Automobiles – an Industry in Change

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Content

1. The Automotive Industry in Change

1.1. Challenges Facing the Sector

The automotive industry faces various challenges which will affect car manufacturers in the immediate and the long-term future. The main challenges include tightening regulations regarding air pollutant emissions of vehicles. Stricter regulations put a huge strain on and demand great efforts by car makers to comply with and avoid devastating financial penalties imposed by regulators. The digitalisation and internet of things lead to technological leaps in the automotive industry. From semi- to fully-autonomous driving solutions, infotainment and connected vehicles to vehicle to infrastructure communication, a huge variety of business chances and risks emerge. Ethical and legal aspects will challenge our societies.

The automotive industry is in change, innovation and new business models are imperative. Car makers respond in different ways to these challenges. Investors are increasingly interested in financing environmentally friendly and energy efficient solutions. More and more investors want to tap new markets where financial risk-return requirements are met, while supporting the generation of positive environmental and social impacts. What they need is transparency, the basis for financing and active ownership.

2. Climate Change as the major Challenge of the 21st Century and the Role of the Automotive Industry

The transportation sector is still a major contributor to global CO_2 emissions. According to the International Energy Agency (IEA), transportation was responsible for almost a quarter (23%) of worldwide energy-related CO_2 emissions in 2015.[1] Within the transportation sector, on-road vehicles accounted for about three-quarters of CO_2 emissions, whereas more than half of these emissions resulted from light vehicles, such as passenger cars.[2] However, a global approach to tackling the issue has not been developed. Countries have adopted different regulatory policies and implementation procedures.

The most prominent developments within the automotive industry are linked to the ever more stringent regulatory requirements regarding carbon emissions. This has led to massive amounts of R&D expenditures being directed towards fuel-efficient, natural gas, hybrid or even electric engines.

2.1. Combustion Engines are out – the Electric Car Revolution

Today most experts share the view that electric vehicles (EV) will become the cars of the future, as they are more efficient than other alternatives and costs of batteries are decreasing gradually.[3] According to a report from Climate Action Tracker (CAT), car manufacturers need to stop selling fossil fuel cars by 2035 in order to achieve the 2-degree target determined in the Paris Agreement.[4] This implies that if governments stay committed to the Paris Agreement, the traditional internal combustion engine will come to an end in the next twenty years.

The worldwide stock of electric cars surpassed 2 million units in 2016 after crossing the 1 million vehicle threshold in 2015.[5] The International Energy Agency (IEA) estimates that if supportive policies including tighter fuel-economy and emission regulations as well as financial incentives become stronger and more widespread, the effect would be to have some 715 million electric cars on the road

[1] IEA Tracking Clean Energy Progress 2017: https://www.iea.org/publications/freepublications/publication/TrackingCleanEnergyProgress2017.pdf

[2] IEA World Energy Outlook 2016: https://www.iea.org/.../2016/.../world-energy-outlook-2016.html

[3] Kanellos, "Which Are Better: Electric Cars or Natural Gas Vehicles?", January 2012, forbes.com

[4] climateactiontracker.org

[5] IEA: Global EV Outlook 2017 https://www.iea.org/publications/.../GlobalEVOutlook2017.pdf

by 2040.[6] However, the market share of electric cars in proportion to fossil fuel cars new registration in 2016 were still very low, ranging from 0.5% in Japan to 1.5% in China (table 1).

Until 2015, the United States accounted for the largest portion of the global electric car stock. In 2016, China surpassed the US and became the largest market for electric cars with over 300'000 new electric cars registered. In the US, California is the leader with an electric passenger car market share of 5.2% of total sold cars in 2016. One of the reason is certainly that California has implemented the most ambitious climate change policies in the U.S in recent years.[7]

Electric car sales in China accounted for more than 40% of the electric cars sold in the world and encompassed more than double the amount sold in the United States.[8] China is leading in deploying electric buses in its cities, before the US and Europe. Chinese regulators have set a 2019 deadline for global carmakers to meet new quotas requesting that electric cars and plug-in hybrids must account for at least 8 % of an automaker's sales. Representatives of the automotive industry suggest delaying these targets, arguing scale and pace are too fast.

