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How do traditional European car manufacturers respond to competitive pressures in an increasingly changing environment?

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THE INTRODUCTION

The first two decades of the twenty-first century have been marked by a significant burst of technical advancements and new digital technologies, leading to the necessary transformation of almost every industry's business models and processes. Coupled with the increased interest in environmental-friendly and sustainable solutions and the advent of sharing platforms and collaborative consumption, these important changes are forcing traditional companies to rethink their strategy to stay ahead of the curve (Ferràs-Hernández, 2017; Rogers, 2016).

Among all industries, one has particularly been affected by technological changes and digitalization: the automotive industry. This sector used to be described as a "fortress industry" since car manufacturers, also known as OEMs (Original Equipment Manufacturers), used to hold stable positions with few chances of being disrupted by new actors (Ferràs-Hernández, 2017). Today, this is no longer true. The car industry is indeed being disrupted on four main fronts: connectivity, self-driving cars, electric vehicles and shared mobility models (Wolcott, 2017). Furthermore, a whole set of new actors is invading the industry and redefining the competitive positions of every traditional incumbent: digital start-ups attempt to colonize every possible niche, and tech giants are investing massively to seize a part of the pie as well (Ferràs-Hernández, 2017).

Traditional car manufacturers end up operating in an increasingly complex and growing ecosystem where all players are trying to capture value (Krasniqi & Hajrizi, 2016). In this context, there is a need to understand how traditional car manufacturers respond to competitive pressures and how they continue to grow in this trillion-dollar industry. The current research and reports on the topic have indeed tended to focus either on very specific topics (i.e. electric vehicles or self-driving vehicles), or on broad prospective views for the future of the automotive industry and high-level recommendations for car manufacturers. Little research has been done on the current strategies that OEMs implement with specific examples and insights from professionals of the industry.

Throughout this thesis, we will therefore attempt to answer the following question:

"How do traditional European car manufacturers respond to competitive pressures in an increasingly changing environment?"

By "traditional European car manufacturers", we mean to refer to car makers established in the early 20th century, or even before, in opposition to newly established car manufacturers founded in the 21st century. When it comes to the "competitive pressures", we are referring to the wide definition of competition, for example, as seen by Michael Porter in its model of the five forces. In fact, elements such as substitutes to the car, legislations and new entrants are important for OEMs to take into account while considering strategic decisions.

By answering this question, we aim to understand how traditional European car manufacturers position themselves in this changing environment, whether or not they feel threatened by potential new actors, how they make sure to stay aware of their environment and what kind of strategic actions they undertake to go forward.

The methodology adopted to answer the research question is characterized by a literature review followed by a multi-case qualitative research. The literature review, which relies mainly on scientific articles and strategy consultancy reports, will outline the main trends that shape the industry today as well as the underlying new business models and their consequences for the industry dynamics. The multi-case qualitative research will rely on press releases and interviews conducted with managers coming from several European car manufacturers and will deepen the question by bringing real-life examples and substantial insights from the industry.

The thesis is built around three parts:

The first part gathers the literature review, which is made of three chapters. The first chapter will serve as an introduction to the automotive industry by briefly presenting its history, its importance and its structure. The second chapter will present the three main trends of the automotive industry today, namely: (i) environment and mobility issues, (ii) changing customer needs, and (iii) digitalization and technologies. Finally, the third chapter will introduce the underlying new disruptive business models, such as shared mobility and mobility-as-a-service, and a disruptive actor which has questioned the industry: Tesla. This

first part will conclude by announcing the rise of a new competitive landscape in the car industry made of traditional and non-traditional actors.

The second part exposes in details the methodology used to answer the research question. The first chapter, the introduction, will link the literature review with the rest of the thesis. The second chapter will display the research question as well as its underlying sub-questions. Finally, the third chapter will detail the method used for the analysis by specifying the methodology choice, the sample used, and the approach for data collection and analysis.

The third part organizes and describes the results in four chapters. The first chapter will describe some results regarding the automotive industry and traditional OEMs which are countering some facts which can be found in the press, for example. The second chapter will disclose some of the tools and methods used by OEMs for business intelligence. The third chapter will address the new actors of the automotive industry depicted by the OEMs and whether or not they are considered as competitors. Finally, and most importantly, the fourth chapter will reveal the different strategic actions taken by the OEMs to cope with the changes in the automotive industry.

Finally, the conclusion will gather and summarize the collected insights and will answer the research question. Needless to say that we will share the limits of our work and our recommendations for future research on the topic.

PART I: THE LITERATURE REVIEW

1. A Picture of the European Automotive Industry

1.1. History

Since the creation of the first gasoline-powered car in 1886, the industry has come a long way. The first modern car, which was a three-wheeled car, was created by the German inventor Karl Benz, who eventually made several improvements to build a car with four wheels, a fuel tank and rear brakes. At the beginning of the twentieth century, only a few cars were sold because of the significant time and cost to produce them (Miller-Wilson, n.d.).

The democratization of the car has been made possible by the American Henry Ford, who invented the assembly line to make the Model T: the first affordable car for a majority of Americans. The use of the assembly line during the production has generated a drop in cost from 850$ in 1908 to less than 300$ in 1925 (History, n.d.). As a result of this progress, more and more Americans bought their first cars and many small car companies began to make cars during the second decade of the twentieth century (Miller-Wilson, n.d.).

In Europe, the car industry followed the path of the American one, yet with slower progress due to lower purchasing power, smaller markets and difficulties in tax and policies. From the second half of the twentieth century however, the situation shifted strongly as Western Europe (and Japan) became major producers and exporters of cars (Binder & Rae, 2018). During that period, Europe has witnessed a strong concentration in car manufacturers only allowing a few to survive today. Those manufacturers have contributed to the evolution of cars by incorporating elements such as air conditioning, seat belts, airbags, hybrids, smart technology and smart cars (CEBOS, n.d.).

1.2. The Importance of the Automotive Industry

On top of revolutionizing transport, the automotive industry has profoundly changed the social landscape by altering the relationship between people and space (Histoire pour tous, 2011). It has also largely contributed to cultural and economic development: the automobile is a source of well-being, freedom, mobility and employment (Febiac, 2000).

The automotive industry is of substantial importance for the European economy as well as for the global economy. In 2016, the automotive sector accounted for 4% of the European GDP (European Commission, 2018), and employed directly and indirectly 12,6 million people. In terms of production, 16,5 million passenger cars were produced in the same period in Europe, which represent one fifth of the global production and is almost the same level as the one of 2007, before the financial crisis (Christiaens, 2017).

Furthermore, the car industry goes further than just manufacturing and selling cars. In fact, numerous industries are generating revenues thanks to the car industry: energy, insurance, finance, medical & legal, public sector, media, etc. (Corwin et al., 2015).

1.3. Structure of the Industry

It is important to keep in mind that to put a car on the market, several actors are involved. Car manufacturers are often called OEMs (Original Equipment Manufacturers), which is not entirely correct. Car manufacturers produce some original equipment but in reality, their activity relies mainly on designing and *assembling* cars. To assemble cars, car manufacturers call out car parts suppliers referred to as Tier 1, 2 and 3 suppliers. Tier 1s directly supply OEMs and often work tightly with only one or two car manufacturers. Tier 2s do not sell directly to OEMs, but their parts will still end up in cars. Often, they provide parts for other industries. Tier 3s are basically providers of raw material such as metal (Amatech, 2017). Then, there are the downstream actors who ensure the distribution of the cars. In our analysis, we will consider car manufacturers.

Today, several car manufacturers hold diverse brands, which limits the number of actors in Europe and leads to a considerable concentration in the market. We have listed below the ten biggest car manufacturers in Europe, by market share in 2017. The market share has been calculated in terms of new passenger vehicle registration. Together, European car manufacturers account for 66% of the market share in Europe (Bekker, 2018).

Car manufacturers	Market share (2017)
VW Group	23,8%
PSA Group	12,1%
RENAULT Group	10,4%
FCA Group	6,7%
BMW Group	6,7%
Ford	6,6%
Daimler	6,3%
TOYOTA Group	4,6%
GM	3,8%
NISSAN	3,6%

Figure 1: Market share of the 10 biggest OEMs (2017)
Source: (Bekker, 2018)

2. Three Trends Shaping the Industry

The automotive industry is going through an important transformation, which some authors even qualify as a disruption (Kefferpütz, 2018). This revolution is triggered by several trends, as well as by new companies and competitors. In the literature, authors have shed light on several trends, and three of them are consistently coming back: (i) environment and mobility issues, (ii) changing customer needs, and (iii) digitalization and technologies. We have therefore decided to go in details into those three trends and understand what is behind them and how they are changing the industry (Berret, 2016; Gao, Kaas, Mohr, & Wee, 2016; Kessler & Buck, 2017; PwC, 2017)

One should also keep in mind that those trends are interconnected and therefore not independent. For example, changing customer needs could be triggered by mobility problems, and solutions could be found thanks to technologies.

2.1. Environmental & Mobility Issues

The continuous production and usage of cars contribute largely to problems such as pollution, congestion and parking spaces shortages.

2.1.1. Pollution

After signing the Kyoto protocol climate change agreement in 1997, most rich countries were required to reduce CO_2 mission by 8% over fifteen years. At that time, the European Commission was lobbied by important German car markers (such as BMW, Volkswagen and Daimler) who encouraged the use of diesel instead of petrol. Diesel indeed emits 15% less CO_2 than petrol but produces four times more NO_2 (Vidal, 2015). Therefore, even though emissions have notably decreased in most European countries between 1990 and 2012, air pollutant concentrations are still too high, and problems related to air quality still persist (European Environment Agency, 2018). Today, "*urban mobility accounts for 40 % of all CO_2 emissions of road transport and up to 70 % of other pollutants from transport*" (European Commission, n.d.).

In 2016, the European Commission launched its strategy on low-emission mobility, which aims at developing measures on low- and zero- emissions vehicles and alternative low-emission fuels. Part of this strategy is to move towards zero-emission vehicles. Those regulations and incentives from the EU are key drivers for the launch of electric vehicles on the market (European Commission, 2017).

2.1.2. Congestion

The use of electric vehicles, however, does not solve the issue of congestion, which is experienced profoundly in Europe (Firnkorn & Müller, 2012). Congestion happens when car traffic volume exceeds the available capacity. It is mainly an issue in urban areas and has become a challenge for most major cities in Europe. Congestion has several important consequences: "*demographic, social and economic characteristics, land use patterns, car-ownership, availability of public transport, availability of parking, and urban freight transport and goods delivery*." (European Commission, 2017, p.7). Every year, congestion costs around 130 billion EUR, which represents 1% of the European GDP (European Commission, 2017). In some cities where congestion is a big issue, it is clear that share mobility is a competitive alternative to car ownership (Gao et al., 2016) and therefore clearly affects car manufacturers.

2.1.3. Parking spaces

The parking spaces shortage is also a well-known issue in major European cities. This problem has repercussions on mobility, traffic flow, safety and pollution in a substantial way. 60% of the traffic in European cities is indeed caused by parking space searching. Moreover, many cars are parked for 95% of the day, which minimizes the number of parking spaces available (City parking in Europe, n.d.). Therefore, in urban areas, many people decide to take public transport or use car-sharing to avoid parking searching (Wyman, 2015).

These negative externalities clearly push car manufacturers – especially via stakeholders asking for more corporate responsibility – to take action to decrease them. Those issues were also an important reason for the rise of car-sharing systems, which the car manufacturers have started adopting by updating their business model (Firnkorn & Müller, 2012).

2.2. Changing customer needs

The private car has been for long an object of social representation and a way to define ourselves. Attachments to cars can even characterize gender identities, especially masculinity. Moreover, the exclusive ownership of a car is associated with the freedom of self-mobility. However, there are a number of evidences that these attachments to car ownership are in decline (Dowling, Maalsen, & Kent, 2018)

In mature markets specifically, the car is less and less perceived as a status symbol and more and more as a way to reach a destination (Rossbach, Winterhoff, Reinhold, Boekeis, & Remane, 2013). Other authors show a decline in car ownership and a rise in the use of share-mobility solutions (Gao et al., 2016; Firnkorn & Müller, 2012). Some authors specifically show that the use of private vehicles is reduced in response of the appearance of car-sharing systems (Firnkorn & Müller, 2012).

This is particularly the case for young and educated people living in the city. Those young people belong to the millennials generation, which deserve particular attention when it comes to mobility. More and more of them move to the city to live the urban experience. The massive use of social-media devices by this generation foster this experience and drive them to use alternative mobility solutions which allows them to be always online. Some studies even show that mobile devices are of bigger importance than a car to them (Newman & Kenworthy,

2015). Millennials do not see ownership anymore as something which is required to access the service it provides (Koushik & Mehl, 2015). In fact, studies show that in the last decade, the number of people below the age of 35 with a driver's license has decreased by 6% (Cubic Transportation System, 2017).

This clearly forces car manufacturers to rethink the way they respond to this "on-demand mobility" need, and the main challenge for them is to build the ecosystem around it (Siemssen & Hahn, 2015). However, it is important to note that in emerging markets, cars will still remain important for personal mobility for a long time (Rossbach et al., 2013).

2.3. Digitalization and Technologies

2.3.1. Digitalization of the Automotive Industry

The (r)evolution of the industry has been augmented by digitalization and has made significant progress with the technologies available. Autonomous driving, Internet of Things, Big Data and Social Media are indeed letting room for innovative products, services and business models, as well as an increased interest in on-demand mobility solutions (Gauger, Gehres, Quinn, Schmieg, & Xu, 2017).

