception to this requirement was for software development costs. Under FASB Accounting Standards Codification (ASC) Topic 985, *Software*, these costs could be capitalized and amortized over their useful life.

As a result of applying this standard, both FCA and VW capitalized a portion of their development outlays and amortized them over their expected lives. **Exhibits 7** and **8** report information on the research and development costs during the period 2015 to 2019 for FCA and VW.

Exhibit 1 Number of vehicles sold (000) by geographic region from 2015 to 2019



Source: Best-selling-cars.com, https://www.best-selling-cars.com/international/2019-full-year-international-worldwide-car-sales/, retrieved June 4, 2020.

Exhibit 2 Number of vehicles shipped by geographic regions for FCA and VW in 2018 and 2019

	FCA[a]		VW[b]	
	2019	2018	2019	2018
North America	2,427	2,460	565	574
Western Europe	778	865	1,496	1,469
China	92	163	3,163	3,110
Brazil	497	434	392	336
Central & Eastern Europe	na	na	279	268

Source: Statista, https://www.statista.com/statistics/475673/vehicle-sales-of-fca-in-leading-countries/, retrieved June 4, 2020, VW web-site, https://www.best-selling-cars.com/brands/2019-full-year-globale-volkswagen-sales-worldwide/, retrieved June 4, 2020

Exhibit 3 Largest automobile manufacturers by number of vehicles sold in 2018

Rank	Company	Country	No of vehicles sold (000)	Market share
1	Volkswagen Group	Germany	10,457	11.8%
2	Renault Nissan Alliance	Japan/France	9,828	11.1%
3	Toyota	Japan	9,536	10.7%
4	General Motors	U.S.	8,690	9.8%
5	Hyundai-Kia	South Korea	7,327	8.2%
6	Ford	U.S.	5,318	6.0%
7	Honda	Japan	4,859	5.5%
8	FCA	Italy/U.S.	4,538	5.1%
9	Groupe PSA	France	3,496	3.9%
10	Suzuki	Japan	2,717	3.1%
11	Mercedes Daimler	Germany	2,552	2.9%
12	BMW	Germany	2,502	2.8%
13	Geely Group	China	2,247	2.5%
14	Mazda	Japan	1,557	1.8%
15	Changan	China	1,185	1.3%

Source: Focus2move, https://www.focus2move.com/world-car-group-ranking-2018/, retrieved June 4, 2020

Exhibit 4 Fiat Chrysler Automobiles, summary income statements and balance sheets for fiscal years ending December 31, 2016 to 2019 (€millions)

	2019	2018	2017	2016
Income statement data				
Revenues	108,187	110,412	105,730	105,798
Cost of revenues	93,164	95,011	89,710	90,927
Gross profit	15,023	15,401	16,020	14,871
Research & development expense	3,612	3,051	2,903	2,930
Other operating expenses	6,594	7,421	7,187	7,443
Operating profit before tax	4,817	4,929	5,930	4,498
Net income	6,630	3,632	3,510	1,814
Balance sheet data				
Current assets	34,932	38,292	36,274	39,722
Property, plant and equipment	28,608	26,307	29,014	30,431
Capitalized development expenditures, net	10,507	9,825	9,697	9,359
Other noncurrent assets	23,997	22,452	21,314	24,831
Assets	98,044	96,876	96,299	104,343
Current liabilities	43,354	46,474	47,269	49,469
Noncurrent liabilities	26,015	25,496	28,043	35,521
Equity	28,675	24,903	20,987	19,353
Total Liabilities & Equity	98,044	96,873	96,299	104,343
Number of vehicles sold (000)	4,272	4,655	4,423	4,482

Source: Fiat Annual Report 2019

Exhibit 5 Volkswagen, summary income statements and balance sheets for fiscal years ending December 31, 2015 to 2019 (€millions)

	2019	2018	2017	2016
Income Statement				
Revenues	212,473	201,067	196,949	186,016
Cost of revenues[1]	157,278	158,361	158,863	158,968
Gross profit	55,195	42,706	38,086	27,048
Research & development expense	13,199	12,116	11,614	11,509
Other operating expenses	28,248	19,463	15,326	10,871
Operating profit before tax	13,748	11,127	11,146	4,668
Net income	11,027	9,926	8,099	3,591
Balance sheet				
Current assets	93,081	91,371	80,210	81,083
Property, plant and equipment	65,043	54,619	52,503	51,415
Capitalized development expenditures, net	23,988	22,426	20,972	19,573
Other noncurrent assets	64,704	66,108	67,436	68,014
Assets	246,816	234,524	221,121	220,085
Current liabilities	63,220	67,982	69,711	80,973
Noncurrent liabilities	90,822	77,692	69,805	69,982
Equity	92,774	88,850	81,605	69,130
Total Liabilities & Equity	246,816	234,524	221,121	220,085
Number of vehicles sold (000)	10,956	10,900	10,777	10,391

Source: Volkswagen Annual Report 2016, 2017, 2018, 2019

1. Volkswagen includes its Research & Development expense as part of Cost of revenues. For comparative purposes, the case authors have presented it separately in similar layout and presentation as FCA.