Table 1: Market share of electric cars remain low in 2016

	New car registrations 2016[a]	New electric vehicles registrations 2016[b]	Percentage of electric vehicles registrations / new car registrations
World	93.8 Mio	750'000	0.79%
Europe	20.1. Mio	180'000	0.9%
USA	17.8 Mio	160'000	0.9%
China	28 Mio	336'000	1.5%[b]
Japan	4.9 Mio	24'000	0.5%

Sources

[a] OICA 2017: http://www.oica.net/category/sales-statistics/

[b] IEA: Global EV Outlook 2017

Norway had by far the greatest share of electric vehicle registrations in 2016 (electric, plug-in hybrid and hydrogen fuel cell cars), up from 22.4% in 2015 to 29 % in 2016 according to the European Automobile Manufacturers' Association (ACEA). Second in Europe is the Netherlands with a share of 6%, but which had fallen from 9.9% in 2015. Its Scandinavian neighbour Sweden is on the third position with 3.6% in 2016, rapidly growing from 2.5% in 2015.[9] Norway is another example of a country considering policies to reduce internal combustion engine (ICE) vehicle sales and strives for 100% EV sales by 2025. Cities like Berlin, struggling with high pollution levels, have created "green zones" where drivers of higher-emission cars have to pay fines when entering these zones.[10]

[6] IEA World Energy Outlook 2016: https://www.iea.org/.../2016/.../world-energy-outlook-2016.html

[7] https://www.nbcnews.com/news/us-news/experts-say-california-s-environmental-polices-are-bellwether-economic-growth-n631841

[8] IEA: Global EV Outlook 2017 https://www.iea.org/publications/.../GlobalEVOutlook2017.pdf

[9] https://reports.autovistagroup.com/blogs/news/ev-box-expands-in-the-nordics-as-norway-enjoys-record-sales

[10] McKinsey&Company (2017): Electrifying insights: How automakers can drive electrified vehicle sales and profitability

How clean are Electric Vehicles?

Electric cars are often referred to as “zero-emission” vehicles. However, carbon emissions of grid powered electric cars can be as high as emissions from average petrol vehicles, if the electricity mix stems from coal based electricity generation. But carbon emissions can also be much lower, if the electricity stems from renewable sources (e.g. solar, wind or water power).[11]

In Switzerland, where electricity is to a large extent generated with hydro and nuclear power, the use phase of electric vehicles is indeed causing less CO_2 emissions than in other countries. Looking at the full life cycle, carbon emissions of traditional fossil fuel cars are 70% higher than the ones of electric vehicles in Switzerland. This difference rapidly shrinks to 20% if the electric vehicle uses the European electricity mix. If the electricity used is completely generated by coal, then the electric vehicles’ GHG performance is worse than the one of a fossil fuel car.[12]

An electric vehicle driven and refuelled in Switzerland emits on average only 80 to 90 g CO_2 per kWh[13] – but one has to bear in mind that nuclear power is not a sustainable electricity source, either.

Electric cars use large amounts of elements such as nickel, lithium and cobalt and the mining of these elements has a substantial environmental impact.[14] A report of the Swedish Environment Institute from June 2017 showed, that battery manufacturing leads to large CO_2 emissions. About half of the emissions occur during the production of raw materials and half during the production of the battery in the factory.[15] The study also reveals that CO_2 emissions rise almost linearly with battery size.[16] Hence, how much progress can be achieved in the next decade to optimise electric batteries will be crucial for the future of electric cars.

2.2. The Digital Revolution Will Transform the Automotive Industry

The electrification of the automobile industry is just the tip of the iceberg regarding the changes that are about to happen in the industry. A digital disruption is taking place in the sense of vehicles becoming interconnected with each other and therefore enabling vehicle-to-vehicle as well as vehicle-to-infrastructure communication. This development ultimately enables autonomous driving where an individual car is part of a larger mobility network. This offers huge efficiency gain potentials in the sense of reducing carbon emissions, improving traffic flows and substantially increasing passenger safety. Additionally, autonomous driving will transform the car into a platform for passengers to use their transit time for personal activities, which discloses a new field for media usage and service offers.

Furthermore, the digital revolution allows automakers to capture valuable real-time data helping to improve the effectiveness of sales and marketing. Also, digital design and manufacturing have the potential to increase productivity significantly by lowering development costs and decreasing time to market. The biggest challenge coming along with the car being part of a broader mobility network will be cyber security. Therefore, the magnitude of the digital disruption will greatly depend on the required time with which regulatory challenges linked to self-driving cars can be overcome. Yet, it remains unclear how fast consumers will accept and adapt autonomous driving as it alters the driving experience substantially. In addition, ethical legal as well as safety aspects need to be solved.

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[11] The German Umwelt- und Prognoseinstitut (UPI) for example came to the conclusion that EV’s CO2-emissions nearly equal the emissions of petrol or diesel cars.

[12] www.tagesanzeiger.ch/schweiz/standard/Der-TeslaTrugschluss-/story/17032433 und Zentrum für Technologiefolgeabschätzung TA Swiss

[13] Schweizerische Energiestiftung SES 4/2016

[14] https://www.theguardian.com/sustainable-business/2017/aug/24/nickel-mining-hidden-environmental-cost-electric-cars-batteries

[15] It has to be noted, however, that the calculation is based on the assumption that the electricity mix used by the battery factory consists of more than half of the fossil fuels.