Many experts affirm that cars of the future will be electric, connected, autonomous and shared (Gao et al., 2016; Knupfer, 2017; PwC, 2017). For a matter of clarity, we will elucidate the last point in the next chapter, which will be devoted to new business models.

2.3.2. Electric cars

2.3.2.1. Definition and context

"*Electric vehicles (EVs) use an electric motor for traction, and chemical batteries, fuel cells, ultracapacitors, and/or flywheels for their corresponding energy sources*" (Ehsani, Gao, Longo, & Ebrahimi, 2005, p. 99). More generally, EVs are vehicles which use electrification of the motor as a primary source of propulsion.

Even though the first electric car was created in the 19th century, it is only in the past decade that Europe has gone through the initial phase of adoption of Electric Vehicles. After a period of excitement and then one of disappointment, there is now an increasing interest for EVs, let it be from consumers or from the automotive industry itself. It is clear that car manufacturers

give importance to EVs because they are crucial to comply with emission and fuel economy targets. Nevertheless, it is important to clarify that even though electric vehicles are on the rise, internal combustion engines will remain a very important part of automakers' strategies (Amsterdam Roundtable Foundation & McKinsey & Company The Netherlands, 2014).

The next point will shed light on the forces which are driving the adoption of EVs in Europe.

2.3.2.2. Drivers of adoption

According to the report on Electric Vehicles written by Amsterdam Roundtable Foundation and McKinsey & Company The Netherlands, there are three forces which will be driving the adoption of EVs in Europe:

- *Consumer demand*. Consumers are becoming increasingly interested in purchasing EVs. For example, in 2016 in Germany, 30% of consumers are considering buying Battery Electric Vehicles (BEVs) (Knupfer, 2017). The early adopters of EVs are driven by the reduction of carbon footprint, by driving and usage benefits such as parking permits and exclusive lane use, and by cost savings in the case of government subsidies (Amsterdam Roundtable Foundation & McKinsey & Company The Netherlands, 2014).
- *Industry developments*. Industry developments have allowed an improvement in technologies mainly through a decrease in battery prices, an increase in vehicle range, for example thanks to lightweight carbon fiber structures (Amsterdam Roundtable Foundation & McKinsey & Company The Netherlands, 2014), and an acceleration of charging infrastructures (Knupfer, 2017).
- *Government stimulus*. Governments are encouraging the production and the purchase of EVs through diverse methods. On the one hand, there are the initiatives coming from the EU such as the 2016 strategy on low-emission mobility launched by the European Commission. On the other hand, many national European governments incentivize people to use EVs through subsidies, tax breaks and driving privileges, like mentioned earlier (European Commission, n.d.; Knupfer, 2017).

2.3.2.3. Implications for OEMs

The rhythm of adoption of EVs will largely depend on the cost competitiveness of EVs compared to cars with internal combustion engines on a TCO basis (total cost of ownership)

(Amsterdam Roundtable Foundation & McKinsey & Company The Netherlands, 2014). This indicates that automakers are creative and agile enough to overcome four challenges related to EVs' profitability. The first challenge regards the evolution of the cost of batteries. The second challenge to overcome is the trade-off between optimizing ICE (Internal combustion engine) vehicles combustion efficiencies or investing in EVs. The third challenge for automakers will be the capital scarcity considering that all automakers invest in other mobility megatrends - autonomy, connectivity and shared mobility – which only increases the competition for capital funding needed for EVs. The fourth and last challenge is to overcome the supply versus demand mismatch, meaning being able to serve the more price-sensitive consumer market, and not only the premium consumer market (Knupfer, 2017).

2.3.3. Connected cars

2.3.3.1. Definition and context

The definitions of a "connected car" are numerous in the literature. This is understandable when one notes that the first small software component was introduced in the car more than thirty years ago. Since then, other software components, technologies and programs have been added to the car (Coppola & Morisio, 2016). Coppola and Morisio advance a thorough definition which congregates well all the notions underlying the concept of a connected car:

A connected car is a vehicle

- *capable of accessing the Internet at any time, using either a built-in device or brought in user devices;*
- *equipped with a set of modern applications and dynamic contextual functionalities, offering advanced infotainment features to the driver and passengers;*
- *capable of interacting with other smart devices on the road or in mechanical shops, leveraging vehicle-to-road infrastructure communication technologies;*
- *capable of interacting with other vehicles, leveraging vehicle-to-vehicle communication technologies. (*Coppola & Morisio, 2016, p.4)

A connected car will therefore provide a range of services and functionalities as a result of advanced applications, graphical interfaces, brought-in devices and data from the cloud. The services offered by connected cars are related to: traffic safety (driver's behaviour monitoring,

accident avoidance and assistance, remote maintenance and stolen vehicle assistance), infotainment (music streaming, video streaming, games, internet browsing, In-car Wi-Fi networks, social networks), traffic efficiency (navigation systems, traffic, weather and road conditions, assisted driving and autonomous vehicles) and cost efficiency (behaviour profiling for insurance, algorithm-based vehicle pricing, energy optimization, contextual advertisement, vehicle testing).

Some of those services are already offered on current cars, others only on luxury ones, and some will be offered on next-generation cars (Coppola & Morisio, 2016).

2.3.3.2. Connectivity – a must have

Connected car is already a reality: almost all OEMs provide connected services today and it is estimated that by 2022, 73% of the cars will be connected (Fulthorpe, 2015).

Currently, many people are constantly using their phone to communicate and inform themselves. It is therefore not trivial that many cars are integrating these functionalities into their system so that it is practical, secure and legal to access those services. A study of McKinsey run in 2015, shows that the demand for connected cars is increasing worldwide: the percentage of people who are ready to switch manufacturer if it was the only one offering connected services nearly doubled from 2014 to 2015 (from 20% to 37%) (Wee et al., 2015).

Connectivity is an even more important aspect for millennials, the generation born between 1980 and 2000, who do value connectivity and computing power when buying a car. This is a particularly important statement when one considers that millennials are demographically dominant among car buyers (Ashokkumar & Sethuraman, 2017).

2.3.3.3. Implications for OEMs

It goes without saying that the level of connectivity described earlier will generate a colossal quantity of data. Intel Corporation indeed predicted that around 1 gigabyte of data will be processed every second, only to ensure safety-critical functions. Adding data coming from infotainment systems, OEMs will be able to capture billions of bits of data about users. This valuable data will allow automakers to have information on our driving habits, our itineraries, the number of passengers we carry, and the type of music that we like (Gao, Hensley, & Zielke, 2014; KPMG, 2014).

The implications for OEMs are numerous. This amount of data can be an ideal means to enhance relationships with customers, and to target specific products and services to them (KPMG, 2014). However, it is conjointly a source of challenges for automakers. In fact, a McKinsey study shows that 80% of automotive executives think that their business will be challenged by new competitors and in-vehicle connectivity (Wee et al., 2015). In fact, there is a tension between traditional car manufacturers and new entrants who are supplying software, components and infrastructure for connected cars (Fulthorpe, 2015).

In order to face this challenge, OEMs will need to build new technical capabilities (such as software development, telecommunications engineering, user experience design and IT automation) or to create close strategic partnerships with specialized partners (Koushik & Mehl, 2015). Other important challenges may be the difficulty to attract adequate talent and overcome cybersecurity and emerging regulations issues (Gao et al., 2014).

2.3.4. Autonomous cars

2.3.4.1. Definition and context

An autonomous car also commonly called a "self-driving car" is "*any vehicle with features that allow it to accelerate, brake, and steer with limited or no driver interaction*" (Krasniqi & Hajrizi, 2016, p. 270). More broadly, it can also be defined as a "*vehicle that has the capability to perceive the surrounding environment and navigate itself without human intervention*" (Jo, Kim, Kim, Jang, & Sunwoo, 2014, p. 7132).

The autonomous car is one of the most discussed topics in the automotive sector today and more specifically, the possibility of its mass marketization (Coppola & Morisio, 2016). Autonomous vehicles are intrinsically related to connectivity. In fact, fully autonomous driving is not possible without establishing communications with the vehicle's environment (Wee et al., 2015).

When one knows that 90% of road accidents are caused by human errors, it goes without saying that cars programmed not to crash (i.e. autonomous cars) are an obvious point of interest (Gao et al., 2014). The level of automation in vehicles has indeed increased greatly during the past years and will continue rising in the future (Reiner, Pletziger, & Buss, 2015).

2.3.4.2. Different degrees of automation

Some authors identify two degrees of automation: such as semi-autonomous and fully autonomous (Krasniqi & Hajrizi, 2016), others identify five of them (Kermorgant & Siary, 2016). Bernhart and Winterhoff (2016) propose four levels of automation, some of which cars are already equipped with, and some cars will be equipped with in the future.

- "*Level 1: function-specific automation*" offers features such as cruise control and automatic braking.
- "*Level 2: combined function automation*" refers to function such as adaptive cruise control together with lane keep assist. Many established manufacturers are already offering those two levels of automation. One example is the technology Lanesense® offered by Jeep in several of their cars which detects when the car has involuntary crossed a lane and replaces the car immediately in its traffic lane (Jeep, n.d.).
- "*Level 3: limited self-driving automation*" with features such as automated driving on highways.
- "*Level 4: full self-driving automation*" can be expected first for low-speed situation such as in parking lots and secondly for more complex situations such as driving in the city.

2.3.4.3. Remaining challenges

One important challenge of the release of autonomous cars on the road will be to combine both autonomous and non-autonomous cars in the traffic mix. This will be particularly challenging at the beginning when both sorts of cars will be on the road. Once autonomous cars will dominate, this will be less of an issue (Gao et al., 2014)

Another very important challenge concerns regulations. Today, legal activities related to fully autonomous driving are only covering testing phases and not public release of self-driving vehicles on the road. Responsibility and product liability in the context of road traffic are matters that still need to be decided on and established by legislators and depends on whether the user of the car can still take control of the car in some situations (Kermorgant & Siary, 2016). Here are several matters related to regulations:

- *Drivers*. The Geneva Convention (1949) states in its article 8 and 13 that all vehicles should have a driver who should be able to control the vehicle at any time. Since the writers of this convention never imagined the release of autonomous cars, they did not specify clearly what a "driver" should be, i.e. a human being. Therefore, the Convention leads to flexible interpretation in terms of the nature of the driver.
- *Road traffic laws.* Road traffic laws also need to be updated and might need to contain specific requirements for autonomous vehicles.
- *Product liability.* Cars are recognized as products and therefore regulated by the EU Product Liability Directive, which means that manufacturers are strictly liable for the products that they release on the road.
- *Distribution of liability*. Autonomous cars are complex and involve several actors in their production: OEMs, software suppliers, sensors suppliers, maintenance contractors, traffic operators and internet operators, etc. (non-exhaustive). The responsibility in case of accident is still a black box, especially for fully autonomous cars where the user can never take control of the car. Several legal solutions are being explored such as granting a legal personality to autonomous cars.
- *Insurances*. Car insurance are based on the capabilities of a human driver, a system which is problematic when it comes to fully autonomous cars, where the risk is transferred to a machine. Insurers will therefore ask for access to data of the car, in order to determine the circumstances of the accident.
- *Data*. Data is the last but very important point regarding regulations in the context of autonomous cars. Considering the amount of data needed to run a self-driving car, issues about data security and privacy are not to be ignored by regulators who will need to define how and when this data should be used.

On top of regulations-related challenges, there are still some technological questions which need to be solved to ensure full safety. Additionally, consumer acceptance represents an additional obstacle, as consumer understanding and pricing are still existing issues when it comes to autonomous cars (Gao et al., 2016).

Some experts predict that once those challenges will be solved, up to 15% of new cars sold in 2030 could be fully autonomous (Gao et al., 2016).

3. From new business models to dynamic ecosystems

The three trends just outlined, namely (i) Environment & Mobility Issues, (ii) Changing customer needs (iii) Digitalization and Technologies, are giving birth to a new range of business models, such as shared mobility and the broader concept of mobility-as-a-service. On top of those new ways of providing mobility, there is also one actor which has disrupted the traditional business model for car manufacturers worth mentioning, Tesla. Those concepts will be presented in the current chapter.

The chapter will conclude by announcing the rise of a new competitive landscape in the automotive sector made of traditional actors (e.g. traditional manufacturers) and non-traditional actors (e.g. Tesla, shared-mobility start-ups, tech giants, etc.), which is without any doubt making the frontiers of the automotive industry blurrier.

3.1. Shared mobility

3.1.1. "Sharing economy" and collaborative consumption in the mobility context

The concept of "sharing economy" is a widely discussed topic and dozens of definitions exist but the purpose of this paragraph is not to debate them, but rather to get an understanding of what it is and how it has impacted the automotive sector. Rachel Botsman, author of the book "*What's Mine is Yours"* defines it as the following: "*an economic model based on sharing underutilized assets from spaces to skills to stuff for monetary or non-monetary benefits*" (Botsman, 2013). Sharing economy and collaborative consumption are generally used interchangeably but in reality, the latter is more of a sub-category of the former. The sharing economy is indeed broader with other underlying concepts such as market-mediated access-based consumption (Paundra, Rook, van Dalen, & Ketter, 2017). Hamari, Sjöklint and Ukkonen (2016) define collaborative consumption as "*the peer-to-peer-based activity of obtaining, giving, or sharing access to goods and services, coordinated through community-based online services.*" (Hamari et al., 2016, p. 2049).