Exhibit 6 Overview of accounting standard setting

To increase the reliability and comparability of financial reports, countries regulated the accounting methods that public companies could use to record their business transactions. Outside the U.S., standards were specified by country regulators and standard-setting bodies. However, over time, many had decided to adopt International Financial Reporting Standards (IFRS), set by the International Accounting Standards Board (IASB). The IASB was an independent board of 16 members with standard setting, auditing, company preparer, investor, and academic backgrounds, who represented countries that had agreed to adopt its standards. It was funded by public authorities (such as China's Ministry of Finance and the U.S. Federal Reserve System), accounting firms, and publication sales.

In 2019, 144 countries required all or most domestic public companies to use IFRS Standards. Notable exceptions, included China, Japan, India, and the U.S. Chinese companies listed on local exchanges reported using standards that "substantially converged with IFRS Standards", although Chinese companies listed on the Hong Kong stock exchange were required to report under IFRS standards. Japanese listed companies were permitted to use IFRS, US standards, or Japanese national standards, and Indian standards were "based on and substantially converged with IFRS Standards."

In the United States, standard setting was performed by the Financial Accounting Standards Board (FASB), an independent standard-setting body delegated responsibility for setting accounting standards by the Securities and Exchange Commission (SEC). The accounting standards formulated by the FASB were known as generally accepted accounting principles (US GAAP). The FASB was an independent board of seven full-time members with auditing, company preparer, investor, and academic backgrounds. It was funded through fees on publicly-traded companies and from sales of FASB publications.

Both the FASB and the IASB followed a similar deliberation process for setting standards. Reporting issues to be reviewed were typically raised by stakeholder recommendations and concerns. These issues were then analyzed by research staff and aired at one or more public meetings. A proposed standard, issued in the form of an Exposure Draft, was released and stakeholder input solicited. After considering this feedback, a final standard was issued.

Although IFRS Standards and US GAAP were both accrual-based, with similar purposes and outcomes, there were differences in their approaches. IFRS Standards were more principles-based (more flexible and broader), whereas US GAAP was more rules-based (involving more complex standards and narrower interpretations). However, since 2002, the two rule-making bodies had worked together in an effort to harmonize the two sets of standards, by developing standards jointly and eliminating narrow differences where possible.

Source: International Financial Reporting Standards (IFRS) set by the International Accounting Standards Board (IASB).

Exhibit 7 Gross and net carrying values of capitalized development costs and R&D expenses at Fiat Chrysler Automobiles for fiscal years ending December 31, 2016 to 2019 (€millions)

	2019	2018	2017	2016
Capitalized development costs gross carrying value				
At January 1	20,228	19,899	18,739	15,749
Additions	2,889	2,235	2,586	2,558
Other (divestitures, translation differences)	(191)	(1,906)	(1,426)	432
At December 31	22,926	20,228	19,899	18,739
Accumulated amortization				
At January 1	10,403	10,202	9,380	7,610
Amortization	1,358	1,456	1,424	1,492
Impairment losses and write-offs	949	147	110	121
Other (divestitures, translation differences)	(291)	(1,402)	(712)	157
At December 31	12,419	10,403	10,202	9,380
Net carrying amount, December 31	10,507	9,825	9,697	9,359
Research and development expense				
R&D expenditures expensed	1,305	1,448	1,369	1,317
Amortization of capitalized dev. expenditures	1,358	1,456	1,424	1,492
Impairment and write-off of capitalized dev. expenditures	949	147	110	121
Total	3,612	3,051	2,903	2,930

Source: Fiat Annual Report 2019

Exhibit 8 Gross and net carrying values of capitalized development costs and R&D expenses at Volkswagen for fiscal years ending December 31, 2016 to 2019 (€millions)

	2019	2018	2017	2016
Capitalized development costs gross carrying value				
At January 1	39,235	36,067	34,651	30,462
Additions	5,171	5,234	5,260	5,750
Other (divestitures, translation differences)	(1,323)	(2,066)	(3,844)	(1,561)
At December 31	43,083	39,235	36,067	34,651
Accumulated amortization				
At January 1	16,810	15,094	15,079	13,005
Amortization	4,049	3,665	3,345	3,278
Impairment losses and write-offs	(384)	2	389	308
Other (divestitures, translation differences)	(1,377)	(1,951)	(3,719)	(1,512)
At December 31	19,098	16,810	15,094	15,079
Net carrying amount, December 31	23,985	22,425	20,973	19,572
Research and development expense				
R&D expenditures expensed	9,534	8,449	7,880	7,923
Amortization of capitalized dev. expenditures	4,049	3,665	3,345	3,278
Impairment and write-off of capitalized dev. expenditures	(384)	2	389	308
Total	13,199	12,116	11,614	11,509

Source: Volkswagen Annual Report 2016, 2017, 2018, 2019

Endnotes

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