[16] https://www.thegwpf.com/new-study-large-co2-emissions-from-batteries-of-electric-cars/

2.3. Other Business Models for the Future

Another disruptive trend in the automotive industry comes from new business models of diverse mobility solutions. In recent years, a shift in consumer preferences has occurred away from car ownership towards car sharing. This has led to an increased demand for car sharing services and transportation networks like Uber or Lyft.[17] This trend is supported by policies restricting the use of private vehicles in urban areas such as low-emission zones in Europe or "no-drive-days" in Mexico City.[18] However, increased car sharing does not necessarily imply less traffic or even declining car sales. Car usage and therefore wear and tear might increase as car sharing becomes more popular. Also, consumers can choose from a broad variety of vehicle types. Therefore, customers might demand a rather utilitarian car to commute to work while enjoying a luxury sports car on a weekend drive.[19] According to experts, this development might lead to an expansion of existing revenue pools due to a broader diversification of offered services towards more on-demand mobility and data-driven services like software upgrades.[20]

3. Investors

3.1. Market Capitalization

Broadly diversified investors are almost by definition invested in equities of the automotive industry given the importance of this industry. The automotive sector has a global market capitalization of 1'157 billion as of end of March 2018.[21] This reflects 2.6% of total market capitalisation of the MSCI ACWI Index. The top 10 companies account for almost half of the global market capitalization.

Table 2: Top 10 Constituents in MSCI ACWI Automobiles and Components Index [a]

	Country	Market Cap (USD bn)	Index weight (%)
Toyota	JP	168	14.5
Daimler	DE	82	7.1
Honda Motor	JP	59	5.1
General Motors	US	46	4.0
Ford Motor	US	41	3.6
Volkswagen	DE	27	3.2
BMW	DE	36	3.1
Tesla	US	36	3.1
Continental	DE	30	2.6
Bridgestone	JP	28	2.5
TOTAL		563	48.7

Sources: [a] MSCI, March 30, 2018

[17] McKinsey (2016): Disruptive trends that will transform the auto industry

[18] The „hoy no circula" program, mexicocity.gob.mx

[19] Hanna, Kuhnert and Kiuchi, „Re-inventing the wheel – Scenarios for the transformation of the automotive industry", 2015, Global automotive, pwc.com/auto

[20] Moor, Kaas, Gao, Wee and Möller, „Automotive revolution – a perspective towards 2030", January 2016, Advanced Industries, mckinsey.com

[21] MSCI ACWI Automobiles and Components Index, Sector Factsheet, March 30, 2018

Passive investors face the risk to have an over-weight in traditional manufacturers and an underweight in more innovative and smaller producers of automobiles and its components.

3.2. What do these Industry Changes Mean for Investors?

The automotive sector is also one of the most significant sectors when it comes to tackling climate change. Carbon pricing and the potential development of climate litigation will change the expected stock returns of different automakers, creating risks and opportunities.

According to a report of the Institutional Investors Group on Climate Change (IIGCC) published in 2016, major investors have warned the automotive industry to address climate change related risks and build a sustainable low carbon transportation system if it is to retain their support. The report is setting out the threats facing the automotive sector and investor expectations for how these companies must shift gear to adapt their business strategies. The study says that long-term investors should ensure that automotive companies are prepared for the challenges resulting from climate change, new technologies, changing policies and shifts in demand caused by global trends. Institutional investors increasingly recognise that climate change will impact their holdings, portfolios, and asset values in the short and long-term. [22]

To achieve sustainable returns for clients and beneficiaries, investors in the automotive sector need to understand which automotive companies are leaders or which ones are lacking behind in meeting these challenges, investors need to know the sustainability impact of a company, i. e. the impact on the environment and on society that occurs along entire life cycles. Furthermore, investors should engage to ensure that companies are prepared to thrive in a carbon-constrained environment. Companies that understand best how to innovate and come up with products that contribute to reducing carbon emissions, while minimizing unfavourable trade-offs relative to traditional fuel cars, will prevail.

4. Conclusions

The automotive industry is reaching a tipping point. It faces disruptive forces from advanced vehicles such as electric cars, autonomous and shared driving. Tightening emissions regulations and country quotas are challenging the industry and forcing companies to increase penetration rates of low-emission vehicles. In this rapidly changing environment, those companies that are able to adjust their business models to the new reality will prevail.

To minimize investment risks, investors should ensure to invest in companies that are best prepared for the challenges of a low-carbon transition. To find out which companies are most successful and understand best how to innovate and come up with products that contribute to reducing carbon emissions, the ESG Impact Rating by Inrate is the right choice. In addition to a conventional analysis of Corporate Social Responsibility and annual reports, this assessment measures the impact of companies' production processes and products along entire life cycles on the environment and society. Thereby, the ESG Impact Rating assesses the companies' positive and negative contribution to a sustainable development, thus providing indications on their chances and risks and future success.

[22] Source: Institutional Investors Group on Climate Change (IIGCC) 2016: Investor Expectations of Automotive Companies.

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