The concept of sharing economy and collaborative consumption is increasing in popularity and have aroused interest in the last decade in diverse domains going from tourism (e.g. Airbnb), entertainment (e.g. file sharing), food (e.g. communal gardens), consumer goods (e.g. Pley) to

transportation with the introduction of car sharing services (Hartl, Hofmann, & Kirchler, 2016; Paundra et al., 2017). It is only recently that the latter has become prominent with an estimation of 12 million car sharing memberships for 2020, which represents a steady increase compared to 2013, where 2.3 million memberships were reported (Paundra et al., 2017).

The reason why the section 3.1 (Sharing models) comes separately, but more importantly *after* the three trends of the automotive sector outlined earlier, is that shared mobility actually derives from the trends and / or is permitted by them.

As the definition of Hamari et al. (2016) outlines it, collaborative consumption is permitted by community-based online services. Car sharing organizations indeed use web 2.0 technologies to allow booking and payments for the use of a car (Dowling et al., 2018). Web 2.0 technologies have also made possible the development of online platforms where user-generated content, sharing and collaboration are promoted. Finally, technological developments, such as the connected car, are only making the sharing of physical and nonphysical goods simpler (Hamari et al., 2016).

The rise of sharing models is also a response to environmental issues and a way to address them. This new way to consume is indeed a potential solution to protect the environment and to meet the problems of overconsumption and overexploitation of resources (Hartl et al., 2016; Paundra et al., 2017). Fossil energy consumption has in fact raised the attention of alternatives which are sustainable and environmental-friendly, for numerous industries. For transportation specifically, on top of the introduction of new engine technologies (e.g. electric vehicles), innovative transportation modes (i.e. car sharing) have been introduced to decrease the negative externalities of transportation (Paundra et al., 2017).

Finally, it is clear that by essence, car-sharing is promoting usage over ownership. Whether one is the consequence of the other is however still unclear. In collaborative consumption, there are two broad categories of exchange: access over ownership and transfer of ownership. The first one is the most common one (Hamari et al., 2016).

In the mobility context, there are essentially two types of sharing models: (i) car-sharing and (ii) ride-hailing (PwC, 2017). These models certainly question and substitute product ownership (Gaiardelli, Songini, & Saccani, 2014).

3.1.2. Car Sharing

The car-sharing model includes station-based car-sharing and free-floating car-sharing. The first one means that cars can only be picked-up and put back at pre-defined stations (PwC, 2017). One example is cambio CarSharing, a concept which started in Germany but which is now also present in 42 Belgian cities. cambio is a perfect example of the "pay-per-use model": the fixed costs are very limited, and the driver only pays for what he or she uses on a price per kilometer and price per hour basis. cambio offers different types of cars, to please customers' different mobility needs. The booking can be done via an app, then the driver picks up the car in one of the stations and accesses the keys via its cambio-Card and PIN code (Cambio, n.d.)

The free-floating car-sharing model is more and more present in cities today. One example is Car2go, a mobility concept that Daimler, a traditional German OEM, launched in several cities in Europe, in Canada, in the United States and China. The concept also works on a pay-per-use basis, available 24/7 but the difference resides in the fact that cars can be picked-up and put back anywhere within the city (Gaiardelli et al., 2014).

Overall, car-sharing has really gained momentum over the past ten to fifteen years, in the three main continents (Europe, North-America and Asia). However, it is in Europe that the car-sharing service per capita is the largest, with 2.1 million users and 31,000 vehicles in service, in 2015 (Bert, Collie, Gerrits, & Xu, 2016).

3.1.3. Ride-Hailing

"Ride Hailing" is the "Uber" model. In this category, we can also include shared journey options such as Bla-bla car or even online taxis. In these cases, users do not drive themselves but instead make use of mobility as a service. This concept is gaining in popularity and people have accepted it as something more than just a phenomenon (PwC, 2017). There is however a difference between models such as Bla-bla car and Uber. In the first one, the driver had planned to make the trip anyway and the rider is only using a seat that would have been free otherwise. In the second one, the user creates new capacity, i.e. the trip would not have been done if he or she did not order the ride. The specific term describing this situation can be summed up by "on-demand economy", which over time, has been distinguished from "sharing

economy". Today, it is therefore more common to call the Uber model ride-hailing, and the Bla-bla car model ride-sharing (Frenken & Schor, 2017).

3.1.4. Impact on the automotive industry

With the increase in popularity of shared-mobility (as a broad concept), a recurrent question has intrigued experts and automotive players: will it have an effect on the amount of new-car sales, and therefore a consequence on car manufacturers' revenues? According to BCG, who has researched on car-sharing's impact specifically, car sharing will only have a moderate impact on new-car sales, mainly because people will not entirely abandon their car, and because car manufacturers will be able to sell their cars to car-sharing fleets in urban areas, which will offset the loss of new-car sales triggered by car-sharing. In addition, car-sharing and ride-hailing will lead to a higher turnover and a lower life expectancy for cars, which will also offset the loss of new-vehicle sales (Bert et al., 2016).

According to Bert et al. (2016) still, car-sharing models will not redirect the stream of revenues of car manufacturers towards a disruptive model, and it will not trigger a large change in consumption. However, car-sharing does, will and should change the business model of OEMs, by for example providing mobility services.

3.2. Mobility-as-a-Service

Following on car-sharing and ride-hailing, we would like to present the broader and emerging concept of Mobility-as-a-Service, which has been facilitated by the collaborative consumption and the on-demand economy we described earlier. Again, this model has been influenced by three trends which are changing the transportation landscape: the question of car ownership, the advent of alternatives transports and the rise of Big Data and real-time technologies (Cubic Transportation System, 2017).

3.2.1. Definition

"Mobility-as-a-Service (MaaS) is a mobility distribution model in which a person's transportation needs are met over one interface and are offered by a service provider. In general, multiple transportation options (mass transit, carsharing, ridehailing, etc.) are bundled, an integrated

solution is presented to the user through a smartphone app, and service is paid for through a single account." (Spulber, Dennis, Wallace, & Schultz, 2016, p. 7)

Mobility-as-a-Service can be understood as a change of paradigm: to get from a point A to a point B, instead of owning a primary mode of transport (e.g. the car), mobility-as-a-service proposes a combination of transport modes, which can be public and private. It can also include owning a car, be it for only part of the journey, or not owning a car at all (Amsterdam Roundtable Foundation & McKinsey & Company The Netherlands, 2014; Cubic Transportation System, 2017).

Especially in large and dense urban areas, demand often exceeds capacity, and therefore commuting can be particularly challenging. In fact, in spite of a lot of energy spent by transit agencies, local authorities and regulators are often afraid of change and even sometimes prevent the installation of alternative transport services. Mobility-as-a-Service is therefore presented as an answer to these problems and responds to a true need for smarter transport solutions (Cubic Transportation System, 2017).

3.2.2. Existing initiatives

Google Maps, with its transportation aggregator system, is often considered as an ancestor of Mobility-as-a-Service. The first real mobility-as-a-service models were however born in Europe and in 2015, the European MaaS alliance was disclosed at the ITS World Congress: a public-private partnership to unlock the economies of scales needed for developing MaaS. Overall, European initiatives are more accomplished than the American ones (Spulber et al., 2016).

The most famous example of Mobility-as-a-Service is Whim, an app for Helsinki (Finland) residents created in 2016. This app allows them to "*plan and pay for all modes of public and private transportation within the city—be it by train, taxi, bus, carshare, or bikeshare*" (Goodall, Dovey, Bornstein, & Bonthron, 2017, p. 114). When entering a destination, the user can make a choice on the preferred mode of transportation, and, when it is not possible to use only one mode, the app will propose a combination of them. To pay, users can decide to subscribe for a monthly mobility fee, or to pay as they go (Goodall et al., 2017). With this app, Whim aims to make people abandon their car, not because they are forced to, but because

the Mobility-as-a-Service solution is more powerful and more efficient than commuting with a privately-owned car (Thomas & Threlfall, 2017).

Another well-known MaaS example is moovel, a project launched by Daimler in Germany and with testing phases in Boston, Portland and Helsinki (Goodall et al., 2017). This app allows user to plan, book and pay for their rides all in one app. moovel gathers car2go (car-sharing), mytaxi (ride-hailing) and Deutsche Bahn (public transport) (moovel, n.d.).

3.2.3. Impact on OEMs

The rise of Mobility-as-a-Service can certainly not be ignored by OEMs, which are not only car manufacturers anymore but who are also meant to become "providers of mobility" (Amsterdam Roundtable Foundation & McKinsey & Company The Netherlands, 2014).

According to Accenture (2018), OEMs should focus on meeting the new needs of customers, such as car-sharing and ride-hailing services which have been provided by new entrants. The challenge for OEMs is to offer those services, and make them profitable, which is according to Accenture, again, not yet the case.

3.3. Car manufacturer next generation: Tesla

Before closing on the disruptive models shaking the automotive sector, we cannot ignore Tesla, which has indeed disrupted the business model of traditional car manufacturers and brought a high level of technologies, whether it concerns electric cars or autonomous vehicles.

Tesla was founded in 2003 by a group of engineers whose aim was to prove that electric cars can be better and more efficient than gasoline cars. The first electric car was launched in 2009, the Roadster, a 100% electric car with impressive speed performances. From there on, Tesla has kept innovating and proposed subsequently the Model S, the Model X and the Model 3, a low-priced electric car, directed to the mass market (Tesla, 2018).

The fact that Tesla has been awarded the second most innovative company in the world by Forbes in 2017, relies on the fact that the American company has reimagined each element of the value chain (sales, manufacturing, technologies, service and business model), redefining the market dynamics and long habits of traditional car manufacturers (Forbes, 2017; Koushik & Mehl, 2015).

The selling model of Tesla is indeed very different from what has been seen in the traditional automotive industry. Tesla is in fact selling its cars directly to its customers, via the internet, without going through dealers. The innovative company is also owner of its different stores, usually located in city centres or malls where potential buyers can book a test-drive (Glowik, Mentuccia, & Tamietti, 2014). This allows the American company to keep a direct contact with the customer, without having to go through car dealerships, like traditional car manufacturers do (Wee et al., 2015).

A second unique selling point of Tesla is its focus on customers, with a value proposition based on user-experience. Instead of proposing a large volume of options, Tesla identified the most important customization options for the customers, which in consequence limits the manufacturing modifications. Rather, Tesla focuses on customization after the purchase, in the software (Koushik & Mehl, 2015). Tesla has indeed built a system where they can push frequent "over-the-air" updates to their customers' vehicles. Their software is made in-house, and every vehicle since the first Tesla Roadster has the capacity to receives over-the-air updates (Wee et al., 2015).

Finally, Tesla has the particularity to be a new-born company from the 21st century, which exempts it from having a legacy system and outdated machineries to write off. Compared to traditional manufacturers, Tesla has an important structural advantage, giving them agility to enter new markets and scale their business by taking advantage of new information technology (Koushik & Mehl, 2015).

Even though Tesla seems particularly threatening for traditional OEMs, consequences for them should be tempered. In fact, authors such as Wee et al. (2015) recognize that Tesla has shaken the industry with its technologies but remind us that it is still a niche player in terms of sales.

3.4. A blurry industry

After having described in detail the three main trends in the automotive industry – namely (i) Environment & Mobility Issues, (ii) Changing customer needs, and (iii) Digitalization and Technologies – and outlined the subsequent new mobility business models of the industry,

this last section aims to conclude the literature review by showing a permeability to the automotive industry's frontiers and the emergence of an ever-expanding ecosystem.

Today, OEMs are no longer the single actors of the automotive industry. In fact, other actors are now part of the competitive landscape. This changing nature of competition is directly linked to technology advancements and the evolution of digital businesses (Koushik & Mehl, 2015). Digitization is indeed transforming traditional industry borders and making them more and more permeable (Atluri, Dietz, & Henke, 2017).

Gao et al. (2016, p. 13), authors from McKinsey, have also described the increased complexity of the situation by plotting a graph which shows the evolution of the competitive landscape in the past and the one that will be in 2030.

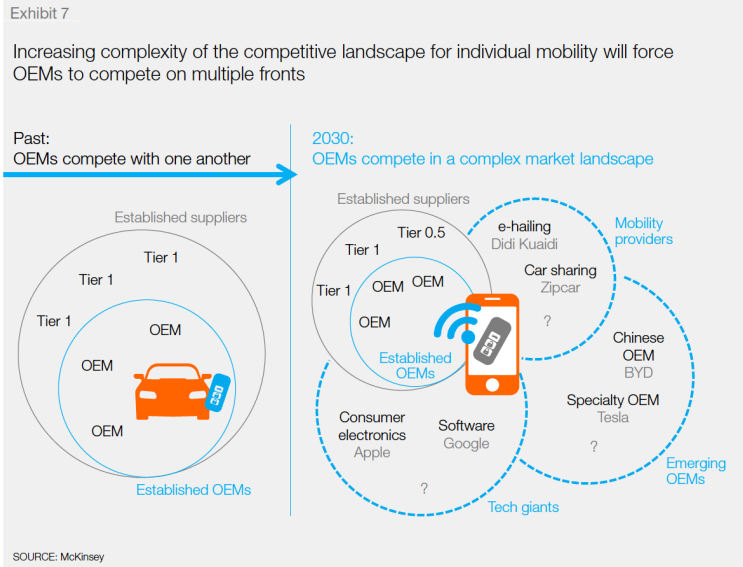

Figure 2: Increased complexity of the OEMs competitive Landscape
Source: (Gal and al., 2016, p.13)

This graph confirms that a new era in which traditional car manufacturers are competing with tech giants and mobility start-ups has started (Ferràs-Hernández, Tarrats-Pons, & Arimany-Serrat, 2017).

According to Koushik & Mehl (2015), who also confirm the permeability of the market boundaries, the world's digitization has brought new challengers to traditional OEMs, such as companies Google, Apple or technology start-ups. This digitization has changed customer needs and expectations in mobility and therefore forces OEMs to adapt their internal process, manufacturing, distribution and supplier partnerships.

However, some authors, such as Wee et al. (2015), temper the threats that new entrants can pose to traditional OEMs by reminding that the large upfront capex investments constitute high barriers to entry and that in the last decade, the list of the top ten first OEMs (in terms of revenue) has only welcomed one new entrant.

Furthermore, according to Fulthorpe (2015), there is not necessarily a reason for OEMs to feel threatened by the entrance of new actors. In fact, even though some companies outside of the industry are gaining ground inside of it, especially with the in-vehicle connectivity, the authors remind that the automotive sector is an industry worth trillions of dollars, with some of the largest companies in the world being part of it. Car manufacturers have already proved time and time again that they are successful at delivering new cars and new technologies. However, some authors underline the criticalness of partnering with those new actors. It has indeed become too complex and too expensive for car manufacturers to deliver their product on their own and the winning companies will be the one able to invest in new technologies, new recruits and building strategic alliances with key partners (KPMG, 2014).

Due to the evolution of the industry, software competencies are indeed becoming increasingly important. Today, some high-end cars contain more lines of code than fighter jets and computing power may become as important as horsepower (Ashokkumar & Sethuraman, 2017; KPMG, 2014). Software will in fact be used to respond to several services such as mobility services, location-based services and remote analytics. Partnerships between automakers and software companies are therefore key to respond to technological evolution and customer needs (Gao et al., 2016).

This rapidly changing environment has led to the increasing use of the word “ecosystem” to describe the automotive industry’s landscape. “*A business ecosystem is the network of organizations — including suppliers, distributors, customers, competitors, government agencies, and so on — involved in the delivery of a specific product or service through both competition and cooperation. The idea is that each entity in the ecosystem affects and is affected by the others, creating a constantly evolving relationship in which each entity must be flexible and adaptable in order to survive, as in a biological ecosystem*.” (Investopedia, 2018).

The industry has indeed evolved from competition among OEMs towards new competitive interactions where OEMs need to conclude partnerships beyond the industry with actors that will bring new capabilities and capacity that OEMs are missing (Gao et al., 2016; Gauger et al., 2017; Wee et al., 2015). They will inevitably be part of a new ecosystem made of OEMs, suppliers and technology suppliers (Ashokkumar & Sethuraman, 2017). Another example may also be engaging with governments to develop regulation and infrastructures for new mobility solutions (Gao et al., 2016).

Gauger et al. (2017) highlight the importance for OEMs to leverage a diverse ecosystem of partners to foster technology, business models and distribution innovations. A key differentiator for OEMs is increasingly having the ability to play with internal and external sources to integrate the best components within cars. Wee et al. (2015) also suggest collaborations between OEMs to use identical software platforms leading to exchanging and sharing certain data, such as those coming from an intelligent navigation system.

However, Gao et al. (2016) remind us that despite collaboration with other actors, OEMs should keep the manoeuvre of and control the individual creation of value within these emerging ecosystems.

PART II: THE METHODOLOGY

4. Introduction

The literature review has shown that traditional European car manufacturers are under pressure due to a massive transformation of the automotive industry. Environmental issues, changing customer needs, digitalization, technology additions and enhancements within and outside the car, new mobility business models and new actors: traditional OEMs are facing important challenges and the possibilities to deal with them are manifold. It has also been shown that the industry's frontiers are increasingly becoming blurry and that traditional OEMs are strongly encouraged to play with untypical actors.

The aim of the empirical study is to confirm what has been found in the literature review, but most importantly to prove it with concrete examples in a structured way. We will therefore draw a picture of the automotive industry today, and more specifically, the underlying interactions between stakeholders either belonging to the industry or connected to the latter. We want to understand how traditional OEMs respond to the challenges, what strategic alliances they build and which actors they are playing with.

5. Research question

Specifically, the following question will be elucidated:

"How do traditional European car manufacturers respond to competitive pressures in an increasingly changing environment?"

This research question specifically makes sense in the current literature, which offers no feasible answer to the matter. In fact, most of the sources propose forward-looking views on the automotive sector or high-level recommendations regarding specific topics (autonomous, connectivity, electric or shared-mobility). Few documents detail the different strategies undertaken by OEMs, especially not with such a broad panel of OEMs which we were able to gather here. This phenomenon is particularly important since OEMs, part of a trillion-dollar industry, are facing important pressures in an industry where the pace of change is especially

fast. The research question has been built broadly on purpose, with the aim to gain in flexibility.

In order to answer the research question, we have established several sub-questions. The generation of those sub-questions mainly results from the reflexion carried out during the literature review along with informal discussions with professionals in the automotive sector, such as with Philippe Casse. We believe in fact that to answer the global research question and to understand the automotive industry from the point of view of traditional car makers, there is a need to understand joint contextual elements, specifically because they can influence the strategies adopted by traditional OEMs. For example, it is important to understand the level of threat felt by OEMs in order to understand what types of solutions they need to adopt. Similarly, their strategic choice will depend on the actors present in the industry and the competitive pressures that OEMs undergo.

The list of sub-questions is the following:

- What is the level of threat felt by OEMs?
- What tools and methods do OEMs use to build an effective business intelligence?
- Who are the new actors in the industry, and which ones are seen as competitors by OEMs?
- What strategic actions do OEMs take to not be left behind?

6. Analysis method

6.1. Methodology choice

In order to answer the research question and build our theory, we will use a qualitative approach. The research strategy which we will use involves the use of multiple case studies to constitute empirical evidence. Indeed, case studies are particularly rich examples of a phenomenon and often used for contemporary descriptions of recent events (Eisenhardt, 2007). While we could have used a single-case study and focus on only one OEM, we intentionally decided to use multiple cases because they offer a more robust base for theory building (Yin, 1994). Furthermore, multiple cases facilitate the broader exploration of research questions (Eisenhardt, 2007).

The qualitative data for the multiple case studies will be gathered through several methods. The main one will be through semi-structured interviews, which will be completed with secondary data, essentially coming from the press (see section 6.3 for more details).

6.2. Sample

Since our purpose is to draw a picture of the automotive industry today, it is crucial to collect information from as many traditional OEMs as possible. Therefore, we obtained contacts from the most important OEMs in Europe. What mattered in the profile of the interviewees was their knowledge about the automotive industry and its trends, and their awareness as for what strategic decisions and investments the OEM took or is taking. We made sure that the interviewees met those requirements. Two types of "positions" were prominent among our interviewees: Press manager and high-level managers with experience in the concerned OEM. Here are the OEMs we talked to:

- BMW Group
- Daimler AG
- Volkswagen Group
- Renault Belux
- Volvo Cars

Secondly, we found it interesting to interview mere Belgian distributors, since they were also able to give us insights about the car brands they distribute. Here are the two distributors we talked to:

- D'Ieteren (Volkswagen)
- Beherman (Mitsubishi)

Finally, we also interviewed the general secretary from Febiac (Féderation Belge et Luxembourgeoise de l'Automobile et du Cycle), a federation which represents Belgian and Luxembourgish importers, and to a larger extent, European car manufacturers.

A summary table of all interviews can be found here below:

Name	Position	Company	Date	Length (hour)	Means
Xavier Mourlon	Head of Network Development	Volkswagen Group France	29/03/2018	0:55	Phone call
Jean-Marc Ponteville	Press and Public Relations Manager	D'Ieteren	09/04/2018	1:05	Face-to-face
Christophe Weerts	Corporate Communication Manager	BMW Group Belux	11/04/2018	0:55	Face-to-face
Umberto Stefani	Advisor to the board of directors	Beherman	18/04/2018	1:00	Face-to-face
Manager*		Daimler AG (Germany)	19/04/2018	0:25	Phone call
François-Xavier Dubois	General Secretary	Febiac	02/05/2018	1:25	Face-to-face
Karl Schuybroek	Communications director	Renault Benelux	08/05/2018	0:30	Face-to-face
Andreas Olsson	Vice president – Product Strategy	Volvo Cars (Sweden)	24/05/2018	0:25	Phone call
Project Leader*		BMW Group (Germany)	28/05/2018	1:25	Phone call

* These interviewees expressed the desire to not be disclosed.

6.3. Data collection

Due to the strategic facet of the question, we decided to make the use of qualitative interviews, which allowed us to grasp as much relevant information as possible.

More specifically, in order to collect the information, we opted for semi-structured interviews. This type of interview is made of a certain number of open-ended questions, which relate to the topics that the researcher wants to address. The chosen nature of the questions gives freedom both to the interviewer and the interviewee to go deeper into some questions. For example, if an interviewee remains broad when answering a question, the interviewer can encourage the interviewee to go deeper (Hancock, Ockleford, & Windridge, 1998).

The interview guide was built around the four sub-questions laid out earlier, and therefore around four topics: (i) the level of threat felt by OEMs, (ii) the tools and methods used by OEMs to carry out an effective business intelligence, (iii) the new actors in the automotive industry and whether or not they are seen as competitors by OEMs and (iv) the strategic actions undertaken by OEMs to respond to the pressures of the automotive industry. For each

topic, we formulated several questions by keeping in mind potential adaptations and new questions throughout the interview.

Here are some examples of the questions asked:

- What are the challenges for your company?
- Does your company feel threatened by new actors in the automotive industry? Why?
- What does your company do to stay aware of the evolutions in the industry?
- Who are your new competitors?
- What does your company do to respond to the challenges of the automotive industry?
- What kind of partnership did your company conclude?
- Which competences is your company missing to cope with evolutions in the industry?
- Do you think the frontiers of the industry are blurry?

At the beginning of each interview, the purpose of the thesis was explained, and the structure of the literature review was outlined. More specifically, the three big trends were enunciated to the interviewee. After asking for a brief self-introduction from the interviewee, we began the interview following the semi-directive interview guide.

It is also important to mention that the interview guide has evolved dynamically throughout the interviews. Some questions were added, for example if we noticed that a specific topic was often addressed or if an interviewee raised some interesting points which were not anticipated beforehand. Some questions were modified because, for example, we noticed that they lacked clarity.

The interviews lasted usually between 30 minutes to 90 minutes, depending on the interviewee's personality and time availability. The interviews conducted with professionals working in Belgium were all face-to-face interviews, while some other interviews, such as the ones with professionals in Germany or Sweden, were conducted via Skype, or over the phone. Each interview has been recorded and transcribed.

For the fourth topic, we were aware that most of the information that the interviewees will provide us with is public information since they are usually not allowed to disclose non-public on-going and future projects. Therefore, we will also make use of secondary data, such as press releases, to complete the information given in the interviews.

6.4. Data analysis

Given the relatively high number of interviews, it is important to have a thorough method to analyse the qualitative data. We have decided to opt for a “self-made” method instead of using a software, because of the diversity of topics and length of the interviews, which can sometimes be quite long.

The method that we used was the following:

- First, we transcribed the interviews, which were all recorded with the authorizations of the interviewees, in order to have access to the data at all times.
- Second, we printed the interviews with the aim to manipulate them easily and to make annotations directly and quickly on the document.
- Third, we picked a colour for each theme (level of threat, strategic watch, actors / competitors, strategic actions), which allowed us to have a great overview of the document and know exactly where the useful information stands.
- Fourth, we made a summary table which fits on an A3 sheet of paper, each column being a different interview (and therefore a different OEM), with key words in each category and the page number of the information in the interview, which allowed us to retrieve the information. For example, in the column “Volvo”, under the category “Strategic actions”, we have a bullet point which says “Collaboration with Uber: selling vehicles + developing self-driving technologies (p. 1)”.

This table helped us to build the structure of Part III (The Results).

PART III: THE RESULTS

The results will be drawn in four chapters. Chapter 7 will describe some results regarding the automotive industry and traditional OEMs which are countering some facts which can be found in the press, for example. Chapter 8 will disclose some of the tools used by OEMs to stay aware of the latest doings in the industry and stay ahead of the curve. Chapter 9 will address the new actors of the automotive industry depicted by the OEMs and whether or not they are considered as competitors. Finally, and most importantly, chapter 10 will reveal the different strategic actions taken by the OEMs to deal with the changes in the automotive industry.

7. Some counter-intuitive results

The press and media websites tend to publish strong statements to attract the audience, especially with exorbitant titles or strong introductions. Even though the body of the article then often tempers the title, it can convey false messages to the superficial readers. This section aims to bring clarity to three topics: the death of the automotive industry, the level of threat as seen by OEMs and the emergence of Tesla.

7.1. The automotive industry is not dead

Some articles tend to make one believe that the automotive industry is dead or dying. For example, Enrique Dans, professor of Innovation at IE Business School, wrote in January 2017: "*The automobile industry is stuck in a dead end*" (Dans, 2017). Even stronger, Bob Lutz, former vice chairman and head of product development at General Motors, quotes on November 11, 2017 in AutoNews: "*It saddens me to say it, but we are approaching the end of the automotive era*." (Lutz, 2017). Those are just examples.

Without even asking the interviewees about the "death" of the industry or of the car itself, they specifically clarified themselves that the industry is not dead nor dying. For example, Jean-Marc Ponteville, Press and Public Relations Manager at D'Ieteren, explains that there are approximately one billion cars on earth today, and statistics estimate that by 2050, there will be two billion of them. He concludes by saying: "*Therefore, it is not an industry in decline.*" He

continues by explaining that the industry will evolve differently in each part of the world; a thought shared by a project leader at BMW Group, with more than 60 million business cases and 20 years of experience at BMW in multiple areas, who confirms: "*OEMs will still have their business, but maybe we have to break it down across geographies or maybe across customers*". Ponteville explains that in China for example, the car market is booming, in fact being the first market of Volkswagen. For BMW, China represents a quarter of their sales. Africa, Middle East and South America are also developing strongly and are far from reaching maturity. Europe is still an important region for European OEMs, but not the most important one anymore and therefore could give a wrong vision of the evolution of the automotive industry.

In addition to breaking down the automotive industry across geographies, several professionals mention that yes, there is a shift in the way to sell cars, but OEMs' largest part of their business will still be to sell cars. In fact, according to Jean-Marc Ponteville, Press and Public Relations Manager at D'Ieteren, new mobility business models should only be seen as a new market to serve, and therefore "*we have to be present in that market, just like any other market*". Xavier Mourlon, Head of Network Development at Volkswagen Group France, also shares this opinion and reminds that OEMs' mission will still be to sell cars, whether it is to private customers or to mobility actors, "*it does not change*", he states. Related to that, he therefore points out the importance for OEMs such as Volkswagen to invest in shared mobility companies. Finally, François-Xavier Dubois, general secretary of Febiac, mentions that of course the growing population will not allow everyone on Earth to have a car, but he confirms that "*there is no threat for the existence of the car: there is only a limit above which we need to go towards other solutions*."

In contrast, Karl Schuybroek, Communications director at Renault Benelux, expresses its concern about the very existence of the automotive sector: "*The automotive industry needs to react if it still wants to exist*". This is a strong statement compared to the ones above and was therefore worth underlining. He in facts justifies this statement by saying that already today, OEMs need to do more that designing and producing vehicles. He of course agrees that OEMs will still do that, but not exclusively.

7.2. No threats, only opportunities

Similarly, many authors and journalists prefer to use the word "threat" to qualify what OEMs feel or what the automotive industry faces. For example, McGee (2017) writes: "*Carmakers face threat from new drivers of profit"* and Lampinen (2016) titled her article *"Product and brand under threat in the auto industry of the future"*.

In fact, during the literature review, the word "threat" was encountered repeatedly and therefore, we decided to incorporate it in the interview guide by asking what the threats for each OEMs were. The reaction after the pronunciation of this word was unanimous. When asked what the threats were related to the three big trends of the industry, Christophe Weerts, Corporate Communication Manager at BMW Group Belux said: "*For us [BMW], we mainly see opportunities"*. A manager from Daimler AG also expressed "*Of course there are some threats, but a lot more opportunities*". On the same level, François-Xavier Dubois, general secretary at Febiac says that new mobility start-ups are not a threat to OEMs, but should instead be seen as a complement.

7.3. What OEMs think about Tesla

Tesla has succeeded in making people talk about them over the past decade. The media has also written frequently about Tesla, publishing articles ranging from how successful they are to how overvalued the company is or to how everything could go wrong. Among the articles, some authors emphasize the level of threat that Tesla represents for car makers. In 2013, Katie Fehrenbacher writes an article titled "*A decade later, Tesla now officially a threat to the auto industry*" (Fehrenbacher, 2013). More recently, in 2016, Steven Loveday writes "*German automakers now fear Tesla*" (Loveday, 2016). Given this tone often used in the press, we assumed traditional OEMs would feel threatened by Tesla, and use uncomplimentary judgements.

On the contrary, we were surprised to hear most professionals complimenting Tesla while holding a rather objective statement. Many are the professionals who affirmed that Tesla has benefited the industry. For example, Andreas Olsson, Vice President of Product Strategy at Volvo Cars, affirms: "*I think they have done an impressive effort in challenging the existing industry. I think it's needed to have actors like that*". When it comes to Christophe Weerts,

Corporate Communication Manager at BMW Group Belux, he claims: "*We wish them all the best, and they have brought new blood to the auto industry".*

Two other professionals, with more distance and mistrust, also admitted that they did not believe in Tesla but today they recognize their strength. A project leader at BMW Group confirms: "*If ten years ago you would have told us that an American company was going to offer the same things as us, we wouldn't have believed you"*, then he pursues: "*Tesla is bringing a new nice design. BMW won't say this officially, but Tesla design is not bad".* Similarly, a manager from Daimler AG said: "*Tesla, you have to admit, they came with an electric car, everyone said it's crazy but they made the point. That was someone who was underestimated*". To link that with Section 7.2 (No Threats, only Opportunities), he continues by claiming that he sees Tesla as a chance, as something to learn from, and therefore, not as a threat.

On the other hand, many interviewees explained why they are not fearing Tesla at the moment. However, this point will be addressed in the Paragraph 9.3.1 (Tesla), where we will discuss the new competitors of traditional manufacturers, and more specifically the new OEMs, such as Tesla.

8. Tools and Method for an Effective Strategic Watch

"Strategic Watch", also called "Business Intelligence" has been defined by Lesca as "*the information process by which the company anticipates its external environment with the creative aim of opening windows of opportunity and reducing uncertainty and risks*" (Lesca, 1994). The process of strategic watch proves to be useful for companies which are experiencing strong pressures and important changes. Those changes are often encouraged by globalization, technologies evolution, threats from the competition, and customers' needs requirements (Lesca, 1997).

Since the automotive industry is going through a wave of changes, in particular with the arrival of new actors and the advent of new technologies, traditional OEMs need more than ever to be attentive to their external environment, if they want to anticipate changes and reduce uncertainty (Lesca, 1997). This is the reason why we decided to question our interviewees on

the tools and methods they are using to stay aware of the latest doings in the industry and how they make sure to not be left behind.

8.1. Markets make OEMs, not the opposite

"*It is wrong to believe that OEMs launch something and that the market follows"*, says Jean-Marc Ponteville, Press and Public Relations Managers at D'Ieteren. He indeed emphasizes that just the opposite happens. OEMs are in fact observing the market, trying to detect its evolution and then proposing what the market seems to want. As Ponteville expresses it well, it is a strategy of adaptation. This is mainly done by the marketing services of Volkswagen. Renault, also, uses a prospective department to constantly analyse the market as well as the new trends, according to Karl Schuybroek, Communications Director at Renault Benelux.

This is also consistent with a statement from the Daimler AG manager: "*We are a global company and we are very close to our markets and to our customers all the time*". He underlines the advantage of being a global company, which allows them to be very close to their customers and therefore to listen to what they want. He also adds the advantage of being where the action is, especially in cities where technologies are developing strongly: Tel Aviv in Israel, the Silicon Valley in the United States, and in China.

BMW goes even one step further: "*We precede the future"*, says Christophe Weerts, Corporate Communication Manager at BMW Group Belux. BMW's 120 000 employees around the world and its R&D centre with more than 10 000 engineers allows the German company to study the markets needs and to be ready at the right time. Their engineers, who are in Munich, but also in the United States and in China, study the different mentalities and try to imagine the products of the future.

8.2. Industrial espionage

Industrial espionage is not an unknown topic, many scandals have seen the public light, and this, since the 20th century already (Wright & Roy, 1999). The most famous scandal of industrial espionage is the development of the supersonic aircraft Tupolev Tu-144, similar to the Concorde. Sergei Pavlov, who was arrested in 1965, was indeed in possession of detailed plans for the brakes, the landing gear and the Concorde airframe. Since then, many scandals

have broken with some of the biggest companies such as Volkswagen – GM in 1993 or Coca-Cola – Pepsi in 2007 (Lutzky, 2011).

According to the Financial Times Lexicon, industrial espionage is "*the process of illegally and unethically obtaining confidential information from other companies – formulas, strategic plans, pricing policies, experience – with an end to using said information to be able to gain a competitive edge.",* very close to the practices of competitive intelligence, a sub-brand of business intelligence as defined earlier, which aims to gather information of competitors' strategy. As Andrew Crane (2005) says it very well, the crossing line between industrial espionage and competitive intelligence is very blurry, the difference being essentially normative.

When asked about the methods used by Volkswagen to stay aware of the latest doings in the industry, Xavier Mourlon, Head of Network Department at Volkswagen Group France, answered "*It's industrial espionage in the broad sense of the term*. *There is the classical strategic watch, looking at everything. But then there is practically industrial espionage*". Even though the line is fine between competitive intelligence and industrial espionage, it seems like he meant to use that word specifically, even though he wished to soften it with the words "in the broad sense" and "practically". He pursued by explaining that for example Google, in its car project, might call out to one of the car makers' suppliers. For example, to Bosch, who is a supplier of Valeo, who is a supplier of the car makers. He follows "*This supplier might better release some information to the car manufacturer, and especially the car manufacturer puts pressure to the supplier to release information*". He concludes by reminding that the auto industry is an industry that fights, using the terms "*economic war*".

8.3. Others

Other tools and methods were briefly mentioned by some of the interviewees: annual events and conferences, concept cars, and consulting expertise and external researches.

8.3.1. Annual events and conferences

Karl Schuybroek, Communications Director at Renault Benelux, explains that there are important annual events, in the Silicon Valley in the United States for example, where all

actors from the automotive sector gather and show the projects they are working on. It is an occasion where there are numerous informal exchanges between the actors.

8.3.2. Concept cars

The display of concept cars in auto shows is another technique to test the market. The idea is to show a design or a concept and see how the public reacts, according to Jean-Marc Ponteville. This is also a practice mentioned by Renault, which was applied at the Geneve auto show in March 2018 for example, by showing their new concept of urban mobility EZ-GO: a robot-car.

8.3.3. Consulting expertise and external researches

A manager from Daimler AG mentioned that the German car manufacturer gets external information from consulting companies but also from external researches through enquiries and votes, to get the opinion from as many people as possible.

9. Towards a dynamic automotive ecosystem

This chapter aims to provide a non-exhaustive list of new actors playing in the automotive industry, as mentioned by the OEMs, and whether or not they are considered as competitors, and if yes, on which level.

9.1. Providers of mobility solutions

According to François-Xavier Dubois, general secretary at Febiac, the new actors in the automotive industry are the providers of mobility solutions. Still according to him, they are not a threat for OEMs but instead should be seen as a complement. The following paragraphs will describe the providers of mobility solutions mentioned by OEMs as new actors in the automotive industry and whether or not they are considered as competitors.

9.1.1. Uber

Uber was founded in 2009 in San Francisco by Travis Kalanick and Garrett Camp, who developed a technology of on-demand transport which puts in contact drivers and passengers (Uber, 2018). Almost ten years later, Uber has become the highest-valued startup in the world,

with a valuation of around $65 billion (Blystone, 2018). The American unicorn is now offering multiple services in more than 600 cities in the world: UberX, UberBLACK, UberPOOL, Uber Eats, Uber Freight, UberRUSH, Uber For Business, and even UberAIR, a project of a vertical takeoff and landing aircraft in urban areas (Uber, 2018).

When asked about the actors that BMW fears today, a project leader at BMW Group mentioned: "*The Ubers"*, but reminded that those services companies still endure a lot of issues, especially with regulations and drivers, and that they are still not profitable. Therefore, he concludes that they might appear more as a threat in the news than in reality.

9.1.2. DiDi

DiDi is the Chinese counterpart of Uber, and one of its biggest competitors (Johnson, 2017). The company was founded in 2012 and is defined as a mobile transportation platform, offering a plethora of commuting solutions in around 400 cities in China (Crunchbase, n.d.): DiDi Taxi, DiDi Express, DiDi Premier, DiDi Hitch, DiDi Chauffeur, DiDi Bus, DiDi Car Rental, DiDi Enterprise Solutions and DiDi Minibus (Didi Chuxing, 2018).

After two years of intensive competitive battle and attempt to gain ground in China, Uber surrendered and sold its UberChina operations to DiDi in August 2016 in exchange for stocks in the Chinese company. After the sale, the Chinese company jumped from a valuation of $28 billion to $35 billion (Abkowitz & Carew, 2016; Johnson, 2017; Mian, 2016).

9.1.3. Lyft

One of the other biggest competitor of Uber in America is Lyft, an American on-demand transportation company, based in San Francisco and founded in 2012 by Logan Green and John Zimmer. The service is available to 95% of the American population and has just opened in January 2018 its first European office, in Munich.

9.1.4. Others

A project leader at BMW Group also mentioned actors such as Fair, a Californian start-up which offers a digital car marketplace on an app, where the user is offered an on-demand-based flexible model. The consumer can shop and pay for a car entirely on the app, and can

return it whenever he or she wants, with a five days' notice only. With this app, Fair is rethinking car ownership. Interestingly, this app has been co-founded by managers coming essentially from traditional OEMs: Georg Bauer worked at BMW, Mercedes-Benz, and Tesla; Scott Painter at TrueCar; and Fedor Artiles at Mercedes-Benz, Chrysler, Volkswagen, and Tesla. Their goal was to help dealers to sell more used car, by increasing velocity in the process (CBT News, 2017; Lunden, 2017).

9.2. GA(F)As

"*GAFAs are scaring everybody, whatever the industry is*" said Xavier Mourlon, Head of Network Development at Volkswagen Group France. The interviewees who mentioned GAFAs as new actors in the automotive industry and potential competitors were numerous. However, none mentioned precisely Facebook individually, and most interviewees mentioned Google and Apple together. Amazon was mentioned by one interviewee. For these reasons, the first two paragraphs 9.2.1 (Google) and 9.2.2 (Apple) will respectively outline Google's and Apple's engagement in the automotive industry, based on information publicly available on the internet. The third paragraph 9.2.3 (Google and Apple: seen as competitors by OEMs?) will discuss whether or not, according to the interviewees, Google and Apple are considered as competitors. Finally, the fourth paragraph 9.2.4 (Amazon) will explain how Amazon could have a place in the automotive sector.

9.2.1. Google

Google has been working on a self-driving car project since 2009, part of their program "Google X". Since 2016, this project is called "Waymo", which stands for a "new way forward in mobility" (Waymo, n.d.). The technology was based on the Google Street View technology and their new software called "Google Chauffeur". In 2012, after intense lobbying from Google, the State of Nevada in the United States authorized self-driving cars operations. This allowed Google to launch a real scale test for their autonomous cars. California and Florida also enacted such laws, the same year (Charneau, 2016). After testing the technology on the Toyota Prius and on the Lexus RX450, Google launched in 2015 the Google Car, nicknamed "Firefly". The particularity of this car resides in the absence of any steering wheel or pedals. In 2017, Google adds the fully self-driving Chrysler Pacifica Hybrid minivans to their fleet. Since

2009, Google's fleet has "self-driven" more than 5 million miles in the US (about 8 million kilometers), mainly on urban streets (Waymo, n.d.).

On top of developing its own car, Google is also providing a fully-integrated infotainment system called Android Automotive, in which apps, vehicle safety monitoring, internet and phone connectivity are integrated. Thanks to its open-source nature, several car manufacturers have adopted it and more than 400 models are compatible (Patterson, 2017), such as: Audi, Citroën, Ford, Mercedes-Benz, Mitsubishi Motors, Nissan, Opel, Peugeot, Renault, Volkswagen and Volvo (Android, n.d.).

9.2.2. Apple

When it comes to the automotive industry, it is today not very clear what the company with the apple shape is working on. Whether it is a physical autonomous car, or an autonomous system still remains a question. The certain element is that the California Department of Motor Vehicles granted Apple a permit to test its autonomous car technology on public roads in the state (Jacobo, 2017).

Apple has also developed its own infotainment system CarPlay, which basically puts the driver's iPhone's interface on the car dashboard. Today, more than 300 vehicles models are compatible with CarPlay. Some of the brands compatible are: Audi, BMW, Citroën, Ford, Jaguar, Mercedes-Benz, MINI, Mitsubishi Motors, Nissan, Opel, Peugeot, Renault, Volkswagen and Volvo (Apple, n.d.).

9.2.3. Google and Apple: seen as competitors by OEMs?

9.2.3.1. As car manufacturers

Xavier Mourlon, Head of Network Development at Volkswagen Group France expressed his concern: "*Google and Apple are to become competitors*". He in fact reminds that electric vehicles are much easier to produce and require less R&D and expertise than for classic cars.

On the contrary, Jean-Marc Ponteville, Press and Public Relations Manager at D'Ieteren, and Karl Schuybroek, Communications Director at Renault Benelux, do not see Google as a competitor for car manufacturing and do not feel threatened. Schuybroek reminds that the Google Car project has been delayed: "*They [Google] realize that the car is still an important*

condensate of technologies, which must be mastered.". He also points out the risk incurred by those new actors who try to develop cars, for the automotive industry: "*we must hope that these people are aware of what they have in their hands*".

Ponteville argues: "*They will probably not do it*". He in facts believes that the business model for car manufacturing is not interesting anymore and not profitable enough, especially without a strong manufacturing power, which Google will not have according to him. As Ponteville summarizes it well: "*We don't fear them as competitors for car manufacturing, no.*".

9.2.3.2. As service and technology providers

While Google and Apple do not appear as a threat for car manufacturing for most interviewees, the two giants could however be potential competitors as service providers and mobility solutions developers. "*Google and Apple could indeed develop applications and solutions even by using our vehicles*", said Karl Schuybroek, Communications Director at Renault Benelux. He explains that if OEMs cannot develop those solutions themselves, it will be a loss. In order to prevent that from happening, Renault invests in start-ups and recruits talents to develop services inside their organization instead of giving the chance to other actors to do it themselves.

According to Jean-Marc Ponteville, Press and Public Relations Manager at D'Ieteren, Google and Apple can be competitors for GPS systems, embedded systems, telematics and connected cars: "*We could think that with the power they have, they will be stronger on this level*". Ponteville also mentions the existing competition on data: "*There, there is indeed a real competition*". He in fact explains that when a customer is in his car with a smartphone, it is indeed Google who knows where he is, but the OEMs would also like to know.

« *What we are seeing in our industries is really the merge of manufacturing companies like ours but also the software companies coming into the field trying to monetize data, to get into the manufacturing applications as well and I think the only real powerful thing that can come out of this is a partnership between both worlds, to obtain a really complete product*", concludes a Manager from Daimler AG.

9.2.4. Amazon

According to Christophe Weerts, Corporate Communication Manager at BMW Group Belux, Amazon could be a competitor for BMW, not by making cars, but by selling them on the internet: "*We could imagine that one day people stay at home and purchase their car on the internet via Amazon*". He continues by saying that BMW is taking that into account and also offers the possibility to buy cars on the internet.

There are indeed some suspicions on the internet that Amazon could sell cars at some point. In fact, in 2016, Amazon announced their new portal: Amazon Vehicles, whose aim is to provide prospective car buyers with any car's information, recommended pricing from manufacturers, pictures, videos, specs and customer reviews (Bariso, 2016; Lauletta, 2017).

People like John Rosevear (2016) predict Amazon's entry in car selling business: "*But the new site is a sign that Amazon is thinking about ways to insert itself into the car-sales process, and that has implications for a lot of players in the business of cars.*".

9.3. New entrants as OEM

The reason why there are new entrants as OEMs was highlighted by a project leader at BMW Group and Xavier Mourlon from Volkswagen Group France: with the rise of electric cars, the barriers of entry are much lower. As Xavier Mourlon said: "*An electric engine is very simple, it is extremely basic, technologically speaking, compared to a thermic engine, so it means that it opens the door to many new entrants who would like to enter the automotive industry*". The project leader from BMW Group confirms that "*the design, manufacturing and maintenance [from classic cars] is what has restricted people from coming in the car space before*"

9.3.1. Tesla

The section 7.3 (What OEMs think about Tesla) has already highlighted what OEMs think about Tesla, mainly how the American company has challenged the automotive industry. However, we have not clarified whether or not traditional OEMs consider Tesla as a competitor. Actually, no interviewee has expressed a real concern in regard to Tesla.

Christophe Weerts, Corporate Communication Manager at BMW Group Belux, for example reminds the low number of cars produced per year by Tesla (compared to BMW) to justify

why BMW does not fear Tesla as a competitor: "*We realize that producing cars is not something that everyone can do.”*, while staying very cautious: "*It can go really fast, it can evolve very strongly*". He also explains that BMW is pleased to have competition because it forces the German company to progress, and he concludes "*It's great that new actors* [such as Tesla] *are coming, but we are not worried*".

Three other interviewees, Andreas Olsson from Volvo Cars, a project leader from BMW Group and Jean-Marc Ponteville from D'Ieteren address the question of the profitability of the American company: "*Tesla makes extraordinary cars. They have a completely disruptive model. They reach performances which shoved the industry. They have an undeniable success. Everything is fantastic, except that, it is not profitable”*, said Jean-Marc Ponteville. Andreas Olsson and the project leader from BMW Group also clearly expressed their doubts about Tesla's profitability.

9.3.2. Chinese OEMs

The Vice President of Product Strategy at Volvo Cars, Andreas Olsson, mentioned that there are at least ten to fifteen Chinese OEMs who are trying to enter the electrical market, a fact also mentioned by the project leader at BMW Group. Even though there were no real concerns expressed, Andreas Olsson claims: "*Not so many have reached the scaling yet, but it's something to observe*".

Our research has allowed us to indeed identify Chinese OEMs active in the electrical market, such as: SAIC, FAW, Dongfeng, Chana, BAIC, GAC, Chery, BYD and Geely (Liu & Kokko, 2012). Chinese automakers are in fact making impressive efforts in design, engineering and quality, which could soon counterbalance the dominance of foreign brands on the Chinese market, and therefore have an impact on European car manufacturers (McElroy, 2016). A fact also mentioned by the project leader at BMW Group and confirmed by McElroy (2016) is the generous incentives offered by the Chinese government to any new-energy vehicle that is produced in China, an initiative made to encourage the dominance of Chinese automakers on the global market for electric cars.

9.3.3. Start-ups

A project leader from BMW Group also mentioned several start-ups, such as Byton and Faraday who are developing high-end electric cars. Barnard (2017) mentions other start-ups such as Lucid, and Rimac and predicts that those start-ups are more likely to dominate the car industry in 30 years than many of the current traditional manufacturers. Byton, for example, is a Chinese car maker founded in 2018 by Carsten Breitfeld, a former BMW Group Vice President and creator of the BMW i8. This electric level-4 autonomous SUV is said to challenge Tesla by proposing higher performances at a lower price (Comte, 2018).

9.4. Other factors

In addition to providers of mobility solutions, GAFAs, and new entrants as OEMs, there are other factors that can compete with car manufacturers.

Xavier Mourlon, Head of Network Development at Volkswagen Group France and Jean-Marc Ponteville, Press and Public Relations Manager at D'Ieteren mention public transportation as potential competitors to the car, and therefore to car makers. However, they both argue that public transports rely heavily on authorities who decide the way they develop public transports and city infrastructures. Jean-Marc Ponteville mentions the example of Brussels, where car drivers are becoming reluctant to drive due to complexities such as parking spaces restriction, pedestrian areas and one-way streets. However, Ponteville thinks that the autonomous car will change the paradigm: "*Today the public transports compete with cars, but tomorrow the autonomous car will compete with the public transport because each one of us will use its own individual public transport*".

Videoconference, on another level, can also compete with cars. As Ponteville argues, it makes commuting totally unnecessary, while being costless and time-efficient. Fuel prices also influence the whole industry, according to Ponteville. He concludes this way: "*The car is such an object of society that there is an infinity of things that can have an influence on the car and that can compete more or less with it".*

10. Strategies developed by OEMs to respond to pressures in the auto industry

This chapter 10 aims to lay out the different strategic initiatives undertaken by OEMs to respond to the pressures of the automotive industry. We have decided to present those results by classifying them in three parts. The section 10.1 (Internal initiatives) will lay out the internal initiatives taken by OEMs such as strategy statements, in-house innovations and recruitment strategies. The section 10.2 (Initiatives with traditional actors of the sector) highlights the strategies initiated in collaboration with other OEMs and suppliers. Finally, the section 10.3 (Initiatives with actors outside the traditional industry) describes the initiatives engaged with actors from outside the traditional auto industry, such as with mobility service providers, GAFAs, start-ups and newly established OEMs. Since the following sections will be mainly based on specific examples, we will take a step back at the end of each section to reflect on those specific actions and what they mean for OEMs. These reflexions will be highlighted in boxes.

10.1. Internal initiatives

10.1.1. Strategy statements

Some of the OEMs explicitly include the challenges of the car industry into their strategy statements. Two of the OEMs interviewed, which are the two European premium manufacturers BMW and Daimler, mentioned components of their company's strategy who directly relate to the trends found in the literature review.

10.1.1.1. BMW – ACES

In 2016, the BMW Group launched its Strategy Number One > Next on the occasion of the 100th birthday of BMW. ACES are core elements of this strategy and stand for: "Autonomous, "Connected", "Electrified" and "Shared / Services". According to Christophe Weerts, Corporate Communication Manager at BMW Group Belux, this strategy allows BMW to look forward to the next hundred years, and the four elements were made to reach their goal of still being a successful company in one hundred years (BMW Group, 2017).

10.1.1.2. Daimler – CASE

At Daimler, strategic actions are driven by their 5C Strategy: Core, Case, Culture, Company and Customers. CASE, one component of their strategy stands for: “Connectivity”, “Autonomous”, “Shared & Services” and “Electric”. With this strategy, Daimler aims to go from an automaker to a provider of mobility services (Daimler, n.d.).

10.1.2. In-house innovation

Even though it is increasingly difficult to launch something from the ground up, some OEMs still do it.

10.1.2.1. Volkswagen launches MOIA

On December 5, 2016, the Volkswagen Group officially launched MOIA, a new mobility services company. MOIA was established as a stand-alone company and headquartered in Berlin, as the thirteenth brand of the Group. Designed to operate like a start-up, MOIA will “*let users share rides, borrow different types of vehicles for specific journeys and get around cities with a light environmental footprint at affordable prices*” (Pollard, 2016). “*The idea is to not only be car providers, but kilometres providers. So, we will sell kilometres instead of cars.*”, explained Jean-Marc Ponteville, Press and Public Relations Manager at D’Ieteren and for the Volkswagen brand.

Interestingly, MOIA is an innovation of the Volkswagen Group, but has still been established as an independent company. Ole Harms, the CEO of MOIA explained why: “*The mobility market is different from the traditional car manufacturing business. If you want to be successful, you have to play by the rules of the game. For example, we need to be fast. While automotive companies sometimes take several years to develop and launch a new model, we have to operate in a different time frame – a couple of weeks or less”* (MOIA, 2016).

10.1.2.2. Daimler launches moovel

In July 2012, Daimler launched the mobility platform called “moovel” as a pilot project in Stuttgart. moovel, which fits in the concept of “mobility-as-a-service”, show its users the optimal way to go from point A to point B (Daimler AG, 2012). In April 2016, the service launched in the US, under the new company “Moovel North America”. This new company

results from the merger and the acquisition of two American transportation technology companies: GlobeSherpa and RideScout.

The idea of moovel is to partner with cities to offer mobile ticketing for public transport systems, which includes other transit options such as ride-sharing or car-sharing. The goal is to solve the "first / last mile challenge", which is the distance between someone's home and the closest public transport hub (Hawkins, 2016).

10.1.3. Recruitment strategies

Some of the interviewees have mentioned the acquisition of talent as a strategy to cope with the industry's pressures. Karl Schuybroek, Communications Director at Renault Benelux, explains: "*The goal is to look for competences, either by buying start-ups, or by hiring directly*.". Then he continues by explaining that at the corporate level, in a department related to car connectivity, 80% of the human resources are people who come from outside the automotive sector. "*Because it's another profession*", he concludes. Andreas Olsson, Vice President for Product Strategy at Volvo Cars, also mentions that Volvo was recruiting talents from cell phone companies or other software houses, as they are closer geographically than the GAFAs, who are also a rich source of talents.

Vehicle automation, for example, is a field where strong talents are needed, such as experts in artificial intelligence and deep learning. It is indeed important for OEMs to be innovative in their recruitment strategies, otherwise they take the risk of being overtaken by tech giants like Google and Apple, who are also working hard on autonomous vehicles (Putre, 2018).

It is hard to do it alone

Those few internal initiatives already give a hint about the difficulty to do things alone. For mobility services innovations, few examples were found where OEMs only use their internal resources to build a solution. For example, moovel started as a pilot project within Daimler, but then the German company made use of acquisitions and mergers (GlobeSherpa and RideScout) to expand the service in America.

It is also interesting to note how Volkswagen decided to create MOIA as an independent company in order to be able to operate as a start-up. It also joins the thoughts of Christophe

Weerts, Corporate Communication Manager at BMW Group Belux, about the necessity to work differently: "*The advantage is to have people from the outside, who have another way of thinking, from what we have in a traditional company. They do not have the barriers that we have at the creation of a project, and especially they do not suffer from the time horizon that it takes to put it in place. The goal is to listen to what can be done outside the clichés of a big company*".

10.2. Initiatives with traditional actors of the sector

To respond to the pressures of the automotive industry, OEMs are increasingly encouraged to collaborate together as well as with their suppliers. This section aims to illustrate the phenomenon by explaining briefly how the relationship between OEMs and their suppliers has changed and by providing several examples of collaborations between OEMs.

10.2.1. The close link between suppliers and OEMs

Due to the fast pace of change in the automotive industry, especially technologically speaking, OEMs and their suppliers are increasingly working together on innovations, opening a channel of communication where ideas flow freely between the two entities. In fact, it has been proved that the level of interaction between OEMs and suppliers has increased significantly over the past twenty years (Kapadia, 2018).

One example is Valeo, a traditional automotive supplier founded in 1923. Today, Valeo wants to become a technology company and defines itself in the following way: "*Valeo is an automotive supplier and partner to automakers worldwide*" (Valeo, n.d.).

10.2.2. Daimler AG and BMW Group form a joint venture for mobility services

On March 28, 2018, Daimler AG and BMW Group announced the merger of their car-sharing businesses. Before creating this joint venture, the two German groups decided to take full ownership of their mobility services DriveNow and Car2Go, which we explain here below.

10.2.2.1. DriveNow

The BMW Group and Sixt AG, a German car rental company, created in 2011 a joint venture called DriveNow: a car-sharing venture. In this 50-50 joint venture, the BMW Group provided the premium vehicles and the underlying technologies while Sixt AG brought its expertise in car-hire, IT system and customer registration networks. As a project leader from BMW Group told us: "*We didn't have the capabilities inside, this is why we made a joint venture with Sixt*". The aim of the German carmaker was to fill a gap in the market which was an increasing demand for flexible mobility in urban areas (BMW Group, 2011).

In January 2018, the BMW Group bought Sixt's stake in the joint venture and has therefore acquired full ownership of DriveNow. This acquisition was a logical step in their corporate strategy Number One > Next, one of its element being the expansion of its offer for on-demand mobility, parking and charging, in a sustainable way (BMW Group, 2018).

10.2.2.2. Car2Go

Car2go was first launched by Daimler AG in October 2008 as a pilot project for new urban mobility concepts. In 2012, the service is officially provided in Hamburg through a joint venture between car2go GmbH, a subsidiary of Daimler AG, and Europcar Germany, the leader in car rental in Europe at that time, with respectively 75% and 25% stake. With this partnership, car2go was able to benefit from Europcar's know-how in fleet management and networks while Europcar would add a highly innovative element to its existing broad offer of mobility services (Daimler AG, 2011).

Similarly to the BMW Group, Daimler Mobility Services bought back the 25% stakes of Europcar in car2go Europe GmbH, the joint venture created in 2012, leaving the German manufacturer with 100% of car2go in its hands (Daimler Mobility Services, 2018).

10.2.2.3. The joint venture

After obtaining full ownership of their car-sharing businesses, the BMW Group and Daimler AG announced in March 2018 their plan to gather their existing on-demand mobility services and expand them strategically by forming a 50-50 stake joint venture. The equally-owned joint venture will offer services in five key areas: (i) multimodal and on-demand mobility (moovel, ReachNow), (ii) Car-sharing (Car2Go, DriveNow), (iii) Ride-Hailing (mytaxi, Chauffeur Privé,

Clever Taxi, and Beat), (iv) Parking (ParkNow and Parkmobile Group), (v) Charging (ChargeNow and Digital Charging Solutions). This project is still subject to the approval of competition authorities (Daimler AG, 2018).

The Chairman of the Board of Management of BMW AG, Harald Krüger, justifies: "*Combining our mobility services as planned will create a unique digital ecosystem. This alliance will make it easier for our customers to discover the emission-free mobility of the future. We remain competitors when it comes to the best premium vehicles. The planned merger of our mobility services will pool our resources and sends a strong signal to our new competitors*." (Daimler AG, 2018).

By "our new competitors", Harald Krüger means companies such as Uber. In fact, a project leader from BMW Group we interviewed says about this joint venture: "*We are doing this because none of the OEMs are big enough to compete with the Ubers and the Didis"*. Then he pursued: "*The OEMs are forced to work together to compete with the big players, which do it on a more global level. BMW is forced to go that path, like Daimler is also*.".

10.2.3. The Renault-Nissan-Mitsubishi Alliance

10.2.3.1. The Alliance

In 1999, Renault and Nissan signed an alliance agreement in Tokyo and described it as a "*buffer to protect its partners during regional downturns*" (The Alliance, 2017). Today, Renault holds a 43,4% in Nissan while Nissan holds 15% of Renault. The alliance is managed by the entity "Renault-Nissan B.V.", which is jointly-owned by Renault and Nissan. This shareholding model guarantees that the two partners support each other towards a "win-win" strategy which is beneficial to both of them (The Alliance, 2017).

In 2016, Nissan Motor Co., Ltd. acquired a 34% stake in Mitsubishi Motors, making the Japanese car manufacturer the third member of the Alliance. Karl Schuybroek, Communications Director at Renault Benelux explained that Mitsubishi is a great asset in the Alliance due to its experience in hybrid vehicles, a field in which the original Alliance Renault-Nissan was not so strong.

The resulting cross-shareholding model is depicted in the Figure 3 here below.

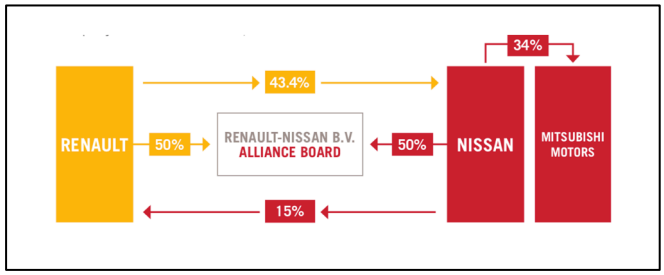

Figure 3. Cross-shareholding model of the Alliance
Source: (The Alliance, 2017)

The three members aim at collaboration and maximization of synergies in order to increase their competitiveness on the market (The Alliance, 2018). Carlos Ghosn, Chairman and CEO of Renault-Nissan-Mitsubishi indeed stated: "*We expect to generate growing synergies in coming years as the Alliance accelerates convergence through increased utilization of joint plants, common vehicle platforms, technology-sharing and our combined presence in mature and emerging markets. We reaffirm our synergy goal of more than €10 billion by the end of 2022*." (The Alliance, 2018).

10.2.3.2. The strategic cooperation between the Alliance and Daimler AG

Beyond the Alliance, Renault-Nissan has also concluded some partnerships with other OEMs. In fact, in 2010, the Alliance announced a collaboration with Daimler AG, the German premium car manufacturer. This agreement also came with equity investments (as shown in the Figure 4): the Renault-Nissan Alliance took a 3.1% stake in Daimler, while Daimler took a 3.1% stake in Nissan and in Renault (The Alliance, 2017)

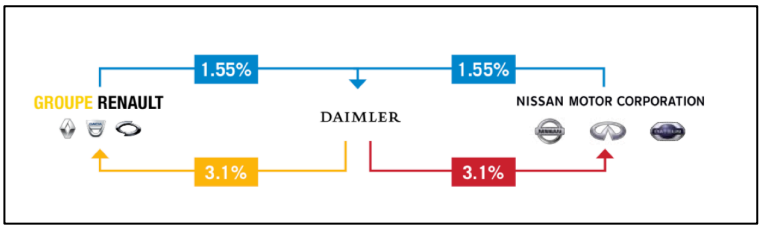

Figure 4. the Alliance's stake in Daimler
Source: (The Alliance, 2017)

As part of this agreement, Renault-Nissan and Daimler share engines, production and production facilities (The Alliance, 2017). Karl Schuybroek, Communications Director at Renault Benelux, justifies this strategic cooperation in the following way: "*It happened because the car has become a highly technological product, which requires massive investment*

and multi-field expertise.". He concludes: "*We could not do it if we could not share cost to remain profitable*".

10.2.4. BMW, VW and Daimler buy Nokia Here

On August 3, 2015, the three premium car makers BMW, Volkswagen and Daimler agreed to buy Nokia Here for €2.8 billion, the digital mapping system of the Finnish group Nokia. This purchase was an important strategic move for the German manufacturers in their quest to develop connected cars and self-driving vehicles. In fact, Nokia Here competes directly with Google's mapping systems and the Dutch company TomTom (Bryant, 2016).

A manager from Daimler AG explained: "*For technical and commercial aspects, it was very interesting to buy Nokia HERE with BMW and VW"*. HERE's digital mapping system is indeed able to benefit from real-time data picked up by BMW, Mercedes and Audi cars, which is more beneficial than if only one car manufacturer was contributing the data (Muoio, 2016).

Christophe Weerts, Corporate Communication Manager at BMW Group Belux, explains that it is essential to have the most updated and accurate cartography to develop self-driving vehicles. Then, he adds: "*It is essential for us to master this and to not depend on an external company, who could decide to give us or not give us data*".

Even though BMW, Daimler and VW are direct competitors, Christophe Weerts explains that mobility is not competition: "*There is only an interest to share mobility services. It is useless to keep them for oneself. The more we are to have the information, the better it is for traffic, and the happier our cars' users will be on the roads*".

Co-opetition between OEMs

The three previous examples show that OEMs are strongly encouraged to co-operate together. Those examples were not exhaustive, of course. For example, BMW and Toyota also announced a partnership in 2012 on hydrogen fuel cells, vehicle electrification, lightweight materials and a future sports car (Reed & Bryant, 2012).

Jean-Marc Ponteville, Press and Public Relations Manager at D'Ieteren confirmed this strong collaboration between OEMs and explained the reasons: "*If you put all OEMs on the table, you can absolutely link them all with partnerships. Everyone is linked to everyone. The reason is*

that most of the time, to build such projects, so much capital is required that it is not profitable to do it alone. The only answer is to create synergies."

When talking about the joint venture formed by BMW and Daimler (see paragraph 10.2.2), a project leader from BMW Group used the term "co-opetition", a neologism made to describe cooperation and competition. The term, defined by Investopedia as "*the act of cooperation between two competing firms*" (Investopedia, 2018), was actually coined by Ray Noorda and made popular by Adam Brandenburger and Barry Nalebuff in their book simply named "*Co-opetition*". By using game theory, the authors prove that the effective strategy for competing businesses is often a mix between cooperation and competition. This view is also shared by Michael Porter, the guru of theory on competition, who believes that the traditional thinking about competition, i.e. "competition to be the best", leads to poor performance and therefore, the right strategy often requires to work in cooperation with direct competitors (Roger, 2016).

It is also worth mentioning the underlying legislative difficulties: when asked about the collaborations that Volvo made with other OEMs, Andreas Olsson, Vice President of Product Strategy at Volvo Cars, reminded the complexities related to antitrust legislations when collaborating with competitors: "*We need to be very cautious*".

10.3. Initiatives with actors outside the traditional auto industry

10.3.1. With mobility service providers

10.3.1.1. Volvo and Daimler partner with Uber

"*We inherently understand we cannot do everything ourselves, so we need to build on partnerships, which I think in the end will make us better. Because the sum of all those partnerships, in my view, is better than the sum of what you could do yourself.*" are the words of Henrik Green, senior VP of Research and Development for Volvo, pronounced in an interview conducted by Doug Newcomb when he was asked about the advantage to partner with Uber (Newcomb, 2017).

In order to avoid becoming irrelevant in a world of increased automation, Volvo decided in fact to partner with Uber by agreeing on November 20, 2017 to sell 24,000 self-driving cars (the XC90 SUVs) to Uber as part of a non-exclusive deal from 2019 to 2021. While Volvo will provide the vehicles, Uber will provide the self-driving system, which is being developed by Uber's Advanced Technologies Group. This deal follows a $300m agreement made between Uber and Volvo almost two years earlier, which aim was to collaborate on autonomous vehicles research and development (Gibbs, 2017).

A similar deal had been closed with Daimler AG on January 31, 2017, the German premium car manufacturer. Under this deal, Daimler accepts to build autonomous cars which will operate on the transportation network of Uber. Again, this agreement is not exclusive, which means that Daimler could produce similar cars for Uber's competitors and Uber can collaborate with other car makers (Isaac, 2017). Travis Kalanick, CEO of Uber, made an interesting statement on the reason of this collaboration: "*Auto manufacturers like Daimler are crucial to our strategy because Uber has no experience making cars—and in fact, making cars is really hard. This became very clear to me after I visited an auto manufacturing plant and saw how much effort goes into designing, testing and building cars."* (Kalanick, 2017)

As Isaac (2017) said it, collaborating with car manufacturers could temper the impression that Uber is a threat to the sales of the car industry. With these types of deals, Uber is moving from a model of ride-sharing which uses freelances drives to a model of ride-sharing with ownership of an autonomous cars' fleet (Gibbs, 2017).

10.3.1.2. Renault-Nissan-Mitsubishi and VW partner with Didi Chuxing

The Renault-Nissan-Mitsubishi alliance and Volkswagen have initiated similar deals with Didi Chuxing, the Chinese competitor of Uber.

The automotive alliance Renault-Nissan-Mitsubishi signed in February 2018 a memorandum of understanding with DiDi, making them a partner of DiDi Auto Alliance, an intelligent ride-sharing alliance which empowers and redefines smart mobility. The goal is to "*explore the possibility of future business cooperation on a new electric vehicle car-sharing program in the People's Republic of China*" (Groupe Renault, 2018).

Ogi Redzic, senior vice president of Connected Vehicles and Mobility Services for Renault-Nissan-Mitsubishi, justified the partnership in the following way: *"The potential business and technology opportunities that we will explore with DiDi are quite promising. This cooperation fits with the Alliance expansion in vehicle electrification, autonomy, connectivity and new mobility services."* (Lambert, 2018).

When it comes to Volkswagen, the German giant has been in talks with Didi Chuxing to form a joint venture in order to manage a part of Didi's car fleets and develop "purpose-built" cars for the Chinese giant's services. As part of this deal, which is supposed to be signed at the time of the writing, Volkswagen should provide and manage a fleet of around 100 000 new cars as well as providing electric and autonomous vehicle technology (Reuters, 2018; Shields, 2018).

An executive from Volkswagen reported to Reuters that this deal could allow them to access Didi's substantial amount of data on customer behaviors that Didi collects thanks to their 30 million rides provided every day in China (Reuters, 2018).

10.3.2. With GAFAs

As explained in the paragraphs 9.2.1 (Google) and 9.2.2 (Apple), most OEMs have partnered with Google and Apple for their car infotainment systems, respectively Android Auto and Car Play. However, it is worth noting that the BMW Group did not make any partnership with Google for the infotainment system and therefore, none of their car models (from any of their brands) offers the Android Auto system. Christophe Weerts, Corporate Communication Manager at BMW Group Belux, justifies this choice "*The absolute dream of Google is to be able to bring you shopping wherever their clients (the advertisers) would like you to go. This is specifically what we want to avoid. We want to keep the independence of our customers, meaning them going wherever they want, whenever they want*.". Christophe Weerts made it clear that they do not want new actors to interfere in the behaviors of their customers. A project leader from BMW Group also gave his point of view on Google: "*Google is an American company, and there is a fear that Google will misuse their monopoly. We'd rather not be working with them necessarily*".

10.3.3. With start-ups

Most automakers are investing into car-related tech start-ups to help them enter this new generation where car ownership and cars themselves are redefined (Lunden, 2017). The following three sub-paragraphs expose some examples of start-up-related investments made by OEMs.

10.3.3.1. Volvo Cars acquires start-up Luxe

On September 8, 2017, Volvo Cars announced their acquisition of the Silicon Valley start-up Luxe, a digital service that allows drivers to drop off their car to a valet anywhere in a city, who will find a parking spot for the vehicle, refuel it and clean it if requested by the customer. By acquiring the start-up, Volvo Cars acquired Luxe's platform, technology and key staff (Lunden, 2017). The key staff acquired mainly includes the CEO and co-founder of Luxe, Curtis Lee, who became the VP of digital for Volvo Cars. Martin Craig, the second co-founder of Luxe, also joined Volvo Cars as the leader of their engineering team (Lunden, 2017).

"*We acquired this company to add technology to our own offerings"*, said Andreas Olsson, VP of Product Strategy at Volvo Cars, when we interviewed him. Atif Rafiq, Chief Digital Officer at Volvo, also justified this acquisition in a statement: "*Our vision is a future in which technology simplifies life so you never have to stop at a petrol station, go to a car wash or even take your car in for service ever again. The acquisition of Luxe is a step towards realizing that ambition*" (Peterson, 2017).

10.3.3.2. BMW investment in start-ups

As part of the four pillars of BMW's strategy (see sub-paragraph 10.1.1.1), namely Automated, Connected, Electrified and Shared, the German manufacturer decided to work closely with start-ups in order to transform itself from a premium car manufacturer to a premium mobility service provider. More precisely, BMW founded three companies to benefit from the "out-of-the-box" thinking of startups: BMW i Ventures, BMW Startup Garage, and Urban-X (Ciferri, 2017).

- BMW i Ventures is a venture capital fund based in the Silicon Valley, which invests in the following areas: autonomous driving, digital car & automotive cloud, e-mobility, AI / data / cyber security, industry 4.0, shared & on-demand mobility, customer digital

life and energy services. To date, the portfolio is composed of 27 start-ups, each benefiting from BMW's experience and network. BMW i Ventures contributes $1 million to $15 million per investment (BMW i Ventures, n.d.)

- BMW Startup Garage, based in Munich, gives the opportunity for start-ups to build their automotive business by helping them to put their products or services in BMW Group models (Ciferri, 2017). By doing that, BMW makes sure that they become their first client (BMW Startup Garage, n.d.).
- Urban-X, based in New-York and launched by the brand MINI, is an accelerator for start-ups who aim to improve the quality of life in cities. Every six months, Urban-X selects 10 start-ups and invests up to $100,000 per company, who then benefit from a 20-weeks program to "accelerate" their projects (Ciferri, 2017; Mundubeltz-Gendron, 2017; Urban-X, n.d.).

10.3.3.3. Renault-Nissan-Mitsubishi Alliance Ventures

The Alliance Renault-Nissan-Mitsubishi announced in January 2018 the creation of a venture capital fund, called Alliance Ventures. Their goal is to invest in start-ups up to $1 billion over the next five years in the following areas: new mobility, vehicle connectivity, autonomous driving, enterprise technology and energy, electric vehicles, and batteries. This venture is 40% held by Renault SA, 40% by Nissan Motor Co and 20% by Mitsubishi Motors Corp (Cohen, 2018).

Carlos Ghosn, the chairman of the Alliance Renault-Nissan-Mitsubishi, justifies this investment in a Bloomberg Television interview: "*The way we're organized now is not sufficient*". Then he concludes: "*I don't think we can do it alone*.", after having reminded the need of collaboration with start-ups and external partners' creativity (Welch, Lippert, & Zhang, 2018).

10.3.4. With Tesla

In May 2009, the German car manufacturer Daimler invested $50 million in Tesla, giving them 9.1% shares of the company. Elon Musk, CEO of Tesla, was indeed looking for investors to refloat the company after the issues with its first car, the Roadster, and Daimler was looking for a supplier for a suitable drive train and battery system for their electric version of the Smart ForTwo. The manager we interviewed from Daimler AG said: "*We want to participate in what*

we believe in" when talking about the early investment made in Tesla, which confirms the fact that Daimler saw a bright future in Tesla (Miller, 2009).

However, in 2014, Daimler decided to sell its stakes in Tesla for $780 million. Some analysts link this withdrawal with the fact that Tesla had become a serious competitor for Daimler. As some analysts put it, being a shareholder does not make it mandatory to collaborate with Tesla, especially since the American company made its technology public for any manufacturer to use (Harrer, 2014). Bodo Uebber, a member of Daimler's board of management explains the previous fact: "*We are extremely satisfied with the development of our investment in Tesla, but it is not necessary for our partnership and cooperation. For this reason, we have decided to divest of our shares. This will also allow Tesla to broaden its investor base*.". The CEO of Daimler, Dieter Zetsche confirms that their partnership with Tesla is successful and will be pursued (Statik, 2014).

Untypical collaborations

The few previous examples illustrate well the rise of collaborations between OEMs and non-traditional actors. These collaborations show that OEMs have changed the way they work. As a manager from Daimler AG said: "*It is also a big challenge for an OEM to change how we used to work a hundred years ago and to broaden our scope*".

Andreas Olsson, Vice President of Product Strategy at Volvo Cars justifies these untypical collaborations as a response to an increase in the challenges: "*I think that the need to have a more multi-faceted or multi-dimensional collaboration is increasing since the challenges increase. I think you see more collaboration than in the past, and more untypical collaborations.*" The project leader from BMW Group which we interviewed explained that these collaborations are necessary to reach competences that OEMs do not have.

THE CONCLUSION

This thesis is the final step of a long journey. A memorable journey of five years at university where I have worked hard to become the woman I am today. On top of learning about innumerable subjects and topics, I have learned to work hard to reach impressive results, I have learned to work in teams, to manage some of the complexities of human relationships, I have learned to be giving and helpful to others, I have learned to work with international teammates and to deal with cultural differences, I have learned that to succeed, concessions need to be made, I have learned to be innovative and use entrepreneurial skills, I have learned to manage a project and reach pre-defined objectives, and finally, I have learned to be critical about the world surrounding us and the information given to us.

This final work reminded me again the importance of being critical. This research has indeed allowed us to relativize the big announcements made about the automotive industry. There is in fact a tendency to caricature the reality to make us believe it is worse than it really is. No, the automotive industry is *not*, in my point of view, suffering. Yes, the automotive industry is going through major changes and it is critical for traditional car manufacturers to act to not miss the turn. But, European car manufacturers are strong, they are colossal groups with impressive financial and operational means and they do understand what to do to evolve in this highly changing environment. They are not passive nor reactive, they are proactive.

The context in which this thesis has been written is the one of the twenty-first century. A century which has witnessed impressive advancements in technologies along with the rise of environmental awareness and the advent of collaborative consumption. The automotive industry has particularly been shaken by those evolutions and is therefore going through an important transformation. Part of this transformation is the arrival of a new set of actors who are trying to capture value on four main fronts: connectivity, self-driving cars, electric vehicles and shared mobility. Throughout this research, we were interested in understanding how traditional car manufacturers (also known as established OEMs) strategically approach this change and therefore, we elaborated the following research question:

"How do traditional European car manufacturers respond to competitive pressures in an increasingly changing environment?"

By relying on our literature review and multi-case qualitative research, we can globally answer that European car manufacturers adapt to the competitive pressures of the automotive industry by getting out of their comfort zone, by experimenting with new business models and collaborating with untypical actors. Numerous initiatives undertaken by traditional OEMs are related to new mobility solutions, making them increasingly going from "car manufacturers" towards "providers of mobility solutions", which means that they shift from offering a product to offering a service. In order to offer that, OEMs are strongly encouraged to surround themselves with a range of different players, creating therefore an ecosystem where each player brings its own capabilities and areas of expertise. In this ever-expanding ecosystem, two types of interactions were prominent.

The first type is the increase in the interactions and collaborations between traditional OEMs themselves. The following statement from Jean-Marc Ponteville says it all: "*If you put all OEMs on the table, you can absolutely link them all with partnerships. Everyone is linked to everyone. The reason is that most of the time, to build such projects, so much capital is required that it is not profitable to do it alone. The only answer is to create synergies*.". These collaborations between OEMs call to mind the notion of "co-opetition": making traditional OEMs direct competitors in certain areas (e.g. producing and selling cars) and partners in other areas (e.g. providing mobility solutions).

The second type is the increase in the strategic partnerships built or investments made with non-traditional actors of the industry such as providers of mobility solutions (e.g. Uber), start-ups, tech giants (e.g. GAFAs) and emerging car manufacturers (e.g. Tesla). Henrik Green, senior VP of Research and Development for Volvo, when talking about their partnership with Uber, explained the reasons of this type of collaboration: "*We inherently understand we cannot do everything ourselves, so we need to build on partnerships, which I think in the end will make us better. Because the sum of all those partnerships, in my view, is better than the sum of what you could do yourself.*".

It goes without saying that our thesis presents some limits, and therefore some recommendations for future research. First of all, as a matter of feasibility, we decided to focus our research on European car manufacturers. It would be interesting to expand it to

American and Chinese car manufacturers, who respond to different challenges and opportunities than European car manufacturers.

Second, we would like to note that the examples of strategic initiatives provided in the Chapter 10 are not exhaustive. They were selected either because they were mentioned by our interviewees, or because the press made it a well-known public example. Further work could make a census of all public strategic initiatives undertaken by European car manufacturers.

Third, we would like to remind about the strategic importance of some of the questions addressed to our interviewees and therefore remind that we are not immune to a lack of transparency from them. Some of the questions were indeed far from trivial since they are directly related to the business model of European car manufacturers. The underlying limit is therefore a lack of honesty and spontaneity in the answers, which is difficult to counteract, except a posteriori.

Finally, with more time and scope liberty, it would be very interesting to collect insights from non-traditional actors of the sector, such as from mobility service providers (e.g. Uber), tech giants (e.g. GAFAs), and disruptive car manufacturers (e.g. Tesla), to learn more about their perspective of the car industry and on how they imagine the future with traditional car manufacturers.

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